Agenda

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Session purpose and objectives

The purpose of this session is to build shared understanding of common themes between the stakeholder proposals and the AESO's rate design bookends, and areas of agreement and disagreement. The session objectives include:

- Understand common themes across stakeholder rate design proposals and the AESO rate design bookends
- Understand areas of agreement and disagreement and why
- Introduce mitigation conversation to foster/build understanding

Date: **Thursday, Dec. 10, 2020**
Time: **9:00 a.m. – 12:30 p.m.**
Location: **Webinar**
Facilitator: **Stack'd**

Time	Agenda Item	Presenter
9:00 – 9:15	Welcome, introduction, purpose and session objectives	AESO
9:15 – 9:45	Overview of proposals and session feedback • Opening remarks • Spectrum of options • Discussion and Q&A	AESO
9:45 – 10:30	Review themes • Cost allocation • Energy storage tariff treatment • Discussion and Q&A	AESO
10:30 – 11:00	Break	
11:00 – 11:30	Review themes • Status quo • Complexity • Discussion and Q&A	AESO
11:30 – 12:00	Review minimal disruption and mitigation process • Mitigation to achieve minimal disruption • Mitigation process • Discussion and Q&A	AESO
12:00 – 12:15	Review areas of agreement and disagreement • Discussion and Q&A	AESO
12:15 – 12:30	Session close-out and next steps	AESO

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Bulk and Regional Tariff Design Stakeholder Engagement Session 4

December 10, 2020

Public

Notice

In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session and making the session recording available to the general public at www.aeso.ca. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Bulk and Regional Tariff Design engagement sessions. This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4, by telephone at 403-539-2528, or by email at privacy@aeso.ca.

COVID-19 update

- The AESO's top priorities are the health and well-being of our employees and stakeholders and continuing to meet the electricity needs of all Albertans
- All business meetings with external stakeholders will be via phone or webinar indefinitely (this includes stakeholder engagement sessions)
- Based on stakeholder feedback, the AESO's own security assessment and the use of Zoom for governments, post-secondary institutions and other companies, the AESO has decided for now to continue using Zoom for our stakeholder engagements until such time that face-to-face engagements are allowed
- The AESO will continue to monitor developments and provide updates to our stakeholders as necessary
- For additional information, please visit the AESO website at www.aeso.ca and follow the path Stakeholder Engagement > COVID-19

How to Ask Questions

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Using Zoom – asking questions

- All attendees join the webinar in listen-only mode and the host will have attendee cameras disabled and microphones muted
- When asking or typing in a question, please state
  - **The organization you work for and your first and last name**
- Two ways to ask questions if you are accessing the webinar using your computer or smartphone
  - If you would like to ask a question during the Q&A portion, click the icon to raise your hand and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone and then you can ask your question. Your name will appear on the screen but your camera will remain turned off.
  - You can also ask questions by typing them into the Q&A window. Click the “Q&A” button next to “Raise Hand.” You’re able to up-vote questions that have been already asked.

Using Zoom – where to access controls

- Using a 2-in-1/PC/MAC Computer
  - Hover your cursor over the bottom area of the Zoom app and the Controls will appear.
  - Click “Raise Hand” and the host will be notified that you would like to ask a question.
  - Click “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.
- Using a Smartphone
  - Tap “Raise Hand.” The host will be notified that you've raised your hand.
  - Tap “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.

Using Zoom – where to access controls

- If you are accessing the webinar via conference call
  - If you would like to ask a question during the Q&A portion, on your phone's dial pad, hit *9 and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone by hitting *6 and then you can ask your question. Your number will appear on the screen.
- Phone controls for attendees
  - To raise your hand, on your phone's dial pad, hit *9. The host will be notified that you've raised your hand.
  - To toggle between mute and unmute, on your phone's dial pad, hit *6.

Stakeholder participation

The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:

- Listen to understand others' perspectives
- Disagree respectfully
- Balance airtime fairly
- Keep an open mind

Welcome and Introductions

Public

Session purpose and objectives

- Session purpose
  - To build shared understanding of themes between the stakeholder rate design proposals and areas of agreement and disagreement
- Session objectives
  - Understand common themes across stakeholder rate design proposals and the AESO rate design bookends
  - Understand areas of agreement and disagreement and why
  - Introduce mitigation conversation to foster/build understanding

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12:15 – 12:30	Session close-out and next steps	AESO

Registration (as of Dec. 3, 2020)

- Acestes Power
- Alberta Direct Connect Consumers Association (ADC)
- Alberta Forest Products
- Alberta Newsprint Company (ANC)
- Alberta Utilities Commission (AUC)
- AltaLink Management Ltd.
- Arcus Power
- ATCO Electric Ltd.
- Battle River Power Coop
- BECL and Associates Ltd.
- Best Consulting Solutions Inc.
- BluEarth Renewables
- Canadian Renewable Energy Association (CanREA)
- Capital Power Corporation
- Chapman Ventures Inc.
- Chymko Consulting on behalf of Cities of Red Deer and Lethbridge
- City of Medicine Hat
- DePal Consulting Limited
- Dow Chemical Canada ULC
- Elemental Energy
- Enel NA
- Energy Storage Canada (ESC)
- ENMAX Corporation
- EPCOR Distribution & Transmission Inc.
- FortisAlberta
- Government of Alberta
- Guidehouse
- Heartland Generation Ltd.
- Imperial Oil ExxonMobil Canada
- Invinity Energy Systems
- Industrial Power Consumers Association of Alberta (IPCAA)
- Kanin Energy
- Lionstooth Energy Inc.
- Logan's Clear Vision Consulting Ltd.
- Millar Western Forest Products Ltd
- NextEra Insights Inc.
- NRGCS
- Peters Energy Solutions
- Power Advisory LLC
- RMP Energy Storage
- Rodan Energy
- Signalta Resources Limited
- Suncor Energy Inc.
- TC Energy
- Tesla
- TransAlta Corporation
- Turning Point Generation
- University of Calgary
- Utilities Consumer Advocate (UCA)
- URICA Asset Optimization
- Voltus Energy Canada, Ltd.
- West Fraser

Overview of Engagement Process

Public

AESO Stakeholder Engagement Framework

Overall approach for bulk and regional tariff design stakeholder engagement

The AESO intends to:

i. Engage with stakeholders to allow stakeholders' needs and interests to be consistently, transparently and meaningfully considered in the development of a rate design proposal for bulk and regional cost recovery;

ii. Engage with stakeholders regarding the objectives to be examined and evaluated in the development of a rate design proposal for bulk and regional cost recovery;

iii. Supply stakeholders with analysis tools for bulk and regional cost recovery impact analysis;

iv. Seek and identify for the Alberta Utilities Commission (AUC) areas of agreement and disagreement in the AESO rate design proposal to accelerate the regulatory approval process; and

v. File with the AUC an application for bulk and regional rate design by June 2021.

Revised engagement and filing schedule

Session 1 March 13, 2020	Session 2 Sept 24, 2020	Session 3 Nov. 5, 2020	Session 4 Dec. 10, 2020	Session 5 Feb. 25, 2021	Session 6 April 15, 2021
Session objectives	**Session objectives**	**Session objectives**	**Session objectives**	**Session objectives**	**Session objectives**
• Present rate design options for bulk and regional cost recovery with rate objectives assessment • Provide rate design analysis tools • Review, respond to clarifying questions and collect initial input on options	• Review and gain acceptance on process and approach to complete a rate design • Understand current state rate design • Reconfirm tariff rate design objectives and balance of trade-offs • Understand rate design bookends • Identify initial implications of rate design bookends • Understand energy storage treatment options and considerations • Provide technical clarity around rate design bookends	• Stakeholders to present and discuss alternative rate design options, including energy storage options and implications • Understand which rate design options stakeholders support and why	• Understand common themes across stakeholder rate design proposals and the AESO rate design bookends • Understand areas of agreement and disagreement and why • Introduce mitigation conversation to foster/build understanding	• Present preferred rate design, including energy storage treatment, to stakeholders • Discuss and evaluate mitigation options • Present bill impact summary and assumptions • Provide Bill Impact Tool • Begin to discuss implementation considerations	• Present preferred mitigation path to stakeholders • Present and collect feedback on the emerging application (to be filed by June 2021) • Share and discuss the implications of the rate design proposal and mitigations • Understand outstanding stakeholder concerns

Reminder of engagement scope

- In-scope
  - Rate design for bulk and regional charges (calculation)
  - Tariff treatment of storage
  - Reduction of associated regulatory requirements (red tape reduction), where applicable
- Out-of-scope
  - Participant-Related Costs for DFOs (Substation Fraction) and DFO Cost Flow-Through
  - 2020 Rates Update
  - Other 2018 GTA Decision and Corresponding Compliance Filing Items

Opening Remarks

Public

Your participation

- Your participation to date has been very helpful to the AESO in understanding your perspectives and helping the AESO begin to develop its bulk and regional rate design proposal
- We appreciate the time it takes to develop proposals, prepare for and attend the sessions, as well as provide written feedback sharing your thoughts and insights following the sessions
- Your continued participation in this engagement is critical to help us make a well-informed decision for the benefit of Albertans

Bulk and Regional Tariff Design progress

- AESO maintains that it is important to progress changes to the bulk and regional rates now
  - Technology and cost trends are influencing consumers decisions in how to meet their electricity needs; these trends are influencing the need for changes to transmission cost allocation
  - Need to take a long term view on how to make transmission cost recovery sustainable
- Will continue to progress in parallel with other engagements and initiatives
  - AESO is involved in a recently initiated Government of Alberta engagement on Self-Supply and Export Policy
  - Cost allocation decisions guiding bulk and regional rate design are important regardless of a policy decision on self-supply and export

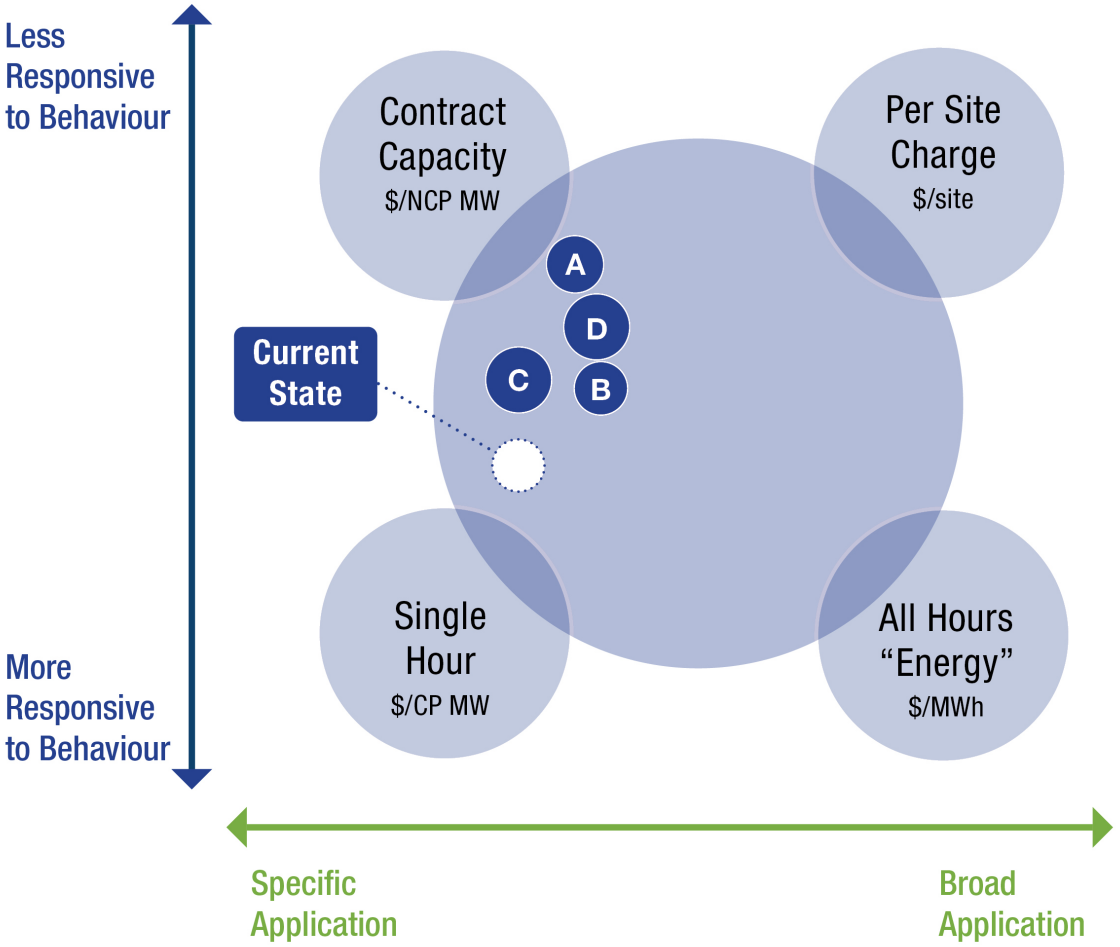
Spectrum of options

Public

Proposals presented on Nov. 5, 2020

- Bulk and regional rate design proposals
  - Joint presentation by Alberta Direct Connect Consumers Association (ADC), Dual Use Customers (DUC) and Industrial Power Consumers Association of Alberta (IPCAA)
  - Suncor Energy Inc
  - Consumers Coalition of Alberta (CCA)
  - Joint presentation by Canada West Ski Areas Association (CWSAA), Utilities Consumer Advocate (UCA), AltaLink Management Limited (AML) and Conoco
- Energy storage treatment proposals
  - Energy Storage Canada (ESC) supported by Power Advisory LLC (PA)
  - Canadian Renewable Energy Association (CanREA) supported by Solas Energy Consulting (SEC)
  - RMP Energy Storage

Spectrum of options presented to date



A: *AESO bookend A*
B: *AESO bookend B*
C: *CWSAA, UCA, AML, Conoco*
D: *CCA*

*Suncor proposal not shown as it includes blend of CP, NCP and per site charges
*ADC, IPCAA and DUC joint presentation recommends "current state" (status quo)

Rate design proposals (updated)

Charge	Status Quo	Bookend A – AESO	Bookend B – AESO	Alternative C – AML+	Alternative D – CCA	Suncor
Demand ($/MW NCP)	Regional: 90%	100%	Intra-regional: 100%	Regional: 90% Bulk: 93% (un-ratcheted NCP)	Monthly NCP: X% Ratcheted NCP: (1-X)%	Marginal Bulk (un-ratcheted) Z%
Peak (System/ Regional) ($/MW CP)	Bulk: 93%	N/A	Inter-regional: 100%	N/A	N/A	Regional coincident inflows: X% Regional coincident demand: Y%
Energy ($/MWh)	Bulk: 7% Regional: 10%	N/A	N/A	Bulk: 7% Regional: 10%	N/A	N/A
Customer ($/site)	N/A	N/A	N/A	N/A	N/A	(1-X-Y-Z)%

CP: Coincident Peak; **NCP:** Non-coincident peak (i.e., billing capacity)

AML+ is CWSAA, UCA, AML and Conoco joint proposal

Ratchets: demand charge can be set monthly, or ratcheted for a period of time

- Monthly (un-ratcheted) demand sets charge based on maximum demand in a given month
- Ratchets set demand charges based on maximum monthly demand for next two years (status quo)

What we heard

- Some stakeholders suggest that burden of proof is on the AESO to make the case for changes to status quo
  - Now is not the time for change
  - No issues with current rate design
- Other stakeholders identified the following changes relative to status quo
  - Allocate bulk costs to billing capacity (NCP) charge, reduce/remove ratchets (two proposals)
  - Extend from system to regional CP, with additional precision and complexity (one proposal)
  - Calculate marginal cost of transmission savings to set rates for load to respond (two proposals)

Questions?

Public

Themes

Public

Themes

- Themes that emerged across stakeholder proposals
  - Themes we are exploring
    - Cost allocation: embedded and marginal approaches
    - Energy storage tariff treatment
  - Themes we are not exploring
    - Continuing status quo
    - Additional complexity
  - Mitigation to achieve minimal disruption

Cost allocation

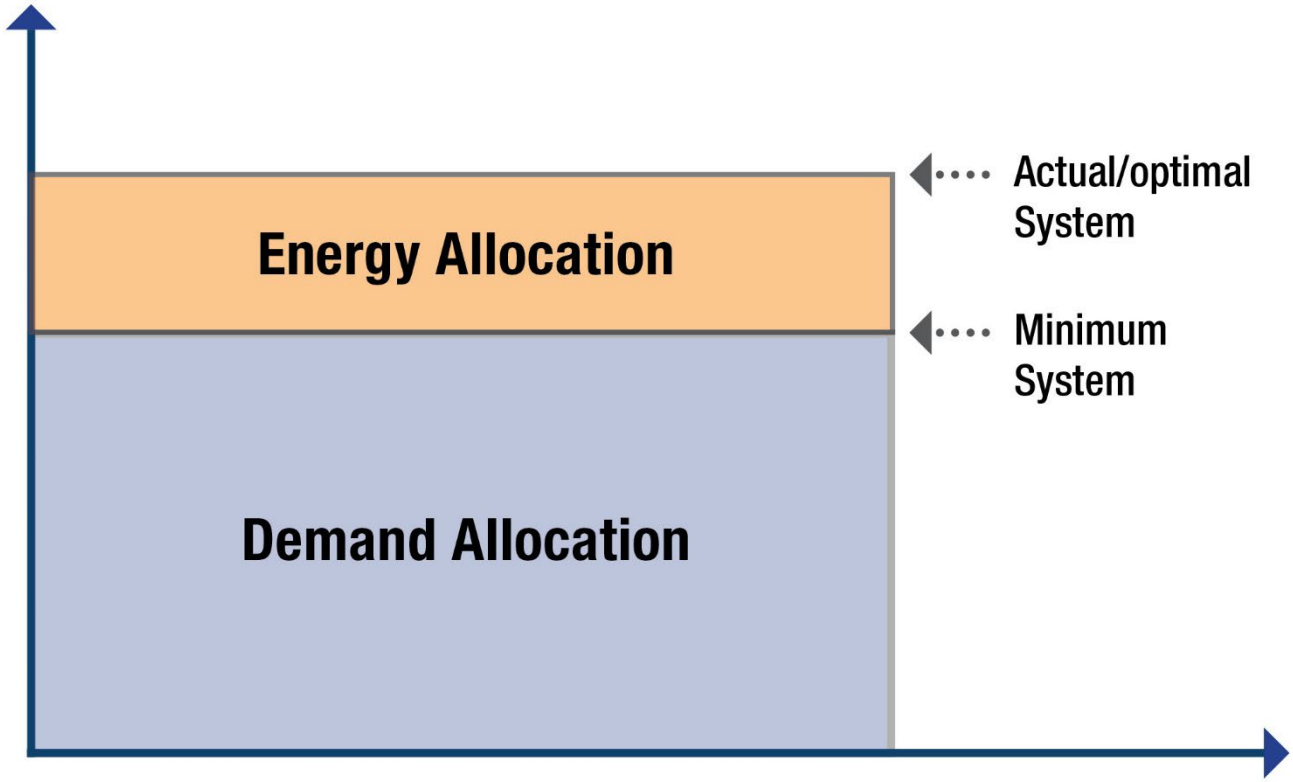
Public

Embedded or marginal cost allocation

- **Embedded approach**
  - Answers: “how is planned, current, or future use of the network related to costs of the network?”
  - Status quo classification between demand and energy charges is based on embedded approach to cost allocation
    - Developed through London Economics 2014 study for tariff application
    - Updated inputs in 2018, relied on same approach as 2014
    - Stakeholders have asked for an update to the study
- **Marginal / Incremental approach**
  - Answers: “what is the incremental cost of supplying one more unit of demand? Or what is the cost savings from reducing demand by one unit?”
  - A shift from historical rate design approach
  - Incorporated in two stakeholder proposals

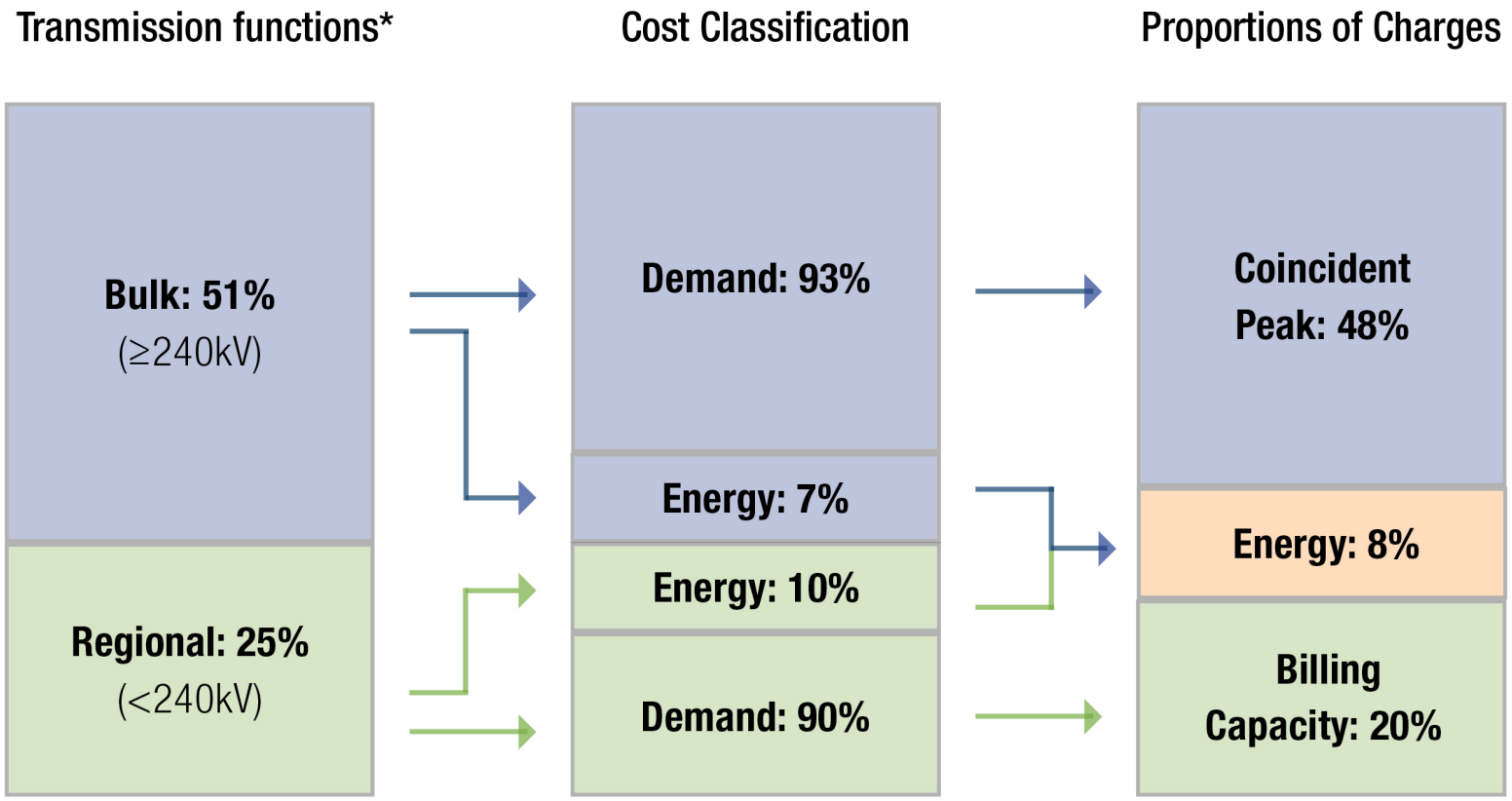
Status quo: How embedded costs are allocated

- Estimates the difference between the “minimum system” needed to serve load and the actual or optimal system
  - Since 2014 allocations have not adjusted to reflect investment or changes in forecasts of future use



Charges based on current cost allocation (updated)

- Portion of costs recovered on each charge is based on voltage and allocation of that portion to cost drivers (demand and energy) using the minimum system approach



*POD Costs (25%) not shown

Alternatives within embedded approach

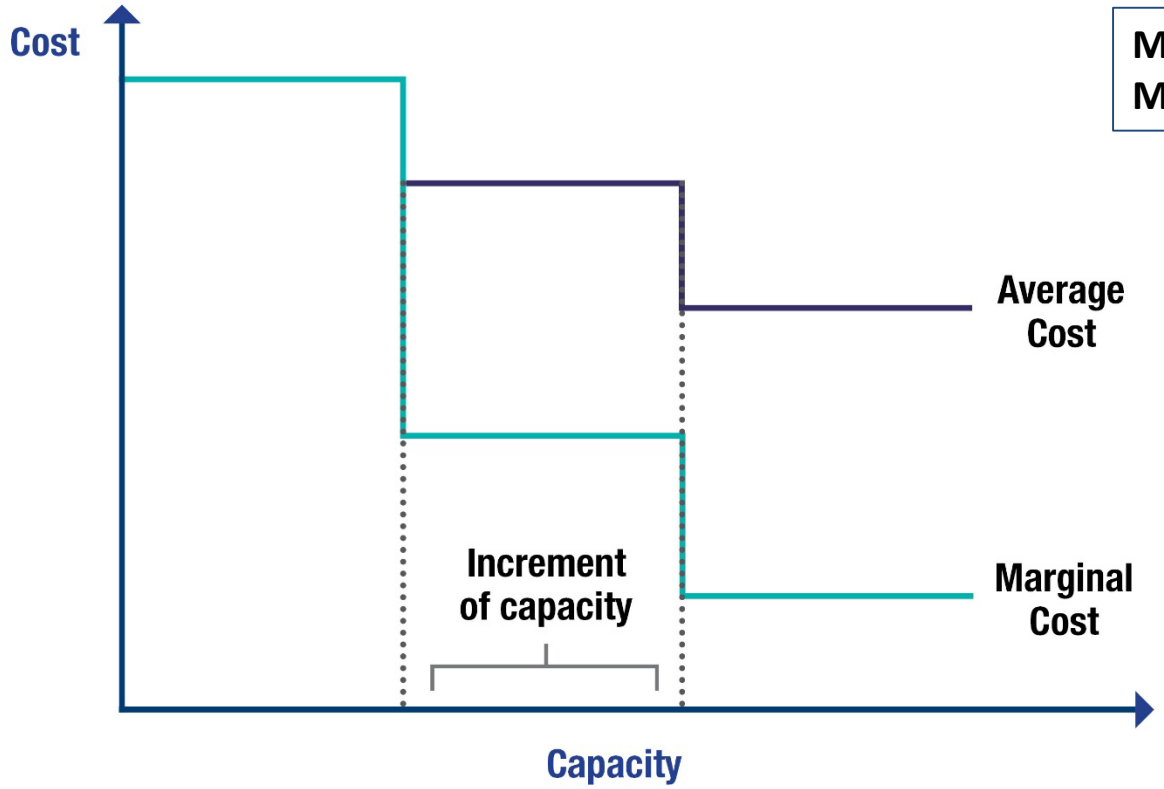
- Functional alternatives
  - Voltage (current approach)
  - Intra and Inter regional (e.g., Bookend B)
  - Load or policy drivers (London Economics “special” category in 2014)
- Classification alternatives
  - Minimum system (current approach)
    - Smallest system needed: demand
    - Difference between minimum and optimum: energy
  - Minimum Intercept
    - Zero-intercept of cost curve represents customer component
  - Marginal Cost Approach
  - Average and Excess Approach
    - Average system load factor: energy allocation
    - Remainder (excess): system load above average -> demand

Marginal approach: Rationale (RAP)

- The fundamental principle of marginal cost pricing is that economic efficiency is served when prices reflect current or future costs — that is, the true value today of the resources that are being used to serve demand rather than historical embedded costs.
  - Advocates for a marginal cost of service study approach work backwards from this pricing concept to suggest that cost allocation should be based around marginal costs as well
  - Critics of marginal cost methods often point out that this economic theory is appropriate only when other conditions are present, including that all other goods are priced based on marginal costs, that there are no barriers to entry or exit from the market and that capital is fungible

Marginal approach

- Starting from effective price signal, work backwards to cost recovery
- Marginal Cost: Change in cost to serve one more customer/MW with next increment of capacity
- Difference between marginal and average costs recovered to minimize distortions



Micro: incrementally larger lines
Macro: incremental load growth

Options for marginal calculation (updated)

- Stakeholders have identified the following approaches
  - Long run incremental transmission cost divided by long run planned load growth
    - Long run ~6 years
  - Least distortionary cost recovery on customer charge (per site)
- Other approaches to consider
  - Macro approach
    - Future planned costs and planned load growth
    - Actual costs and actual growth
    - Portion of transmission projects where load is the driver
  - Micro approach
    - Analysis based on cost of “next size up” of transmission facilities (line, substation, transformer) and additional capacity it can serve

Questions?

Public

Energy Storage Tariff Treatment

Public

March 13, 2020: Options* considered for storage

I. Charge based on flows
   - DTS for inflows and STS for outflows (current tariff)

II. No DTS costs while providing certain “Market Services” (FERC Order 841 treatment)
   - Not be charged DTS when dispatched by the AESO to provide certain market services
   - Full DTS charges when not providing those services

III. Interruptible service with lower rate, since storage can be off if transmission system is stressed
   - Direct physical control by AESO, asset can be tripped off without notice (AESO has certainty)
   - Dispatch control based on bids and offers: Financial incentive to comply (not full certainty)

* Options apply to market assets and not storage as a transmission asset

Energy storage tariff proposals

- CanREA with Solas Energy Consulting
  - Treat storage as transmission facility (substation)
  - Complete tariff exemption; however, an energy storage administration fee be developed to recover storage resource's contribution to the transmission component of AESO's "own costs" related to storage treatment
  - The ISO trading charge would also apply to recover energy market administration
- Energy Storage Canada with Power Advisory LLC
  - Storage be exempt from tariff charges and pay an administration fee
  - Storage be permitted to offer services that direct storage to stop consuming during an inflow constraint and provide transmission must-run (TMR) like services that require discharge during an outflow constraint thereby deferring the need for new transmission investment
- RMP Energy Storage
  - Storage pay only STS for its discharge and pay no wires cost for charging except for station service needs
  - Likes the AESO's interruptible service option; storage would be subject to AESO System Controller directive for relieving transmission constraint
  - But unlike the AESOs interruptible service option, rate is not restricted to areas where constraint are likely to occur.

Areas of agreement

- Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
- Energy storage can participate in Alberta's electricity use-cases by providing
  - Energy Price arbitrage
  - Operating Reserves
  - Non-wires solutions for transmission deferral
- Energy Storage should be treated in a FEOC manner

Areas of disagreement

- Is energy storage a user of the grid or a component of the grid or both?
- Does energy storage use the network for the Alberta specific use-cases?
- Should energy storage pay for inflows and outflows like every other network user or not?
- Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?

Questions?

Public

Break

Public

Continuing Status Quo

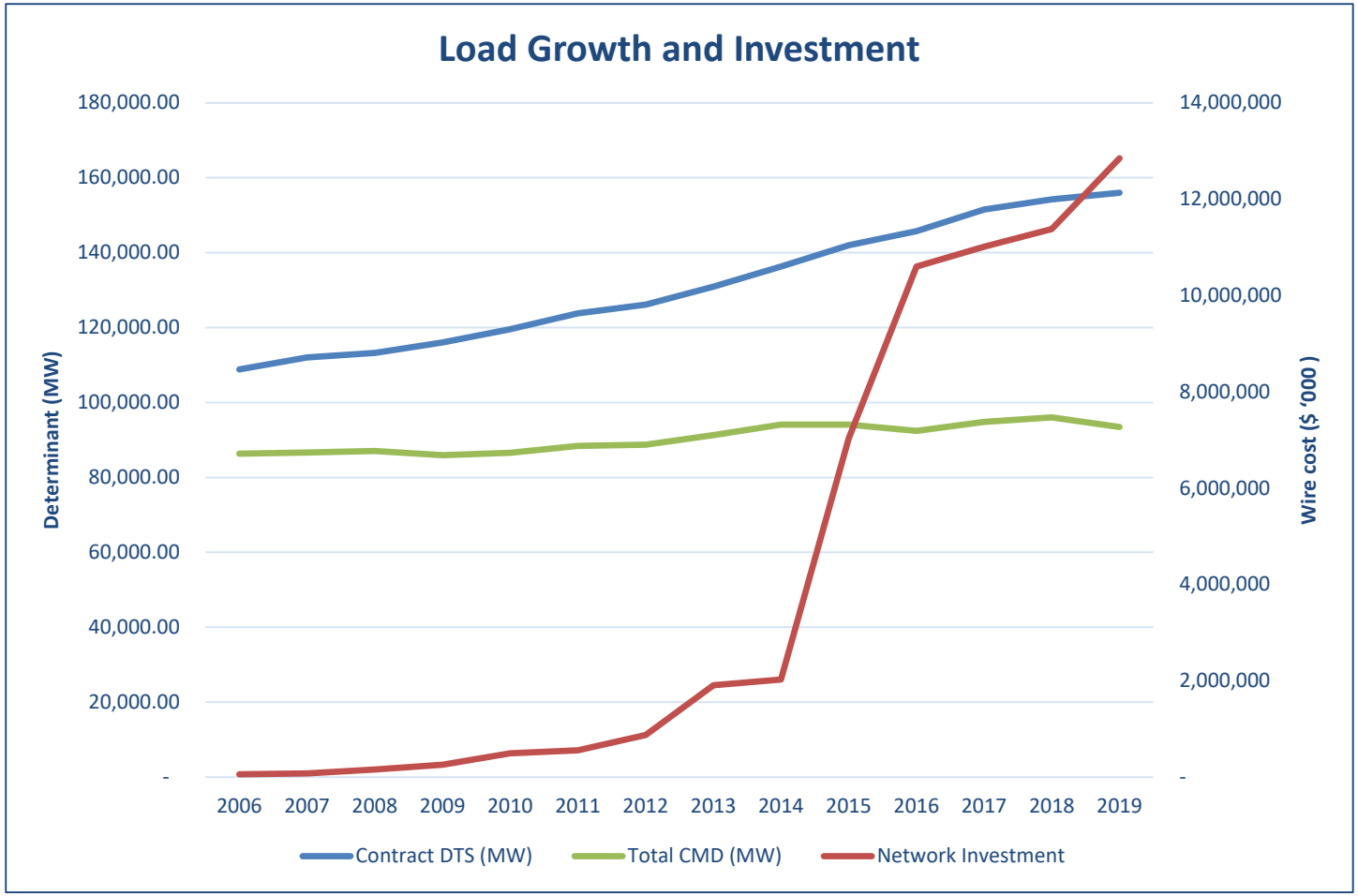
Public

Review of transmission cost drivers

- TTWG learnings report (Sept. 10, 2019) identified the following drivers of transmission development
  - Bulk power transfers
    - Foothills Area Transmission Development (FATD)
  - Local load supply
    - South and west of Edmonton project
  - Generation integration capability and access
    - Most components of Southern Alberta Transmission Reinforcement (SATR)
  - Both regional load and generation combined
    - Hanna Regional Transmission Development (HRTD) Phase 1
  - Others
    - Intertie restoration

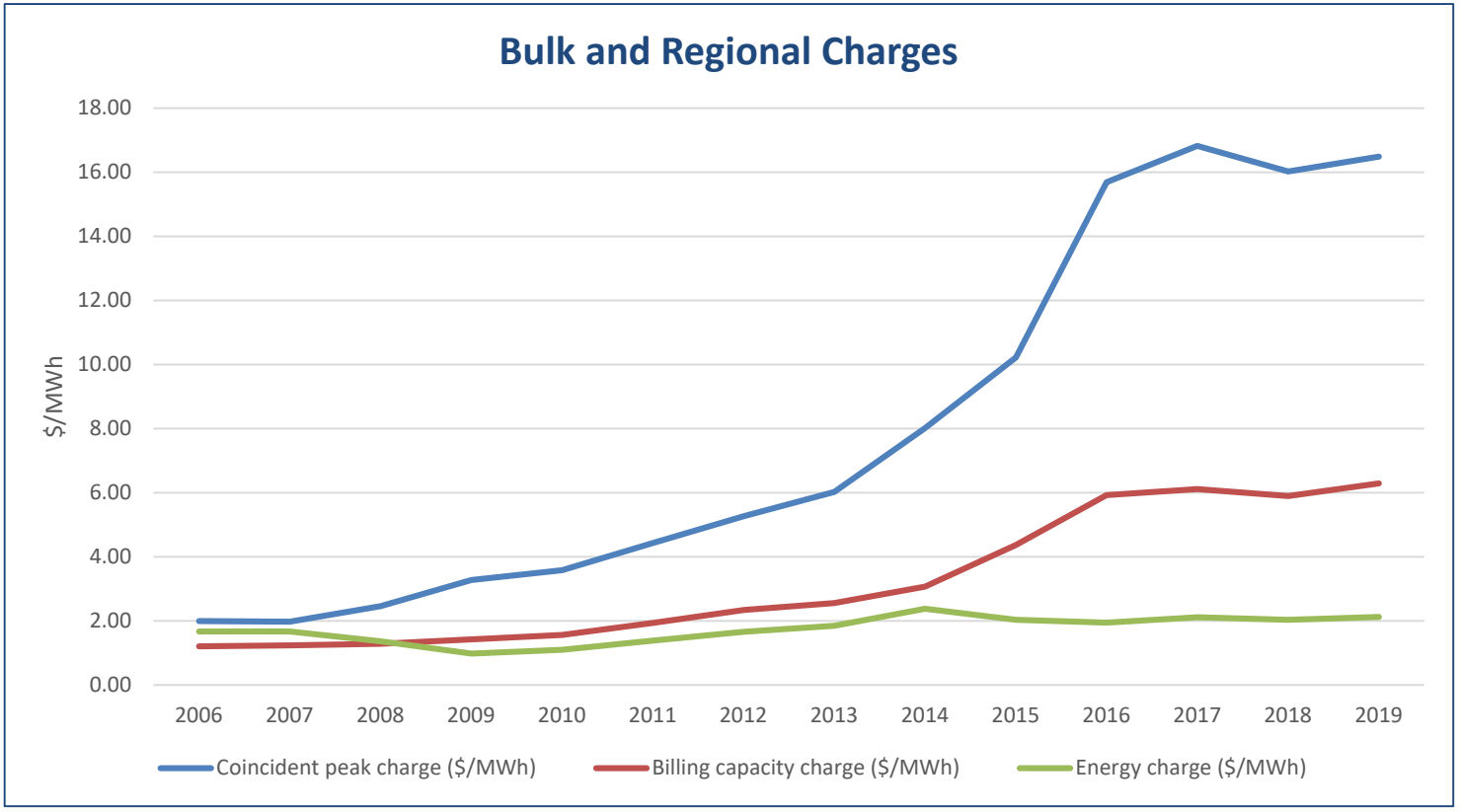
Load growth and transmission costs (updated)

- Load growth since 2006 has increased billing capacity, but coincident metered demand (CMD) has hardly changed
- Over that same time period total transmission costs have climbed



Costs recovered on coincident peak

- Bulk and regional charges (coincident peak, billing capacity, and energy charges) have evolved on different paths since 2006
  - Shown on common units ($/MWh) for relative comparison



Case for change

- Recent transmission projects are not only peak demand related
  - Transmission costs 240kV and above are recovered on CP charges, regardless of whether they are peak demand related
  - Transmission costs have grown over past decade because of multiple different drivers, not only peak demand
- Billing determinants beginning to fall
  - Customers have more options to reduce coincident peak charges today because the costs of alternatives have fallen
  - Allocation of costs to coincident peak charge encourages customers to reduce their demand at peak times that is not in proportion to the future transmission cost savings
- Current cost recovery is not sustainable
  - Price signals are counterproductive: increasing as customers use less
  - Total costs are not changing, so some customers responding shifts costs to others, further increasing incentives to respond

Questions?

Public

Additional Complexity

Public

Complexity of regional vs system peak

- High correlation between peak demand in region and system
  - Only NW is significantly different than other regions
- Regional constraints are a product of supply and demand; implementation based on demand alone will not reduce transmission constraints
  - For example in NW:
    - When generation in NW is not dispatched, peak load behavior likely contributes to transmission constraint
    - When generation is dispatched, peak load behavior less likely to contribute to transmission constraint
- Increasing number of regions increases implementation complexity
    - For example billing data disputes that require time and energy for the customer and the AESO to resolve
- Constraint of postage stamp pricing limits flexibility

Questions?

Public

Mitigation to achieve minimal disruption

Public

What we mean by minimal disruption

- Minimal disruption means finding a transition for tariff changes that balances two risks
  - Continuation of current tariff incentives risks increasing the cost shifting between customers who can respond to incentives and those who cannot
  - If the tariff changes are so significant they lead some customers to leave the grid, that risks further increasing costs to remaining customers
- Path to change should allow customers to adapt to new tariff
  - For example, phasing-in changes over time to allow customers to gradually adjust their response and manage costs

Mitigation options

Type	Category	Description	Examples
Rate Design	Transition Rate Design	Phase in tariff changes	Bulk cost recovery from 90% on 12-CP to 10% over X years
		Adjustment period	- Contract Change grace period - Reset ratchets
	Rate Classes	Set rates by customer size/type/class	- Volume discount - Interruptible/standby rate - Load attraction/retention rate
Bill Adjustment	Transition bill impacts	Bill increase of no more than X% per year for Y years	- Bill credits - Calculated based on current or future billing
	Permanent bill reduction	Bill increase of no more than X%	- Bill credits - Calculated based on current or future billing

Included in stakeholder proposals presented in Session 3 hosted on Nov. 5, 2020

- CCA: declining block prices, transitionary bill credits
- AML: permanent bill credits, load attraction and retention rates
- UCA, CWSAA, Conoco: transitionary bill credits
- ADC, IPCAA, DUC: n/a

Likely path to minimal disruption

- Depending on rate design a combination of options are likely to best achieve objectives
  - Prefer rate design mitigations over bill adjustments
  - Mitigation may not be symmetric for all customers
- For example:
  - Rate design transitions to goal state over five years
    - Remaining concern: customer goes out of business in five years instead of in one year
  - Assess rate impacts
  - Consider and model addition of rate classes
    - Evaluate additional rate mitigation
- Mitigation path depends on rate design choices

Engagement plan

Session order	Session objectives
Session 4	• Understand common themes and areas of agreement/disagreement • Introduce mitigation conversation to foster/build understanding • Present mitigation schedule and rationale to stakeholders
Stakeholder Comment Matrix Session 4	• Seek written feedback on mitigation option preference and mitigation process • Seek written feedback on cost allocation approaches and areas of agreement/disagreement
Session 5	• Present preferred rate design, including energy storage treatment, to stakeholders • Discuss and evaluate mitigation options • Present bill impact summary and assumptions • Provide Bill Impact Tool • Begin to discuss implementation considerations
Additional Technical Session (new)	• Provide information to stakeholders about how to use the Bill Impact Tool and respond to stakeholder questions
Potential One-on-One Meetings (new)	• Provide the opportunity to respond to stakeholder questions about how to use the Bill Impact Tool in a one-on-one setting
Stakeholder Comment Matrix Session 5	• Seek written feedback on the mitigation options presented at Session 5 • Seek written feedback on the preferred rate design
Session 6	• Present preferred mitigation path to stakeholders • Present and collect feedback on the application (to be filed by June 2021) • Share and discuss the implications of the rate design proposal and mitigation paths • Understand outstanding stakeholder concerns
Stakeholder Comment Matrix Session 6	• Seek written stakeholder agreement/disagreement with preferred mitigation path • Seek written feedback on the application and outstanding stakeholder concerns

Engagement plan – Mitigation

- The AESO will inform all stakeholders of the mitigation option(s) and seek feedback on those options from all stakeholders
- The Bill Impact Tool will assist all impacted stakeholders in assessing the mitigation option(s) and providing meaningful feedback to the AESO
- The AESO will limit one-on-one discussions to helping stakeholders use the Bill Impact Tool
- The AESO will seek feedback on whether stakeholders agree or disagree with the AESO's preferred mitigation path, and will provide this information to the Commission for the purpose of improving regulatory efficiency

Questions?

Public

Areas of Agreement and Disagreement

Public

Where we agree

- Efficient Price Signals
  - Price signals matter
    - Tariff charges provide incentives for customer behavior
- Cost Responsibility
  - Recognize that more than just load behavior drives transmission development
  - We are dealing with an evolving system
    - Current and future use may differ from what was originally planned
- Minimal Disruption
  - Transmission costs have risen
    - Tariff charges are more important now than ever before
  - Minimize disruption, mitigate rate shock
    - It is not in anyone's interest to reduce the number of ratepayers

Where we disagree

- Efficient Price Signals
  - Are status quo price signals efficient?
    - Price signals in tariff have reduced the cost of energy to other load
  - Are price signals forward looking?
    - Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
- Cost Responsibility
  - Is the primary objective cost causation, or cost responsibility?
  - Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
- Minimal Disruption
  - Now is not the time for change or time to stop the bleeding?
    - Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
  - Does rate mitigation need to be permanent or will customers adapt if temporary?

Next Steps and Session 5 Overview

Public

Session feedback (updated)

- We want to thank you for attending the Bulk and Regional Tariff Design Stakeholder Engagement Session 4 and we would appreciate your feedback on the session
- To limit stakeholder fatigue, we are modifying how we collect your initial feedback on the session by conducting a Zoom poll during the session rather than emailing you a short session survey following the session. The questions remain the same
- We value stakeholder feedback and we invite all interested stakeholders to provide their input on this session via the questions set out in the **Stakeholder Comment Matrix Tariff Session 4 on or before Jan. 12, 2020**. The matrix is available on our website at www.aeso.ca
  - Path: Stakeholder Engagement > Rules, Standards and Tariff Consultations > Tariff (filter) > Bulk and Regional Tariff Design > Dec. 10, 2020 Session 4

Next session

- The next session (Session 5) will be hosted on **Feb. 25, 2021**. Registration details will be available in January.
- Session 5 purpose
  - To present and discuss the preferred rate design, including energy storage treatment, and mitigation options to continue to build shared understanding and seek feedback from stakeholders
- Session 5 objectives
  - Present the preferred rate design, including energy storage treatment
  - Discuss and evaluate mitigation options
  - Present bill impact summary and assumptions
  - Provide Bill Impact Tool
  - Begin to discuss implementation considerations

Questions?

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Contact the AESO

- ***Twitter:*** *@theAESO*
- ***Email:*** *tariffdesign@aeso.ca*
- ***Website:*** *www.aeso.ca*
- Subscribe to our stakeholder newsletter

Thank you

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List of Acronyms

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Acronyms

- ADC = Alberta Direct Connect Consumers Association
- AML = AltaLink Management Limited
- AUC or Commission = Alberta Utilities Commission
- CanREA = Canadian Renewable Energy Association
- CCA = Consumers Coalition of Alberta
- CMD = Coincident Metered Demand
- CP = Coincident Peak
- CWSAA = Canada West Ski Areas Association
- DCG = Distribution Connected Generation
- DFO = Distribution Facility Owner
- DTS = Demand Transmission Service
- DUC = Dual Use Customers
- ESC = Energy Storage Canada
- FATD = Foothills Area Transmission Development
- FEOC = Fair, Efficient, and Openly Competitive
- GTA = General Tariff Application

Acronyms (cont.) (updated)

- HRTD = Hanna Regional Transmission Development
- IPCAA = Industrial Power Consumers Association of Alberta
- NCP = Non-coincident Peak (i.e., billing capacity)
- RAP = Regulatory Assistance Project
- SATR = Southern Alberta Transmission Reinforcement
- STS = Rate Supply Transmission Service
- TMR = Transmission Must-run
- TTWG = Transmission Tariff Working Group
- UCA = Utilities Consumer Advocate

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Company Representative
Comments From:	Company Name			**Phone:**	Contact Phone Number
Date:	[yyyy/mm/dd]			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers	

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?	

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner	

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	
11	Do you have additional clarifying questions that need to be answered to support your understanding?	
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Bulk and Regional Tariff Design Stakeholder Engagement Session 4 hosted on Dec. 10, 2020

I. Purpose and objectives of the session

The purpose of this session is to build shared understanding of common themes between the stakeholder proposals and the AESO's rate design bookends, and areas of agreement and disagreement. The session objectives include:

- Understand common themes across stakeholder rate design proposals and the AESO rate design bookends
- Understand areas of agreement and disagreement and why
- Introduce mitigation conversation to foster/build understanding

II. Session agenda

Time	Agenda Item	Presenter
9:00 – 9:15	Welcome, introduction, purpose and session objectives	AESO
9:15 – 9:45	Overview of engagement schedule and session feedback • Opening Remarks • Spectrum of options • Discussion and Q&A	AESO
9:45 – 10:30	Review themes • Cost allocation • Energy storage treatment • Discussion and Q&A	AESO
10:30 – 11:00	Break	
11:00 – 11:30	Review themes • Status quo • Complexity • Discussion and Q&A	AESO
11:30 – 12:00	Review minimal disruption and mitigation process • Mitigation to achieve minimal disruption • Mitigation process • Discussion and Q&A	AESO
12:00 – 12:15	Review areas of agreement and disagreement • Discussion and Q&A	AESO
12:15-12:30	Session close-out and next steps	AESO

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Calgary Place, 2500, 330-5th Avenue SW Calgary, AB T2P 0L4
Phone: 403-539-2450 | Fax: 403-539-2949
www.aeso.ca
@theaeso

III. Attendees

Company
Acestes Power
Alberta Direct Connect Consumers Association (“ADC”)
Alberta Electric System Operator (“AESO”)
Alberta Forest Products
Alberta Newsprint Company (“ANC”)
Alberta Utilities Commission (“AUC”)
AltaLink Management Ltd.
Arcus Power
ATCO Electric Ltd.
Battle River Power Coop
BC Hydro
BECL and Associates Ltd.
Best Consulting Solutions Inc.
BluEarth Renewables Inc.
Brubaker & Associates, Inc. on behalf of ADC
Bullfrog
Canada West Ski Areas Association (“CWSAA”) per Vidya Knowledge Systems
Canadian Renewable Energy Association (“CanREA”)
Capital Power
Cement Association of Canada
Cenovus Energy
Chapman Ventures Inc.
City of Medicine Hat
Consumers Coalition of Alberta (“CCA”)
Customized Energy Solutions
DePal Consulting Limited
Dow Chemical Canada ULC
Dual Use Customers
Elemental Energy
Enbridge
Energy Storage Canada

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Company
ENMAX Corporation
EPCOR Distribution & Transmission Inc.
FortisAlberta Inc.
Government of Alberta Energy
Heartland Generation Ltd.
Imperial Oil ExxonMobil Canada
Invinity Energy Systems
Independent Power Producers Society of Alberta (“IPPSA”)
Industrial Power Consumers Association of Alberta (“IPCAA”)
Kanin Energy
Lionstooth Energy Inc.
Logan's Clear Vision Consulting Ltd.
Millar Western Forest Products
NextEra Insights Inc.
NRGCS
Palezieux Regulatory Solutions Inc.
Peters Energy Solutions
Power Advisory LLC
Power Grid Specialists Corp. (“PGSC”)
RMP Energy Storage
Signalta Resources Limited
Solas Energy Consulting Inc.
Suncor Energy Inc.
TC Energy
TransAlta Corporation
Turning Point Generation
Utilities Consumer Advocate (“UCA”)
University of Calgary
URICA Asset Optimization
Voltus Energy Canada, Ltd.
West Fraser
Wolf Midstream Inc.

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Company
Stack'd Consulting, Inc.
Attendees by phone
14033897720
14033901368
14038134573

IV. Overall outcomes from the day

The main objective of the session was to understand where stakeholders and the AESO are aligned and misaligned regarding the spectrum of rate design options available, set out by the AESO's rate design bookends (discussed at Session 2) and stakeholders' proposals (introduced and discussed at Session 3). Participants engaged in meaningful discussion and overall, stakeholders agreed that this was a valuable session that allowed them to level set with the AESO about what they had heard in Sessions 2 and 3.

V. Session highlights

Captured below are the highlights of the questions and discussion on a topic-by-topic basis. For a detailed review of the session, please refer to the session recording, posted at www.aeso.ca.

Topic 1: Spectrum of Options

i. Participants were generally aligned with the AESO's recap of proposals:

- There was some clarification from Session 3 presenters about their proposed alternatives.

ii. Stakeholder Commentary

- Some participants expressed concern with the uncertainty of the alternatives shown on slide 24:
    - *Lionstooth Energy:* We have not seen yet to date, the quantitative analysis to show why the change is necessary and whether it's going to create the solution that we're potentially after. We need to be careful as we get into this.
    - *AltaLink:* Alternative C has uncertainty because it is built on the assumption of using 2018 design of the metering practice.
- Clarifying comments:
    - *CCA:* Alternative D mentions the fact that we should give consideration to setting the Non-coincident Peak (NCP) based on marginal charges and the remaining amount would go to billing capacity.
    - *RMP Energy Storage:* Slide 23 assumes that all load customers are looking for the same firm service; can't separate firm and non-firm load customers. Is this something we try to change and allow us to evaluate customers differently?
    - *Alberta Newsprint:* The graph on slide 23 clearly indicates we need to move to the bottom left corner where we have more response. But we're actually moving away from

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the corner where we need to be. Because the costs have gone so high, we are throwing away all cost principles and moving away from the corner which doesn't make any sense.

- *Best Consulting Solutions:* The last thing we have heard about the Alberta Self-Supply and Export Policy came last summer from AUC. Have there been any developments since then that would impact the tariff design?

iii. AESO Clarification

- Response to clarifying comments:
  - The inability to evaluate firm and non-firm customers differently is a limitation of the figure the AESO is presenting. The diagram on slide 23 is high level and meant to illustrate a broad perspective.
  - Regarding the Alberta Self-Supply and Export Policy, the Government of Alberta initiated a meeting last week and disclosed that they are running an engagement over the next month that involves two workshops and a survey.

Topic 2: Cost Allocation

i. Participants generally agreed with the AESO's presentation of the options for an embedded approach or a marginal approach to cost allocation:

- Stakeholders were aligned on the fact that there is a decision to be made on the approach taken for cost allocation.

ii. Stakeholder Commentary

- Some participants pushed back on the AESO's comments on cost allocation:
  - *Solas Energy:* The AESO referred back to a study from 2014 – is it still relevant? It is up to the AESO to determine if the study is still relevant.
  - *Solas Energy:* The bulk of our conversation is on the calculation, but not on the location of measure. Where exactly are you measuring this? We're spending a lot of time on the math of *how* it's calculated but not *where* it is measured.
  - *Suncor:* People are responding to price signal, regardless of which billing determinant we use; people will behave according to the signal you send them. The AESO's perspective is a bit misleading or short sighted and we need to look at it more practically. Cost causation does not necessarily align with an embedded approach.

iii. AESO Clarification

- Response to stakeholder feedback:
  - Regarding the 2014 study, it is important to recognize that transmission is a long-term game and that we make investments for the long-term. The AESO is looking for a method that updates our current state.
  - The topic of location of measure has been discussed and evaluated in Alberta in the 2018 GTA proceeding where the AESO put forward a proposal of location and the

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commission approved it. Implementation is still in evaluation. This topic has been a discussion that Alberta has had for two to three years.

- Regarding customers' responses to price signal, these concepts are difficult to summarize and the topic will be explored further in the session.

Topic 3: Energy Storage Tariff Treatment

i. Participants generally agreed with the AESO's proposed treatment of energy storage as unique from both loads and generators:

- There was further discussion on the interruptible rate option presented by the AESO.

ii. Stakeholder Commentary

- There was discussion around the interruptible rate option:
  - *Power Advisory LLC:* At a high level, what the AESO has put forward makes sense. It would be helpful to understand what the interruptible rate would be composed of. Is the AESO considering using existing ones or making their own?
  - *RMP Energy Storage:* In our alternative, we were looking at energy as most like a dispatchable generator, therefore paying Rate Supply Transmission Service (STS) is the best option. During charging it would be interruptible by the AESO. STS treatment for tariff but interruptible by charging is the ideal option. The second-best option is a tie-line. It is interruptible, but also paying an opportunity rate where the interruptible component is on a shorter time period.
- Clarifying questions:
  - *CanREA:* Going back to summary of CanREA's position, the "like a substation" part is the most important point. There are issues here with trying to bucket storage with what already exists. A lot of the conversation we've had is that storage is unique because it's not a generator or load – it shares behaviour with both, but it's not any one of those at the same time. We need to have a bigger bucket of thinking including "other" types of facilities that storage is akin to in addition to load and generation.
  - *Capital Power:* Would the AESO look at extending this unique rate option to any participants or only energy storage?

iii. AESO Clarification

- Response to clarifying questions:
  - The AESO would do their best to make the rate as technology-agnostic as possible. We don't have a design yet; it is just an option that we're exploring. However, the idea would be that it would be a rate that any customers who are eligible would get.

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Topic 4: Continuing Status Quo

iv. Participants generally expressed concern with excluding past investments from consideration in the future rate design:

- Stakeholders do not want to find themselves with a new tariff design that replicates similar issues of the current design.

v. Stakeholder Commentary

- Many participants discussed the importance of using learnings from past actions to inform the new rate design:
    - *ADC:* In reference to slide 47, we keep talking about how we can't look back. The reason we've gotten into the problem we're in today is because of the network investment from 2014-2019. We invested this money not for load or load growth; it was a policy decision. No load customer in Alberta was responsible for this increase so it is unreasonable to make them pay for it. It is inappropriate to say the past does not matter and forgetting about what happened with the network investment is flawed.
    - *TransAlta:* Whatever billing determinant you use, you'll see a response, which makes it a bit difficult to draw too many conclusions. Slide 49, bullet two, causes some concern. The current rate model was designed to incentivize billing determinants to fall. How do we prevent this from happening in the future? We don't want to find ourselves with a tariff design that creates the same issues in five years, and we don't want to replicate the issues with the new tariff design.
    - *Solas Energy Consulting:* Are there other creative ways of dealing with this other than those presented? The regulatory oversight was needed but now looking back, have we overbuilt the system? Can we deal with this creatively outside of the existing regulatory structure?
- Some participants disagreed with the AESO's presentation:
    - *Dual Use Customers:* Slide 47 shows that Coincident Metered Demand (CMD) has not increased substantially over the last 15 years, which shows that the price signal tariff is working. The 12-CP is intended to have customers avoid the peak and that's exactly what they did. Therefore, it is wildly inappropriate to make the customers who don't use the system to pay for it.
    - *Suncor:* In reference to slide 49, surprised because the AESO is making a case for change but this slide shows going from embedded cost to marginal cost. Challenge to the AESO – reread your own material. The argument is not a case for change to move away from 12-CP; it is a case for change from an embedded signal to a marginal signal.

vi. AESO Clarification

- Response to using past learnings to inform the new rate design:
    - The AESO is operating within our mandate and scope for this process. We are trying to gather information to formulate into the preferred option going forward and we do recognize the comments. The outcome of the current rate design has led to the trends we're seeing today. Unwinding those effects is not easy and we're treading with as

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much caution as possible to make sure we're not creating a new version of this problem.

- Response to other comments:
    - In response to Suncor's comment, slide 49 describes the way customers are responding and the lens we're looking at it through is economic. If you look only at the changes and drivers of the transmission projects, that is a case for change from an embedded approach.
    - The AESO recognizes that customers have responded to the price signal.

Topic 5: Additional Complexity

i. Participants generally wanted more clarity on the AESO's path forward:

- What is the AESO's process and plan between today and February to come up with a solution?

ii. Stakeholder Commentary

- Participants asked for clarity on the AESO's process going forward:
    - *Power Advisory LLC:* Want to clarify what's left in the path forward. Are we looking at embedded or marginal cost or is the AESO back to keeping 12-CP or moving to 120 seasonal CP? Is there still more scope to discuss?
    - *DePal Consulting:* Can you talk about the AESO's process? What are you going to do between today and February to come up with the solution?
- Additional questions:
    - *IPCAA:* Has the AESO considered Ramsey pricing? The issue is that there is too much money spent and the AESO is just moving money around. What you need to do is look at a system where the allocation is higher for those customers who do not respond. All the options proposed by the AESO still lead to a response from some customers, with no differentiation.
    - *RMP Energy Storage:* Looking at the classes of customers – currently all of them are paying on the same methodology but we have different classes of customers that want different products. Offering a non-firm rate would enable the system to avoid some of these additional costs, have active participants within the market, and enable us to avoid the issue of stranding some of the investments that have been made. Energy storage can also be a non-firm customer. Is breaking down customers into firm and non-firm categories something that we can look at in more detail?
    - *Power Advisory LLC:* Does the AESO have any sense of what the size of the rates would be if we moved to a marginal approach? It would be helpful if stakeholders could get an understanding of what these options look like before we pass the point where stakeholders can influence the AESO.

iii. AESO Clarification

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- Response to questions about the AESO's process going forward:
  - The AESO does have outstanding questions. We are narrowing down and trying to concentrate on the fundamental issues that need to be resolved such as cost allocation (embedded versus marginal) and where those are allocated in terms of the rate design.
  - The AESO has benefited from stakeholder feedback. We are trying to narrow down the list of issues and areas of disagreement and come back with our preference in February. Bill impact is an important component of that, and we are looking at how each option will impact customers and appropriate mitigations.
- Response to other comments:
  - The AESO has heard that the current rate structure has some Ramsey pricing attributes.
  - The AESO has considered the categorization of firm and non-firm customers in our path of minimal disruption.
  - The AESO cannot provide rates for the marginal approach at this time.

Topic 6: Mitigation to Achieve Minimal Disruption

i. Participants generally wanted more clarity on the AESO's two mitigation options of transitional rate design and bill adjustment:

- These was discussion among participants to which of the two options is preferable.

ii. Stakeholder Commentary

- Some participants opposed the bill adjustment mitigation option:
  - *CCA:* Not as concerned about the bill credits as providing the right signals going forward to not only the current customers, but future customers as well. The nature of industry in this province is changing and everyone is looking for the right price signal – this is where the balance lies.
    - *Power Advisory LLC:* In response to CCA's comment, the goal here needs to be what the end states of the rates are so we are sending proper incentives to future customers but disagree that we can't achieve that with a transitional mechanism. Customers aren't making investment decisions off rates today, but off of their understanding of future expectations. All of the concerns raised by CCA can be addressed with a transitional mechanism.
  - *ADC:* Doing a bill credit is the absolutely wrong way to go moving forward. How do you determine how much bill credit one customer should get over another, who decides that? Bill credit also creates issues with fairness. Instead, we need to develop a standby interruptible tariff that works for the customers that have flexibility and adds value to the system.
  - *TransAlta:* Why does the AESO prefer rate design mitigations over bill adjustments?

- Additional comments:

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- *Dual Use Customers:* If some customers can respond and some can't, it is irrelevant. We need to send a price signal where customers will respond for the benefit of everybody.
- *Capital Power:* On process and engagement – how can we fairly review the preferred rate design (session 5) without understanding the mitigation path (session 6)?
- *Enbridge:* The Bill Impact Calculation Tool has some mistakes. My suggestion is to add details, such as input boxes, to allow the customers to put in their own contract capacity so it can be more accurate in determining the billing capacity.

iii. AESO Clarification

- Response to discussion of mitigation options:
  - The two options represent the two sides of the coin where we want to make changes to the rate design.
  - The rate design mitigation options are preferable to the AESO.
    - If a customer is more responsive and if their load behaviour creates value for other rate payers, capturing that value using a rate class creates a better outcome than a bill adjustment option.
- Response to additional comments:
    - In response to DUC's comment, this may be an area of fundamental disagreement. The AESO's data shows that the continued cost exchanging between those who can and cannot respond will have a negative impact on load payers for Alberta.
    - The AESO wants to provide the tools and data for stakeholders to understand the rate design and the mitigations. The AESO is committed to trying our best to provide certainty for stakeholders but cannot guarantee it. We are working very hard for the data and analysis so you can comment appropriately and in time for the proposal.
    - Please forward errors in The Bill Impact Calculation Tool to the AESO so they can be rectified.

Topic 7: Areas of Agreement and Disagreement

i. Stakeholder Comments

- *IPCAA:* We can all agree that we want Alberta to be an attractive place for investment and have a rate that works for the province. We need something that works for the long term and the bigger picture is a system that makes us a place that succeeds. Going forward, we need to look at the arguments more through that broader lens.
- *ADC:* Want to raise an area of disagreement – has the AESO analyzed additional incremental investments that we would have had if the 12-CP had not been in place?
- *RMP Energy Storage:* From the perspective of energy storage, there are investment decisions being made right now about generation within the province and without a clear tariff, these decisions will be delayed. There is a bias in the current system and this needs to be rectified in the very near term.

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Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Colette Chekerda
Comments From:	Alberta Direct Connect Consumer Association	**Phone:**	780-920-9399
Date:	[2021/01/12	**Email**:	colette@carmal.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session compared the proposed tariff suggestions, but didn't provide any evidence or analysis on which to to base a new tariff design or to establish why the current design isn't workable going forward. The best outcome of the session was the acknowledgement that a regional CP will not be considered any further.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	The AESO must consider the embedded costs in meeting the rate design objectives. Customers have invested significant capital in responding to the tariff signal since the policy change in transmission cost allocation in 2005/2006. It was determined at that time that regardless of the cause of transmission need, costs would flow through to customers and it was more efficient to have those flow through the tariff design rather than the pool price. As long as this policy remains unchanged, the embedded costs should continue to flow through in a manner similar to the current CP rate design.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	a) The ADC preference for a mitigation option is through a tariff design establishing 2 rate elements for the bulk system charges: a firm capacity and a non-firm capacity charge. Any bill mitigation options that are customer specific will be difficult to establish in a fair manner and will increase the regulatory burden of all participants. b) The ADC has a tariff mitigation proposal for a firm/non-firm service included as an attachment to this response. c) The tariff design should enable the recovery of the Alberta economy and set up customers for long term success. The rate design needs to maintain the competitiveness of Alberta's electricity intensive and trade exposed industries.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		1. Efficient Price Signals
		
		The tariff needs to continue to have efficient price signals to minimize future transmission build. The system peak matters and a CP price signal is the best way to have flexible loads curtail and signal when standby use of the grid is adding to system stress.
		
		2. Cost Responsibility
		
		Everyone will agree that it is more than just load behavior that drives transmission development. However, our policy is that we have a congestion free transmission system and that load pays for tranmsisison. The transmission development that has occurred has happened to connect all forms of generation that ultimately serve load and need to be able to reliably serve load at peak times. The only way to mitigate future build is to incent load to curtail at peaks.
		
		3. Minimal Disruption
		
		We hope all will agree that if tariff changes result in loads exiting the province that we all have failed in this tariff effort.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		ADC agrees that these are the key areas of disagreement.
		
		Efficient Price Signals
		ADC agrees that the CP method reduces costs for other consumers.
		
		Cost Responsibility
		Both cost causation and cost responsibility need to be considered.
		The AESO could undertake to recreate the historical system peaks without the price responsive load and behind the fence generation to determine how much more transmission development would have been required to meet peak loads. Without this analysis, we submit that it is incorrect to assert that load behaviour has not influenced these costs.
		
		Minimal Disruption
		It remains unclear what shuffling costs amoung customers will do to stop the bleeding. If province is truly concerned about the impact of transmission costs on customers, they need to address that in a review of transmission policy and who pays.
		If the AESO pursues rate mitigation that is temporary through a bill impact model, that will not change the outcome for price sensitive loads. If these loads know that their rates will be unaffordable in a future year and other options such as self supply become limited they will have no option but to exit the grid.
		Regardless of the tariff direction, the AESO needs to re-examine the notice and PILON provisions for changes to the DTS contract capacity.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	The ADC would support the effort of examining a firm / non-firm tariff that is minimally disruptive to firm, price responsive and standby customers.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		ADC is generally supportive of the areas of agreement.
		
		Any storage tariff should be based on cost causation principles which should be technology agnostic.
		
		A firm / non-firm tariff could also work for storage assets.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	The tariff should incent storage to locate in areas that are the most cost efficient for Alberta consumers. For example, storage co-locating with intermittent generation or load could reduce the need for future transmission investment. If storage requires an interconnection that triggers additional transmission costs for charging, then they should have a cost responsibility for POD, regional, and CP bulk charges.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	ADC believes a well designed firm/non-firm tariff could provide a tariff solution for price responsive, standby and storage users of the grid.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	The ADC submits that any tariff proposal needs to be modelled for rate impact. Note that ADC can't support any change that would render our members uncompetitive in Alberta.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	Not at this time.
12	Additional comments	The ADC is putting forward a rate mitigation tariff proposal for the AESO's consideration. We are available to discuss the concept and merits of the design.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Surendra Singh
Comments From:	Alberta Newsprint Company	**Phone:**	780-778-1537
Date:	2021/01/11	**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Since in next session on Feb 25, 2021, AESO is planning to present their preferred rate design, we were expecting that this session would have much more analytic work and detailed analysis of various aspects to justify if any changes are needed in the current tariff design. The session was heavy on high level concepts/ideas and lacked in any material/analysis/data supporting them. We are pleased to see that AESO is not pursuing the idea of dividing the province in to 6 regions as it would have very unfair with no opportunity to manage transmission charges for the flexible price response load in the North West region.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	AESO has not been able to provide any compelling reasons for changing from current practice of embedded cost. To make this decision, AESO should have initiated a similar study as was done by London Economic in 2014. The pros and cons of Marginal cost and Embedded Cost were carefully discussed in London Economic report. In the absence of any study/analysis, AESO should refrain making such as critical decision and therefore should continue to use embedded cost.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	The mitigation option has to be through "Rate Classes" as a part of "Rate Design". It would have been very helpful if AESO has included in their presentation some analysis/design criterion on such as Interruptible/Standby rate classes. AESO needs to recognize that there is a significant and real risk of large energy intensive industrial consumers leaving the grid to manage their electricity cost if significant changes in tariff design were to be implemented without proper rate mitigations through rate design. Large industrials leaving the grid completely is not in the interest of consumers with even higher transmission charges.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		We are agreed that "Efficient Price Signal" is one of the key criterion for tariff design. And this has been the case since AUC directed AESO to use 12CP method for allocating Bulk system cost in 2005. It is clearly evident from slide 47 of AESO presentation in Session 4 that even though DTS contract MWs (and likely total energy usage MWh) have increased, the peak CMD demand load has not increased much. This is exactly what an efficient tariff design should do and that's why CP method has been used in a large number of jurisdictions.
		
		Increased transmission cost does not change the fundamental principal of cost causation. We have been practicing our peak load management since CP charges were less than $1500/MW. For some transmission lines, there may be some other reasons for building, but at the end of the day, it's the load who pays the transmission charges and should be incented to minimize the need for future build.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		The current price signals including 12CP are efficient which in turn reduces the cost of all the consumers by eliminating and/or delaying the need of additional transmission.
		
		The current rate design is equally applicable today as it was in 2005 when approved first time and being approved several times since then.
		
		The problem is not the cost allocation method in tariff design; it is the total cost. It will do no good to lower the transmission cost of small consumers (residential/commercials) by a few dollars per month while rendering energy intensive large industrial load unviable by increasing their transmission cost by over 100% to 130%.
		
		We support the proposal put forward by ADC of nominating firm and non-firm load for bulk system charge with the expectation that non-firm load will be curtailed during system peak or pay much higher charge if failed to curtail. By this nomination, AESO will need to plan only for firm load during peak hours.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner	

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	We are concerned that there is not enough time from now to the filing with AUC for doing a thorough analysis of any changes. AESO should undertake a similar study as was done by London Economics in 2014. There is a need to have a strong quantitative support to justify any changes from current tariff design.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	Please provide details as soon as possible on various rate classes such as Interruptible/standby.
12	Additional comments	So far AESO has not provided any solid support for changes other than their desire to change. The proposed changes are anything but modernization of tariff. We don't see any need to change the current design in any significant way.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Hao Liu/Rob Senko
Comments From:	AltaLink			**Phone:**	(403) 710-1247/(403) 874-6762
Date:	2021/01/12			**Email**:	Hao.liu@altalink.ca/Rob.senko@altalink.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was useful because the AESO stated what they have heard from stakeholders, providing stakeholders the opportunity to clarify or correct the AESO's interpretation of stakeholder feedback. The session was also useful in that the topic of rate mitigation was introduced.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	As load growth is not the primary driver of new transmission, a study determining load's marginal cost of transmission will not effectively reflect cost responsibility of province-wide transmission costs. A marginal cost-based price signal could be useful in locations where there might be load-driven incremental transmission. However, the requirement for postage-stamp transmission rates precludes this type of rate design. An embedded cost allocation approach has been used in Alberta for some time. It has the advantage of allocating all embedded costs based on a chosen cost allocation method. A cost allocation method grounded in planning principles and customer use can and should reflect cost responsibility. 12-CP does not meet these criteria.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	The AESO presented a comprehensive list of mitigation options. AltaLink supports an option that results in a just and fair transition to new rates. Customers who made investments under current rates must be treated fairly. Ideally, the rates under a planned transition should be known so that there is some cost certainty for customers in the future.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		AltaLink agrees that price signals matter. The structure and levels of prices will influence customers' use of the system. Poorly designed tariffs could encourage development of otherwise uneconomic behind the fence generation that will shift transmission costs to other customers.
		
		AltaLink agrees that more than just load behaviour drives transmission development. Even where load behaviour is not the driver of transmission development, the regulatory framework requires the costs be recovered from load. Cost responsibility should include a recognition that customers connected to the grid benefit from the connection, independent of usage.
		
		AltaLink agrees that it is important to minimize disruption due to rate changes. However, minimal disruption should not be the primary objective in the AESOs rate design process. AltaLink supports the AESOs statement (slide 20) that they 'need to take a long term view on how to make transmission cost recovery sustainable.' A sustainable rate design should be principle-based; any necessary rate change mitigation plan should be developed separately.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Efficient Price signals
		• AltaLink does not agree that the status quo (i.e. 12CP) price signals are efficient. Current price signals have not resulted in decreased transmission cost. Further, in attempting to avoid monthly coincident peaks, loads respond in many hours which likely results in a distortion to pool prices that is neither efficient nor desirable.
		• AltaLink agrees that price signals are forward looking because they will influence future behaviour. However, there is sufficient capacity in much of the system such that incremental changes in load do not significantly impact transmission costs. In such circumstances price signals should not discourage use. An efficient tariff is going to price transmission in a way that does not cause customers to exit the system.
		• There may be locations where incremental changes in load do have more influence on future transmission costs. However, location specific prices are precluded by postage stamp rates. To achieve efficient signals in these areas the AESO should therefore look to the use of non-wires alternatives, location-based credits and demand opportunity service (DOS) when evaluating options against building future transmission.
		Cost responsibility
		• The primary objective is cost recovery. The current transmission costs are fixed and must be recovered from all customers that are connected to the grid. The fact that, at this time, transmission costs are not primarily driven by load lessens the importance of cost causation in comparison to cost responsibility. AltaLink believes that the value of being connected to the grid is a key component of cost responsibility.
		• AltaLink does not agree that the current rate design achieves the goal of cost causation. The current rate design leads to load changes that do not influence transmission costs resulting in cost shifting.
		Minimal disruption
		• AltaLink agrees that now is the time to take steps to stop the bleeding. As per the AESOs January 4, 2021 letter, 'the earliest the new rate design would come into effect is 2023.' Today's economic climate should not dictate an efficient and sustainable rate design. The mitigation measures will

		allow fair transition to a new rate design and will be influenced by the economic climate at the time of implementation. • AltaLink agrees with the AESOs statement on slide 57 that a mitigation path will depend on the rate design. As a guiding principle, AltaLink believes customers need to have certainty in their tariffs in order to invest in Alberta.
6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	AltaLink would like to see the AESO produce a roadmap to its desired end state of an optimal rate design if the AESO is unable to make its desired changes at this time.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		AltaLink agrees with these statements.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	AltaLink believes that, unless energy storage is in service as strictly a transmission asset, energy storage should be allocated a fair charge for being connected to the grid.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	No comments.
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	No comments.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	No additional questions.
12	Additional comments	No additional comments.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Tony Martino,
Comments From:	ATCO Electric		Dan Thackeray
Date:	2021/01/12	**Phone:**	780-420-5493 (Tony)
			780-721-4284 (Dan)
		Email:	tony.martino@atco.com
			dan.thackeray@atco.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session held on Dec 10, 2020 was well organized, well attended and allowed for reasonable opportunities for the various parties to ask questions and seek clarification.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	While there are various pros and cons to both embedded and marginal cost allocations, where possible and where practical, preference would be to assess cost allocations based on marginal costs that results in costs (and in turn tariffs) being assessed in real time and with a view towards where current and future costs are being incurred. However, it is important to note that with increases in AESO revenue requirement now being a slower rate, relative to the growth experienced over the last number of years, that embedded cost allocation is still going to be relied upon with respect to many aspects of AESO's tariff.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	a) Mitigation processes that minimize disruption are highly important. While many options are available, any type of grandfathering provisions will be difficult to administer. As such, bill credits carried out through a transitionary process appear to strike the most appropriate balance. b) There are many mitigation options that have been utilized in other contexts (for example, rate caps, grandfathering, revenue to cost ratio (R/C) bands (for example, 95% to 105% R/C) and so forth. However, for these purposes, transitionary bill credits appear most suitable. c) The AESO needs to achieve a balance between the status quo rate design and the alternative rate design and that allows for various stakeholders to adjust to the transition while administering appropriate cost recovery and providing efficient price signals. The objective is to ensure that stakeholders, who have made economic decisions based on the current tariff structure, are able to adjust to a change in tariff structure over time.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		In general, ATCO Electric is supportive of the areas of agreement presented at Session 4 and provides the following comments:
		
		Efficient Price Signals:
		This area of agreement illustrates that parties are cognizant and fully aware of the importance of price signals in incentivizing efficient customer behavior. All parties appear to appreciate that efficient usage behavior improves system reliability and helps minimize the cost of the Alberta transmission system in the long run.
		Cost Responsibility:
		The system continues to evolve, and parties understand that transmission costs need to be attributable to both load customers and generation customers. As well, the system needs to reflect the current state as well as the future state of transmission development.
		
		Minimal Disruption:
		Finally, and most importantly, it is positive that all parties appear to fully appreciate the importance, in the event of fundamentally changing a tariff structure, of minimizing disruption, and ensuring that rate shock is mitigated. All parties appreciate and agree that potential reductions in load and/or increased grid defection, resulting from an improper tariff structure, are issues that need to be addressed.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		ATCO Electric considers the areas of disagreement presented at Session 4 to be areas that need to be resolved and offers the following comments.
		
		Efficient Price Signals
		Efficient price signals are extremely important, but the price signals must also be fair and widely available to be adopted by all stakeholders. The current Coincident Peak (CP) price signal is not widely available to allow for proper responsiveness by all stakeholders.
		
		While CP price signals may be forward looking, other prices signals, such as NCP, are also forward looking and, more importantly, are not discriminatory and provide fair treatment and opportunity for responsiveness across all stakeholders.
		
		Cost Responsibility
		While cost responsibility is an important cost allocation objective, ultimately more weighting should be accorded to the principle of cost causation when it comes to determining cost allocations.
		
		Minimal Disruption
		While the Alberta Economy has been negatively impacted lately and while there is concern with respect to making changes to AESO tariff structure during these challenging times, it is expected that by the time a new tariff is implemented, the economy may stabilize. As well, the concept of providing transition bill credits is a solution towards addressing any potential material bill impacts to stakeholders.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	No. There are no other considerations in addition to those discussed above that the AESO should include in its rate design proposals.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		In general, ATCO Electric agrees with the areas of agreement noted and offers the following comments.
		
		Energy storage is unique in that it is not solely a producer or consumer of electric energy.
		
		All three cases – energy price arbitrage, operating reserves and non-wires solutions are markets within which energy storage operates
		
		FEOC principles should be applied for Energy storage solutions relative to the totality of the electricity market.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	The areas of disagreement that are listed summarize the areas of contention from the session. These are areas that would benefit from a wider, more direct consultation on the policy direction of energy storage within the tariff, as the inclusion of energy storage in the current review introduces additional contention. See additional comments below: • Energy storage may be a user of the grid (e.g. energy price arbitrage), a component of the grid (e.g. non-wires alternative), or conceivably for some applications may be viewed as both. • There was no agreement on use cases, nor payment structures on in and out flows from energy storage facilities • Payment structures for various cost components have not been agreed to, and would benefit from a more direct review with impacted stakeholders in isolation of the tariff review.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	As ATCO Electric stated in comments provided to the AESO in the previous stakeholder session, treatment of these types of facilities within the tariff need to be broached with caution and examined thoroughly to avoid unintended consequences associated with policy change. The AESO should consider a thorough review of the application of Energy Storage **in isolation** of this rate design consultation in order to assess all implications impacting energy storage connections (which would include an assessment of rate design for these types of customers).

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	See notes in (9) above. ATCO Electric maintains that a separate, focused review on energy storage as a facility would be beneficial for the AESO in tariff design.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	ATCO Electric has no further clarifying questions at this time.
12	Additional comments	ATCO Electric has no additional comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Evan Wilson
Comments From:	Canadian Renewable Energy Association	**Phone:**	
Date:	2021/01/12	**Email**:	ewilson@renewablesassociation.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
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4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	CanREA submits that a balanced approach is most appropriate. To remove price signals completely will result in inefficient behaviour by market participants. It is reasonable to motivate participants to limit both their NCP and CP demand.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	Mitigation is necessary to reduce unexpected economic disruption to industry and to reduce stranded capital for those market participants that have made investments under the current tariff structure. To reduce immediate adverse impacts to industry in the middle of economically difficult circumstances, CanREA suggests that it may be appropriate for the AESO continue to design a sustainable tariff structure, but delay implementation for two or three years. This approach will: 1) Provide a sustainable cost recovery structure in the long term 2) Avoid adding to the current economic turmoil experienced by industry 3) Allow market participants to plan and invest based on the long term structure. ***However, the tariff treatment of energy storage resources needs to be addressed immediately as the current tariff treatment is a roadblock to energy storage development***.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Efficient Price Signals
		CanREA submits that price signals matter. Significant system savings can be realized through appropriate market participant behaviour.
		Minimal Disruption
		Minimizing disruption will reduce the risk of stranded capital for those market participants that have already made investments based on the current tariff rate structure.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
		Minimal Distruption
		CanREA understands the AESO's argument that the current tariff structure may not be sustainable. CanREA also understands the concern from industry that the sustainability of the tariff design can be addressed once the current economic turmoil has subsided.
		CanREA submits that a delay of major tariff design changes of up to three years is unlikely to destroy the long term ability to pay for the transmission system. At the same time, it would be helpful to provide certainty to industry about what the ultimate tariff structure will be. Providing clarity now will allow industry to plan and make investments based on a future structure without contributing to immediate economic difficulties.

	Cost Responsibility • Is the primary objective cost causation, or cost responsibility? • Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs? **Minimal Disruption** • Now is not the time for change or time to stop the bleeding? ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively • Does rate mitigation need to be permanent or will customers adapt if temporary?	CanREA reiterates that immediate changes to the tariff are required where they relate to the treatment of energy storage***. In fact, it is essential that the next tariff filing to remove the unfair barrier represented by the current tariff treatment and allow energy storage to provide the many system benefits that are being realized in many other jurisdictions***.
6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		CanREA is supportive of all the areas of agreement relating to energy storage presented at Session 4.
		We agree that energy storage is a unique technology. However, becuase storage is unique, it is neither fair nor efficient to treat it like other technologies. Because they are unique, load, generation and provincial interties receive different tariff treatment. By that measure, storage is unique and it follows that fair and efficient tariff treatment should be applied to tariff facilities.
		The current tariff treatment, which does not fully consider the unique nature of storage, has created an artificial barrier to investment.. If the tariff barrier is not removed, it is unlikely that the full range of services provided by provided by energy storage technologies will be deployed to benefit the grid.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:**	**Energy Storage as a User of the Grid or Component of the Grid** There may be storage facilities that operate as users of the grid or components of the grid or both.

	• Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	**Payments for Inflows and Outflows** The phrase “like every other network user” is not useful in this context. This phrasing suggests that storage should pay the current tariff, as if it is simply a load customer. This is not appropriate, as storage is not load. If storage is operating like a component of the grid, such as providing a non-wires solution to reduce transmission congestion, providing grid support services or deferring transmission construction, then the storage facility is supporting the grid, rather than using it. In this case, no tariff charges should be levied. When a storage facility is a market participant and is operating like a user of the grid, it is appropriate for the facility contribute to network system costs. To identify a just and reasonable share of the costs, the AESO should examine the justification for the rate for Export Opportunity Service (XOS) and Demand Opportunity Service (DOS) as these are the two existing ISO tariff services that use the system in a manner that is closest to the way storage will use the system. It should be noted that this discussion does not address the “double double” problem that had been raised by CanREA and Solas Energy Consulting during previous stakeholder sessions. The “double-double” problem refers to the fact that electrons stored and returned to the grid are already charged STS tariff rates to the original generator and DTS tariff rates to the ultimate end user. Therefore, charging tariff rates to the storage facility results in double charging for those electrons for both the grid injection and grid withdraw behaviour. CanREA has previously proposed that an Administration Fee is an appropriate mechanism to avoid the “double-double” problem, but recognize that the limits of the current Bulk and Regional Tariff discussion may not be sufficiently flexible support this approach. Other mechanisms that have been considered include: 1) A storage specific tariff rate which recognizes the uniqueness of energy storage but does not address the “double-double” problem. 2) A new Interruptible Demand Service that would not be technology specific and does not address the “double-double” problem, but may be more acceptable to a larger group of stakeholders and which the AESO may feel more able to justify.

		These options would both likely be more economical than the current tariff treatment, but further details will be required in order to properlyanalyse the impacts of any AESO proposal. While any one of the three mechanisms described above may, at the appropriate pricing level, remove the barrier to storage development that is caused by the current tariff treatment, CanREA emphasizes that this feedback has been given within the context of the Bulk and Regional Tariff re-design process and in the current regulatory and legislative environment. Given the unique nature of storage, there are further policy changes needed to ensure fair and efficient participation of energy storage resources in the Alberta electricity market. CanREA acknowledges that the current tariff process is not the appropriate venue to debate these changes, but is clear that the choice of a tariff mechanism within the current process, which does not adequately reflect the unique attributes of storage facilities, will not remove the need for future regulatory and/or legislative changes. CanREA anticipates that regulatory and legislative changes may have an impact on future tariff options, leading to mechanisms and rates that are more appropriate to reflect the unique nature of storage technologies. **Storage Payments for Administration, Operations and Maintenance, Pod, Regional and Bulk Charges** CanREA notices that XOS and DOS charges are not broken down into the cost categories listed and therefore it is not necessary to separate the energy storage tariff rate into those categories. If necessary, the AESO may determine how tariffs collected from energy storage contribute to each of the cost categories, just as the AESO does with revenues collected from XOS and DOS.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Energy storage is considered to be unique because it shares characteristics with a number of different – and sometimes competing – technologies, including those that operate as market participants and as components of the grid. The key to supporting fair, efficient, and openly competitive market participation is enabling the purchase of certain reliability products that can be provided by energy storage and other facilities. The AESO should consider the three mechanisms described in our response to Q 8. Given the minimal incremental system costs of storage, the tariff rate for withdrawing energy from the grid under the chosen mechanism should be far below the rate resulting from current DTS. We reiterate that the proposed rate should be similar to those resulting from XOS and DOS treatments. More discussion will be required to establish the details of the chosen mechanism.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	More time is requested to address energy storage issues during the upcoming consultation sessions.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Matthew Davis
Comments From:	Capital Power			**Phone:**	403-540-6087
Date:	2021/01/12			**Email**:	mdavis@capitalpower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Capital Power appreciates the opportunity to provide comments on the December 10th, 2020 stakeholder session. The session struck a balance of discussing market participant's proposed rate designs, introducing the concept of mitigation options, and broadly indicating the AESO's intentions on changes to the bulk and regional tariff. Capital Power is supportive of the AESO's direction to move away from the status quo (12 coincident peak or "12-CP" methodology),[1] and looks forward to reviewing the AESO's detailed bulk and regional tariff design with mitigation options presented in session 5. The details will be important, and Capital Power suggests that with the session materials the AESO intends to publish, it includes mitigation options within its bill impact calculator to clearly illustrate the benefits of the mitigation options.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	Capital Power understands that the embedded and marginal cost approaches need not be an either / or discussion and regulators have used both when designing rates.[2] Capital Power suggests that the AESO consider the benefits of using both allocation approaches appropriately to support its design objectives. While a marginal cost approach aligns with sending efficient price signals and may provide opportunities for additional innovation and flexibility, it requires a complex handling of re-allocating existing costs to ensure cost recovery. Further, a marginal cost approach would require determining the marginal cost of transmission, which Capital Power suggests is not likely a simple exercise, but one that could better inform future tariff development. As there is a significant requirement to reflect overall existing system costs and the benefit that customers receive from the grid, Capital Power views an embedded approach to most appropriately align with the AESO's objectives around cost responsibility. Additionally, its current use aligns with the simplicity objective. Capital Power sees the objectives around minimal disruption and creating opportunities for innovation and flexibility as being enabled through the mitigation options discussion.

[1] AESO Session 4 Presentation, Slide 28.

[2] e.g. Synapse Energy Economics, Inc. Ratemaking Fundamentals Fact Sheet which states that "some regulators rely on embedded cost studies to allocate costs between classes, and then use marginal cost information to inform rate design elements (such as inclining block rates or time-varying rates) within classes."

3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	a) Capital Power is supportive of the AESO designing mitigation options that focus on rate design over those that focus on bill adjustments. Creating additional options based on service level expectations and market participation allows for a more sustainable, customer-oriented design for the tariff going forward. A gradual and phased approach to transitioning the rate design vs. an abrupt change will mitigate the rate of regulatory change. When coupled these two mitigation options provide existing and future consumers several ways to manage their transmission costs. The use of bill adjustments appears more arbitrary and less aligned with FEOC principles, particularly permanent reductions. This option creates many questions such as: who would be eligible, what quantum of adjustment is allowable, who would arbitrate the process, and why past behaviour should infer current and future benefits. Capital Power is not supportive of the AESO pursuing this option. b) c) The AESO's use of mitigation options as strategies has the potential to alleviate the impact of changes to the tariff not just on existing consumers but also future consumers. This is essential as customers are looking for additional options to manage their transmission costs. In creating an interruptible service, Capital Power suggests that there is an opportunity to create a technology neutral rate option that would suit energy storage projects. Specifically, if the AESO designed a rate for any sink resource that commits to bidding into the market and adhering to the market rules, such a rate could also apply for energy storage assets when charging. This would alleviate Capital Power's concerns on creating a technology specific rate for energy storage.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Capital Power is generally supportive of the areas of agreement identified. Specific details follow:
		
		Efficient Price Signals: Capital Power believes that the price signals generated through the rate design matter greatly and have the potential to create opportunities to unlevel the playing-field and distort the energy market signal for investment. Capital Power has observed a trend of generation development that is designed to avoid current transmission rates and is concerned that the tariff signal is supporting investments that may not be borne out of the energy-only market signal alone. This is a clear indication of how the current price signals sent through rates are creating incentives for customers to alter their behaviour. As the AESO modernizes their bulk and regional rate design, it should take great care in understanding how its rate design impacts the energy-only market price signal, particularly given current uncertainty around self-supply and export opportunities. The AESO's rate design should provide customers with options to remain on the system and be attractive to new investment – only with increases in overall load will transmission costs lower for all customers.
		
		Cost Responsibility: Capital Power agrees that the transmission development is driven by more than just load but would note that discussions around the transmission development policy and load's cost responsibility is out of scope of tariff consultations. Capital Power believes that there is value in accessing the transmission system as it provides customers a highly reliable source of electricity, and access to the competitive wholesale market.
		
		Minimal Disruption: Capital Power is aware that with rising transmission costs, the overall delivered costs for consumers is rising. The total cost of the transmission system is largely sunk, as such, within the confines of the tariff design discussions the AESO is limited in their options to lower costs for all customers. The AESO can create mitigation options that better reflect customer's service level expectations, allowing customers that are more elastic to price greater options. This can create a positive feedback loop and grow overall demand – which would lower prices overall. Without mitigation, there is a real concern that load destruction could occur which is disadvantageous to all Albertans.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Capital Power submits the following comments with respect to areas of disagreement:
		
		Efficient Price Signals: Capital Power understands that the current tariff signal was set at a time where incremental transmission build out was occurring, as such, its design to lower peaks deferred or reduced the need for additional transmission. Much of that infrastructure is now built out and the tariff needs to recognize the benefits of the existing transmission system, and its existing costs. As such, while a marginal cost allocation approach would set a forward looking price signal, Capital Power is concerned that it would require significant, complex, modifications to fully recover the costs of the existing system, eroding the strength of a forward-looking price signal. Instead of adding this complexity at this time, Capital Power views the AESO's work on rate classes as an opportunity to better send price signals that align with the need for future transmission costs, and how customers value their connection to the grid.
		
		Cost Responsibility: The AESO has indicated that the bulk of the transmission costs are sunk, and ultimately there is a responsibility to recover those costs. Capital Power believes that the current design does not accurately achieve its stated objectives as it creates equity concerns amongst customers, and un-levels the competitive playing field.
		
		Minimal Disruption: Capital Power understands the sentiment to pause due to uncertainty but believes that providing clarity on tariff design is essential for investor certainty. The concerns with the current design have been well known and providing clarity now will allow for the development of an orderly transition that will allow industry time to plan for the future structure.
		
		Capital Power notes that the AESO's rate transition mitigation option is, by definition, temporary. Mitigation through the creation of new rate classes for differentiated service should be permanent and while supportive of the endeavor, Capital Power suggests that calling it a mitigation is a misnomer. While Capital Power is not supportive of the AESO pursuing bill adjustments as a mitigation, if done, would recommend it be temporary.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	Please see discussion above.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Capital Power supports the AESO's conclusion that energy storage is unique but notes that each service it provides to the grid is not.
		
		Capital Power disputes that energy storage can participate as a non-wires alternative at this time. While it is a plausible use-case, there are policy questions that need to be determined such as whether regulated or de-regulated investors can develop non-wires alternatives. Capital Power expects that this issue will be addressed separately and that any non-wires alternative energy storage project would adhere to applicable tariffs, and not be granted any special tariff.
		
		Capital Power believes that any assets participating in either the energy or ancillary services markets should be held to the same standards, regardless of technology. This is essential to maintaining a level playing field that is foundational to Alberta's FEOC market.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	Capital Power believes that the policy implications of the first question are out of scope of this discussion. Energy storage use-cases focused on energy and ancillary market participation clearly align with storage using the grid. Energy storage as a component of the grid has profound policy implications around what regulated utilities can invest in, how the AESO plans, and the role of non-wires alternatives. With respect to the following three questions, Capital Power reaffirms its position that the AESO develop technology agnostic rates in which energy storage is able to align how they use the transmission network with other market participant who behave similarly. All market participants are responsible for procuring the necessary fuel for producing electricity. Energy storage should not be treated differently just because its fuel source is electricity itself. Transportation costs, which for energy storage are costs associated with the network, are part of the equation when setting offers and should not be absolved for one technology over any others. Capital Power would like to indicate that through the introduction of differentiated rate classes as proposed in the mitigation discussion above, it is possible to design a rate that would align with an energy storage use case that would see outflows offer into the market just as source assets do today, and inflows bid into the market. A rate design that is set around any market participant that is willing to bid into the market could align with energy storage use-cases while maintaining technology neutrality in the tariff.

9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Please see discussion above
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Capital Power suggests that the AESO advance as much as possible the rate design mitigation options, particularly any new rate classes. It appears that there are opportunities through that discussion to resolve many of the issues for both customer costs and energy storage treatment.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	Not at this time
12	Additional comments	Capital Power appreciates the AESO's efforts on this issue. This work is very much interdependent with other issues in industry, particularly the DOE's self-supply and export consultation. As the AESO illuminates its preferred design, it will be critical to understand the alignment with other issues.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Raj Retnanandan
Comments From:	CCAS			**Phone:**	403-992-2258
Date:	[2021/01/12]			**Email**:	retnanandan@emrc.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Was helpful
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	During the session certain parties repeatedly asked about Ramsey pricing. Under Ramsey pricing the AESO would price service to those customers who had alternative choices at close to their avoided cost of self supply. This means the remainder gets spread across all other customers. The economic rationale being, by virtue of retaining the choice customers and their contribution to fixed costs, all customers are better off. Unlike in the past when, only ISDs were allowed to create microgrids, the choice customers who have a legal right to create micro grids now includes many others such as Indian Bands, Institutions etc., who can demonstrate community benefits.[Small Scale Generation Regulation] Given all this, it is better to provide marginal cost signals to everyone who is using the system and responding to price signals for their incremental use. Clearly, under this approach, the difference between MC and AC needs to be dealt with. One approach would be to bury this difference in a fixed connection charge which is not usage sensitive. The fixed connection charge could be established in declining blocks so that at the margin, it too reflects marginal costs.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	In CCA's view mitigation of rate increase arising from restructured rates should occur at the bill level. Rates should be restructured to reflect the go forward rate design as soon as possible to reflect the evolving electricity system with two way flow of electricity.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Agreed

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Agreed

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	Please refer to Option D presented by CCA

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Agreed

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	Agreed
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	CCA does not take a position on this at this time.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Agreed on process
11	Do you have additional clarifying questions that need to be answered to support your understanding?	
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Grant Pellegrin
Comments From:	Cenovus Energy Inc			**Phone:**	403-766-3955
Date:	2021/01/12			**Email**:	grant.pellegrin@cenovus.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was moderately valuable, although it is interesting to see what other parties' position is, it would be valuable to get more information from the AESO on the AESO's position and the supporting analysis and cost causation studies to justify the AESO's position.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	Both embedded and marginal costs need to be incorporated into rate design objectives, both past and future investment decisions impact the current and future transmission system and should be reflected in rate design.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	At this time CVE does not have a preferred mitigation option but offers that if needed; rate mitigation will need to be specific to the impacted customers, respecting their investments and the impact their actions have made in alleviating the need for transmission to be built. Rate mitigation will also have to work for those customers, many of which will compete in international markets and their cost structures need to be competitive to keep these industries, consumers and economic benefits in Alberta.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Yes, Cenovus is generally supportive of these areas of agreement.
		Efficient Price Signals:
		Price signals are a critical aspect of rate design and have a long history of incenting behavior to maximize the value of the system for all customers – reducing use during peak periods, incenting use during off-peak periods etc. etc. 12 CP has been an effective method of encouraging customers to avoid using power during peak times, likely reducing the overall need for transmission build.
		Cost Responsibility:
		Whether directly built for load or built for new sources of generation that serves load, arguably generation and transmission are only built to sell to/serve load; or serve with a different product type (renewable). Regardless of reason it is clear in the Transmission Regulation that the cost responsibility is with loads receiving power from the T&D systems.
		Minimal Disruption
		The rise in transmission costs was forecasted well in advance of our current situation and a known outcome of the investment in the transmission system. Minimal disruption is important, as is mitigating rate shock as the only long-term solution to lowering transmission costs is to increase provincial load, part of that is to retain the load we have.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Efficient Price Signals:
		
		Efficient price signals are an integral component of proper rate design, CVE believes the status quo price signals are efficient and point to the prevalent use of CP in many other markets as support for that statement.
		
		Cost Responsibility
		
		Both cost causation and cost responsibility are important factors in rate design.
		
		The AESO has not shown that the initial rate design has not lowered transmission costs, it has not been shown that transmission costs would not have been higher but for the rate design nor has it been shown that on-site cogeneration has not reduced the required transmission build
		
		Minimal Disruption
		
		Change for the sake of change is not necessary, cost causation and the proper allocation of costs should continue to be the focus of rate design. Tariffs are approved for certain periods of time and if changes are required should be implemented as necessary.
		
		Customers will continue to seek the most cost-effective solutions to satisfy their power requirements, both rate design and temporary/permanent mitigation will only work if the cost of electricity is competitive with alternatives. If the cost of electricity is not competitive with alternatives customers will find a way of adapting, including exiting the system if necessary. Both the ability to attract new load and retain existing load will be integral components of lowering transmission costs for all consumers.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	The AESO should include any cost causation analysis that supports the proposed rate design proposal.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Under the caveat that energy storage should pay transmission costs based on cost causation principles CVE generally agrees with these areas of agreement.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	There does appear to be disagreement amongst stakeholders in these areas
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Energy storage should be enabled with FEOC principles and tariff design based on cost causation in mind.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Effective rate mitigation will be a complicated process to properly enable and a considerable amount of time and consultation with impacted stakeholders should be taken if rate mitigation is required.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	CVE would like to see a cost of service study for the AESO's rational for pursuing the proposed rate design at this time
12	Additional comments	The review of the bulk system charges is going to be a time consuming and expensive process. There are other initiatives that could impact tariff charges going forward – Transmission Regulation, Self-supply & export, distribution inquiry to name a few. Resolving these issues should be done in advance to ensure whatever bulk system changes are required reflect any changes to those regulations.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

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January 12, 2021

Spencer Hall
Alberta Electric System Operator
2500, 330 - 5th Ave SW
Calgary, AB T2P 0L4

Dear Mr. Hall

SUBJECT: Bulk and Regional Tariff Design Stakeholder Session

I write on behalf of the cities of Lethbridge and Red Deer, who wish to share their feedback on the presentation and materials from the AESO's December 10th session. Following that session, the AESO requested parties to respond to questions. The cities' response is provided below.

Question 1:

Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?

The cities consider the AESO's December 10th session to be useful in summarizing where there is general agreement amongst proceeding participants and where there is more entrenched disagreement.

Question 2:

Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?

As discussed in our previous response to question 2 last November, the cities consider an embedded cost allocation method to be a more practical approach. This is also more consistent with Bonbright's "practical-related" rate design attributes.[1]

A marginal cost approach to allocating transmission costs is problematic because marginal cost is only a theoretical concept. In the short-run the marginal cost of an incremental unit of capacity is virtually zero (the additional cost to provide one more MW of capacity is negligible) and determining the long-run marginal cost of additional capacity is still highly dependant on multiple assumptions, all likely to be controversial and add additional regulatory debate, delay and cost. Moreover, the long-run marginal cost will not look much different than embedded cost, apart from inflation.

Question 3:

a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not?

b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify.

C7) What do you think the AESO's needs to achieve with its mitigation(s)? Why

As discussed in our previous response to questions 2 and 3 last November, the cities prefer a phasing-in approach to any of the bill adjustment approaches. The

[1] See page 384 of Principles of Public Utility Rates: Practical—related Attributes: 9. The related, practical attributes of simplicity, certainty, convenience of payment, economy in collection, understandability, public acceptability, and feasibility of application.
10. Freedom from controversies as to proper interpretation.

fundamental problem with a bill adjustment approach is that it does not encourage new (and preferable) customer behaviour. Existing customers have already demonstrated that they can respond to a price signal. The purpose of updating the AESO rate design is to provide a different price signal in order to incentivize behaviour that is beneficial to the system. If bills are adjusted, then there is no or limited reason for these customers to adopt the desired behaviour. The cities also note that at this point it is not clear that any mitigation measure will be needed, depending upon what new price signal is chosen and how quickly the price-responsive customers react.

Question 4:

Are you supportive of the areas of agreement presented at Session 4? Why or why not?

Based on the discussion and submissions to date, the cities would consider there to be general agreement on the issues highlighted by the AESO.

Questions 5:

Are you supportive of the areas of disagreement presented at Session 4? Why or why not?

Based on the discussion and submissions to date, the cities would agree that the areas highlighted by the AESO represent the issues of greatest disagreement.

Question 6:

Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.

Given the relative positions of the various parties on the main areas of disagreement, the cities are unable to offer any additional insights as to how to move parties from areas of disagreement to agreement.

Question 7:

Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?

Based on the discussion and submissions to date, the cities would consider there to be general agreement on the issues of energy storage highlighted by the AESO.

Question 8:

Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not?

Based on the discussion and submissions to date, the cities would agree that the areas highlighted by the AESO represent the issues of greatest disagreement.

Question 9:

Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.

As the cities noted in their November 20th response to question 2, it is first necessary for the AESO to provide clarification around what behaviours are beneficial to the system. Once it is understood which behaviours should be encouraged and which behaviours should be discouraged, the necessary price signal should become more obvious.

Question 10:

Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?

The cities have no comment on the AESO's proposed stakeholder process other than the say that it would be helpful if the AESO were to make available a fully developed proposed tariff with explicitly defined billing determinants and indicative pricing for those billing determinants before an application is filed.

Question 11:

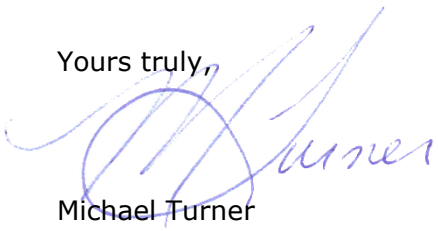
Do you have additional clarifying questions that need to be answered to support your understanding?

Question 12:

Additional comments

The cities undertook to provide helpful responses that supplement their November 20th submission, and have no additional comments or clarifying questions. We trust that these supplemental comments will be received in the constructive spirit that they are intended. Should any of our comments require further clarification, please feel free to contact me at (403) 781-7691.

Yours truly,



Michael Turner
President

cc: Jim Jorgensen, City of Red Deer
Stew Purkis, City of Lethbridge

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Blair Wood
Comments From:	Conoco Phillips Canada			**Phone:**	403 532 3575
Date:	2021/01/12			**Email**:	Blair.wood@conocophillips.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable and Conoco appreciates the AESO's consultation work on the tariff. The AESO reviewed many tariff concepts in the session, it would have been helpful to outline the process the AESO will use going forward on reaching its recommended tariff design.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	Conoco views the embedded cost allocation approach to be most appropriate. Alberta has recently greatly expanded its bulk transmission system. The marginal cost allocation approach will therefore likely lead to a very low level of cost for an additional MW of new load. Therefore, the marginal cost is likely small, and we are left with allocating based upon an embedded approach for most of the cost. Bulk transmission comes in large blocks and therefore a marginal cost approach is likely not useful.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	Conoco supports a mitigation approach that does not extend for a significant period. Conoco recognizes that a change in rates will impact some firms significantly. However, to be fair to all ratepayers, tariff adjustment should be made within a reasonable time period (i.e. <5 years). Conoco is open to a transition rate design, which may allow for the same rates to be charged to all ratepayers, while slowly reducing the dependence on 12 CP. The mitigation should allow firms that have sunk capital assuming the current CP design, to recover some these costs. The mitigation should not allow for ongoing subsidization of these market participants longer than a reasonable defined term.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Conoco agrees that price signals matter. However, the price signals and resulting behaviour must make economic sense overall for Alberta ratepayers. If a price signal transfers costs from one customer group to another, then the price signal must also add more value to all ratepayers that it costs.
		
		Cost responsibility- Conoco agrees that generation additions also drive transmission costs in addition to load growth. Therefore, any tariff design must recognize responsibility to pay the cost of these additions from load only customers.
		
		The use of the grid is evolving with more generation being constructed and some generation added closer to the end use customers. The rate design must take into account the economics presented to participants inherent in the transmission rate design.
		
		The largest problem from a transmission perspective facing all Alberta load customers' is the very high cost of transmission. Therefore, Conoco agrees that given this high cost, tariff design is extremely important. To give correct economic signals to load customers, a new rate design is required. Conoco agrees that some mitigation of rate increases, caused by the transition to a new rate design, should be mitigated. However, Conoco reiterates that this mitigation should have a reasonable term. The AESO may want to explore ways of allowing price responsive loads to add value for all ratepayers by designing further opportunities such as expanding LSSi or looking at non-wires alternatives from loads to defer further regional transmission expansion.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Conoco recognizes there are areas of disagreement in the tariff design discussions.
		
		Conoco believes that the current CP design is not efficient since it has created a significant response to very little benefit to all load customers. While this load response to CP may impact pool price in the hour of response, the value of the load response to pool price could be significantly greater if these price responsive loads focused solely on the pool price as opposed to the CP charge.
		
		While the load response has likely impacted the peak demand in the Province, there is no evidence that this response has deferred or eliminated transmission capital costs. The AESO has previously forecasted significant load growth, which lead to a significant expansion of the transmission grid. It is not clear that the AESO's load forecast was impacted at all by the response to 12 CP.
		
		Ideally, a rate design is based upon the principle of cost causation. However, where clear responsibility for a cost is unclear, such as the bulk costs, then other rate design principles must be relied upon. In these cases, cost responsibity and fairness must be considered. Any amount of load behavior cannot reduce transmission costs that have already been sunk.
		
		It is reasonable for the AESO to consider all of the policy initiatives currently underway as context for any rate design changes, including the Governments discussion on self-supply and export. However, this consultation on Bulk and Regional charges has gone on for over 3 years. It is now important for the AESO to apply to the Commission for a proposed rate design and for the Commission to clarify the future rate design in Alberta. Further delay in a rate design will impact customer cost analysis and lead to delays in capital spending a decline in economic growth.
		
		Conoco views that any rate mitigation should be temporary. If a customer cannot function under the new design then the Customer can apply for a load specific rate with the Commission.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	Conoco is in agreement with most of the AESO's considerations. Conoco awaits the AESO's specific rate design proposal.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Conoco is aligned with the areas of agreement on energy storage.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	Conoco has the following opinions on areas of disagreement on energy storage. Energy storage is a user of the grid for activities such as arbitrage, but if relied upon for transmission services, then storage could be a component of the grid. Storage should be viewed like other types of opportunity services, such as export and DOS. Storage should also pay STS costs. In that way, storage should pay for inflows and outflows like every other network user. As stated in Commission decision 2007-106 when discussing opportunity rates: • "P86 "The Board considers that opportunity service should be priced at no less than incremental variable cost of providing the opportunity service, and that opportunity service rates should also reflect the value of the opportunity service to the customer. " Therefore, the AESO should consider storage pricing at levels higher than the administration costs of providing the rate, but lower than value of service to storage (in order to attract storage to the grid).

9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	The AESO should view energy storage as an opportunity rate. Then the AESO should use the principles and calculations used in determining the export and DOS rates in creating a reasonable storage tariff. The AESO must understand the cost of storage and its value in order to design a rate that will create value for Alberta consumers.
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	The AESO should clarify its process for determining the appropriate rate design for Bulk and Regional rates.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	
12	Additional comments	Thank you for the opportunity of providing our input.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Rick Cowburn
Comments From:	Canada West Ski Areas Association	**Phone:**	(403) 397-8785
Date:	Jan. 12, 2021	**Email**:	rcowburn@vidya.ca

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	"On September 14, 2017, the AESO filed an application for approval of its 2018 ISO tariff application." We have now been at this for over three years. Everyone has said what they have to say, and the AESO has heard it all. All that is left is for the AESO to file the application, and for the Commission to rule.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	Marginal cost makes sense in a generation context, when considering the cost of adding additional peaking capacity; the capacity market exercise explored this at great length. Marginal cost makes no sense in a transmission context. "What is the marginal cost of a piece of string?" No generic answer is possible – it depends on the specifics of the situation. For good reason, Alberta has never implemented a marginal cost based rate. Let us not expend resources on a vague, undefined concept that can only lead to endless debate and dispute.

3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not?
	b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify.
	c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?
		This is surely the most difficult issue facing this tariff application.
		In this stressed economic situation, it is essential that transmission tariff changes not have a material adverse impact on any party.
		However a continuation of the current 12CP methodology would have widespread adverse impacts as some customers take advantage of the opportunity to shift costs onto others.
		There are at least three broad approaches to mitigation:
		• **Grandfathered cost-transfers**: Analyze past cost transfers achieved by individual customers & grandfather past levels of 12-CP response.
		  ○ Grandfathering is administratively complex & arguably unfair. (Note AUC's abandonment of grandfathering re substation fractions in ID 25848, see also https://ablawg.ca/2019/12/02/further-thoughts-on-the-law-and-practice-of-grandparenting/)
		  ○ However a backward-looking approach could demonstrably shield customers from disruption; a similar approach was implemented through deferral accounts in 2001 by the GOA to deal with the price explosion at retail market opening. This is perhaps the next best alternative after Rate Design.
		• **Rate design:** A rate design phase in would unfortunately continue the 12-CP cost-shifting incentives for some period of time at some reduced level. However this appears to be the most practically workable alternative. This need only apply to bulk charges, which could be divided into two pools, one pool recovered through the current 12CP method, one through another method (for example NCP). There are two billing determinants and two rates for bulk charges, and it's done.
		• Rate 'tinkering' through contract or ratchet changes seems unduly complex and unlikely to achieve balanced results.
		• **Bill adjustment:** This is just another way of looking at the rate design option. Consumption will change from month to month, and the resulting bill must change as a result. To calculate bill impacts one needs an 'old rate' and a 'new rate', whose difference can then be dealt with. This creates more billing and administrative complexity, with no obvious benefits compared to simply creating two bulk rate designs.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Efficient price signals: The AESO's planning documents demonstrate that generation additions, dispatch and line outages will be the primary drivers of most transmission system expansion. There is little point in implementing broad-based price signals for load at this time. Better to wait for the promised review of the T Reg, and see what emerges.
		
		Cost responsibility: User pay is the core concept of ratemaking, with usage being measured in various ways.
		
		In practice, no attention is paid to the historic drivers of facilities expansion, nor is that practical. The major exception is of course the Big Build, particularly CTI facilities, which were put in place as a matter of public policy and hence are a cost responsibility for all Albertans.
		
		Moving to an unratcheted NCP allocator & billing determinant would be one reasonable way of ensuring that all users contribute when they use the bulk system; retaining the regional charge's two year ratchet ensures that occasional or 'humalong' cogen users make a fair contribution, retaining many of the flexibility benefits of the current 12-CP approach while mitigating its cost-shifting potential.
		
		Minimal disruption: Given the chaos created by COVID-19, minimizing disruption due to tariff changes deserves the highest priority. We need to stop the 12-CP created bleeding of costs between customers, while mitigating the impacts of phasing out this cost shifting – and that's it. Customers need certainty as to future transmission charges, not creative constructs designed to benefit their proponents.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Efficient Price Signals: Truly efficient price signals should be targeted at new generation, not load. The money has now been spent, and what remains is a predictable squabble over who should pay, dressed up in fancy concepts like "economic efficiency" and "marginal pricing" to obscure the fundamental self-interest driving some proposals.
		
		Rather than seeking to create new 'winners' and 'losers', it is reasonable to accept the status quo for the moment and await further policy developments, particularly in this difficult economic situation.
		
		Cost Responsibility: Is a province-wide matter. The bulk of the bulk system costs were caused by provincial policy decisions, particularly CTI. Under the current legislation, generation pays essentially nothing for transmission, even though generation location is the fundamental driver of all transmission costs. Load-focused discussions of cost responsibility appear to be primarily driven by a desire to shift costs elsewhere, not by physical and legislative realities.
		
		Minimal Disruption: Now is not the time for change, other than to stop the bleeding.
		
		Permanent rate mitigation is impossible - all things must pass, and the Commission cannot permanently fetter its discretion. Permanent rate mitigation is just a way of avoiding the difficult decision as to how mitigation might be phased out. Certainty as to phase-out timing would be helpful to customers who need to plan their future activities.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	There is an unbridgeable gap between those who benefit from 12-CP and those who are paying higher costs as a result. Three years of discussion have only served to harden positions. The Commission will have to decide; the industry cannot.
7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?	No comment
8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not?	No comment

9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	No comment
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	The AESO's open stakeholder engagement process and the diligent work of AESO staff is much appreciated. This has been a long and difficult journey with a fractious band. We await the AESO's application, which will be controversial no matter what.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	To assess mitigation options, a POD-level database of monthly billing data is essential, as was suggested in CWSAA's earlier submission. All that would be required for status-quo based bulk tariff analysis would be each POD's monthly 12-CP demand and NCP demand, along with some corroborating data.
12	Additional comments	Addition of precisely targeted transmission rates options would be useful, where possible within the legislation's straightjacket. Locally targeted behaviours such as interruptible load or generation schemes may be of benefit, provided that they meet specific local needs and result in demonstrable deferral savings (which will be rare). Broadly available options such as interruptible rates would however just recreate the familiar scenario of customers jumping onto the rate when risk of interruption is low, and migrating off of it when interruptions become necessary (recall Class III interruptibles from the 1980's). A focused discussion of reasonable rates options might be useful, as parties might then be less inclined to 'talk their book' and more open to pursuing options in the broad public interest.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Christine Runge (Power Advisory)
Comments From:	DCG Consortium The DCG Consortium is comprised of the following members: BluEarth Renewables Inc., Canadian Solar Solutions Inc., Elemental Energy Renewables Inc., Irricana Power Generation, RWE Renewables Canad Holding Inc. and Siemens Energy Canada Limited. This submission represents the consensus view of the group and is submitted on behalf the group by Power Advisory LLC.	**Phone:**	403-613-7624
		Email:	crunge@poweradvisoryllc.com
Date:	2021-01-12		

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
	Initial Comment	The DCG Consortium has participated in this consultation based on the impact changes to the bulk and regional rates will have on DCG Credits. The Commission has recently initiated the DCG Credit Module for Fortis' Phase II Distribution Tariff Application (Proceeding 26090) which will consider whether DCG Credits should continue to be included in a distribution utility's tariff. Until the resolution of that proceeding, the DCG Consortium will continue to participate in this consultation on the assumption that there will continue to be a relationship between the DCG Credits and the bulk and regional rates. The DCG Consortium continues to be of the view that this consultation should be put on hold until a review of the *Transmission Regulation* takes place and resolution is achieved on a number of ongoing regulatory proceedings, including but not limited to the Distribution System Inquiry (Proceeding 24116) and Proceeding 26090 (collectively, the "Ongoing Matters").
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	

3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	The preference of the DCG Consortium was expressed in its comments to Session 3. Those comments are repeated here for ease of review: "Further, in the event that the AESO is filing for changes to its bulk and regional tariff design in 2021, the DCG Consortium supports the use of a grandfathering mechanism that protects investments that have been made in response to the existing tariff design. This would include grandfathering of both load customers as well as DCGs that have responded to the DCG Credits. If a grandfathering mechanism is considered to be overly complex, a transitional mechanism would be an acceptable substitute." "A grandfathering approach is preferable to a transitional mechanism as it allows companies that have made substantial investments in response to the existing tariff to earn a return on those investments whereas a transitional mechanism will limit the benefits available to those companies." This grandfathering approach allows existing DCGs to continue to operate under the regime under which these developers initially brought forward their generation projects, which is both just and reasonable. These comments reflect the DCG Consortium's preference for a permanent grandfathering of past rates for existing customers that have made substantial capital investments in response to the current tariff signals. This was not one of the AESO's five proposed mitigation options outlined on slide 56. Of the AESO's five options, the DCG Consortium prefers either the permanent bill reduction approach, described as "Bill increase of no more than X%" or the "phase in tariff charges" approach from AESO slide 56. Applied to DCGs, the permanent bill reduction would prevent DCG Credits from decreasing by more than X% permanently. In order to provide fully informed feedback on this approach, the DCG Consortium needs to understand the AESO's expectation of the magnitude of "X". The DCG Consortium suggests a low level of X that sufficiently prevents material disruptions to investments. Similarly, when discussing the phase in of tariff charges, the DCG Consortium needs to understand over how many years the AESO is considering this phase in. The DCG Consortium suggests a phase in term that is sufficiently long to prevent material disruptions to investments. Overall, DCGs are currently facing a significant level of uncertainty regarding the DCG Credits given the initiation of Proceeding 26090 and this consultation. The uncertainty as a result of the Ongoing Matters represent potential material changes to DCG Credits which increase investor risk and impairs future investment in the Alberta electricity market.

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		The DCG Consortium agrees with the statements included on the areas of agreement slide from the presentation.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Efficient Price Signals
		
		The AESO has not indicated how much the response to the 12CP tariff signal has reduced the costs of the transmission system over the past two decades. While we do not know the magnitude of the value, we do know that the response to that price signal – by price responsive load, self-suppliers, energy efficiency, and DCGs – has flattened Alberta's overall load shape. This flattened load shape should have reduced the need for new transmission infrastructure over the past decade resulting in material cost savings to load customers in Alberta.
		
		Tariff price signals should be forward looking, *i.e.* the rates should be designed to incent desirable behavior in the future. This requires the creation of variable rates wherein response to those rates results in cost savings to the end use customer. The 12CP rate fits into this category. If it has been determined that the behaviour incented by the 12CP charge is no longer desirable, the AESO should determine the desirable future behaviour and set variable rates to incent that behaviour.
		
		The AESO should design its tariff rates with a focus on incenting desirable behaviour for future development, rather than changes to rates that punish decisions already made by investors (including both loads investing in load reduction or onsite generation and DCGs).
		
		Cost Responsibility
		
		Cost responsibility is difficult to reflect in rates without changes to the *Transmission Regulation*. Alberta has a transmission policy wherein load pays for the delivery charges, regardless of the original need for transmission development, in order to facilitate a competitive energy market and transparency regarding delivery charges vs. energy charges. Under this policy, the transmission tariff should be more heavily focused on efficient price signals as compared to cost responsibility. The rates should incent desirable behaviour where possible and accept the constraints of the existing *Transmission Regulation*.
		
		Minimal disruption
		
		The DCG Consortium commented on this point in its previous comment matrix where it stated:
		
		"The DCG Consortium strongly agrees with Proposal 1 that this is not the appropriate time to engage in a major tariff redesign. To foster investor certainty, when and if any change is made to the bulk and regional rates, the new rate structure should be maintained in that form for 10+ years prior to being revisited again. This is extremely unlikely to be the case if the tariff

		is redesigned in advance of a review of the *Transmission Regulation* and resolution on a number of ongoing regulatory proceedings, including but not limited to the Distribution System Inquiry (Proceeding 24116) and the DCG Credit module for Fortis' Phase II application (Proceeding 26090) (collectively, the "Ongoing Matters")." "The DCG Consortium prefers Proposal 1. While the status quo may not be the best outcome in the long run, maintaining the status quo until the Ongoing Matters are resolved is the only responsible path forward. Investor certainty and regulatory efficiency require that we do not waste time debating a new tariff structure only to have it changed again quickly thereafter. Further, given regulatory lag (the AESO has noted that this tariff may be in place by January 1, 2023), this tariff design may never be fully put into place if a new *Transmission Regulation* comes into place part way through the regulatory process. The current *Transmission Regulation* is set to expire at the end of 2021." From a regulatory efficiency perspective, it would be desirable for Proceeding 26090 to be concluded prior to continuing with this consultation. However, until that proceeding is concluded, DCGs need to continue to participate in this consulstation under the assumption that there may continue to be a link between these the bulk and regional rates and DCG Credits. Further, and as previously noted, in the bigger picture, this consultation should be put on hold under the government reopens and reviews the *Transmission Regulation*.
6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	The DCG Consortium supports the release of a bill impacts tool prior to the final AESO session. The DCG Consortium continues to suggest this consultation be put on hold until the resolution of some or all of the Ongoing Matters.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	(1) It is difficult to determine if there is a concern with the use of marginal rates without understanding the magnitude of those marginal rates. Please provide approximate example rates for this rate design similar to what was done previously (*i.e.* the AESO provided a workbook suggesting the regional 120CP would be set at approximately $1,000/MW x 120 hours a year.) (2) As noted in response to question 3, in order to provide informed comments on the various mitigation proposals outlined on AESO slide 56, the AESO must provide values in place of the Xs. Specifically, the DCG Consortium is interested to know the number of years over which the AESO is considering a tariff phase in and the percentage of permanent bill reduction.
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Dale Hildebrand
Comments From:	Dual Use Customers			**Phone:**	403-869-6200
Date:	2021/01/12			**Email**:	dale.hildebrand@desiderataenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	At this stage of the engagement the information provided is still very high level without any analysis and study (e.g., cost of service study) to support the AESO's proposals.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	The embedded costs cannot be ignored. Cost causation and rate design must consider what created the costs in the first place. A marginal cost approach is appropriate for incremental costs, not embedded costs. Tariff price signals need to address both embedded and incremental costs.

3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	The significant increase in transmission bulk system investment is a combination government policy (e.g., *Transmission Regulation* requiring congestion free system), government fiat (e.g., Bill 50 directing critical transmission investment) and poor transmission planning decisions (e.g., SATR building transmission to serve wind generation that has not materialized). These transmission system costs were not caused by or built for price responsive customers or cogenerators. Therefore, rate mitigation measures need to be permanent to price responsive and cogenerators customers impacted by large rate increases. The rate mitigation measures should be commensurate with the level of rate shock imposed. If the proposed rate increase amount to severe rate shock (e.g., a rate increase to any one customer greater than 20% more than the average rate increase to all customers in aggregate) then 12 CP should be retained for existing customers. The DUC discourages utility tariffs that differentiate between existing and new customers. So called "grandfathering" creates administrative issues that are exacerbated over time and can be patently unfair to either existing or new customers. In our view, grandfathering has no place in Alberta's competitive electricity markets. However, faced with severe rate shock, grandfathering may be a requirement. Perhaps an appropriate mitigation option to severe rate shock would be for the AESO to develop two DTS type rates – one that applies to existing customers (12 CP for mitigation) and one for new customers (with a new AUC approved rate design). Large rate increases (severe rate shock) should not be rolled in over time; rate mitigation needs to be sustainable and permanent. We note the following from the AESO's January 4, 2021 Stakeholder Newsletter: > The AESO recognizes that the concept of bookends, shared at our Sept. 24, 2020 session, and associated rate impacts has created much angst and concern among certain stakeholders. We want to take this opportunity to clarify that it has never been the AESO's intent to move forward with a one-time +100 or +130 per cent rate increase to broad groups of customers in our bulk and regional rate design development. While this clarification is welcome, revised tariff designs that result in severe rate shock will need to be justified based on sound cost of service study results and industry standard rate design principles. To date, we have not been provided with proper justification for the rate increases proposed by the AESO. If large rate

		increases are found to be justified, then permanent rate mitigation (i.e., 12 CP) is required for those customers faced with severe rate shock.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Efficient Price Signals:
		
		12 CP provides a very strong price signal that we continue to believe is appropriate for future tariffs. All of the other tariff proposals will have a weaker price signal that will lead to increased transmission investments over time and higher power pool prices (as price responsive loads will be less motivated to reduce demand during times of the system coincident peak).
		
		Cost Responsibility:
		
		The major transmission build was intended to provide congestion free transmission primarily for renewable generation, increased reliability and provisions for future load growth - these reasons lead to firm loads being cost responsible. The major transmission build was not driven by price responsive loads or cogenerators, yet the AESO believes these customers should be subject to astronomical rate increases.
		
		Until the Transmission Regulation is revised, load pays for transmission wires costs, regardless of why the costs were incurred.
		
		Minimal Disruption
		
		As noted above, there should be mitigation for existing customers who will be subject to severe rate shock. A fair and appropriate mitigation option to severe rate shock is for the AESO to develop two DTS type rates – one that applies to existing customers (12 CP for mitigation) and one for new customers. However, the DUC remains concerned that any new tariff design that discourages new load from connecting to the Alberta grid will not help lower transmission tariff rates over time.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Efficient Price Signals:
		
		DUC submits that 12 CP price signals are efficient and forward looking.
		
		Cost Responsibility
		
		Both cost causation and cost responsibility should be utilized for rate design.
		
		DUC disagrees that 12 CP has not influenced transmission costs - in the absence of 12 CP transmission investments could have been even higher.
		
		Transmission investments have been driven by factors in addition to peak loads – this does not negate the reasons why 12 CP continues to be the appropriate rate design for Alberta in the future.
		
		Minimal Disruption
		
		The DUC does not understand how a rate design change will “stop the bleeding”. Shifting costs from one group of transmission customers to another will do nothing to reduce past or future transmission investments. Alberta electricity consumers need new load to help pay for the transmission that has been built – the AESO’s proposed tariffs will result in load reductions and discourage new investment that could lead to load growth.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	Until the Alberta government provides clear policy direction that a transmission rate design change is required the AESO should not be proposing radical tariff changes that will financially impact the province (jobs, taxes, economic growth and prosperity, etc.).

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		The AESO should start from the premise that load pays for all transmission costs except losses. If for example, energy storage can provide competitive ancillary services, then the AESO should find innovative ways to procure these services. To the extent energy storage competes with other generators for the provision of electricity, the DUC echoes IPPCA's perspectives:
		• Energy storage-related transmission costs should be based on cost causation.
		• Treatment of energy storage projects needs to be fair to other entities, and consistent, in order to provide certainty and stability for potential investors.
		• The AESO should consider modelling and reporting on energy storage projects in Alberta, including metrics to evaluate their use of the transmission system. This reporting should be made publicly available.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	See 7 above. Concessions for energy storage may be appropriate for the provision of lower cost ancillary services. The AESO has provided special provisions for different types of generations to accommodate their unique attributes, for example, the lack of wind dispatchability.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Energy storage should be enabled in a manner that provides value to Alberta electricity consumers**.**

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Rate mitigation is critical for Alberta at this juncture and should be determined before any further tariff development is pursued.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	The DUC continues to not understand the AESO's rational for pursuing the proposed rate design at this time, and in the absence of an industry standard cost of service study.
12	Additional comments	If the proposed tariff changes are politically driven, then please make public the Alberta government's policy directives.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	EDF Renewables Development Inc.
Comments From:	CanREA			**Phone:**	416-557-9155
Date:	2020/01/12			**Email**:	David.Thornton@edf-re.com

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	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	It is important that the AESO pursue mitigation options that do not result in large stranded costs for market participants that relied on the price signal in the market. EDF believes that stability and a reliable investment framework is important for the long-term sustainability of the Alberta market.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Efficient Price Signals
		• There is value in price signals but the types of signals should be expanded in scope. Load attraction rates, for example, should be considered to locate new loads in areas that reduce transmission needs (such as high renewable generation areas)
		• Interruptible tariff also makes sense for those not using the system as firm power as long as the AESO accounts for the curtailable load in its planning.
		Minimal Disruption
		• Minimizing disruption will reduce the risk of stranded capital for those market participants that have already made investments based on the current tariff rate structure. This is applicable both to loads and generators (distribution connected in particular).

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Minimal Distruption
		• There is no immediate need to alter the tariff other than for the storage question. A delay to determine whether potential changes to the T-Reg would impact the end point is reasonable.
		• Mitigation does not need to be permanent but should be tied to the reasonable investment horizon, i.e. if an investment was made that has an expected life of 20 to 30 years, the mitigation should be for a similar timeframe (if it was made prior to the potential tariff changes being undertaken.)

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Energy storage is a unique technology. It should be treated in a FEOC manner, and this requires a storage tariff that does not distort real-time decision making for storage. EDF will provide further comments on specific storage tariff proposals but notes the key point is that storage can be utilized to improve market efficiency and reduce transmission requirements if the tariff sends appropriate signals.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	**Energy Storage as a User of the Grid or Component of the Grid** There may be storage facilities that are users of the grid or components of the grid or both. The key is that the tariff approach and the market rules support both uses without creating inefficient price signals in the real-time energy market nor discourage storage investment. **Payments for Inflows and Outflows** The key point is storage is generally not using electricity but rather changing the timing. Adds efficiency to the market). The price signal should not distort real-time decision making for storage optimization. For example, storage should not avoid charging in low energy priced hours simply because of tariff considerations unless there is an actual congestion concern with charging at that time.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	
11	Do you have additional clarifying questions that need to be answered to support your understanding?	
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Justin Rangooni
Comments From:	Energy Storage Canada			**Phone:**	647-627-1815
Date:	2021/01/12			**Email**:	jrangooni@energystoragecanada.org

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	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Energy Storage Canada (ESC) found Session 4 valuable for building a shared understanding of agreement and disagreement on future tariff design as the AESO intended.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	The status quo embedded cost approach divides the costs between a demand allocation and energy allocation based on minimum system needed to serve load (i.e., demand allocation) and the actual or optimal system (i.e., energy allocation). The marginal cost allocation approach is derived by determining the change in cost to serve one more customer/MW with next increment of capacity. A core issue the AESO has focused on is the rapid growth of network investments (see slide 47) over the past decade and the need to ensure sufficient funding is collected. While a focus on existing total costs is important in the near-term, that focus may not address the drivers for future network investments that could reduce the compounding of additional network investment costs. ESC supports a cost allocation approach to incentives consumption behavior that maximizes the use of existing network investments and decreases the potential for future network investments. At this time, it is not clear to ESC whether an embedded or marginal cost allocation approach is better suited to address the challenge of maximizing existing investments and minimizing future investments.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here? Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	ESC supports interruptible/standby rates as mitigation options in rate design. Rate design that provides both adequate cost recovery and increased optimization of network investments is an appropriate path forward. Interruptible/standby rates can recover a portion of total costs while providing a signal for consumption that avoids future costs in the system due to constraints.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
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	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Yes, ESC believes generally the AESO has captured areas of disagreement as presented in Session 4.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behavior has not influenced those costs?
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Yes, ESC believes generally the AESO has captured areas of disagreement as presented in Session 4.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	The AESO states that total costs are not changing; however, there are a number of potential transmission network investments under consideration. It would be beneficial for the AESO to describe the future system development expected and how much total costs may change over the next decade as a new tariff design might be implemented. This would provide guidance on the difference between cost causality and cost responsibility.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Yes, ESC supports the areas of agreement identified by the AESO in Session 4. ESC has consistently agreed with the AESO that energy storage is a unique asset that should be considered as so in tariff design.
		
		In addition to the list of participation in Alberta's electricity use-cases presented by the AESO, ESC notes that new market products are being developed that energy storage can offer (e.g., fast-frequency response)

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	In general, ESC is supportive of the areas of disagreement for energy storage presented in Session 4. The areas of disagreement accurately summarize the key topics that must be addressed in developing a unique energy storage participation type within the AESO tariff design. The attributes of energy storage are different that other network users (i.e., load and generators) and should be considered when developing energy storage tariffs. As discussed during Session 4, tariff treatment of energy storage as a transmission alternative must be considered carefully. As an efficiency tool for electricity systems, the value proposition of energy storage is different than other resources. If storage should pay charges for the transmission system, the value provided in avoiding future transmission investments and maximizing the use of the existing system should be appropriately attributed to storage.

9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	If energy storage is considered to be both a user of the grid and a component of the grid (e.g., storage as a transmission alternative), it would be beneficial for the AESO to describe how the value of using storage to avoid higher cost options (e.g., wires solutions) to meet electricity system needs is reflected in storage tariff design. Related, if storage is expected to pay for system charges (e.g., administration, O&M, POD, regional, bulk), it would help for storage entities to understand how the natural operation of energy storage assets (i.e., charge during unconstrained off-peak hours and discharge during constrained on-peak hours) will be considered by the AESO for cost allocation. Under the AESO's third option presented in Session 1, there would be a lower rate applied to storage under an interruptible service. As presented by ESC, administration and O&M costs are appropriate charges for energy storage to pay. What portion, if any, of POD/Regional/Bulk charges that should be included in the lower interruptible service rate for storage is a key area of discussion. The portion should reflect the increase in utilization of the existing and future electricity system by the actions of energy storage.
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	None at this time.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	None at this time.
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Mark McGillivray
Comments From:	ENMAX Corporation			**Phone:**	
Date:	2021/01/12			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	No comment.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	The vast majority of wires costs are fixed, so it will be extremely difficult (if not impossible) to find a marginal cost approach that produces a fair cost allocation across all transmission-system users. The use of marginal costs in the energy market makes sense because the resource mix and the associated costs can change materially as the load increases from (say) 8,000 MW to 11,000 MW. Said another way, the next megawatt consumed (or not consumed) can materially affect supply costs. However, since the transmission system is built to handle the 11,000 MW, there is no difference in fixed costs when demand is 11,000 MW compared to when it is only 8,000 MW; the next megawatt consumed (or not consumed) makes little to no difference. Consequently, a marginal cost allocation is very unlikely to meet the AESO's rate design objectives. As noted in our response to Question 5, a tariff design objective is to achieve a fair allocation of fixed costs.

3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	While ENMAX does not currently have a preferred option, we support a mitigation path with minimal disruption. The most appropriate mitigation path will depend on the rate design choice selected.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		See response to Question 5.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behavior has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		ENMAX recognizes that there is room for improvement in the current tariff design with respect to more efficient price signals and future cost allocation. However, in keeping with our previous comments submitted to the AESO, we support a path with minimal disruption and believe that major changes to the existing tariff design are premature at this time.
		
		Regarding cost responsibility, ENMAX is of the view that cost recovery must be based on the cost of providing each transmission service and an appropriate allocation of that cost across all customers.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	See response to question 5 and 10.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		ENMAX understands an energy storage facility to look like a generator when it is producing power and a load when it is absorbing power. It makes no difference to the physical transmission system whether power is flowing from a generator or an energy storage facility, and it also makes no difference whether power is flowing to a conventional load or an energy storage facility. Also, batteries are not the only possible energy storage facilities: pumped storage hydro, compressed air energy storage, and hydrogen production using wind energy are other examples. Technology agnosticism means that a tariff design must not favour one technology over another.
		
		ENMAX agrees that an energy storage facility can participate in Alberta's electricity use-cases by providing energy price arbitrage, operating reserves and non-wires solutions for transmission (and distribution) deferral.
		
		ENMAX agrees that energy storage should be treated in a FEOC manner. The preservation of a FEOC market in which no participant receives unearned advantages is a legislative requirement.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	Energy storage does not necessarily provide benefits to the grid in all cases. For instance, it may be considered a grid component if structured to charge/discharge at certain times for stability or reliability reasons, in which case it should be paid as would any provider of those services. However, if it is independently owned and operated, and participating in price arbitrage, then it is not a component of the grid and its compensation should be through that arbitrage. Either way, it is grid connected. Since all connected sources and sinks use the network, all should pay a fair share of transmission costs—including administration, operations, etc.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	See response to Question 10.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	The storage roadmap is still being worked on and there are a number of interrelated issues that remain outstanding, including the potential for changes to be made to the transmission policy and regulation. As such, ENMAX cautions against making major changes to the existing tariff design at this time. ENMAX trusts that the AESO will conduct a fulsome consultation with stakeholders prior to filing its application with the AUC and make adjustments to the timing of its application as needed.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	No comment.
12	Additional comments	No comment.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Gerald Zurek
Comments From:	EPCOR Distribution & Transmission Inc	**Phone:**	780-412-3243
Date:	2021/01/12	**Email**:	gzurek@epcor.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	EDTI found the session valuable.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	EDTI believes that an embedded cost allocation approach is appropriate as the majority of the AESO's costs, i.e. TFO rates, are developed using an embedded cost allocation approach.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	a) EDTI prefers the rate design mitigation approach as EDTI believes that this approach will be easier for DFOs to implement and easier for DFOs customers to understand. b) EDTI is not aware of any additional mitigation options. c) EDTI believes that the AESO's mitigation measures need to achieve an orderly transition to the new rates limiting the magnitude of the bill impacts with each change.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		EDTI generally supports the areas of agreement.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		EDTI generally supports the objectives of efficient price signals, cost responsibility and cost caustion and has an appreciation of the areas of disagreement. Further, EDTI believes that comprimises will be required to balance these sometime opposing objectives.
		
		Regarding minimal disruption EDTI believes that the AESO needs to more forward with changes to its tariff with mitigating measures.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	As noted in its response to question 5 EDTI believes the compromise will be required to achieve some aspect of the objectives of efficient price signals, cost responsibility and cost causation.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		EDTI is generally supportive of the areas of agreement. EDTI notes that energy storage may also participate in Alberta's electricity market as non-wires solutions on distribution systems.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	EDTI believes that storage should be treated as load when taking energy from the AIES and shold be treated as supply when delivering energy to the AIES.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Refer to EDTI's response to question 8.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	EDTI has no comments.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	EDTI has no questions.
12	Additional comments	EDTI has no additional comments.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Jordan Balaban
Comments From:	Greengate Power Corporation	**Phone:**	403 930 1300
Date:	2021/01/12	**Email**:	jordan@greengatepower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable in understanding the alternatives available and the AESO's assessment of the alternatives offered by participants.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	For the bulk cost allocation, Greengate views the existing embedded approach is the most reasonable. Alberta's system build has recently expanded substantially. If a marginal cost approach were used in such a bulk system with significant new and expanded capacity, the marginal cost of the next MW of capacity would likely be very low. This leaves an embedded approach as the more reasonable method to recover costs.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	New projects should face the new rates immediately after their implementation. Mitigation should be implemented to cover a short-term period, phased in if appropriate, and designed to account for some of the sunk capital that was invested assuming the current CP design. Mitigation should be designed to avoid an artificially induced "rush" to meet deadlines imposed by the mitigation.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Efficient Price Signals
		Greengate believes that price signals matter.
		Cost Responsibility
		Generation also cause wires development, and this should be recognized in the AESO's rate design for loads. The AESO should also design rates that recognize the unique value of storage.
		It is important that the next AESO tariff provide clarity to market participants after a lengthy examination of the bulk and regional tariff design. This should include a storage-specific rate that allows the system to plan for the value of current and future technology.
		Minimal Disruption
		Greengate believes that at this time, it is important to minimize disruptions and rate shock.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Efficient Price Signals
		
		Greengate acknowledges that disagreement exits over the efficiency of price signals with the Bulk charge. To be efficient the outcome of the pricing signal must create an appropriate response.
		
		Cost Responsibility
		
		Since much of the system costs have already been spent and the cost causation may not be clear, changes to rates must respond to other principles.
		
		Minimal Disruption
		
		Although policy uncertainty is a factor, rate changes cannot be delayed indefinitely. This is a source of uncertainty in itself, and can cascade into further policy uncertainty. After a period of three years on this bulk and regional process, it would be beneficial for market participants to understand how future rates will be structured.
		
		It is essential that a storage-specific rate be implemented in the next tariff application to create certainty for investors.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Greengate is supportive in all areas of agreement.
		
		Energy storage has unique characteristics that make it reasonable to implement a storage-specific rate in the next tariff. Like other participants, Greengate shares the concern that regulated transmission and distribution facility owners will be the main, and possibly only, investors in stand-alone storage if a unique tariff treatment isn't created. The AESO should allow a competitive market to grow for storage.
		
		Additionally, load, generation, and provincial interties receive differential tariff treatment to accommodate and receive the value of their unique requirements. The system and ratepayers should receive the greatest value for storage, which would accommodate an efficient rate for storage characteristics and would not restrict the competitive landscape for storage.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	Although there are some areas of slight disagreement, Greengate believes that there is enough agreement to move a forward in the next tariff with a storage-specific rate. When used for arbitrage, storage could be considered a user, while it is a component of the grid when used as a non-wires solution or other grid support. It is not reasonable, however, to put it in either category in considering how it should be treated in the AESO tariff. It is an existing, and evolving technology that offers great value to the grid, and a unique rate should accommodate these properties. Among other participants, Greengate believes it is reasonable to view storage similarly to other opportunity services like DOS and XOS. In order to attract storage to the grid, storage rates should exceed the administrative costs of providing service but remain lower than the value of service to storage. Storage should pay STS-related costs. With storage paying an opportunity rate for charging and the STS rate for discharging, storage would pay for inflows and outflows.

9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	The principles of the AESO's opportunity rates (DOS and XOR) should be applied to design a storage-specific rate. In Decision 2007-106, the Commission's view of these opportunity rates is useful in considering the appropriate charging rate: "The DOS rate has traditionally been priced in a manner to entice customers who would not otherwise be willing to pay the full DTS rate to use the transmission system for certain portions of their energy requirement. While it is a discounted rate, the DOS rate has been designed such that customers would not be enticed to use the DOS rate as a replacement rate for the DTS rate for their base load" […] The XOS rates were designed to recover all variable costs and also a contribution to fixed costs, to reduce the average level of rates charged to other customers. The resulting costs attributable to Rate XOS 1 Hour and to Rate XOS 1 Month were presented in the Application." Storage rate design principles should include that opportunity rates are partially designed to attract assets. The storage rate should recognize that storage should pay for some fixed and variable costs. This approach is necessary and appropriate because storage offers value to the grid that other assets cannot provide.
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Frequent check-ins with Market Participants is requested so that the AESO's proposed filings have the most appropriate level of stakeholder consultation.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Kurtis Glasier
Comments From:	Heartland Generation Ltd. (“Heartland Generation”)	**Phone:**	587-228-9617
Date:	[2021/01/12]	**Email**:	Kurtis.Glasier@heartlandgeneration.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Overall, Heartland Generation believes Session 4 was valuable and the AESO did a good job summarizing and characterizing the different rate design proposals. However, there is still little hard evidence to support a change in rate design; it seems that the AESO and stakeholders are only just establishing the theoretical framework with which to evaluate different tariff design options, without being given the opportunity to consider the evidence or analysis that would support one option or another. This is particularly problematic given that the AESO is proposing to present its preferred, final option at the next stakeholder session.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	Heartland Generation understands that both methodologies may theoretically meet the AESO's rate design objectives, but likely with varying degrees for each individual objective. For instance, the marginal approach may more fully meet the rate design objective of sending efficient price signals, whereas the embedded approach may achieve minimum rate disruption better as the regulator and stakeholders are more familiar with this approach. Rate design is often about tradeoffs, as the more efficient design may come at the cost of simplicity or minimal disruption.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	Heartland Generation finds it difficult to comment on mitigation options without first knowing the preferred rate design that the AESO is trying to accommodate. For instance, a mitigation approach that is trying to accommodate for a 100% or more bill increase will look very different than the approach to accommodate a much smaller bill increase. It seems presumptive to assume a significant bill impact, while the preferred rate design is not yet known to stakeholders. c) Any mitigation plan employed by the AESO should avoid rate shock and limit regulatory holdup, to the extent possible. Mitigation should be transitional, clearly outlined and appreciate the significant investment that many loads have made to react to the currently approved price signals. The AESO may also want to consider the addition of new rate classes as a proposed mitigation plan. For instance, a subset of DTS customers who are highly elastic and readily respond to the 12-CP signal may be eligible for a different class of treatment from the typical DTS customer.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Heartland Generation appreciates IPCAA's characterization provided in the Session 4 Summary: "We can all agree that we want Alberta to be an attractive place for investment and have a rate that works for the province. We need something that works for the long term and the bigger picture is a system that makes us a place that succeeds. Going forward, we need to look at the arguments more through that broader lens." The AESO needs to consider not just how we divide the current "pie", but how we achieve the right size of "pie" in the future.
		
		The socializing of transmission costs that could be deferred by behavior may only serve to increase the transmission cost burden in the future and lead to load behavior response that is much more severe (load growth reversal, participant exit). All participants want to ensure a fair and just rate design, which appreciates the diversity of needs and characteristics of all market participants.
		
		Finally, Heartland Generation does not agree that "Tariff charges are more *important* than ever before" and would clarify that due to their size they are only more "significant". Tariff charges and the correct behavioural signal they indicate have always been important and continue to be important to those parties that are able to react to the signals.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Heartland Generation does not take issue with the AESO's characterization of the areas of disagreement. It is worth noting that most of these areas of disagreement will need to be addressed by the AESO, either explicitly or inherently, in whichever preferred rate design is ultimately submitted to the Commission for approval. As such, the AESO should indicate their position on these areas of disagreement through this stakeholder engagement process.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	As stated above, the AESO should indicate its position regarding these areas of disagreement. This would include the analysis that the AESO's position relies upon in reaching these conclusions, and how that position aligns with the preferred rate design that it has selected.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Heartland Generation does not take issue with the AESO's characterization of areas of agreement for energy storage.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	Heartland Generation does not take issue with the AESO's characterization of areas of disagreement for energy storage.

9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Heartland Generation remains supportive of a rate class solution for energy storage, rather than an overall rate design solution. As energy storage acts as both a load and supplier of electric energy, it may be more appropriately handled as an opportunity service with the addition of a rate class similar to IOS/XOS. This could allow for energy storage, or other qualifying customers/facilities, to pay for costs directly related to the unique attributes of its facility and would not require overall bulk and regional tariff changes to accommodate. It is important to continue the characterization of energy storage as a market asset, rather than as a transmission asset, for the physical reality that energy storage must charge or discharge energy and this necessarily impacts the wholesale electricity market, to varying degrees.
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Session 5 will include the AESO presenting their preferred rate design, as such it would be helpful to receive these materials as much in advance as possible. The session in February has a lot of facets to be discussed, so having familiarity with the proposal prior will allow stakeholders to better participate in the session.

11	Do you have additional clarifying questions that need to be answered to support your understanding?	Generally, Heartland considers that the AESO's analysis to support a change from the status quo (12CP) raises more questions than it answers. Until recently, the AESO had indicated that the bulk system was built to serve peak load, and 12CP has been repeatedly approved on that basis; however, the AESO is now stating that "recent transmission projects are not only peak demand related" and that these projects were caused by "multiple different drivers." The AESO's support for its new-found position appears to stem from the correlation (or lack thereof) between coincident metered demand and network costs over the past decade, as shown on slide 47. However, much of the network investment over this period was in the form of Critical Transmission Infrastructure, which was mandated by the government. Does accounting for this considerable share of network costs influence the interpretation of this relationship? Furthermore, does the extent to which network expansion was driven by factors other than coincident metered demand impugn the AESO's planning? In other words, given that the AESO made it clear in the past that system peak does drive the need for bulk system expansion, does this lack of correlation indicate a failure in its planning, and not necessarily an underlying flaw in the tariff design? Heartland Generation, and likely other stakeholders, would appreciate the evidence that the AESO used to reach this conclusion and if the AESO could please identify which drivers do determine transmission planning and costs. Slide 49 provides rationale without supporting evidence; seeing the quantitative analysis regarding the alleged misalignment of the price signal from the future transmission cost savings would be helpful. Currently, the evidence mostly shows that customers are responding to the signal but has failed to adduce how this leads to an inefficient result, or why the transmission build signal differs from the load behaviour signal.
12	Additional comments	Heartland Generation does not have additional comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Vittoria Bellissimo
Comments From:	Industrial Power Consumers Association of Alberta (IPCAA)	**Phone:**	403 966 2700
Date:	2021/01/12	**Email**:	Vittoria.Bellissimo@IPCAA.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The December 10th session was not overly valuable to Alberta's industrial consumers. At this point, customers are confused as to why the AESO is redoing its tariff in this economic climate. Customers are also looking for actual proposals and a mechanism to evaluate the impacts of these actual proposals on their bills. IPCAA expects that the February 25th Session will be more valuable. IPCAA thanks the AESO for scheduling the March 2021 Technical Session to review the updated Bill Impact Tool. IPCAA encourages the AESO to limit the scope of this session and focus on customer needs and customer understanding of the Bill Impact Tool. It may be beneficial to run a separate session for Energy Storage. Load customers will have plenty of questions to fill this session. A review of the bill impacts of the mitigation options is expected at the March Technical Session. Please let us know in advance if this will not be provided.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	As the AESO indicates, the status quo classification between demand and energy charges is based on an embedded approach to cost allocation. At this point, there has not been a good case made as to why a departure from this approach is appropriate. IPCAA is concerned with a marginal/incremental approach in that it may exclude past investments from consideration in the future rate design. In order for rate design to be effective, it must remain in place for sufficient time to allow those who react to the price signals to capture value. Changing the rate design will impact customers who made good faith investments.

3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	a) IPCAA has significant concerns with the Bill Adjustment approach. It raises several questions: • How do you determine how much bill credit one customer should get versus other customers? • Which entity (AESO? AUC? DOE?) decides how much bill credit is appropriate for a customer? • What is the recourse for customers who feel they have not been dealt with fairly? • What information is required by the deciding entity and how is the evaluation conducted? Instead of grappling with these fairness issues, it would be more appropriate to develop a standby interruptible tariff that works for flexible customers and adds value to the system. b) Ramsey pricing should be considered as a rate design approach. c) The AESO needs to implement a system that does not force any customers out of business or out of the province. We need more load in Alberta, since we built a wires system for much more load than we currently have.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		IPCAA has no major concerns with most of these areas of agreement; however, the line: "Tariff charges are more important now than ever before" is questionable. First of all, the AESO is not taking any responsibility for the fact that transmission costs have risen at a rate that is not reflective of the underlying load growth on the system. Second of all, perhaps we missed a window for tariff changes before the big build, when some of the $17B of transmission infrastructure could have been avoided. Finally, IPCAA continues to object to the AESO's proposal to overhaul the tariff at this time, during a global pandemic, when there are many elements that have not been resolved that will ultimately impact the ISO tariff causing further revision, including:
		• The Transmission Regulation being re-examined by government by the end of 2021
		• Government changes related to self-supply and net-export expected in the spring of 2021
		• AUC changes resulting from the Distribution System Inquiry (such as aligning transmission and distribution rates). Further proceedings expected in 2021.
		• AUC changes to sub-station fraction and DCG credit issues need to be addressed.
		
		The AESO should work with both the DOE and AUC to resolve the issues impacting the tariff, prior to changing the tariff. The timing for a change is pre-mature. Customers do not want to see two major tariff overhauls in short order.
		
		As mentioned at the AESO session, IPCAA would support higher level areas of agreement being included in this list, such as:
		• We can all agree that we want Alberta to be an attractive place for investment and we need a rate that works for the province.
		• We need a rate design that works for the long-term and the bigger picture goal is an electricity system that makes Alberta successful.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		IPCAA agrees that there is no consensus amongst the AESO and stakeholders on these issues.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	If the AESO agreed that a tariff overhaul is premature, IPCAA could agree with: Minimal Disruption – now is not the time for a change.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		IPCAA has no major objections to these areas of agreement on energy storage. As stated previously, IPCAA provides the following high-level perspective:
		• Energy storage-related transmission costs should be based on cost causation.
		• Treatment of energy storage projects needs to be fair to other entities, and consistent, in order to provide certainty and stability for potential investors.
		• The AESO should consider modelling and reporting on energy storage projects in Alberta, including metrics to evaluate their use of the transmission system. This reporting should be made publicly available.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	IPCAA agrees that there is limited consensus amongst the AESO and stakeholders on these issues.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Energy storage should be enabled in a manner that provides value to Alberta consumers. This can be demonstrated with publicly available reporting.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Please see comments above on: • Question 1 – regarding the expectations of the March Technical Session; and • Question 4 – regarding how a tariff overhaul is premature at this time.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	Not at this time. IPCAA will likely have many clarification questions after the February 25th Session.
12	Additional comments	IPCAA recommends that the AESO consider the Alberta Direct Connect Consumer Association (ADC)'s rate design proposal, including Firm and Non-Firm Rates, and evaluate and report on this proposal.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Erika Goddard
Comments From:	Lionstooth Energy			**Phone:**	
Date:	2021/01/12			**Email**:	erika.goddard@lionstoothenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	While the session was valuable, it is becoming increasingly apparent the AESO is proceeding with changes to B&R rate design, regardless of the areas where there remain material differences between stakeholders and the AESO, particularly the strongly expressed position by some that a change is not required and should not be pursued in today's economic environment. Any changes to B&R rate design must consider first and second order impacts. Load has responded to effective B&R price signals, as is evident in the relatively flat CMD over the years. It is important to note that it is not just increasing wires charges but also declining costs of on-site solutions, including energy efficiency and load management, that have driven investment, some of which would have occurred regardless of B&R rate design. Increasingly, the conversation has been shifting to those factors, other than load, that cause B&R wires growth (i.e., TCG, policy). A focus on "unwinding" the response to existing rate design by removing the link between load response and billing determinants, like CPD, is unlikely to resolve these concerns, and has the real potential to introduce new issues. The burden of proof is on the AESO. In order for further efficient and effective discussion, we must have quantitative studies, to justify the need for change,

		evaluate any rate design alternatives, and analyze both the impact and response from customers.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	No. It is our understanding that our market has historically used the embedded approach and so any change from using this approach would need to be supported quantitatively. To date, we do not believe this evidence has been provided. We note that the AESO has commented that rates under a marginal approach were not available at the time of Session #4. It is therefore premature to continue discussion on any alternative allocation approaches.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	We have a strong preference for a market where mitigation is not required. If mitigation is required, we prefer rate design mitigation options, specifically introduction of rate classes. Any mitigation options that include annual rate increases within an impact threshold or that would not come into effect until at least 2023, require careful consideration of the signal being sent to loads.

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
		We do not believe there is full support for these areas of agreement from all stakeholders. For example, there is strong support and agreement among a large group of attendees to maintain the status quo, an area of agreement not shown here.
		• **Efficient Price Signals:** Yes, price signals provide incentives for customer behaviour. However, tariff rate design signals only flow to Tx connected loads and DFOs. As such, these price signals are not effective on the other elements driving wires growth, nor is there alignment between Tx and Dx tariffs.
		• **Cost Responsibility:** We strongly disagree with the concept of cost responsibility or any concept that looks to assign cost based on value. The introduction of cost responsibility appears to be an unintended consequence

	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		of factors other than load driving wires system cost increases. Our market has long relied on cost causation.
		
		As our market evolves, we must consider the future vision for the integrated electric system, and pursue change across the broader perspective, not just focus on what could resolve immediate concerns without consideration of longer-term impacts.
		
		• **Minimal Disruption:** Further to our comments above, we agree with a path forward that is minimally disruptive, noting that consideration of the broader perspective may suggest that remaining with the status quo, until such time that other impactful issues may be progressed or resolved, would also be minimally disruptive.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		We do not believe there is full support for these areas of disagreement from all stakeholders.
		
		• **Efficient Price Signals:** In our view, there remains insufficient evidence to suggest a change from the status quo would be any better than any rate design alternatives.
		
		• **Cost Responsibility:** The primary mechanism for allocating costs should be based on cost causation.
		
		• **Minimal Disruption:** We agree, now is not the time for change, not only from an economic perspective, but also because the discussion to date has lacked sufficient quantitative analysis to justify the need for change, evaluate any rate design alternatives, and analyze both the impact and response from customers.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	Any rate design proposals must include sufficient quantitative analysis to justify the need for change, evaluate any rate design alternatives, and analyze both the impact and response from customers. An updated Cost of Service study remains outstanding. As it relates to the 2014 study, while Tx may be a long-term game, the evolving nature of our market, plus considerable changes in B&R tariffs over the past 7 years, suggests that an update, at a minimum, is required.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		We reiterate our previous comments on energy storage rate design – any tariff treatments that are afforded to energy storage would also need to be made available to other stakeholders that behave in a similar manner, including loads and generation.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	

9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	We must start to move from the theoretical to the analytical. Future discussion must include sufficient quantitative analysis to justify the need for change, evaluate any rate design alternatives, and analyze both the impact and response from customers. In doing so, it is inappropriate and premature to simply declare that maintaining the status quo is "off the table." To do so simply moves this inevitable discussion into subsequent regulatory proceedings, the cost of which is also borne by loads through regulatory cost recovery.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Horst Klinkenborg
Comments From:	Suncor Energy Marketing Inc.	**Phone:**	(403) 819-7125
Date:	2021/01/12	**Email**:	hklinkenborg@suncor.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Suncor considered the session valuable. Two things could have made the consultation more productive: 1) While the discussions get more and more detailed, very fundamental issues have not been resolved. The case for change is still not clear. Some parties argued that the current 12-CP methodology is inefficient; however, there has been no analysis of marginal costs of individual billing determinants, which would be required to incorporate efficiency in the tariff. Other parties have argued that because the industry is changing, cost allocation also needs to change. However, this perspective also has not been supported through any kind of analysis that would show why other allocation measures would somehow be "better" – statements of personal preference do not qualify in Suncor's view. 2) There has been no synergy in discussing the treatment of storage at the same time. Suncor submits that it would beneficial to hold that discussion until a base rate proposal for DTS has been developed. Afterwards, development of alternative rate classes in general and the treatment of storage in particular should be discussed.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	Suncor submits that in light of the overarching efficiency objective in the *EUA*, the tariff design should fundamentally be based on a marginal cost perspective with any deviation needing careful consideration and appropriate justification. Given the requirement to recover all costs, remaining costs should be recovered in a fashion that does not interfere with the efficiency objective.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	a) Suncor is not sufficiently aware of arguments for each of the options to have a preference. b) No c) One of the goals needs to be to avoid inefficient new investment. Further, sunk investment should not unnecessarily be stranded. Finally, the design should not create inappropriate barriers for new demand or inappropriately destroy existing demand.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Efficient Price Signals
		Suncor is not convinced that this is an area of agreement. While the current design is being critiqued as being inefficient, most proposals do not consider or include efficient price signals.
		Cost Responsibility
		Cost responsibility is in Suncor's view too vague a term. Instead, the focus should be on cost causation, *i.e.* efficiency.
		There has been a lengthy debate around 15 years ago on who should pay for transmission and why. Suncor does not believe a, on its surface simple, statement that "more than just load behavior drives transmission development" can sufficiently captures the necessary nuances.
		Suncor believes there was agreement that the system and consequently transmission need is evolving.
		Minimal Disruption
		Suncor believes there was indeed agreement on the items listed on the left.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Efficient Price Signals
		
		Suncor submits that there has been no analysis showing that current price signal, which were approved as reflecting cost-causation, are inefficient. Suncor considers the supposed impact of tariff signals on energy costs to be an irrelevant consideration.
		
		Price signals should always be considered forward looking because price signals inevitably impact future behavior. Price signals are efficient when individual incentives align with societal benefits.
		
		Cost Responsibility
		
		Cost responsibility is in Suncor's view too vague a term. Instead, the focus should be on cost causation, *i.e.* efficiency.
		
		Suncor is not aware of any analysis that shows to what extent, if any, the current price signal deviates from the efficient marginal cost signal. Suncor believes that there is no evidence that load behavior has not influenced transmission costs.
		
		Minimal Disruption
		
		Suncor believes that given the current overall situation, any case for change needs to be extra carefully evaluated. To date, Suncor has not seen any compelling evidence that a change to the tariff structure is required with any amount of urgency.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	Any rate design proposal should make a clear case for the need for change and then show why the new proposal is *better* than the existing design. Because fundamental issues haven't been resolved, it is difficult, if not impossible to discuss agreement/disagreement on solutions.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		• In Suncor's view, the *unique nature* of energy storage is irrelevant for the tariff discussion.
		• Suncor takes no position on how energy storage can or should be part of the electricity industry. However, for the tariff discussion, it is important to focus only on the role of energy storage as a market participant and on the type of system access service provided to them.
		• Suncor supports the treatment of all market participants in a FEOC manner.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	• The only relevant issue from a tariff perspective is the system access service energy storage receives as a market participant. • Any other use/service/etc. is irrelevant for the tariff discussion. • Energy storage should pay the rates appropriate for the system access service they receive based on their billing determinants. • While storage might prefer to receive different or lesser service, this would be appropriately addressed through new rate classes that are available to all customers; not by creating some exceptions or special charges for energy storage.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Suncor submits that FEOC treatment requires that all customers, including energy storage, pay the rates for the services they receive, regardless of whether these customers would prefer a different service. However, Suncor is supportive of investigating the creation of new rate classes as it has been requested by some market participants for quite some time.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Suncor submits that it is of upmost importance to ground this consulation. In its current state, the consultation is effectively a back and forth between rate design preferences without any serious considerations of rate design principles and without any supporting analysis (quantitative or qualitative) one way or another. Suncor does not believe that there is any chance for agreement under the current process.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	
12	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Akira Yamamoto
Comments From:	TransAlta Corporation			**Phone:**	403-267-7304
Date:	2021/01/12			**Email**:	akira_yamamoto@transalta.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, Session 4 was valuable. It provided a good opportunity to review and discuss the proposals made in the previous session. ***Energy storage should be separate out at its own tariff initiative*** We find the scope of the meetings to be mixed and confusing with discussions at a higher level, bulk and regional tariff design, and then at a more granular level, energy storage treatment. We view the differences in these consultations to be significant and the consultation on energy storage has suffered (with less progress) due to its relative (smaller) significance compared to bulk and regional tariff design. As suggested in our previous comments, we recommend that the AESO separate the consultation on energy storage from the bulk and regional tariff design.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	TransAlta provides the following assessment of the current embedded cost and a marginal cost allocation approach following the five design objectives selected by the AESO. We note that both approaches must fully recover all embedded costs under the cost of service legislative framework as such the assumption is that even if a "marginal cost allocation approach" were applied any shortfall or surplus between embedded and marginal costs would ultimately be recovered/refunded to customers.

		(1) Reflect Cost Responsibility The embedded cost and marginal cost allocation approaches rank similarly in reflecting cost responsibility because both approaches must ultimately provide for the recovery of embedded costs under cost of service regulation. Neither approach truly measures or attempts to allocate costs based on the "benefit and value transmission customers receive from the existing grid" (they allocate effectively deemed a value of transmission benefit that is established by the actual cost of the system). That said, it is more likely that a marginal cost approach that allocates costs based on incremental cost and not on the cost of the existing grid could deviate more from achieving this design objective. We would further note that the embedded costs of overbuilt transmission (built well in advance of need) can create significant dislocations between the cost and benefit/value. In other words, excess transmission beyond the needs of customers does not translate to higher benefit or value for customers. (2) Efficient Price Signals To the extent that the embedded and marginal cost approaches reflect different values by billing determinant, the marginal cost approach is likely to provide a more representative price signal in that it would attempt to quantify the expected future cost for an increment of the selected billing determinant. The embedded cost approach is historical/backward looking and, where future build/cost are expected to deviate significantly from the past, could provide inefficient price signals that under or over-estimate future costs. The AESO's definition of an efficient price signal is a "Price signal to alter behavior to avoid future transmission build". If this definition is accepted, then the greater the costs that are allocated through a billing determinant that a customer can respond to would be an efficient price signal. In other words, a $10,000/MW/month charge is a stronger signal than a $3,000/MW/month charge and would likely incent a stronger customer behavioural response. (3) Minimal Disruption Obviously, maintaining the existing embedded cost approach is likely to be the least disruptive for customers that have responded to the 12 CP price signal and invested to reduce transmission costs. The marginal cost approach may be more disruptive because it is applying a different approach than the current embedded cost approach. However, a

		change from the current embedded cost approach to new/different embedded cost approach may be equally or more disruptive (for example, allocating more costs using a billing determinant that is not 12 CP based). (4) <u>Simplicity</u> The marginal cost approach would involve introducing the complexity of calculating the marginal cost of transmission. This would be a departure from the current approach which does not rely on calculating or identifying the marginal cost for any change billing determinants. The current approach is relatively non-contentious because it utilizes actual costs and does not require estimates of expected future costs or establishing the expected impact on changes in billing determinants to those cost estimates. (5) <u>Innovation and Flexibility</u> The existing embedded cost tariff design has provided the price signals and incentive to innovate through price responsive behavior and reducing their reliance on grid delivered power. As noted by the AESO, this has led to a "decline in 12-CP billing determinants and resulting cost recovery in 2019".[1] Arguably, the reduction in cost recovery in 2019 represents "pushing costs to other customers". A marginal cost approach may also provide optionality for transmission customers to innovate in response to a more accurate estimate of the expected change in costs related to a change in billing determinant. However, the manner in which shortfalls or surpluses between embedded and marginal costs are handled could create even greater cost shifting to other customers. Moreover, the accuracy of marginal cost estimates and their relationships to billing determinants will largely dictate how much better this approach is than the embedded cost approach but with the additional complexity of managing the potential countersignal that may be created by the way that shortfalls and surpluses are handled. In this regard, the better signal from marginal cost could be unwound by the allocation of shortfalls, which could yield a poorer/more complex signal and still push cost to other customers.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not?	***The objective for any mitigation option should be avoiding the loss of customers***

[1] Slide 23, Bulk and Regional Tariff Design Stakeholder Engagement Session 2, September 24, 2020.

	b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	Customers must be provided transparent, easily accessible and understandable information about the impacts to transmission costs whatever mitigation option is applied. Mitigation such as transition bill impact mechanisms may be preferable to phase in tariff changes because they establish ceilings on the impact to end-use customers. In contrast, phase in tariff changes may provide less certainty about and allow for greater impacts to end-use customer. However, the bill impact mechanism will add additional complexity with establishing threshold values, shifting costs from customers above the threshold to customer below the threshold, and deciding on how long the ceilings will be in effect for. ***Customers should be provided with the greatest flexibility to remain on the system*** The more significant the potential impact of the rate design change, the more options the AESO should provide customers to manage those impacts. In this regard, it is difficult to express a preference for mitigations options without knowing the bulk and regional rate design that the AESO intends to propose and how different that design may be from the existing design. At a minimum, the AESO should consider the use of adjustment mechanisms contract change, and load attraction/retention rates. Additionally, the AESO should consider the wider application of interruptible/standby rates not only as a mitigation option but as a basis for a more modernized tariff design that contemplates the wider adoption of energy storage and greater customer choice with respect to how their electricity needs are met (customer choice). ***Load and customer growth is the solution not rate design*** The issues that AESO has noted about the existing rate design in terms of high charges and declining billing determinants is not going to be addressed by rate design alone. It is clear in the AESO's work presented in its *Delivered Cost of Electricity Estimates* study that high transmission costs have contributed to a situation where self-supply is a highly attractive alternative for large commercial and industrial customers to grid-supplied power. Judicious wires planning in combination with sound rate design needs to set competitively priced grid-supplied electricity as an objective and load and customer growth on the Alberta Interconnected Electric System as its goals. These goals are fully aligned with Alberta's provincial goals with respect to economic growth and prosperity and would deliver on the forecasted need and drivers that underpinned the significant expansion of the bulk (and regional) transmission systems.

		The risk with an approach that views rate design as the solution to a high embedded cost problem is that it is prone to design rates that attempt to capture customers. This runs counter to technological, environmental and social trends that are driving down the cost of renewable and low emission generation (as an alternative to wires and large generation), favour source and sink co-location, and encourage electric vehicles and customer choice (through technological innovation/disruption).
	Questions	**Stakeholder Comments**

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		TransAlta is generally supportive of the areas of agreement presented in Session 4.
		(1) <u>Efficient Price Signals</u>
		The energy-only market design is premised on the wholesale electricity market delivering clear price signals to support efficient decisions on when to add/retire generation. At the outset of the deregulated market, wholesale generation/electricity costs accounted for a significant majority of the overall delivered cost of electricity and transmission costs were low. Given the low cost of transmission, developing on-site generation to reduce/avoid transmission cost was generally uneconomic.
		Over the span of two decades Alberta's transmission costs have increased nearly four-fold and have risen to a level that is almost as high as wholesale generation cost. Concurrently, natural gas has become a highly competitive fuel source, smaller scale generation has become more competitive with larger scale generation, and renewable generation has significantly reduced in cost. Moreover, environmental and social trends have encouraged customers to rethink their consumption behaviours and manage their environmental footprint. These trends have generally increased the importance of factors other than wholesale electricity cost on customer behavior including to a great extent, transmission cost.
		Two things are very clear today: (1) Alberta's transmission tariff charges are significant and are now amongst the highest in Canada, and (2) tariff charges are high enough to drive customers to develop self-supply generation and incent other behavior responses such as reducing consumption at system peaks.
		(2) <u>Cost Responsibility</u>
		Yes, transmission planning drives transmission development and this takes into account more than just load behaviour. It also takes into account generation supply development which is driven by a myriad of factors that drive competition

		to develop the lowest cost sources of generation. However, generation supply development is ultimately responsive to load behavior as private investors/generators are investing into opportunities with the aim to supply customers and future demand for electricity. We also agree the the transmission system is evolving and that current and future use can differ from what was originally planned. This is a critical risk to manage and supports a case and need to add other tools in the Alberta wires development framework such as non-wires alternatives that may reduce planning risk and preserve the optionality to delay expensive, long-lived transmission investment. (3) Minimal Disruption TransAlta agrees that transmission costs are higher than ever before and therefore more important. It is critical that we respond by containing these costs and learn from past lessons to avoid further contributing to transmission cost issues. We also agree that the loss of customers and grid supplied load will serve to make the issue of high transmission costs worse. However, we must also be cognizant that attempting to capture customers to mitigate the risk of ratepayer defection is unlikely to successful. Customers have choice: they can choose to develop their own supply and, ultimately, choose not to operate in Alberta.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
		TransAlta comments on the areas of disagreement are as follows:
		
		(1) Efficient Price Signals
		
		We understand that the AESO's concern is that the customer response to the 12-CP billing determinant has resulted in the decline of 12-CP billing determinant. This would recover less bulk system charge from those customers that have responded to that price signal and recover more from customers that do not respond to that signal. Other than noting this observation, we have little information to judge whether this allocation is fair but it would appear justified by the design - the design was created to incentivize 12-CP response and appears to have been successful.
		
		Given that the price signals are based on an embedded cost approach, it is clear that the historical costs are used. We understand the future transmission costs are not planned or expected to be at the same pace or magnitude as they have been historically, as such, we would expect that the use of historical costs would not produce price signals that would be the same as forward looking costs.

	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs? **Minimal Disruption** • Now is not the time for change or time to stop the bleeding? ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively • Does rate mitigation need to be permanent or will customers adapt if temporary?	(2) <u>Cost Responsibility</u> The primary objective must be viewed within the context of the legislative and policy framework (which, in Alberta, has established cost responsibility) as well as applicable rate design principles including cost causation. It is clear that transmission costs are driven by transmission planning that considers more than just load behavior. Where transmission costs can be clearly delineated to be driven by load behavior, those costs ought to be allocated to loads based upon those drivers. To the extent that transmission costs are driven by other factors such as policy or supply development, they could/should be allocated to load using factors that do not differentiate loads based on behavior. (3) <u>Minimal Disruption</u> We are sympathetic to concerns raised about the significant uncertainty that load customers face at this time. However, the review of the bulk and regional tariff design was directed by the AUC and is a tariff matter that has been raised in previous regulatory proceedings and pre-dates many of the drivers for heighten uncertainty today. Respectfully, there is no ideal time for change for any party that is likely to be face higher costs associated with the change. We also believe that it is important to comprehensively review the bulk and regional tariff design to meet the AUC's direction so as to bring some resolution to the concerns that have been raised previously. As suggested in our comments to Session 4: "We recommend that the AESO use the remaining time and resource effort to perform some cost analysis that could help in the future but may also help to focus the tariff modernization on changes that could provide relief under the current design, support load growth and the competitiveness of the Alberta market, and create new tariff features that can be leveraged in the future if built into our framework." We believe that we ought to comprehensively review the bulk and regional tariff design to meet the AUC's direction. With respect to rate mitigation, as stated in our response to Question 3 above, it is difficult to provide a view about specific mitigation options without knowing what the rate design change may be but we would recommend that: "the more significant the potential impact of the rate design change, the more options the AESO should provide customers to manage those impacts." We would consider all rate mitigation options such as phase ins or bill impact options be temporary but for those mitigation options such as new rates such as interruptible/opportunity rates could be permanent features of the new design.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	No additional comments or considerations at this time.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		TransAlta provides the following comments on the AESO's areas of agreement:
		• Electricity storage is not a producer or end-consumer of electric energy and is not a transmission wire used to transport electricity. However, energy storage is not unique: it exists in many forms (e.g. hydro reservoir storage).
		• Electricity storage is currently limited to participating in Alberta's market with energy price arbitrage and operating reserves. There is no competitive mechanism for electricity storage to be considered as a non-wires solution for regulated service. Electricity storage also provides value in terms of providing other types of ancillary service as well as on-site power quality. Another end-use case is Alberta is for self-supply sites to utilize electricity storage to address the legislative prohibition from exporting without an industrial system designation or under the *Microgeneration Regulation* (and other existing exemptions).
		• We agree that energy storage should be treated fairly and compete in an efficient and openly competitive market.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	TransAlta provides the following comments on the AESO's areas of disagreement: • Electricity storage is a technology type that can used in many different ways including on the grid, behind the meter or both. • Electricity storage may use the transmission system for charging and discharging purpose but is not restricted to only charging and discharging using transmission infrastructure (they can charge behind the meter). • Electricity storage should not pay for inflows if those inflows are directed/controlled by the system controller. As an example, electricity storage can provide frequency regulation services and could be directed to charge by the system controller in the event of a frequency excursion in the performance of the service – the storage asset is being directed to utilize the transmission system to support reliability and not at the discretion of the legal owner.

		• Electricity storage that is co-located with generation behind-the-fence and manages in charging to ensure it only utilizes on-site generation does not utilize the transmission system at all. Such assets should not be charged any transmission costs other than those that apply to supply transmission service because they are managed such that they act effectively as a generation only asset.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	***Energy storage rates should reflect the condition of interruptibility the resource owner is willing to accept*** The AESO should develop energy storage rates that reflect the fact that energy storage assets are likely willing to accept a much greater level of interruptibility that existing DOS rates reflect.
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	No comments at this time.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	No additional clarifying questions at this time.
12	Additional comments	No additional comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020	through	Jan. 12, 2021	**Contact:**	Bryan Krawchyshyn
Comments From:	TC Energy			**Phone:**	403-920-6602
Date:	2021/01/12			**Email**:	Bryan_krawchyshyn@tcenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	TC Energy found both Session 4 – "Bulk and Regional Tariff Design", and the follow-up summary including AESO clarifications, to be valuable for building a shared understanding of common themes between proposals and areas of agreement and disagreement.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	TC Energy supports a cost allocation approach that provides a balanced price signal that will maximize the use of existing network investments and decrease the potential for future network investments. At this time, TC Energy does not have a view whether an embedded or marginal cost allocation approach will more appropriately meet this objective.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here? Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	No Comments.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		TC Energy is supporitive of the areas of agreement.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		TC Energy agrees that the AESO has captured the areas of disagreement presented at Session 4.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	No comments at this time.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Yes. TC Energy supports the areas of agreement for Energy Storage.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	Yes. TC Energy supports the areas of disagreement for Energy Storage.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	TC Energy submits that the AESO should establish a unique rate for energy storage that reflects the unique manner in which it interacts with the transmission system. This is consistent with the tariff's treatment for imports, exports and demand opportunity services. While an appropriate energy storage rate may include multiple components depending on the services being provided, TC Energy supports the development of an interruptible rate option, which recognizes the ability of storage to charge only during times of excess system capacity.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	None at this time.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	None at this time.
12	Additional comments	None at this time

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Kipp Horton
Comments From:	Turning Point Generation (TPG)	**Phone:**	403 233-2259
Date:	Jan. 12, 2021	**Email**:	Kipp.horton@windriver.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, the session was helpful and TPG appreciates the opportunity to provide this feedback.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	At this time, TPG does not have a view on whether an embedded or market cost allocation approach is more appropriate however TPG encourages a rate design which balances the desire to maximize the use of the existing network while minimizes the need for future investment.
3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to acheve with its mitigation(s)? Why?	No comments.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		Yes, TPG is supportive of the areas of agreement presented.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		Yes, TPG is supportive of the areas of disagreement presented.

6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	No comments.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta's electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		Yes, TPG supports the areas of agreement for energy storage.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	Yes, TPG supports the areas of disagreement for energy storage.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	Yes, TPG is supportive of an interruptible rate design for energy storage that appropriately reflects its unique ability to charge only during periods of excess grid capacity. TPG submits that a lower interruptible rate for energy storage will include payment of administration and O&M costs related to system operations.

10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	No comments at this time.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	No comments at this time.
12	Additional comments	None.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – Dec. 10, 2020

Bulk and Regional Tariff Design Stakeholder Engagement Session 4

Period of Comment:	Dec. 10, 2020 through Jan. 12, 2021	**Contact:**	Richard Stout
Comments From:	Alberta Utilty Consumer Advcate (UCA)	**Phone:**	604 366 4184
Date:	2021/01/12	**Email**:	roninconsult@live.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Jan. 12, 2021**.

The AESO is seeking comments from Stakeholders on Session 4. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 4 hosted on Dec. 10, 2020. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was a valuable review of the tariff discussions to date including a clear explanation of why the status quo cost allocation approach has to be replaced, the impact of an alternative allocation, and the need for transitional mitigation.
2.	Do you have a view on whether an embedded or marginal cost allocation approach will more appropriately meet the AESO's rate design objectives? Why?	The short answer is that it is too early to say if an embedded cost allocation approach based on an estimate of marginal transmission costs would meet the AESO's rate design objectives or lead to appropriate cost allocations. The long answer is that although marginal costs theoretically provide efficient price signals in well functioning markets they are very difficult to achieve in practice for regulated, cost-based rate designs. For cost of service based rate design, marginal costs tend to be employed as to *guide* to structural options (such as opportunity service) rather than as fundamental embedded cost allocators. When used for cost allocation purposes, instability and base-line disputes may arise. The load-facing marginal costs of transmission systems (other than for the local facility connection) are notoriously difficult to estimate. Bulk and Regional transmission system needs are based on complex technical security planning, and socio-economic considerations that are not easily related to measurable load billing determinants such as end-use energy or demand parameters. Additions to Bulk or Regional transmission systems arrive in large, long-lived and expensive increments that change the power flows, expansion needs and interconnection opportunities for generators and loads across wide areas of the interconnected system, leading to controversy over the actual need, timing, stability of, and the real meaning of marginal cost estimates for a transmission system. Marginal cost rate design considerations are even more challenging where price regulated transmission systems must be distinguished from energy price signals in an entirely separate but overlaid competitive energy and generation market. (Note: In the case of a generation capacity market marginal cost estimates may rely on the use of a gas-turbine proxy that would not be suitable as an estimate of the marginal costs of Bulk or Regional transmission systems).

3.	a) Do you have a preference for any of the mitigation options presented at Session 4? Why or why not? b) Do you know of any additional mitigation options that have worked in other contexts and might be applicable here. Please specify. c) What do you think the AESO's needs to achieve with its mitigation(s)? Why?	a) We do not have a particular preference for the mitigation options as long as this does not rely on maintaining the status quo tariff for any existing customer. b and c) The objective is to limit escalation of bills over a transition period for customers who would be most significantly impacted by a move away from the status quo.

	Questions	Stakeholder Comments

4.	Are you supportive of the areas of agreement presented at Session 4? Why or why not? The areas of agreement presented include:
	
	Efficient Price Signals
	• Price signals matter
	  ○ Tariff charges provide incentives for customer behavior
	Cost Responsibility
	• Recognize that more than just load behavior drives transmission development
	• We are dealing with an evolving system
	  ○ Current and future use may differ from what was that originally planned
	Minimal Disruption
	• Transmission costs have risen
	  ○ Tariff charges are more important now than ever before
	• Minimize disruption, mitigate rate shock
	  ○ It is not in anyone's interest to reduce the number of ratepayers
		We are supportive of these general areas of agreement. Providing efficient price signals, reflecting cost responsibility, and mimimizing disruption are all important aspects of Bonbright rate design considerations. Great care must be taken over how these considerations are interpreted and balanced however. For instance:
		
		1)The price signal provided by the transmission tariff must be distinguished from the price signal given by the distinct and competitive energy market.
		
		2) The customer response to a transmission a price signal may not be helpful. In particular, a perceived price signal based on an old vertically integrated cost allocation methodolgy may not have been intended as a price signal at all.
		
		3) In the case of the Alberta Bulk and Regiona transmission system that is legislated to provide **unconstrained** generator market-based dispatch it is very difficult to link any accepted metric of **load** behavior (energy, coincident or non-coincident demand) to Bulk and Regional transmission cost causation.
		
		4) Even as the system evolves, the large sunk cost of assets must still be fairly recovered from all customers that benefit from connection to the system.

5.	Are you supportive of the areas of disagreement presented at Session 4? Why or why not? The areas of disagreement presented include:
	
	Efficient Price Signals
	• Are status quo price signals are efficient?
	  ○ Price signals in tariff have reduced the cost of energy to other load
	• Are price signals forward looking?
	  ○ Price signals are efficient to the extent changes in customer behavior reduce the need for future transmission costs
	
	Cost Responsibility
	• Is the primary objective cost causation, or cost responsibility?
	• Does the initial rate design still achieve goal of cost causation since transmission costs have risen and load behaviour has not influenced those costs?
	
	Minimal Disruption
	• Now is not the time for change or time to stop the bleeding?
	  ○ Economic climate, policy uncertainty, change impacts a few very negatively and many slightly positively
	• Does rate mitigation need to be permanent or will customers adapt if temporary?
		What is commonly described as "price signals" within the Status Quo tariff based on 12CP cost allocations were not intended to be treated as price signals, and do not encourage efficient or desirable behavior on the transmission system.
		
		Energy prices are a separate consideration to transmission price signals in two very different systems. While responses to energy prices may reduce the overall cost of energy, responses to "status quo" transmission price signals simply transfer and increase transmission costs for the vast majority of customers who cannot see the "price signal" or respond to the 12CP monthly "interruption" option.
		
		Our understanding of cost causation on the Bulk and Regional transmission system is price driven load interruptions make little difference to future transmission costs. Since restructuring circa 2000, the Bulk and Regional transmission system has been built primarily to accommodate diverse market based dispatches of generation with minimal constraint (see response to question 4 above) rather than loads.
		
		"Efficient price signaling" to loads therefore carries little weight in transmission rate design when compared to other cirteria such as the fair allocation of existing costs.
		
		We are not clear of the intended distinction between "cost causation" and "cost responsibiity" unless this means that the cost *responsibility* of each customer is to pay a *fair share* of the existing system costs as explained above.
		
		The existing rate design does not reflect cost causation.The 12CP methodology was developed to reflect **generation** cost causation in a vertically integrated and centrally planned system with **no separate energy market**. In the monopoly system that existed prior to 2000 loads were considered to cause all costs because the entire network of generation and transmission was built as a *single* pre-optimized entity where the only significant planning determinant was served load.
		
		When the 12CP allocation was developed the transmission system supported only a *single* planned generation development and dispatch monopoly. Transmission costs were consequently minimal and could be considered to follow the pre-planned generation cost allocation. (Note: direct interruptible credits were available in this integrated pre-market world based on the costs of a proxy gas-turbine. This was considered to avoid some marginal *generation* costs but was not considered to avoid any *transmission* system costs).
		
		The integrated monopoly conditions that supported the use of 12CP no longer apply.Transmission system cost causation has been dramatically changed to support multiple unconstrained dispatch options in an unplanned and competitive

		energy market. Continued use of an outdated and unintended 12CP “price signal” has resulted in unfair cost transfers. It is important to “stop the bleeding” as soon as possible as it effects all customers in every part of the economy. The change is most effectively and practically made in the upcoming filing as ordered by the AUC. As a practical matter it will be three years before the changes affect customer bills when the economic climatewill hopefully have improved and policy uncertainty resolved. Even then, a mitigation mechanism will be provided to minimize any substantive negative impact. Rate mitigation need not be permanent and can be phased out over 5 to 10 years.
6.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement (refer to question 5 above)? Please specify.	None known.

7.	Are you supportive of the areas of agreement for energy storage presented at Session 4? Why or why not?
	
	Energy storage areas of agreement:
	• Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
	• Energy storage can participate in Alberta’s electricity use-cases by providing
	  ○ Energy Price arbitrage
	  ○ Operating Reserves
	  ○ Non-wires solutions for transmission deferral
	• Energy Storage should be treated in a fair, efficient, and openly competitive (FEOC) manner
		We are supportive of the general areas of agreement with regard to energy storage.

8.	Are you supportive of the areas of disagreement for energy storage presented at Session 4? Why or why not? **Energy storage areas of disagreement:** • Is energy storage a user of the grid or a component of the grid or both? • Does energy storage use the network for the Alberta specific use-cases? • Should energy storage pay for inflows and outflows like every other network user or not? • Should energy storage pay for one or more of administration, operations and maintenance, pod, regional, bulk charges?	These areas require more careful consideration as different possible roles that are mutually exclusive require different tariff treatment or applicability. For instance, energy storage operators may use the grid to arbitrage energy prices, in which case STS and DTS tariffs would be applicable like any other network user (such as a load with a BTF generator). On the other hand, where energy storage units contract with the AESO to provide a non-wires solution intended to defer a transmission build, then STS and DTS tariffs would clearly not be applicable. The transmission cost components that energy storage operators pay to use depend on the agreed role of the facility as descrived above.
9.	Are there considerations that the AESO could include in its rate design proposal that would move you to at an area of agreement on any of the areas of disagreement for energy storage (refer to question 8 above)? Please specify.	None known.
10	Do you have any comments on the AESO's proposed stakeholder engagement process, including the mitigation process, for the remainder of the Bulk and Regional Rate Design engagement?	Not at this time. We are looking forward to the next stage of development.
11	Do you have additional clarifying questions that need to be answered to support your understanding?	As above
12	Additional comments	We appreciate all of the efforts that the AESO has made to resolve this issue.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

ADC
Alberta Direct Connect Consumer Association

January 12, 2021

ADC Proposal: AESO Tariff – Mitigation Alternatives – Firm / Non-Firm Tariff

There are 3 distinct types of load users of the transmission system: Firm load, standby load, and interruptible load. Each of these requires a different level and type of service from the Alberta grid. The current 12 CP tariff has specifically been designed to act as a proxy for standby service and provide a price signal for loads to interrupt during system peaks.

The ADC remains of the view that the current tariff design is preferrable; however, recognizes that there could be improvements introduced so that the tariff can remain stable for the long term. An area that ADC has been concerned about is charging CP in the shoulder months where there is no system benefit. This has a productivity impact on energy intensive trade exposed industry who must respond to all coincide peaks in order to remain competitive in Alberta.

The ADC proposes a tariff mitigation option that allows customers to select a firm and non-firm portion of their capacity requirement where the firm portion is charged on a fixed rate per MW and the non-firm portion is charged on a CP basis.

Our proposal simplifies the tariff for all firm loads – a fixed cost per MW of firm capacity requirement. For interruptible and standby loads, it still provides a CP price signal for a proposed 6 months of the year with charges assigned to the contribution to the 4 highest 15-minute intervals in each of the months. This creates a 24 CP tariff. The CP rate proposal is structured such that if a load were not able to respond to the coincident peak they would end up paying more than if they elected firm service. This provides a strong financial incentive for interruptible loads to respond to peaks without being directed to curtail by the AESO.

ADC submits that this proposal provides a long term tariff option that will keep interruptible loads in Alberta, will provide the appropriate price signals to maintain existing and encourage the development of new on site generation where it is the most efficient decision from an energy and transmission infrastructure perspective, and provide billing determinant stability for all Albertans. The ADC also submits that the proposal is consistent with the tariff objectives:

Efficient Price Signals

The regulatory history of the DTS tariff has established in principle that the transmission tariff should send a price signal to minimize future transmission build. This has been accomplished through the CP methodology. The CP rate design has 2 important outcomes:

1. Price responsive / interruptible load respond to system peaks which results in:

- Less generation required to serve the peak load, which means less transmission infrastructure is ultimately needed to serve the peak system load. Alberta has approximately 400 MW of price responsive load. *The CP tariff design has helped keep these energy intensive and trade exposed industries viable in Alberta.*
- Improved grid reliability at times of system stress.

2. To act as proxy for a standby tariff to recognize the benefits of generation development at Industrial sites. The benefits of industrial generation development include:

- Efficient use of existing transmission infrastructure
- Reduces system losses
- More competitive electric energy markets
- More reliable grid
- Reduces grid intensity – environmental benefits

Cost Responsibility

Not all customers require the same level of reliability. This naturally leads to a different tariff for firm and non-firm load or Standby service.

- Firm: requires firm service at all times, regardless of time of day or price signal.
- Non-Firm: Certain customers have a portion of their load requirement that does not require service at all times. A good example is electricity intensive loads that will self-interrupt to remain competitive in Alberta. These loads have invested in storage/generation/production modifications to get off the grid when other customers need grid supply the most.
- Standby: Does not require firm service and uses the grid as backup to on-site generation. Site capacity has been built and established through the DTS contract. These customers have less reliance on the bulk transmission grid.

Minimal Disruption

Minimal disruption is required in order to protect and improve Alberta's economic outlook.

The following sets out the ADC's proposal for mitigation using a rate structure alternative that recognizes the different reliability needs of the grid and sets out billing determinants for Firm and Non-Firm service.

Firm / Non-Firm Rate Proposal

The proposal includes 3 billing categories:

1. Site Capacity: This billing element recovers the local/regional interconnection costs. Similar to the current tariff, the greater of 90% of DTS contract capacity or NCP is used as the billing

determinant for the POD and Regional charges. DOS could continue to be used for short term requirements.

2. Firm Capacity: This billing determinant is used to allocate the Bulk system charges to firm service loads. This value is nominated by the DFO or Direct Connect customer.

3. Non-Firm Capacity: This billing determinant is used to allocate the Bulk system charges to price responsive loads and standby customers. It would apply to all load above the nominated firm capacity.

Other costs such as ancillary services/ voltage support would remain the same as today.

Billing Determinants:

For the purpose of exploring the concept, we have used the 2018 revenue requirement for Bulk and Regional Interconnection Costs of $1,557,500,000. This would need to be updated for the current revenue requirement for further analysis and rate impact modelling. The revenue requirement would be recovered in 3 cost categories:

> **1. Site Capacity Charge:** This charge would recover ~ 25% of the revenue requirement as a demand charge based on 90% contract capacity or monthly non coincident peak (NCP). This capacity charge would have no ratchet and no energy component. This billing determinant would be set at ~$3,250/MW (similar to the current Regional costs if energy and capacity costs are combined).
>
> > Billing determinants: 160,561 MW-Months (~13,380 MW) (as per 2018 filing)
> > Revenue generated: $521,000,000
> >
> > Rate: $3,250/MW/month

The next 2 rate components would need to recover the remaining revenue requirement balance of just over $1,036,000,000.

Propose the Firm capacity rate to be set so that it recovers the entire balance and reduced with a rider (new Rider G) by revenues collected from the non-firm cost category.

> **2. Firm Capacity:** recovers the bulk revenue requirement less the revenue received from the non – firm capacity charges.
>
> > Billing Determinants: 110,000 MW – Months (~9,200 MW)
> > Revenue Requirement: $1,036,000,000 (less non-firm revenue contribution - Rider G)

Rate: $9500/MW/Month less Rider G

Rider G: credit applied to firm capacity $/MW based on non-firm capacity revenue.

3. Non-Firm Capacity: contributes to the bulk revenue requirement, which can be avoided if the non – firm load responds to the CP price signal.

The CP signal is proposed to change from 12 CP to a 24 CP model, but with 4 CP's in the 6 months that the peak matters most. In each of the months of Nov, Dec, Jan, Feb, July, Aug, the peak 4 - 15 min intervals would attract a CP charge for non-firm capacity that was taking grid power at the time.

Billing Determinants: estimated at 30,000 MW – Months (~ 2,500 MW of Standby & PRL)
Rate: $12,000 * 12 CP = $144,000/MW year converted to 24 CP is $144,000/24 CP = $6,000 / MW / CP

Rider G - Revenue contribution: Depends on when the Non-firm load uses the system and if they are successful at responding. If they are not successful, they would pay a premium to the firm service, for example:

10 MW of Firm = 10MW x $9500 X 12 = $1,140,000
10 MW of non-firm = 10 MW X $6000 X 24 = $1,440,000

A DFO/DC customer would not select the non – firm rate if they had no ability to respond as they would end up paying a premium.

Terms and Conditions

There may need to be additional terms and conditions around the election of the firm/ non-firm levels. An example is that there is an allowance for POD's to nominate firm/non-firm capacity once per calendar year so it is set for 12 consecutive months.

The concept is illustrated through the following examples:

1. Firm DFO site with 50 MW DTS contract capacity and 48 MW NCP:

50 MW Firm

Site Capacity Charge: 48 MW X $3,250 X 12 = $1,872,000

Firm Capacity Charge: 48 MW X $9,500 X 12 = $5,472,000

Total Annual: $7,344,000

2. Firm & non-firm DFO/DC site with 50 MW DTS capacity, NCP 48 MW, 20 MW firm, 30 MW non-firm.

a. avoided CP 80% of the time

Site Capacity Charge: 48 MW X $3250 X 12 = $1,872,000

Firm Capacity Charge: 20 MW X $9,500 X 12 = $2,280,000

Non-Firm Capacity Charge: 30 MW X $6,000 X 24 CP X 20% = $864,000 (With 80% avoidance)

Total Annual: $5,016,000

b. avoided CP 0% of the time

Site Capacity Charge: 48 MW X $3250 X 12 = $1,872,000

Firm Capacity Charge: 20 MW X $9,500 X 12 = $2,280,000

Non-Firm Capacity Charge: 30 MW X $6,000 X 24 CP X 100% = $4,320,000 (With 0% avoidance)

Total Annual: $8,472,000. (by not avoiding CP, non-firm becomes a premium to firm service)

3. ISD – Cogen Site with 50 MW DTS Capacity (90% is 45MW), NCP 0 MW, 0 MW firm, 50 MW non-Firm

a. avoided CP 95% of the time.

Site Capacity Charge: 45 MW X $3,250 X 12 = $1,755,000

Firm Capacity Charge: 0 MW X $3500 X 12 = $0

Non- Firm Capacity Charge: 50 MW X $6,000 X 24 CP X 5% = $360,000 (95% avoidance)

Total Annual: $2,115,000

b. avoided CP 0% of the time.

Site Capacity Charge: 45 MW X $3,250 X 12 = $1,755,000

Firm Capacity Charge: 0 MW X $3500 X 12 = $0

Non- Firm Capacity Charge: 50 MW X $6,000 X 24 CP X 100% = $7,200,000 (0% avoidance)

Total Annual: $8,955,000 (by not avoiding CP, non-firm becomes a premium to firm service)

Rider G: In the case of 2a and 3a, the total non-firm capacity cost recovery of $360,000 + $864,000 = $1,224,000 would be returned as Rider G. In the case of 2b and 3b, the total non-firm capacity cost recovery of $4,320,000 + $7,200,000 = $11,520,000 would be returned as Rider G. This rider amount would go to reduce the firm capacity charge.

The ADC has performed some initial rate impact analysis and while most interruptible and standby customer would see rate increases it is at a manageable level.

The ADC wishes to explore this rate mitigation option further with the AESO to update the potential rates to reflect the current revenue requirement.

Monday, January 4, 2021

Dear AESO Stakeholders:

Re: **Important Clarification on Bulk and Regional Tariff Design Rate Impacts**

We would like to thank stakeholders for their ongoing involvement in the AESO's Bulk and Regional Tariff Design over the past several years. Your participation to date has been both insightful and informative and has helped the AESO to better understand your perspectives as we advance our bulk and regional rate design.

As we have previously noted, we are keenly aware of the current economic environment in the province and know that a rate design that changes cost structures in a manner that could increase costs for any business must be done thoughtfully and in the public interest.

To that end, we would note that the original bookends A and B and the initial analysis of rate impact implications for the three coincident peak (12-CP) responder categories, shared at our Sept. 24, 2020 session, were outer bounds of possible shifts. The resulting rate impacts represented starting points for rate design work to progress from; they were never intended to indicate a likely or expected outcome as they lacked any modifications and mitigation to support a minimally disruptive implementation. The AESO recognizes that this concept of bookends and associated rate impacts has created much angst and concern among certain stakeholders. We therefore want to take this opportunity to clarify that it has never been the AESO's intent to move forward with a one-time +100 or +130 per cent rate increase to broad groups of customers in our bulk and regional rate design development. We are committed to look for rate design and mitigation options that will provide a transition path to phase in changes and provide customers the opportunity to respond to the new rate design.

We recognize our rate design and corresponding mitigation options will need to fit within an appropriate and fair rate impact threshold that will need to be reviewed and approved by the Alberta Utilities Commission (Commission). In previous proceedings, the Commission provided direction that any rate increase of more than 10 per cent be examined in further detail. This threshold will be relied upon as a guide as we advance the complex rate design process. Within every category of consumer and within every industry, there are sites that would be both worse off and better off depending on the final rate design. The AESO is investigating transition options with stakeholders, both in the form of rate design as well as rate impact mitigation, as part of our engagement process. This engagement will continue through the first half of 2021 to find the right solution for recovering current costs and creating the right signals for the future.

When we share our preferred rate design, we will also provide a bill impact summary and a list of our assumptions with a corresponding Bill Impact Tool. The Bill Impact Tool will assist affected stakeholders in assessing their bill impacts and mitigation options. We welcome any interested stakeholder to meet with the AESO to review the Bill Impact Tool and our assumptions and to ensure they understand how they will be impacted and the potential mitigation options available to them.

We are focused on developing a bulk and regional tariff design that will support Alberta over the long-term as the electricity system transforms while also providing for a minimally disruptive transition to the new rate

Alberta Electric System Operator

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design. At the same time, consumers need clear and stable price signals to be provided by the ISO tariff so they can make effective business decisions. The AESO is committed to providing clarity on this rate design change which has been underway for several years, and filing a bulk and regional rate design application, including mitigation for rate shock, by the end of June 2021, as directed by the Commission. Given the steps in the regulatory process, we anticipate the earliest the new rate design would come into effect is 2023.

Your continued participation in this engagement is critical to help us prepare a well-informed application for submission to the Commission, for the benefit of Albertans in the long-term.

If you have questions or would like to discuss this matter further, please contact me at Miranda.Erickson@aeso.ca.

Sincerely,

Miranda Keating Erickson
Vice-President, Markets

cc: Dale Nally, Associate Minister of Natural Gas and Electricity, Alberta Energy

David James, Associate Deputy Minister of Natural Gas and Electricity, Alberta Energy

Mike Law, President and Chief Executive Officer, AESO

Public

Agenda

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Session purpose and objectives

The purpose of this session is to present and discuss the AESO's preferred rate design. The session objectives include:

- Present preferred rate design, including energy storage treatment, to stakeholders
- Present and discuss path to achieving minimal disruption
- Present bill impact summary and assumptions
- Provide Bill Impact Tool
- Begin to discuss implementation considerations

Date: **Thursday, March 25, 2021**
Time: **8:00 a.m. – 4:00 p.m.**
Location: **Zoom Webinar**
Facilitator: **Stack'd**

Time	Agenda Item	Presenter
8:00 – 8:10	Welcome, introduction, purpose, and session objectives	AESO / Stack'd
8:10 – 8:30	Opening remarks • Case for change • Key highlights	AESO
8:30 – 8:50	What we heard • Cost responsibility • Efficient price signals • Embedded and marginal approaches	AESO
8:50 – 10:30	Methodology and analysis • Summary of rate design • Review and elimination of marginal approach • Improvement to embedded approach	AESO / NERA
10:30 – 11:00	Break	
11:00 – 12:30	What we heard, methodology and analysis • Q&A	AESO / NERA
12:30 – 1:00	Break	

Public

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Time	Agenda Item	Presenter
1:00 – 1:45	Bill impact summary • Summary • Methodology and assumptions • Impacts • Bill Impact Tool Q&A	AESO
1:45 – 2:15	Path to achieve minimal disruption • Targeted engagement • Mitigation proposal principles • Mitigation options assessment • Q&A	AESO
2:15 – 2:30	Break	
2:30 – 3:30	Energy Storage tariff treatment • What we heard • Non-firm rate conclusions • Demand Opportunity Service (DOS) • Q&A	AESO
3:30 – 3:50	Implementation Considerations • Considerations • Flexibility • Q&A	AESO
3:50 – 4:00	Session close-out and next steps	AESO

Public

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

March 25, 2021

Public

Notice

In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session and making the session recording available to the general public at www.aeso.ca. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Bulk and Regional Tariff Design engagement sessions. This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4, by telephone at 403-539-2528, or by email at privacy@aeso.ca.

Using Zoom – Asking questions

- Two ways to ask questions if you are accessing the webinar using your computer or smartphone
  - Click “Raise Hand” and the host will be notified that you would like to ask a question. The host will unmute your microphone, you in turn will need to unmute your microphone and then you can ask your question. Your name will appear on the screen, but your camera will remain turned off.
  - Click “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.
- If you are accessing the webinar via conference call
  - If you would like to ask a question during the Q&A portion, on your phone’s dial pad, hit *9 and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone by hitting *6 and then you can ask your question. Your number will appear on the screen.

Stakeholder participation

The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:

- Listen to understand others' perspectives
- Disagree respectfully
- Balance airtime fairly
- Keep an open mind

Welcome and Introductions

Public

Session purpose and objectives

- The purpose of this session is to present and discuss the AESO's preferred rate design. The session objectives include:
  - Present preferred rate design, including energy storage treatment, to stakeholders
  - Present and discuss path to achieving minimal disruption
  - Present bill impact summary and assumptions
  - Provide Bill Impact Tool
  - Begin to discuss implementation considerations

Agenda (morning)

Time	Agenda Item	Presenter
8:00 – 8:10	Welcome, introduction, purpose, and session objectives	AESO / Stack'd
8:10 – 8:30	Opening remarks • Case for change • Key highlights	AESO
8:30 – 8:50	What we heard • Cost responsibility • Efficient price signals • Embedded and marginal approaches	AESO
8:50 – 10:30	Methodology and analysis • Summary of rate design • Review and elimination of marginal approach • Improvement to embedded approach	AESO / NERA
10:30 – 11:00	Break	
11:00 – 12:30	What we heard, methodology and analysis • Q&A	AESO / NERA
12:30 – 1:00	Break	

Agenda (afternoon)

Time	Agenda Item	Presenter
1:00 – 1:45	Bill impact summary • Summary • Methodology and assumptions • Impacts • Bill Impact Tool Q&A	AESO
1:45 – 2:15	Path to achieve minimal disruption • Targeted engagement • Mitigation proposal principles • Mitigation options assessment • Q&A	AESO
2:15 – 2:30	Break	
2:30 – 3:30	Energy Storage tariff treatment • What we heard • Non-firm rate conclusions • Demand Opportunity Service (DOS) • Q&A	AESO
3:30 – 3:50	Implementation Considerations • Considerations • Flexibility • Q&A	AESO
3:50 – 4:00	Session close-out and next steps	AESO

Registrants (as of March 18, 2021)

- Acestes Power
- Alberta Direct Connect Consumers Association (ADC)
- Alberta Newsprint Company (ANC)
- Alberta Utilities Commission (AUC)
- AltaLink Management Ltd.
- AltaSteel Inc
- Arcus Power
- ASCENT Energy Partners Ltd.
- ATCO Electric Ltd.
- BECL and Associates Ltd.
- Best Consulting Solutions Inc.
- BluEarth Renewables
- Boost
- Brubaker and Associates, Inc. on behalf of Alberta Direct Connect
- Canadian Renewable Energy Association (CanREA)
- Cement Association of Canada
- Cenovus Energy
- Chapman Ventures Inc.
- Chymko Consulting on behalf of Cities of Red Deer and Lethbridge
- City of Lethbridge
- City of Medicine Hat
- City of Red Deer
- Consumers Coalition of Alberta (CCA)
- Customized Energy Solutions
- DePal Consulting Limited
- Dow Chemical Canada ULC
- Dual Use Customers (DUC)
- EDF Renewables
- Enbridge Pipelines Inc.
- Enel
- Energy Storage Canada (ESC)
- ENMAX Corporation
- EPCOR Distribution & Transmission Inc.
- EQUS
- ERCO Worldwide
- FortisAlberta Inc.
- Government of Alberta
- Guidehouse
- Heartland Generation Ltd.
- Imperial Oil ExxonMobil Canada
- Independent Power Producers Society of Alberta (IPPSA)
- Industrial Power Consumers Association of Alberta (IPCAA)
- Inter Pipeline Ltd
- Invinity Energy Systems
- Lehigh Cement
- Lionstooth Energy Inc.
- Matt Ayres Consulting
- Millar Western Forest Products Ltd
- NextEra Insights Inc.
- North American Environmental Markets Inc.
- NRGCS
- Osler, Hoskin & Harcourt LLP
- Perimeter Solar Inc.
- Power Advisory LLC
- Prairie Sky Strategy
- QUEST – Quality Urban Energy Systems of Tomorrow
- Rodan Energy Solutions
- Stantec
- Suncor Energy Inc.
- TC Energy
- TransAlta Corporation
- Turning Point Generation
- Utilities Consumer Advocate (UCA)
- URICA Asset Optimization
- Versorium Energy Ltd.
- VIDYA Knowledge Systems / CWSAA
- Voltus Energy Canada, Ltd.
- West Fraser Mills Ltd.
- Weyerhaeuser
- Whitecourt Power LP
- Wolf Midstream Inc.

Overview of Engagement Process

Public

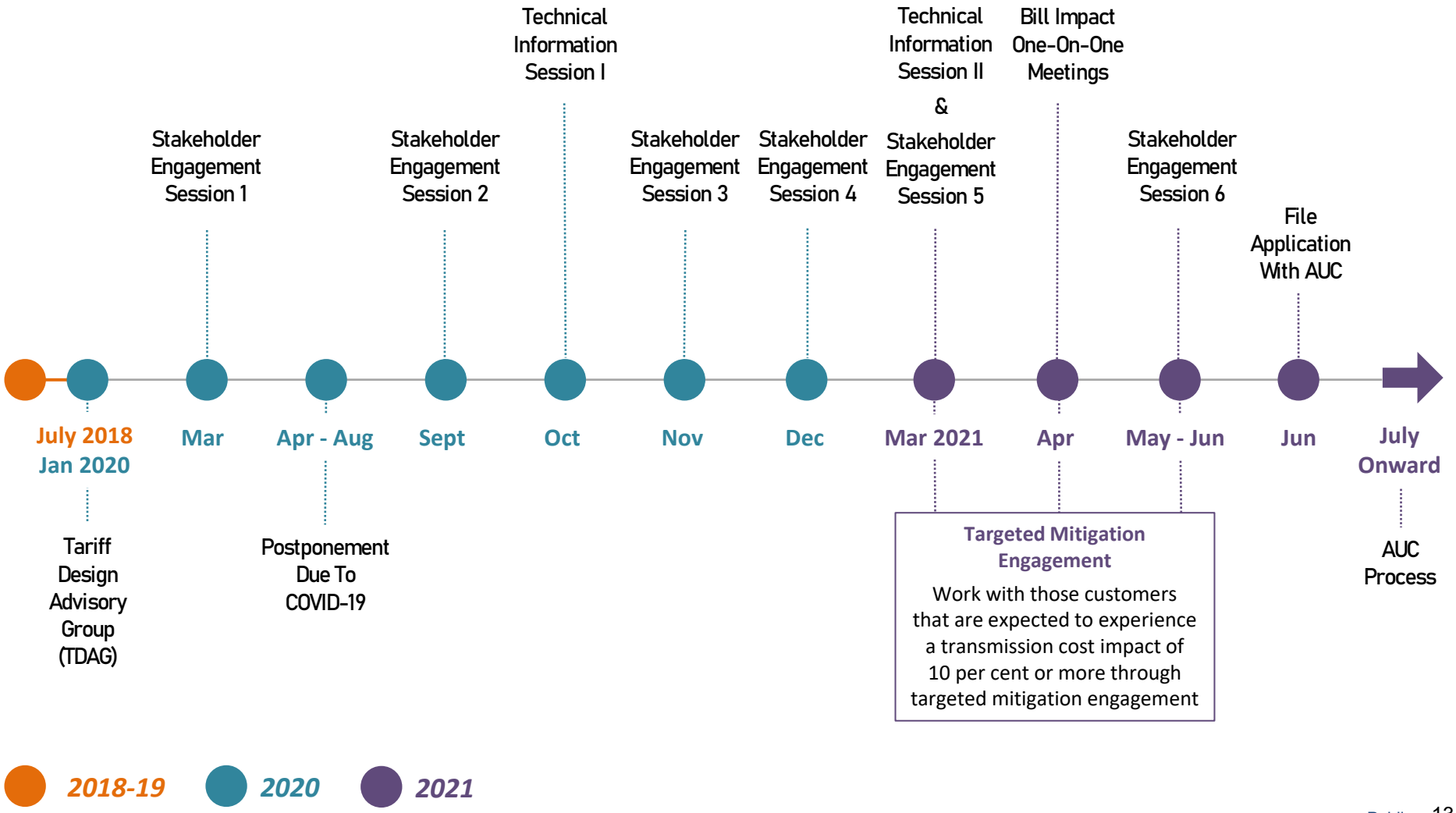
AESO Stakeholder Engagement Framework

Stakeholder engagement

The AESO's stakeholder engagement will:

- Ensure that stakeholders' needs and interests are consistently, transparently and meaningfully considered in the development of a rate design proposal for bulk and regional cost recovery;
- Provide clear objectives to be examined and evaluated in the development of a rate design proposal for bulk and regional cost recovery;
- Assist stakeholders in understanding and evaluating the AESO's preferred rate design;
- Supply stakeholders with tools that will allow them to consider and assess the impact of the AESO's preferred rate design; and
- Identify areas of alignment in order to support an efficient regulatory process.

Stakeholder engagement timeline



Opening Remarks

Public

Case for change

- Since its introduction, the 12-CP rate has increased substantially with significant new investments in the grid to support economic growth and integrate new resources
  - Costs to be recovered are sunk, need to recover these costs to pay for the transmission system
- Substantial peak rate increase has resulted in an increasing risk of cost avoidance at peak hours by customers who can change when they consume power
  - With the current rate design, seeing a negative feedback effect
- The current design is no longer sending effective pricing signals
  - As the transmission system is reinforced and available for use, the weighting of the 12-CP price signal has diverged from the value it creates for the system
- Current rate design does not reflect the drivers of transmission costs to adjust with changes occurring in the landscape of Alberta's electricity system
- Improvements need to be made now so that any future investment decisions are made under the new rate design

Key highlights

- Sharing our preferred rate design today to build understanding and seek input
  - The preferred rate design strikes the right balance moving forward by allocating costs more appropriately to better reflect a customer's use of the system, putting the appropriate long-term price signals in place while also providing for a transition path of minimal disruption
  - Preferred rate design has shifted away from the bookends and stakeholder proposals presented in the fall
- Rate impact is much less impactful than previously estimated
  - Nearly all customers facing an increase will see a rate impact of less than a 10 per cent increase (to both total bill and transmission bill)
  - AESO seeking to mitigate challenges for the few customers who would see a 10 per cent or greater increase in transmission costs through a targeted engagement
  - Many customers (including residential, commercial, and industrial customers) can expect a reduction in transmission costs relative to today

Design objectives

Objective	Description
Reflect Cost Responsibility (updated)	Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*
Efficient Price Signals	Price signal to alter behavior to avoid future transmission build
Minimal Disruption	Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted
Simplicity	Simplicity and clear price signals while achieving design objectives
Innovation and Flexibility	ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers

*AUC Decision 22942-D02-2019

**Proposed rate design must fit within current legislative framework

Your participation

- Your participation to date has been very insightful to the AESO in understanding your perspectives and helping the AESO develop its preferred rate design proposal
- Your continued participation in this engagement is critical to help us prepare a well-informed application to the AUC for the benefit of Albertans
- We are looking for collaborative solutions to minimize the disruption for customers who are impacted by these changes, and your continued engagement is critical for our success
- AESO recognizes the importance of providing clarity on this initiative for all of Alberta's electricity consumers

What We Heard

Public

Session 4 feedback on cost responsibility

- What we heard
  - Cost causation is primary principle that proposed tariff design must meet
  - Embedded approach is likely to best meet cost causation principles
  - Cost recovery must be based on the drivers of the costs to provide transmission service to customers
- In developing the preferred rate design and taking into account stakeholder feedback, preferred rate design is rooted in cost causation, therefore meeting cost responsibility objective

Session 4 feedback on efficient price signals

- What we heard
  - Current tariff design provides price signals allowing customers to manage costs
  - Price signals should be widely available to be adopted by different types of customers
  - Marginal cost approach might be appropriate (including in combination with embedded approach), but relies on forecasts and additional complexity which hamper ability to achieve a more efficient outcome
- AESO views that the embedded approach to cost allocation remains appropriate in that rates based on cost causation will provide cost reflective price signals

Session 4 feedback on approaches

Embedded Approach

- Most appropriately aligns with AESO's design objectives around cost responsibility and would cause the least disruption (several)
- More likely to achieve rate design objective of minimal disruption as AUC and stakeholders more familiar with this approach (several)

Marginal Approach

- Support but would require reallocating existing costs to ensure cost recovery (one)
- May more fully meet rate design objective of sending efficient price signals (several)

Combined Approach / Trade-offs

- Promoted a combination of both to cover past and future investments as well as both incremental (covered by marginal) and embedded costs (several)
- Trade-offs between the two approaches need to be considered as each approach may more fully meet different rate design objectives (several)
- Removing price signals completely will result in inefficient behaviour (several)

Methodology and Analysis

Public

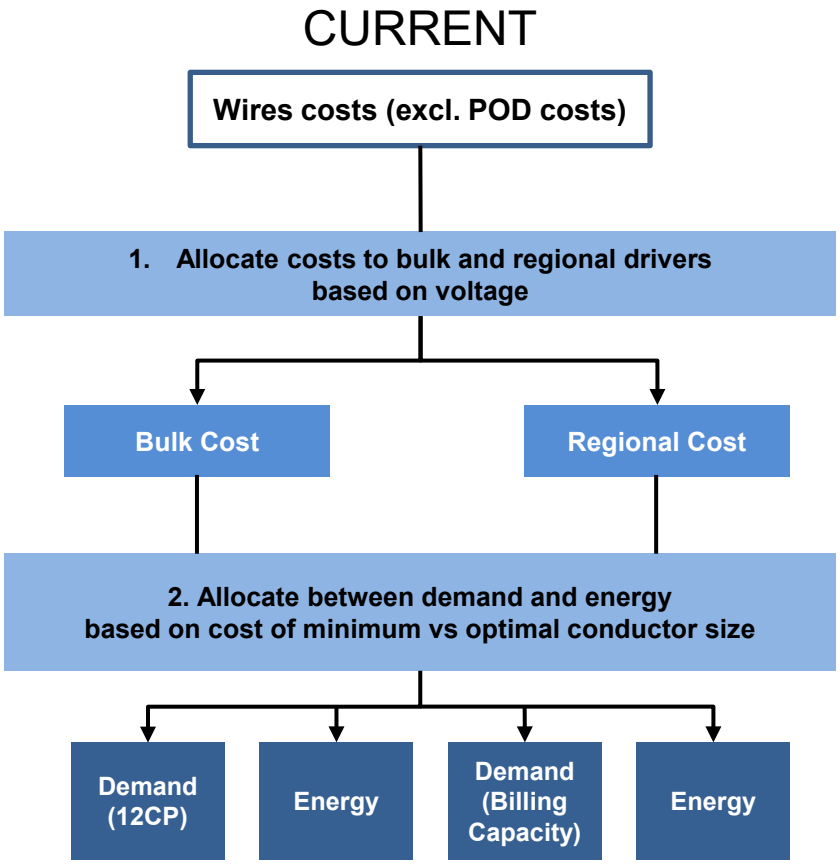
Tariff redesign process

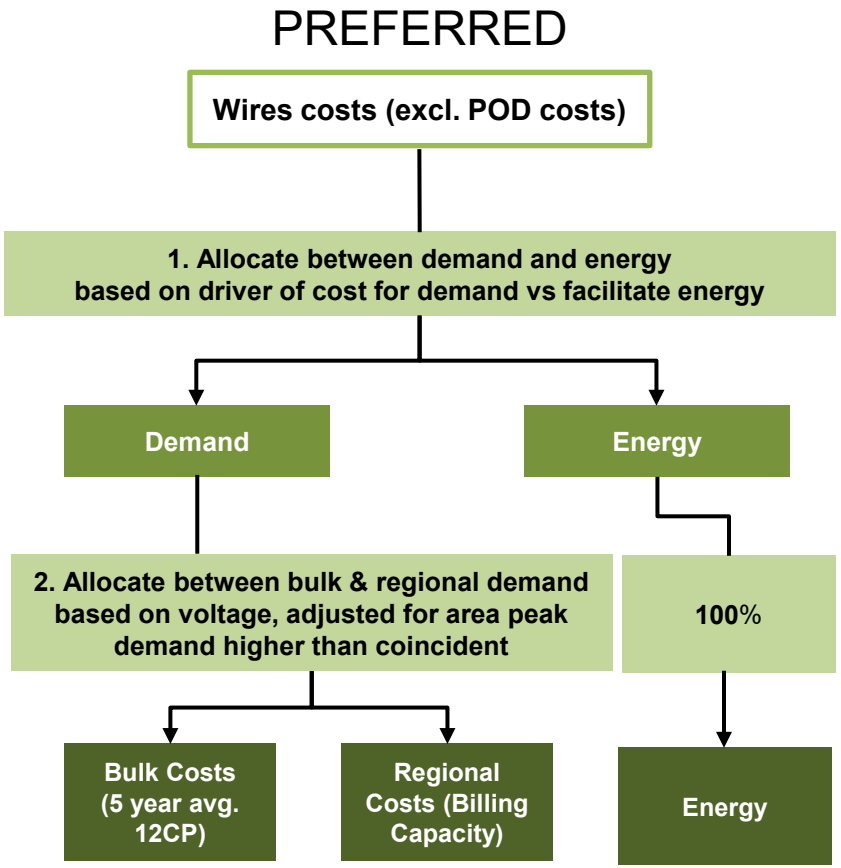
- NERA Economic Consulting has been retained as an expert
- AESO is adopting and proposing NERA's tariff design
- Richard Druce from NERA is an expert in tariff design and is attending this session to respond to questions from stakeholders on the preferred rate design

Summary of rate design

- AESO's preferred rate design relies on an embedded approach, with improvements to better reflect cost causation
  - Relies on concept of minimum system in current tariff, which has been improved to align with transmission system use
- Many stakeholders have stated that an embedded approach remains appropriate for Alberta
  - Identified that updating the current embedded approach is likely the best way to meet tariff design objectives
- AESO's preferred rate design reflects an effective balance in meeting our tariff design objectives

Current and preferred rate design





Current and preferred rate design

Type of charge	Cost Allocation (do not sum due to rounding)		Charges Estimated for 2019 test year	
	Current	Preferred	2019 Test Year	Preferred
Coincident Peak ($/MW month)	47%	29%	10,087	5,980
Energy* ($/MWh)	7%	31%	2.18	10.19
Billing Capacity ($/MW month)	22%	17%	2,668	2,055
POD (**out of scope**) ($/MW month)	24%	24%	N/A	
Total	**100%**	**100%**	**N/A**	

*Current energy charges are the sum of bulk and regional components

Recommended approach aligns costs with drivers

- The preferred rate design characterizes use of the system to allocate the costs of transmission
  - Divide costs between demand-related cost drivers and costs driven by facilitating in-merit flow of energy-related costs
  - Divide demand costs between costs associated with coincident peak consumption and customer's own peak loads
  - Energy charge will increase; peak and billing capacity charge will decrease relative to current tariff
  - No changes to the current types of charges from current tariff: billing capacity charge, energy charge, peak charge (with five-year trailing average)
- Better aligns charges with use of the system, reducing opportunity for customers to shift costs to others by reducing demand at peak hours
  - Customers who wish to manage costs through peak avoidance remain able to do so, but charges are more reflective of the associated costs

Review and Elimination of Marginal Approach

Public

Consideration given to marginal approach

- Discussion in Session 4 about use of embedded and marginal approach to cost allocation
  - Marginal approach is based on estimating the incremental cost of supplying one more unit of demand
    - **Marginal cost**: Change in cost to serve one more customer/MW with next increment of capacity
    - **Residual cost**: Difference between marginal costs recovered and revenue requirement needs to be recovered to minimize distortions
- The suitability of marginal approaches for transmission cost allocation in Alberta was evaluated
  - Applying marginal approach to Alberta context leads to relatively low marginal costs and proportionally higher residual costs
  - Price signal from marginal would be diluted by residual cost recovery
  - Marginal price signal would not encourage efficiency unless pricing is locational since costs vary by location

Marginal approach does not meet rate design objectives

The AESO has assessed that the marginal approach to cost allocation will not meet our rate design objectives based on the following:

- Reflect Cost Responsibility
  - Cost causation could be achieved to the extent marginal rates appropriately reflect costs, but costs will vary by location
- Efficient Price Signals
  - Efficient price signals would need to vary by location and recovering significant portion of residual costs would undermine efficiency of price signal
- Minimal Disruption
  - Marginal cost allocation requires significant residual cost recovery, limiting the gains from efficient price signals and likely to be more disruptive
- Simplicity
  - Calculation of marginal rates relies on forecasts of future growth and future costs, resulting in a greater degree of complexity relative to the current approach
- Innovation and Flexibility
  - Potential to encourage additional price responsive participation, extent of flexibility depends on the basis for calculations

Questions

Public

Improvements to Embedded Approach

Public

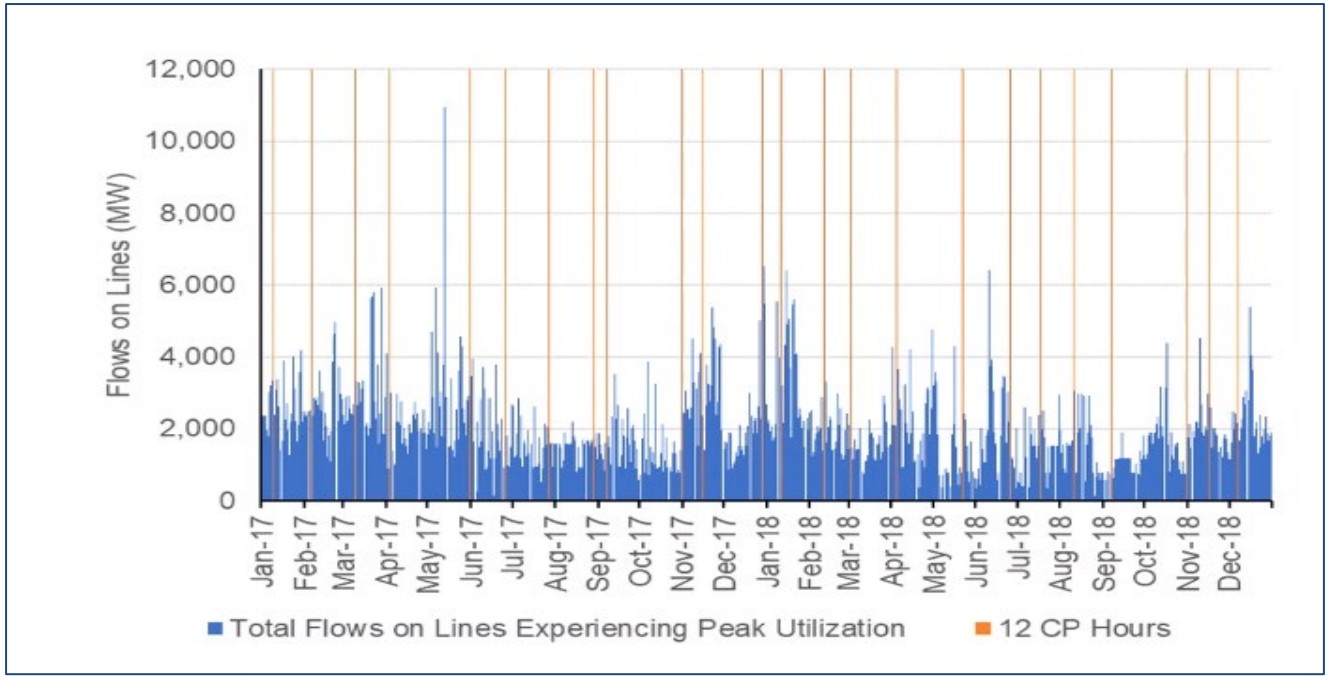
Overview of embedded approach

- The following context frames the AESO's preferred rate design
  - High level overview of transmission cost causation as it applies to the Alberta transmission system
  - An explanation of allocating costs between demand and energy
  - An explanation of functionalizing costs between bulk and regional
  - Allocation of costs to billing determinants
  - Evaluation of preferred rate design against objectives
- Design alternatives that were considered and dismissed are described in the Appendix

Bulk transmission system use

- Demand at times of coincident peak is not the only driver of bulk transmission system utilization
  - Peak bulk line utilization: When a bulk line has flows in an hour greater than 90 per cent of the maximum flow for the year

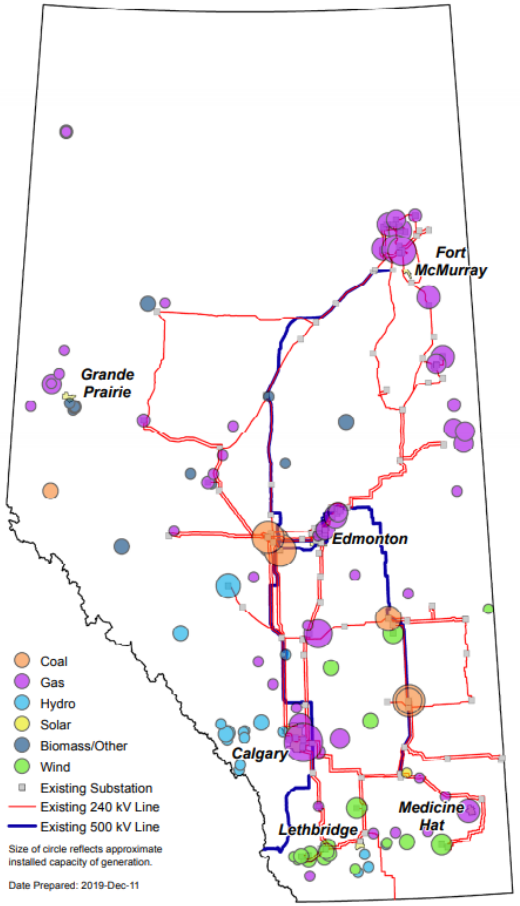
Hours of 12-CP do not necessarily correspond to hours of peak utilization across high-voltage lines



Source: NERA Analysis of SCADA flow data provided by the AESO

Other drivers of transmission system costs

- Other drivers of transmission system costs are not adequately reflected in current tariff
- Flows on transmission system associated with seasonal patterns
- Changes in the regional pattern of in-merit energy drive costs
  - When there are changes in generation dispatch in one region, this affects flows to varying degrees in other regions



Transmission costs associated with energy use

- Energy charges in the current tariff do not explicitly reflect that transmission costs are incurred to enable the flow of in-merit energy
  - Recognizing that transmission costs are allocated to load customers, the costs of facilitating the flow of in-merit energy are not demand related, they are energy related
    - **Demand related**: Costs associated with transmission needed to meet demand
    - **Energy related**: Costs associated with transmission needed to provide in-merit energy
  - The current cost allocation methodology would allocate some of the costs of enabling the flow of in-merit energy to demand

Minimum and actual system approach

- The AESO's preferred rate design allocates transmission costs between demand and energy prior to functionalization of demand-related costs
  - Better matches the fact that the AESO does not distinguish between voltage levels when planning transmission solutions to enable the in-merit flow of energy
  - Better distinguishes the costs that are demand driven and those that enable the flow of in-merit energy

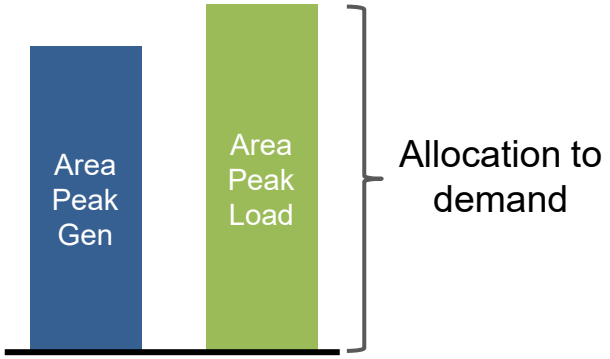
Minimum and actual system calculation

The following methodology is applied to determine the portion of costs allocated to demand and energy

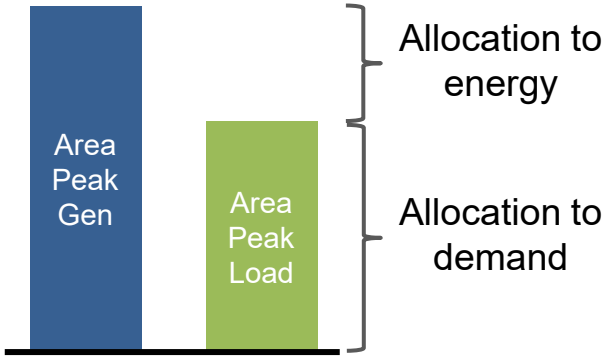
- **Minimum system**: Estimate of the transmission system required to meet peak load (demand)
- **Actual system**: Estimate of the additional transmission system required to facilitate the in-merit flow of energy
- Minimum and actual systems for Alberta are estimated as the sum of the minimum and actual systems across all planning areas
- Calculate the demand-share of costs based on the size of minimum and actual systems for Alberta

The resulting allocations for 2020 are 60 per cent demand and 40 per cent energy, and have changed minimally since 2015

Example of an area where peak gen < peak load



Example of an area where peak gen > peak load

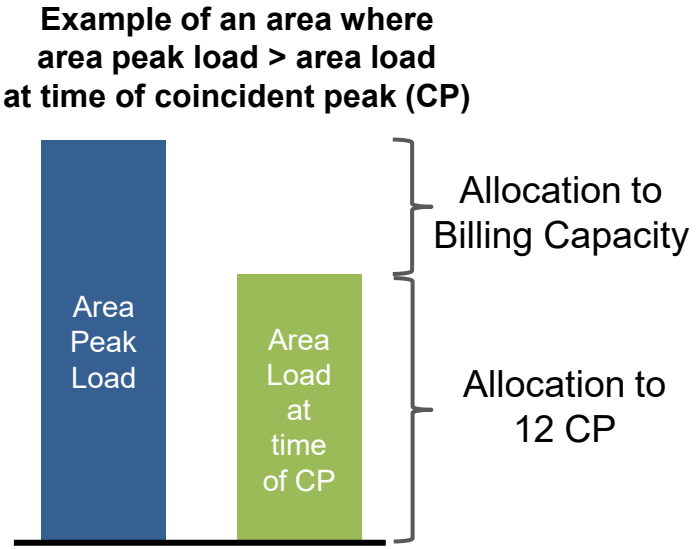


Functionalize demand share of costs

- Functionalize demand-related costs by proportion of book value of assets on the basis of current voltage threshold (240 kV) as a reasonable approximation of the bulk and regional share of costs
  - Low voltage lines more likely to serve a regional purpose
  - High voltage lines are more likely to serve a bulk purpose
  - Consistent with the approach used today but applied only to the demand portion of costs

Adjustment to bulk system share of costs

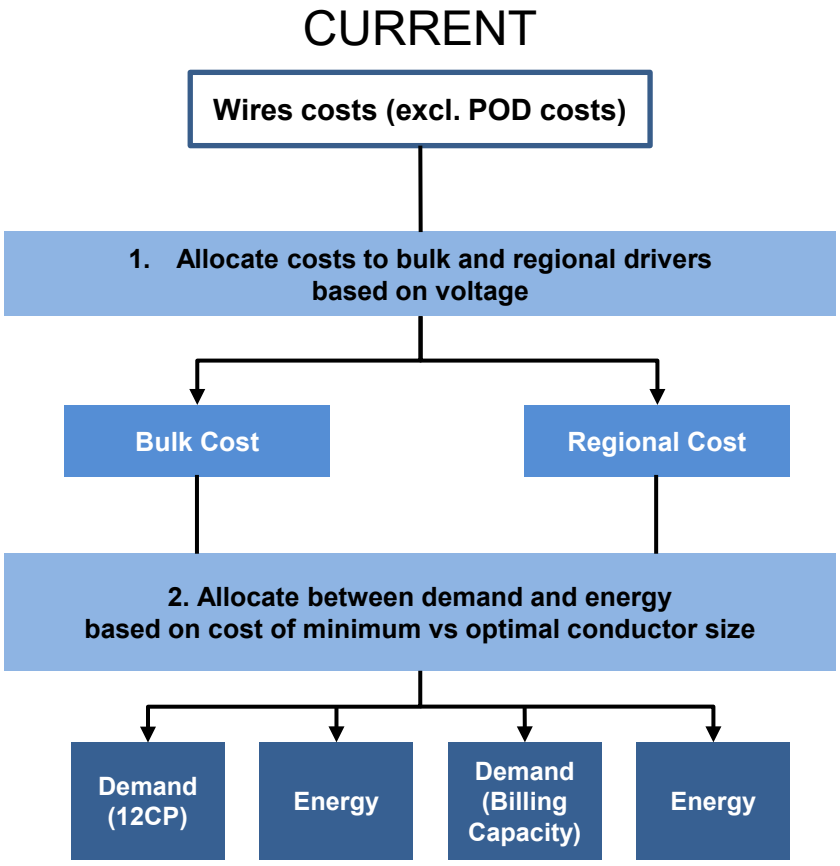
- Size of the bulk system primarily driven by system peak demand, but may need to be larger in areas where the load peaks at times other than the coincident peak
  - The portion of the bulk system that is used to accommodate peaks outside of the coincident peak is allocated to the billing determinant that reflects non-coincident peak (i.e., billing capacity)

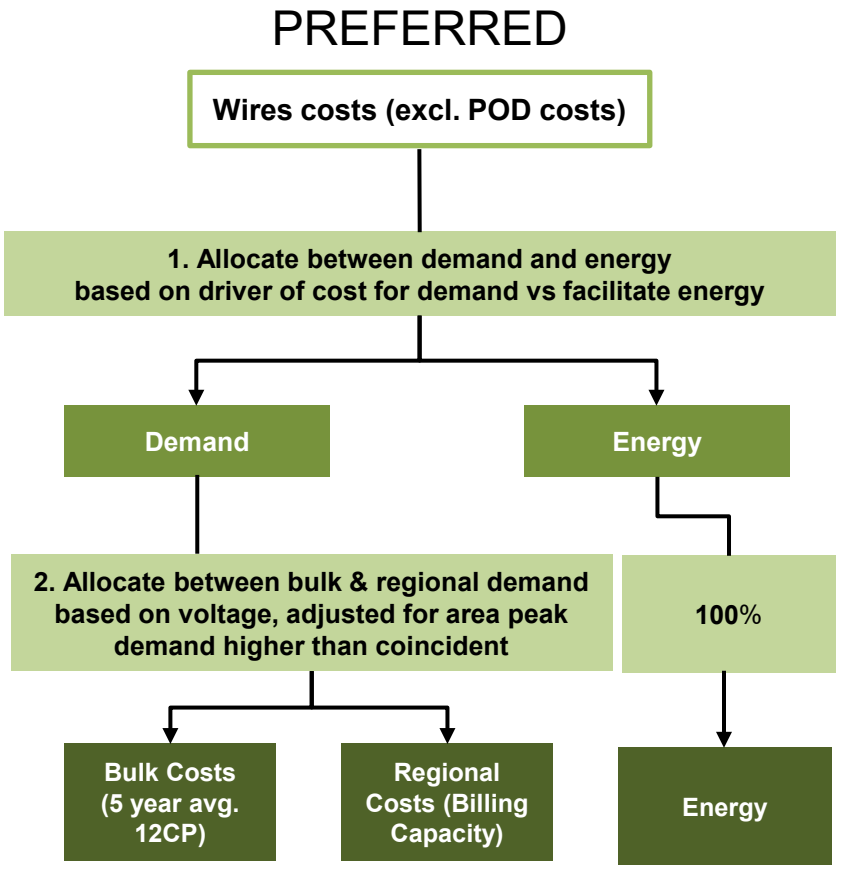


Billing determinants to reflect cost causation

- Majority of bulk demand-related costs recovered on five-year trailing average of monthly coincident peak
  - More appropriately reflects how consumption over the longer-term drives transmission costs
  - Five-year average will be phased-in
- Regional demand-related costs (and remaining bulk costs) recovered on billing capacity charge
  - Regional system is scaled to meet non-coincident peak demand
- Energy-related costs recovered on energy charge
  - Transmission system is planned to facilitate the in-merit flow of energy at all times of the year, so energy use in all hours matters for transmission costs

Review: Current and preferred rate design





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Total	**100%**	**100%**	**N/A**	

*Current energy charges are the sum of bulk and regional components

Resulting rates will meet our rate design objectives

- Reflect Cost Responsibility
  - Resulting rates reflect costs of using the transmission system, including costs associated with in-merit flow of energy, local and peak use of the system
- Efficient Price Signals
  - Resulting rates provide transparent price signals to customers that better reflect the cost drivers of the transmission system
- Minimal Disruption
  - Resulting rates are based on similar billing determinants that customers understand (overall cost impacts discussed later in the presentation)
- Simplicity
  - Resulting rates are comparable to current rates in terms of level of complexity
- Innovation and Flexibility
  - Additional flexibility to allow allocations to change over time reflecting evolution in how the transmission system is used

Break

Public

Question Period

What We Heard and Methodology and Analysis

Public

Break

Public

Bill Impact Summary

Public

Overall summary

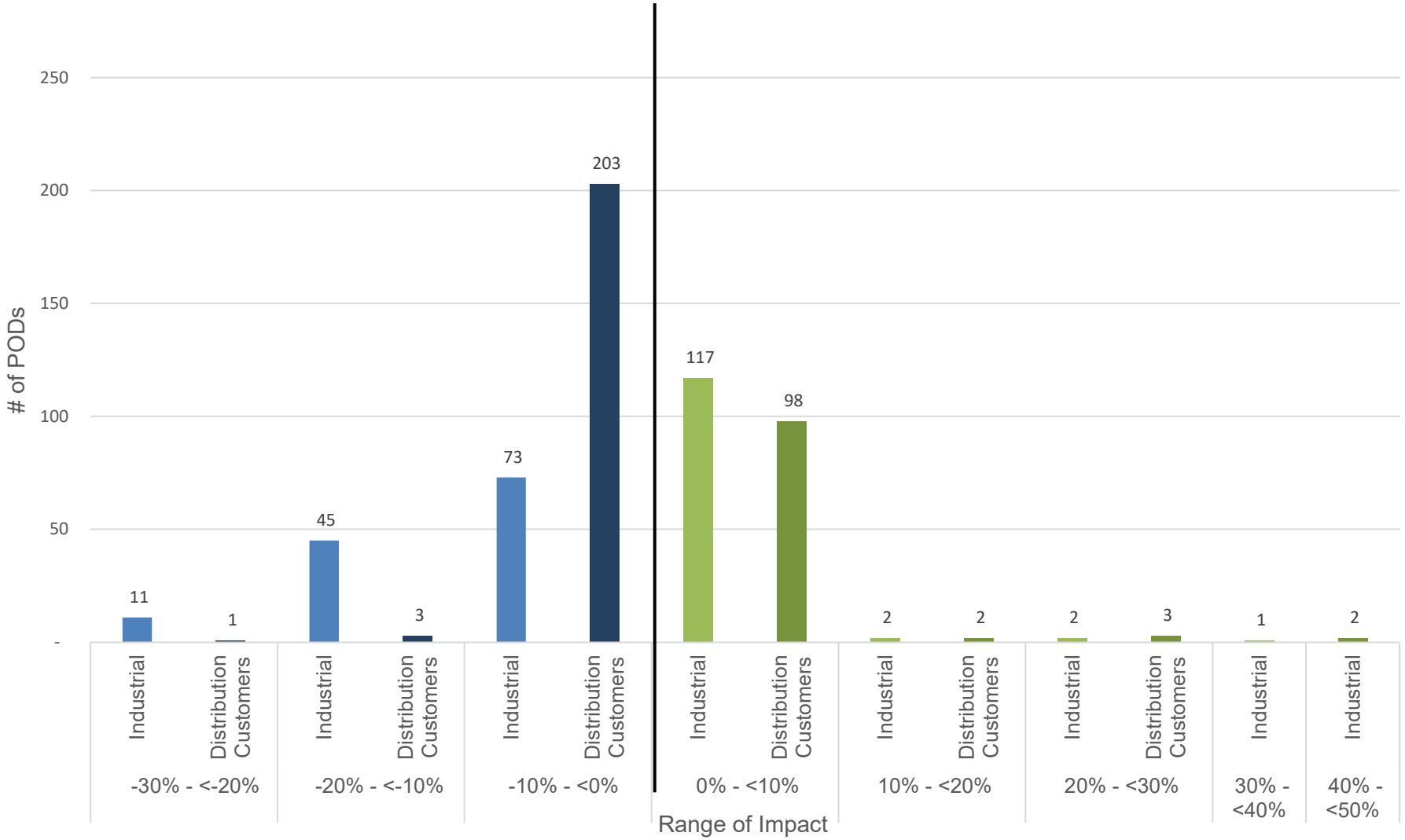
- Total shift in transmission cost recovery will be small
  - Total change less than three per cent of total transmission system costs
- Prior to any mitigation, it is not expected that any customer would have a total bill increase of more than 15 per cent
  - Before we apply any mitigation, a few customers may see up to a 50 per cent increase in transmission costs (15 per cent or less of their total electricity bill)
  - To support a minimally disruptive transition to the new rate design the AESO is exploring mitigation to reduce this impact to no more than a 10 per cent increase in transmission costs
- Many customers (including residential, commercial and industrial customers) can expect a reduction in transmission costs relative to today
  - Changes in bills for customers will depend on how distribution companies pass through transmission costs

*A customer's total electricity bill depends on transmission costs, energy price, and distribution costs (if applicable)

Bill impact methodology and assumptions

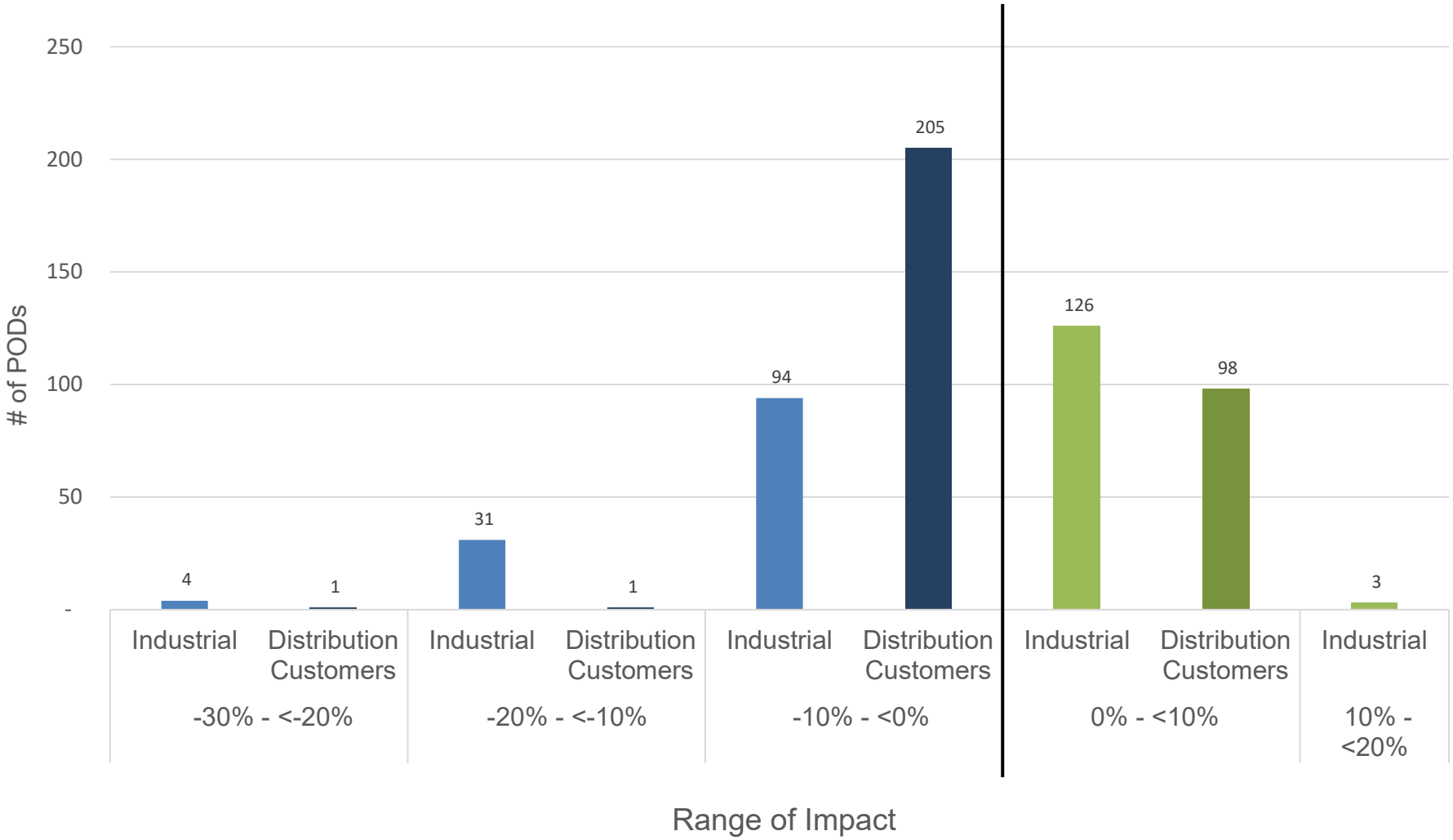
- Calculate the impact of changes in bills attributable to Rate DTS (Demand Transmission Service) changes
  - Proposed and current rates were applied to the same billing determinants (for the 2019 test year) at each **point-of-delivery** (POD) for the bulk and regional charges
    - Transmission bill for each POD includes POD costs, Operating Reserve (OR) charges and other tariff charges
    - Total bill for each POD includes transmission bill and energy commodity costs
  - Estimated per cent impact based on change in transmission costs and total bill by POD under current and proposed tariff
  - Assumed 12-CP consumption maintained at current levels (i.e., no retroactive averages)
- Bills for an individual Rate DTS point-of-delivery will be different from estimates depending on actual demand and usage at the point-of-delivery and actual effective rates

Number of PODs by transmission cost per cent impact (2019 test year)



Industrial: AESO and DFO Transmission connected customers

Number of PODs by total bill per cent impact (2019 test year)



Industrial: AESO and DFO Transmission connected customers

Estimated average transmission cost impact (by Load Factor, 2019)

Billing Capacity (MW)	Load Factor (energy use / capacity)				
	0-20%	20%-40%	~~20~~ 40%-60%	60%-80%	80%-100%
0-7.5	-12%	-1%	0%	2%	5%
7.5-15	-9%	-4%	1%	2%	5%
15-22.5	-11%	-2%	-1%	2%	5%
22.5-30	-13%	-4%	1%	2%	5%
30-37.5	-19%	-3%	-1%	4%	9%
37.5-45	-20%	—	-2%	3%	—
>45	-16%	5%	0%	2%	7%
Total Accounts	**95**	**66**	**170**	**204**	**28**

Estimated average total bill impact
(by Load Factor, 2019)

Billing Capacity (MW)	Load Factor (energy use / capacity)				
	0-20%	20%-40%	~~20~~ 40%-60%	60%-80%	80%-100%
0-7.5	-9%	-1%	0%	0%	1%
7.5-15	-7%	-3%	0%	0%	1%
15-22.5	-8%	-1%	-1%	0%	1%
22.5-30	-11%	-2%	0%	0%	1%
30-37.5	-13%	-2%	-1%	1%	2%
37.5-45	-17%	—	-1%	1%	—
>45	-13%	1%	-1%	0%	2%
Total Accounts	**95**	**66**	**170**	**204**	**28**

Estimated average transmission cost impact by coincident peak response

- Customers with low load factors are less likely to be consuming during coincident peaks
- Customers with higher load factors tend to consume during coincident peaks
- Customers with higher load factors and who respond to coincident peaks will have a larger rate impact under the AESO's preferred design **before mitigation**

Response to Coincident Peak (%)	**Load Factor** (energy use / capacity)		
	0-33%	33%-66%	66%-100%
0-33%	-12%	-2%	2%
33%-66%	-5%	2%	16%
66%-100%	-13%	22%	42%

Further information about bill impact

- The AESO has posted the Bill Impact Tool to allow stakeholders to calculate the estimated bill impact for their sites
  - Stakeholders can request from the AESO their specific site data input for the tool. The AESO will provide the data to the Rate DTS market participant for the site.
  - The AESO is hosting a **Technical Information Session on March 31, 2021** to provide further information on how to use the Bill Impact Tool. Registration details are available on our website.
- Ratepayers can also request a one-on-one meeting with the AESO to ask questions about how the Bill Impact Tool works for your site. These bill impact one-on-one meetings will be scheduled during April 1-14, 2021.
- **Email us at tariffdesign@aeso.ca** to request your site-specific data input for the Bill Impact Tool and/or to request your one-on-one bill impact meeting

Questions

Public

Path to Achieve Minimal Disruption

Public

Session 4 feedback on minimal disruption

- What we heard
  - Gradual implementation over time is preferrable given current economic circumstances
  - Mitigation options can only be evaluated alongside the AESO's preferred rate design
  - Mitigation of rate increases that occur at the bill level allows for quick adoption and allows tariff price signals to become effective
  - Mitigation at bill level is difficult to implement fairly, especially if permanent
  - Major changes to current tariff design are premature at this time
  - Changes to rates cannot be delayed indefinitely
- We are including a pathway to achieve minimal disruption that is targeted at those loads who will see a transmission cost impact of 10 per cent or more

What we mean by minimal disruption

- Minimal disruption means transitioning to the new tariff design in a way that balances two risks
  1. Continuation of current tariff incentives risks increasing the cost shifting between customers who can respond to incentives and those who cannot
  2. If the changes to the tariff design are so significant that some customers choose to leave the grid, costs to remaining customers would increase
- Preferred rate design addresses first risk in a manner that minimizes the second risk for many, with additional mitigation to support the few that are significantly impacted
- Path to change should allow customers to adapt to new tariff design
  - We have an opportunity to develop and put forward to the Commission a mutually acceptable mitigation approach that will allow for a successful transition to the new tariff design

Targeted engagement plan for mitigation

- Rate impact assessment indicates significant increases only to limited number of consumers
  - The Bill Impact Tool will assist all impacted stakeholders in assessing their rate impact to identify concerns to the AESO
- The AESO is initiating a targeted engagement to develop a mutually acceptable set of mitigation options with this small impacted group
- Agreed upon proposal, or identified options*, will be shared with the broad stakeholder group for Session 6
- The AESO will provide both information from the targeted engagement and the broad engagement to the AUC to support regulatory efficiency
- The AESO intends to include a mitigation proposal as part of its application for approval by the AUC
  - The AUC has ultimate authority to decide whether or not to approve the proposal or any identified option

* If unable to agree upon a proposal, options identified by involved parties will be shared

Scope of targeted mitigation

- Parties with an estimated transmission cost impact of greater than 10 per cent increase have been invited to this targeted engagement
  - Includes seven sites / customers across four industries
  - Total estimated impact of roughly $8 million
  - The five distribution facility owners (DFOs) PODs with an estimated transmission cost impact of greater than 10 per cent that are not DFO Transmission connected customers are excluded, as the rate impact is incorporated into overall DFO rates and will not be POD specific

AESO mitigation proposal starting principles

The AESO is seeking to develop a mutually acceptable mitigation proposal with the small group of impacted loads that will:

1. **Limit the rate impact for customers**: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition
2. **Adapt with design and rates**: Ensure options are adaptable to changes to the proposed design and forecast rates
3. **Consistent application**: Mitigation options can be applied consistently across all impacted loads and not be individually defined
4. **Administrative simplicity**: Feasible to implement with current tools and systems
5. **Mutually acceptable**: Account for feedback from broad stakeholder group

Mitigation options assessment

The AESO's initial evaluation of options forms a starting point for targeted mitigation engagement

- Other options may be identified by impacted loads in targeted engagement

Type	Category	Description	Assessment
Rate Design	Transition Rate Design	Phase in tariff changes	Given the small number of load customers with rate impacts over 10 per cent a phase-in of new rates not needed, targeted mitigation more effective
		Adjustment period	Limited effectiveness as a mitigation option as greater portion of rates based on usage and not billing capacity
	Rate Classes	Set rates by customer size/type/class	Preferred rate design provides customers with similar flexibility to today, better reflecting how differences in behavior correspond to transmission costs
Bill Adjustment	Transition bill impacts	Bill increase of no more than X% per year for Y years	Continues to be an available option for consideration in the targeted engagement
	Permanent bill reduction	Bill increase of no more than X%	Mitigation is to support a minimally disruptive transition to getting the appropriate long-term price signals in place.

Targeted approach – Schedule

- **March 19-31 |** One-on-one meetings with impacted loads
  - Describe estimated bill impact
  - Respond to questions on targeted engagement process
- **April 15 |** Stakeholder feedback due on mitigation options and proposal principles from broad stakeholder group
- **April 1 to late May |** Facilitated group meetings
  - Explore options, seek agreement
  - Notes from meetings will be shared (excluding commercially sensitive information)
- **Late May |** Outcomes of targeted engagement will be shared with broad stakeholder group for feedback
- **June |** Adjust mitigation proposal for feedback received from broad stakeholder group

Questions

Public

Break

Public

Energy Storage Tariff Treatment

Public

Session 4 feedback on energy storage tariff treatment

- What we heard
  - Current rates reflect one class of service: firm load
  - Consideration should be given to rates that reflect the different types of uses of the system: non-firm rates
  - Types of tariff treatment that could reflect different use of the system:
    - Rates that allow additional use of available capability that would not otherwise occur
    - Rates that reflect transmission cost savings from interruptions to relieve constraints
    - Rates that encourage participation in markets or provision of ancillary services

Summary of non-firm rate assessment

	Rates that reflect transmission cost savings from interruptions to relieve constraints	Rates that encourage participation in markets or provision of ancillary services	Rates that allow additional use of available capability that would not otherwise occur
Description	• Demand reduction (or increase) beneficial to reduce transmission constraints, value of which is reflected in rates	• Reduced DTS rate available everywhere to eligible loads / storage that participate in markets or reliability services (energy, OR)	• Discount relative to DTS for curtailable service to enable use of the system that would not otherwise occur to offset costs for other customers
Rationale	• Identify need in specific location • Interrupt load to manage transmission constraints • Lower future transmission costs	• Available everywhere • Encourage participation in market / service through additional bids and offers	• Encourage efficient use of capability without incurring additional transmission costs (AESO can recall and load must curtail)
Conclusions	• Rates that reflect transmission cost savings from interruptions to relieve constraints have a strong locational component	• Rates that encourage participation in markets or provision of ancillary services do not impose different transmission costs than those that do not, and provision of services is compensated through those markets / contracts	• Rates that allow additional use of available capability that would not otherwise occur are beneficial for all stakeholders provided the use of this capability would truly not otherwise occur under Rate DTS

Rates that allow additional use of available capability

- The AESO has considered options to reflect different use cases of the grid and has identified that energy storage could make use of transmission capability that would not otherwise occur for benefit of other customers or drive the need for additional transmission capacity
- Demand Opportunity Service (DOS) is one such rate
  - Allows customers connected to the grid to draw additional power over and above the amount they are contracted for under DTS as a means of reducing DTS charges for all customers
  - The current service is interruptible, temporary and available only when there is surplus transmission capacity
    - Term is 12 months
    - Three types based on interrupt-ability: Seven-minute, One hour, Term
    - Loss charges are applied to MW under this rate
  - Participants need to pre-qualify for DOS

DOS rates refresher

Rate DOS Type	Cost Allocation to Rate DOS[1]	Opportunity Service Obligations
DOS 7 Minute	• Costs converted to $/MWh amounts • Variable components of the bulk and regional system (i.e., energy charge)	Recallable within 7 minutes of a directive
DOS 1 Hour	• Costs converted to $/MWh amounts • Variable components of the bulk and regional system (i.e., energy charge) • + 50% of the non-energy bulk and regional system charges	Recallable within 60 minutes of a directive
DOS Term (Available to loads with generation, when generation unavailable)	• Costs converted to $/MWh amounts • Variable components of the bulk and regional system (i.e., energy charge) • + 100% of the non-energy bulk system charges • +1200% of the non-energy regional system charges	Recallable within 7 minutes of a directive

[1]As filed in the AESO's 2010 ~~2020~~ ISO tariff application (paragraphs 229 - 233) and approved in Decision 2010-606, released on Dec. 22, 2010

Key terms and conditions for DOS

- Current DOS pre-qualification
  - Non-refundable $5000 fee (annual fee)
  - Requires anticipated frequency of use
  - Estimate of MWhs per month
- Eligibility criteria
  - Use would not occur under any other rate
  - Sufficient transmission capacity
  - Is temporary or repeated short-term use
  - Must have alternative energy source or a “market opportunity” where the cost of receiving additional electric energy under Rate DTS renders the opportunity uneconomic
- Transaction request
  - 45 days after pre-qualification
  - Prior to use the participant must submit a formal transaction request + $500/month if approved

Modernizing DOS

- The AESO's revised view is that the DOS rate may be revised to allow for expanded eligibility (i.e. energy storage)
  - Overall structure and rate design considerations can remain as is
  - Energy storage may be able to meet DOS eligibility criteria
- Must resolve outstanding questions regarding eligibility, visibility and use of energy under the DOS rate for greater use
  - How to validate that the energy would not have been used under a DTS rate?
    - Any adjustments to expand application need to maintain the balance of allowing customers to draw additional power that otherwise would not be used under Rate DTS, while eliminating any potential for customers to rely on DOS as a means of avoiding DTS charges
  - How to modernize the DOS transaction information so that the AESO has clarity on when energy will be used? And how it is curtailed?
    - Confirm what information is used or needed by the AESO relating to DOS energy and eliminate any unnecessary requirements

Next steps

- We are seeking feedback with respect to:
  - Is DOS a suitable rate for a portion of energy storage charging capacity?
  - And if so, your thoughts on assessing eligibility?
- AESO will continue to explore noted questions
  - AESO will present recommendation at Session 6

Questions

Public

Implementation Considerations

Public

Implementation considerations

- To support the transition, the AESO will provide a forecast of rates in advance of them coming into effect
- The AESO will reduce red tape through administrative changes to rate sheets
- Updates to underlying data and transparent information
  - The AESO will propose to update the data underlying the cost allocations every five years
    - Calculations underlying the demand and energy allocations
    - Calculations underlying the allocations of demand to bulk and regional categories
  - Timing of highest coincident metered demand to hourly from 15-minute interval
    - Provides participants with more transparent information
    - Simpler calculation aligns with public information
    - More appropriately reflects information used for transmission planning

Feedback requested on implementation changes to increase flexibility

- Should the AESO provide participants with more flexibility to contract capacity?
  - Contract reset period
    - Allow participants to change their contract capacity once new rates come into effect, without payment in lieu of notice (PILON), to better reflect their needs given the change in rate design
  - Expand PILON waiver provisions
    - Allow for changes to contract capacity without a PILON, provided the contract level has not changed in the previous five years
    - Encourage participants to provide more accurate information about contract level to the AESO by removing PILON under certain circumstances

Next Steps

Public

Engagement schedule

- **March 31, 2021 |** Host technical information session to go over Bill Impact Tool to ensure understanding and enable stakeholders to understand how to navigate and determine their bill impact
- **March to May 2021 |** Work with those customers that are expected to experience a transmission cost impact of 10 per cent or more through an approach of targeted mitigation engagement
- **April 1-14, 2021 |** Host bill impact one-on-one meetings with interested ratepayers to assist with using the Bill Impact Tool and ensure understanding on how the impact can be calculated
- **April 15, 2021 |** Stakeholder feedback due on questions set out in stakeholder comment matrix
- **Late May/Early June 2021 |** Host stakeholder engagement session to provide an overview and seek stakeholder input on mitigation discussion outcomes, energy storage assessment recommendation, Session 5 stakeholder feedback or follow-up, and areas of alignment
- **June 2021 |** File application with AUC for public proceeding and approval

Session feedback

- We want to thank you for attending the Bulk and Regional Tariff Design Stakeholder Engagement Session 5 and we would appreciate your feedback on the session
- To limit stakeholder fatigue, we are collecting your initial feedback on the session by conducting a Zoom poll during the session rather than emailing you a short session survey following the session
- Zoom poll

Session feedback (cont.)

- We value stakeholder feedback, and we invite all interested stakeholders to provide their input on this session via the questions set out in the **Stakeholder Comment Matrix Tariff Session 5 on or before April 15, 2021**. The matrix will be available on March 25, 2021 on our website at www.aeso.ca.
  - Path: Stakeholder Engagement > Rules, standards and tariff consultations > Tariff (filter) > Bulk and Regional Tariff Design > March 25, 2021 Session 5
- Within this comment matrix we are looking for your feedback on the following:
  - Preferred rate design
  - DOS rate eligibility
  - Targeted approach on mitigation discussions
  - AESO mitigation principles and options
  - Areas of alignment
  - Implementation considerations

Next session

- The next session (Session 6) will be hosted in late May or early June 2021. Notice will be provided three weeks in advance in our Stakeholder Newsletter and on our website.
- Session 6 purpose
  - The purpose of the session is to engage stakeholders in a discussion of the AESO's mitigation discussion outcomes, energy storage assessment recommendation, Session 5 stakeholder feedback or follow-up, and areas of alignment
- Session 6 objectives
  - Provide an overview and seek stakeholder input on the outcomes of the targeted mitigation engagement
  - Present and discuss the energy storage assessment recommendation for the purpose of getting stakeholder feedback
  - Share our learnings and seek stakeholder input on Session 5 stakeholder feedback or follow-up and areas of alignment
  - Understand outstanding stakeholder concerns

Questions

Public

Contact the AESO

- ***Twitter:*** *@theAESO*
- ***Email:*** *tariffdesign@aeso.ca*
- ***Website:*** *www.aeso.ca*
- Subscribe to our stakeholder newsletter

Thank you

Public

Appendix

Public

Tariff design alternatives considered and dismissed

1) Approach to allocating between demand and facilitating the free flow of in-merit energy:

a) Generation capacity compared to contractual demand

Rejected: Does not account for differences in transmission costs that arise from how load and in merit energy use the transmission system at different times

a) Peak net generation compared to peak load

Rejected: Does not account for diversity amongst customers, nor does it account for the fact that transmission is needed to accommodate in merit energy even if load is there to offset.

2) Functionalization of demand-driven costs:

a) Functionalizing based on length or capacity of transmission wires

Rejected: no systematic correspondence between length or capacity and function

3) Consideration of time period for billing determinants for bulk costs to coincident demand:

a) 1CP and 4 CP:

Rejected: if selected, would not capture other times in the year where marginal in merit energy and demand are in different places.

b) 12-CP (in its current form):

Rejected: average is more reflective of how longer- term consumption patterns drive transmission costs

List of Acronyms

Public

Acronyms

- AUC = Alberta Utilities Commission
- CP = Coincident Peak
- DFO = Distribution Facility Owner
- DOS = Demand Opportunity Service
- DTS = Demand Transmission Service
- OR = Operating Reserve
- PILON = Payment in Lieu of Notice
- POD = Point-of-Delivery

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Company Representative
Comments From:	Company Name			**Phone:**	Contact Phone Number
Date:	[yyyy/mm/dd]			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	

12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	
15	Do you have any additional implementation considerations the AESO should consider?	
16	Do you have additional clarifying questions that need to be answered to support your understanding?	
17	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Individual Site Bill Impact Tool

This bill impact tool is not authoritative and is for information purposes only and intended to provide guidance. In the event of any discrepancy between this tool and any authoritative document[1] in effect, the authoritative document governs.

1 Purpose

This bill impact tool is intended to allow ratepayers to assess historical annual impact with respect to the AESO's preferred bulk and regional tariff rate design ("Preferred Rate Design") described in the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5 published on March 18, 2021 and presented in the corresponding AESO's Stakeholder Session 5 on March 25, 2021.

The purpose of this bill impact tool is to allow a market participant to estimate the annual historical charges for system access service under the AESO's Preferred Rate Design, including Rate DTS, *Demand Transmission Service* , and Rate PSC, *Primary Service Credit* .

The calculations in this bill impact tool provide estimated charges under the Preferred Rate Design only. The AESO calculates certain actual charges on an hourly basis rather than on average annual amounts, and ***actual charges under any future tariff design may differ from the estimated amounts presented in this bill impact tool*** .

2 Current Design and Preferred Rate Design Rate Calculations

Current Design (Test Year 2019) and Preferred Rate Design (Test Year Future) rates are calculated using actual 2019 billing detemrinants for all sites and 2019 revenue requirement. The rates only differ by changing the functionalizaiton and classification from current approved in the 2021 ISO tariff to the preferred rate design.

3 Completing the Individual Site Bill Impact Tool

This section describes how a market participant may complete the bill impact tool to estimate and compare annual charges (based on historical load information) for system access service under the existing 2021 ISO Tariff bulk and regional tariff design and under the AESO's Preferred Rate Design.

Initial Steps

Paste single site annual billing determinants on cell "A2" of the 'Site Data Input' tab.
This summary data can be provided by the AESO (in coordination with the DFO if necessary)

In the Technical Information Session on March 31, 2021, the AESO will provide examples and a detailed walk through of the bill impact tool.

The information included in the 'Site Data Input' tab will allow calculations on the 'Annual Summary' tab and will provide annual summary of bill impact resulting from the preferred rate design.

Adjusting Input Data

The 'Adjust Load Profile' tab provides the opportunity to override historical load profile or billing determinant information.

For assistance with this tool and Site Data Input data, please contact the AESO at: tariffdesign@aeso.ca

Attachments

Annual Summary - Summary of bill impact by year
Adjust Load Profile - Allow ratepayers to override input values to assess impact
Site Data Input - Tab to allow annual billing or load profile information by year

Revision History

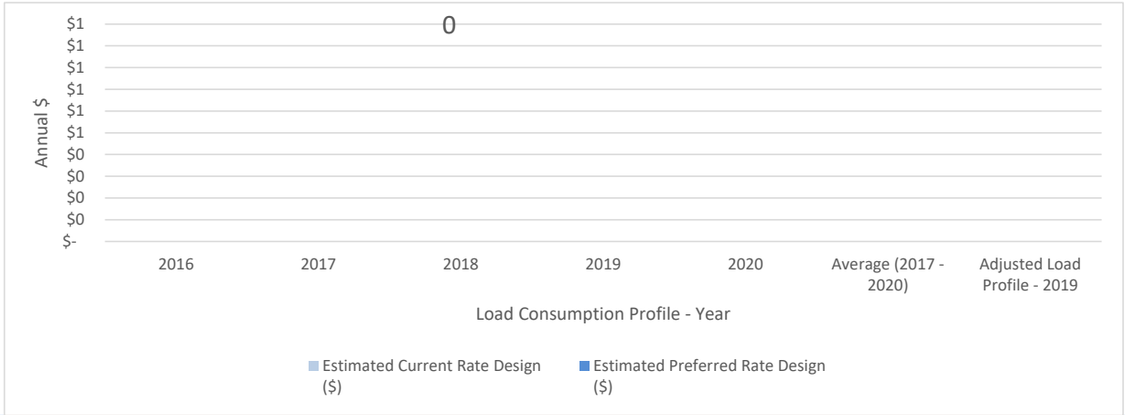
Date	Description
2021-03-18	v 0.1 - Initial release with draft Test Year 2019 values
2021-03-22	v 0.2 - Fixed to work with all Excel versions and Contract Capacity to pull appropriate year selected (not just 2019)
2021-03-30	v 0.3 - Fixed to ensure adjusted load profile data aligned with results from 'Adjust Load Profile' data
2021-04-06	v 0.4 - Fixed to pull actual annual average pool price into 'Adjust Load Profile' tab

[1] "Authoritative document" is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and associated regulations, and that contain binding legal requirements for either market participants or the AESO, or both. Authoritative documents include: the ISO rules, the reliability standards and the ISO tariff.

Market Participant: **0**
Site Description: **0**
Account ID: **0**
Date: August 16, 2021

Threshold for targeted mitigation engagement*:	
2019 Load Profile Year:	#N/A
2017-2020 Average:	#N/A

*Sites with greater than 10% impact (estimated transmission costs) will be invited to targeted mitigation engagement



Estimated Transmission Costs

Load Profile Year	Contract Capacity (MW)	Annual Billing Capacity (MW)	Annual Coincident Peak (MW)	Coincidence Factor (%)	Annual Energy (MWh)	Load Factor (%)	Estimated Current Rate Design ($)	Estimated Preferred Rate Design ($)	Estimated Impact ($)	Estimated Impact (%)
2016	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2017	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2018	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2020	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Average (2017 - 2020)							#N/A	#N/A	#N/A	#N/A
Adjusted Load Profile - 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

Confidentiality: Proprietary When Completed

Market Participant: **0**
Site Description: **0**
Account: **0**
Date: August 16, 2021

Tariff: Test Year 2019

Billing Quantity		Factor	Monthly Average	Applicable Volumes
(a)	Substation fraction (SF)			#N/A
(b)	Rate PSC Applicable			#N/A
(c)	Highest metered demand		#N/A	#N/A MW
(d)	Average coincident metered demand	#N/A	#N/A	#N/A MW
(e)	Contract Capacity		#N/A	#N/A MW
(f)	Metered energy	#N/A	#N/A	#N/A MWh
(g)	Billing capacity		#N/A	#N/A MW
(h)	% of pool price for operating reserve charge			#N/A
(i)	Apparent power factor difference			#N/A MVA
(k)	Site Average Pool Price on Energy Settlement			#N/A /MWh
(l)	Annual Average Pool Price			$54.88 /MWh

	Rate or Rider Component				Rate		Volume		Amount
Rate DTS: Demand Transmission Service									
Connection Charge									
Bulk System Charge									
3(a)	Coincident metered demand				$10,087.00	/MW/month	#N/A	MW	#N/A
Regional System Charge									
3(b)	Billing capacity				$2,668.00	/MW/month	#N/A	MW	#N/A
Energy Charge									
3(c)	Metered energy				$2.18	/MWh	#N/A	MWh	#N/A
Point of Delivery Charge									
3(e)	Substation fraction				$11,278.00	/month	#N/A		#N/A
3(f)	First (7.5 × SF) MW of billing capacity				$4,566.00	/MW/month	#N/A	MW	#N/A
3(g)	Next (9.5 × SF) MW of billing capacity				$2,860.00	/MW/month	#N/A	MW	#N/A
3(h)	Next (23 × SF) MW of billing capacity				$1,995.00	/MW/month	#N/A	MW	#N/A
3(i)	All remaining MW of billing capacity				$1,292.00	/MW/month	#N/A	MW	#N/A
Total Wires									**#N/A**
Operating Reserve Charge Estimate									
4	Metered energy	pool price	#N/A	=	$54.88	/MWh	#N/A	MWh	#N/A
Transmission Constraint Rebalancing Charge Estimate									
5	Metered energy				$0.002	/MWh	#N/A	MW	#N/A
Voltage Control Charge									
6	Metered energy				$0.06	/MWh	#N/A	MWh	#N/A
Other System Support Services Charge									
7(a)	Highest metered demand				$38.00	/MW/month	#N/A	MW	#N/A
7(b)	Apparent power difference				$400.00	/MVA/month	#N/A	MVA	#N/A
Total Rate DTS									**#N/A**
Rate Primary Service Credit									
	Substation fraction				($8,910.00)	/month	#N/A		#N/A
	First (7.5 × SF) MW of billing capacity				($3,607.00)	/MW/month	#N/A	MWh	#N/A
	Next (9.5 × SF) MW of billing capacity				($2,259.00)	/MW/month	#N/A	MWh	#N/A
	Next (23 × SF) MW of billing capacity				($1,576.00)	/MW/month	#N/A	MWh	#N/A
	All remaining MW of billing capacity				($1,292.00)	/MW/month	#N/A	MWh	#N/A
Total Rate PSC Credit									**#N/A**
Transmission Costs									**#N/A**
Energy Market Settlement									**#N/A**
Total Bill									**#N/A**

Confidentiality: Proprietary When Completed

Year	Market Participant	Site Description	Account_ID	Substation Fraction	Rate PSC (Yes/No)	CONTRACT CAPACITY (MW)	ENERGY (MWh)	CMD (MW)	BILLING CAPACITY (MW)	MAX HMD (MW)	ACTUAL HMD (MW)	Energy Settlement ($)	Operating Reserve Charges ($)	Transmission Constraint Reblancing Charge ($)	Voltage Control Charges ($)	Other System Support Services Charge ($)	Power Factor Deficiency Charge ($)

*Input annual data into Cell A2 for years 2016, 2017, 2018, 2019 and 2020

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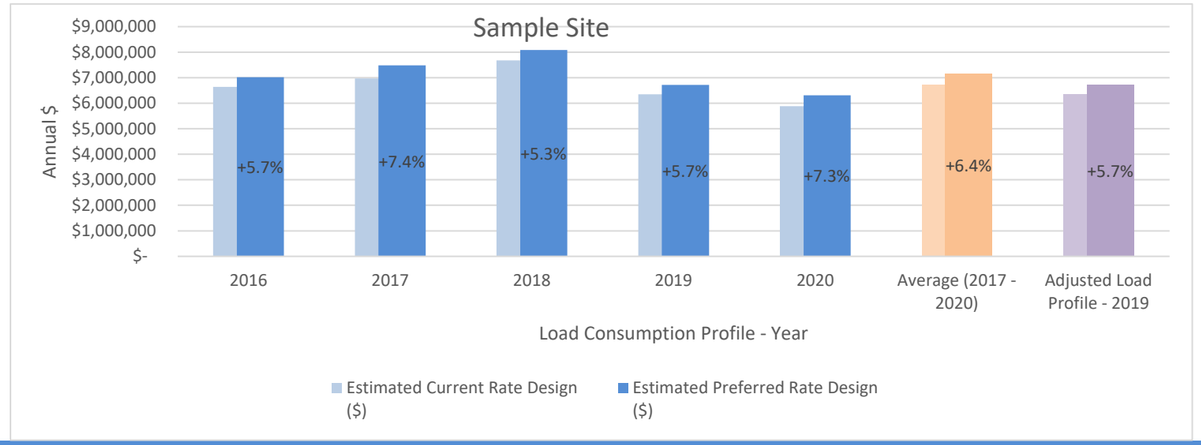
Market Participant: **DFO**
Site Description: **Sample Site**
Account ID: **1000XXXXX**
Date: August 16, 2021

Threshold for targeted mitigation engagement*:	
2019 Load Profile Year:	No
2017-2020 Average:	No

*Sites with greater than 10% impact (estimated transmission costs) will be invited to targeted mitigation engagement



Estimated Transmission Costs

Load Profile Year	Contract Capacity (MW)	Annual Billing Capacity (MW)	Annual Coincident Peak (MW)	Coincidence Factor (%)	Annual Energy (MWh)	Load Factor (%)	Estimated Current Rate Design ($)	Estimated Preferred Rate Design ($)	Estimated Impact ($)	Estimated Impact (%)
2016	43.4	469	300	83.7%	237,025	90.4%	$ 6,635,891	$ 7,016,289	$ 380,398	+5.7%
2017	43.4	469	315	79.5%	261,944	90.4%	$ 6,965,785	$ 7,480,937	$ 515,152	+7.4%
2018	43.4	469	321	82.4%	251,907	88.4%	$ 7,674,997	$ 8,085,251	$ 410,254	+5.3%
2019	43.4	469	247	73.3%	207,360	84.3%	$ 6,353,887	$ 6,713,093	$ 359,206	+5.7%
2020	43.4	469	214	67.9%	199,593	86.4%	$ 5,883,626	$ 6,314,913	$ 431,287	+7.3%
Average (2017 - 2020)							$ 6,719,574	$ 7,148,548	$ 428,975	+6.4%
Adjusted Load Profile - 2019	43.4	469	247	73.3%	207,360	84.3%	$ 6,353,887	$ 6,713,093	$ 359,206	+5.7%

Confidentiality: Proprietary When Completed

Market Participant: **DFO**
Site Description: **Sample Site**
Account: **1000XXXXX**
Date: August 16, 2021

Tariff: Test Year 2019

Billing Quantity		Factor	Monthly Average	Applicable Volumes	
(a)	Substation fraction (SF)			1.00000	
(b)	Rate PSC Applicable			No	
(c)	Highest metered demand		28.1	337.1	MW
(d)	Average coincident metered demand	73.3%	20.6	247.0	MW
(e)	Contract Capacity		43.4	43.4	MW
(f)	Metered energy	84.3%	17,280	207,360	MWh
(g)	Billing capacity		39.1	468.7	MW
(h)	% of pool price for operating reserve charge			6.45%	
(i)	Apparent power factor difference			0.0	MVA
(k)	Site Average Pool Price on Energy Settlement			$51.88	/MWh
(l)	Annual Average Pool Price			$54.88	/MWh

Rate or Rider Component				Rate		Volume		Amount
Rate DTS: Demand Transmission Service								
Connection Charge								
Bulk System Charge								
3(a)	Coincident metered demand			$10,087.00	/MW/month	247.0	MW	$2,491,467
Regional System Charge								
3(b)	Billing capacity			$2,668.00	/MW/month	468.7	MW	$1,250,545
Energy Charge								
3(c)	Metered energy			$2.18	/MWh	207,360	MWh	$452,044
Point of Delivery Charge								
3(e)	Substation fraction			$11,278.00	/month	1.00000		$135,336
3(f)	First (7.5 × SF) MW of billing capacity			$4,566.00	/MW/month	7.5	MW	$410,940
3(g)	Next (9.5 × SF) MW of billing capacity			$2,860.00	/MW/month	9.5	MW	$326,040
3(h)	Next (23 × SF) MW of billing capacity			$1,995.00	/MW/month	22.1	MW	$528,116
3(i)	All remaining MW of billing capacity			$1,292.00	/MW/month	0.0	MW	$0
Total Wires								**$5,594,489**
Operating Reserve Charge Estimate								
4	Metered energy	pool price	× 6.45% =	$54.88	/MWh	207,360	MWh	$733,733
Transmission Constraint Rebalancing Charge Estimate								
5	Metered energy			$0.002	/MWh	207,360	MW	$415
Voltage Control Charge								
6	Metered energy			$0.06	/MWh	207,360	MWh	$12,442
Other System Support Services Charge								
7(a)	Highest metered demand			$38.00	/MW/month	337.1	MW	$12,809
7(b)	Apparent power difference			$400.00	/MVA/month	0.0	MVA	$0
Total Rate DTS								**$6,353,887**
Rate Primary Service Credit								
	Substation fraction			($8,910.00)	/month	1.00000		$0
	First (7.5 × SF) MW of billing capacity			($3,607.00)	/MW/month	7.5	MWh	$0
	Next (9.5 × SF) MW of billing capacity			($2,259.00)	/MW/month	9.5	MWh	$0
	Next (23 × SF) MW of billing capacity			($1,576.00)	/MW/month	22.1	MWh	$0
	All remaining MW of billing capacity			($1,292.00)	/MW/month	0.0	MWh	$0
Total Rate PSC Credit								**$0**
Transmission Costs								**$6,353,887**
Energy Market Settlement								**$10,756,893**
Total Bill								**$17,110,780**

Confidentiality: Proprietary When Completed

Year	Market Participant	Site Description	Account_ID	Substation Fraction	Rate PSC (Yes/No)	CONTRACT CAPACITY (MW)	ENERGY (MWh)	CMD (MW)	BILLING CAPACITY (MW)	MAX HMD (MW)	ACTUAL HMD (MW)	Energy Settlement ($)	Operating Reserve Charges ($)	Transmission Constraint Reblancing Charge ($)	Voltage Control Charges ($)	Other System Support Services Charge ($)	Power Factor Deficiency Charge ($)
2016	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	237,024.8	299.7	468.7	33.6	358.1	$ 4,341,871	$ 416,880	$ 28	$ 12,371	$ 14,539	$ -
2017	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	261,944.0	315.5	468.7	38.0	396.9	$ 5,762,210	$ 530,156	$ 48	$ 16,604	$ 16,297	$ -
2018	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	251,907.2	321.5	468.7	35.1	390.2	##########	#########	$ 124	$ 20,530	$ 16,252	$ -
2019	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	207,359.8	247.0	468.7	33.2	337.1	##########	$ 733,733	$ 721	$ 9,389	$ 10,988	$ -
2020	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	199,592.6	214.3	468.7	29.3	315.6	$ 8,961,157	$ 611,540	$ 1,239	$ 9,037	$ 10,287	$ -

*Input annual data into Cell A2 for years 2016, 2017, 2018, 2019 and 2020

April 12, 2021

To: AESO Stakeholders

Re: Alberta Utilities Commission Questions to the AESO with Respect to the Preferred Bulk and Regional Tariff Rate Design

On April 7, 2021, following Session 5, the AESO received the attached correspondence and list of questions from Alberta Utilities Commission staff ("the AUC staff questions") regarding the preferred Bulk and Regional Tariff rate design. The AESO appreciates the opportunity to consider the AUC staff questions as part of its stakeholder engagement and is of the view that this will bring efficiencies to the overall regulatory process.

The AESO is in the process of reviewing the AUC staff questions and determining how it will respond, and whether it will respond in an upcoming stakeholder session, in its Application or through another forum.

Yours truly,

Nicole LeBlanc
Director, Markets & Tariff

Public

Alberta Electric System Operator
Calgary Place, 2500, 330-5th Avenue SW Calgary, AB T2P 0L4
Phone: 403-539-2450 | Fax: 403-539-2949
www.aeso.ca
@theaeso

AUC
Alberta Utilities Commission

April 7, 2021

Alberta Electric System Operator
Calgary Place
2500, 330 Fifth Avenue S.W.
Calgary, Alta. T2P 0L4

Dear Nicole LeBlanc:

AUC staff questions regarding the preferred Bulk and Regional Tariff design

1. Alberta Utilities Commission staff offer the following questions in order to provide the Alberta Electric System Operator (AESO) with an opportunity to consider them and, if it chooses, to address them either directly or in its anticipated Bulk and Regional Tariff application. They did not originate from, and have not been vetted or endorsed by, Commission members. They are not information requests.

2. The questions are generally premised on the preambles that precede them. The preambles also do not reflect the Commission's views. Challenges to the preambles, including providing alternative perspectives, are invited.

3. AUC staff's intention in providing these questions is to support regulatory efficiency by, to the extent it is able to, identifying in advance those issues and aspects of the proposed design that it feels may arise during the anticipated tariff proceeding.

4. Should you have any questions, please contact the undersigned at 403-592-4435 or by email at carl.fuchshuber@auc.ab.ca.

Yours truly,

Carl Fuchshuber
Director, Regulatory Strategy

Attachment

1. Design Objectives

Preamble:
The AESO stated that its design objectives include:[1]

- Cost Responsibility:
  - Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid (Decision 22942-D02-2019)
- Efficient Price Signals: Price signal to alter behavior to avoid future transmission build
- Minimal Disruption: Customers that have responded to the 12 coincident peak (CP) price signal and invested to reduce transmission costs are minimally disrupted

Regarding its preferred rate design, the AESO stated:[2]

- Reflect Cost Responsibility
  - Resulting rates reflect costs of using the transmission system, including costs associated with in-merit flow of energy, local and peak use of the system
- Efficient Price Signals
  - Resulting rates provide transparent price signals to customers that better reflect the cost drivers of the transmission system

Additionally, the Distribution System Inquiry report commented on distribution rate design,[3] in paragraph 315, as follows:

> In summary, the four experts agreed at a conceptual level that distribution rate design should involve both (i) non-avoidable charges to recover the embedded costs of the existing infrastructure; and (ii) variable, avoidable charges to send a forward-looking price signal capable of affecting future system costs by altering current behaviour. In tandem, these two components incent customers to make economically efficient decisions in their consumption of electricity (including the choice between electricity drawn from the grid and self-supplied).

Questions:

1.1 Please provide the AESO's position on whether the features of non-avoidable and avoidable charges identified above also apply to transmission rate design. Why or why not?

1.2 Of the bulk and regional charges in the current Rate Demand Transmission Service (Rate DTS) rate design and in the preferred rate design, please explain which charges the AESO considers are non-avoidable and which charges the AESO considers to be avoidable.

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[1] Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 17.
[2] Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 45.
[3] Distribution System Inquiry, Final Report, Proceeding 24116, February 19, 2021. An outline of how charges may be referred-to as avoidable or non-avoidable can be found in sections 3.2 and 3.3.

1.3 Based on the response to 1.2 above, of the current bulk and regional charges, what per cent of the current and preferred bulk and regional transmission system is recovered via non-avoidable charges and what per cent of the system is recovered via avoidable charges?

1.4 Please explain how the AESO developed its definition of efficient price signals as set out in Slide 17. Please reconcile this definition with the statements made on Slide 45 regarding the preferred rate design, and comment on whether they are aligned. Does the last sentence of the quoted paragraph from the Distribution System Inquiry report align with the AESO's definition of efficient price signals?

1.5 The AESO determined that a marginal approach does not meet its rate design objectives based on five reasons. These reasons included that: efficient price signals would need to vary by location; and recovering a significant portion of residual costs would undermine the price signal's efficiency.[4]

(a) In the AESO's view, in the absence of being able to send locational price signals for transmission, is there no value in sending any marginal price signals to all Rate DTS customers as a postage stamp rate via the Rate DTS bulk and regional rate design?

(b) Has the AESO performed any analysis that could inform splitting bulk and regional costs into marginal and residual components? If so, please provide the results.

(c) Does the AESO have an analysis of what percentage of residual costs in its preferred rate design are to be recovered via avoidable versus non-avoidable charges?

(d) Please explain the statement that "… recovering [a] significant portion of residual costs would undermine [the] efficiency of [the] price signal"[5] in more detail.

1.6 Cost responsibility and cost causation principles:

(a) Please describe how the AESO defines cost responsibility.

(b) Please provide the paragraph numbers or sections relied on in Slide 17 describing cost responsibility in Decision 22942-D02-2019.[6]

(c) How does cost responsibility pertain to the recovery of existing (sunk) costs?

(d) Please describe how the AESO defines cost causation.

(e) How does cost causation pertain to the recovery of existing (sunk) costs?

(f) Please explain the rationale for recovering demand-classified transmission facilities via billing capacity, versus recovering demand-classified transmission facilities via a 12 CP (or other CP) mechanism.

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4 Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 31.
5 Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 31.
6 Decision 22942-D02-2019: Alberta Electric System Operator, 2018 ISO Tariff Application, Proceeding 22942, September 22, 2019.

1.7 Please explain whether minimal disruption[7] is intended to apply to the rate of cost change or to the overall magnitude of cost change over time, or both.

2. Breakdown of Bulk and Regional Transmission Costs

Preamble:
The AESO provided a spreadsheet showing transmission costs by project for the period 2006-2037, [8] which also identified the driver(s) of each project. AUC staff seek to further understand the drivers of system transmission projects and how they may relate to billing determinants.

Questions:
2.1 For each project listed in the spreadsheet, please identify:

(a) whether it is/would be functionalized as bulk, regional, or both. If both, please identify the approximate percentage of the total project costs relating to bulk system assets, and regional system assets;

(b) whether it is/would be classified as system-related or participant-related, or both. If both, please identify the approximate percentage of the total project costs classified as system-related and participant-related;

(c) for projects where the driver is ambiguous or mixed (e.g., Load / Generation), please provide a percentage allocation to each of load and generation, based on the AESO's best judgement.

2.2 Please generally comment on how the current and proposed incentives produced by the tariff may affect future costs. Please discuss what limitations, if any, restrict the effectiveness of the incentive (e.g., lack of locationality).

2.3 In the bulk and regional rate design, how should the ratio of avoidable to non-avoidable charges ideally be determined in order to strike a balance between using the existing transmission facilities versus building additional transmission? Under what circumstances would it be efficient to build additional transmission facilities?

3. Preferred Design

Preamble:
The AESO's preferred rate design relies on an embedded approach, with modifications intended to better reflect cost causation.

Questions:
3.1 Please identify how the AESO's preferred rate design might change in the absence of its objective of minimizing disruption to 12 CP responders, or its concerns about the current economic climate.

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[7] Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 31.
[8] Drivers and Costs – Historical and 2017 LTP System Projects, Consultation Session 1, posted March 9, 2020.

3.2 In the AESO's preferred rate design, bulk system costs are recovered using billing determinants that appear to be avoidable, e.g., by five-year average 12 CP demand and total energy consumption. Does the AESO anticipate that bulk system costs will be substantially fixed in the near to mid-term? If so, please explain why it is appropriate to recover all bulk system costs through avoidable charges.

3.3 In the AESO's preferred rate design, regional system costs are recovered using billing determinants that appear to be both non-avoidable and avoidable, e.g., by billing capacity and total energy consumption. Does the AESO anticipate that regional system costs will be substantially fixed in the near to mid-term? If so, please explain why it is appropriate to recover regional system costs with a combination of avoidable and non-avoidable charges.

3.4 The preferred rate design has retained the functionalization of bulk and regional portions of the transmission system based on operating voltage.

(a) Please explain why the AESO considers the functionalization of the transmission system should continue to be broken into bulk and regional systems.

(b) Does the AESO consider that voltage (as used in the 2018 transmission cost causation study update[9]) remains a meaningful characteristic that functionalizes the transmission system in Alberta into bulk and regional systems?

(c) In the AESO's experience, is 240 kilovolt transmission used (and/or increasingly being used) to serve a regional transmission function?

3.5 The preferred rate design appears to utilize readings of peak regional demand and peak regional generation to calculate the portion of bulk and regional costs to be allocated to energy, which is recovered through an all hours energy charge.

(a) Please explain why an all hours energy charge is appropriate for recovering costs which were determined based on readings at single instances in time.

(b) Please discuss whether average readings of area loads and generation would be a better allocator of bulk and regional costs to energy as compared to peak readings.

3.6 Please provide a more detailed explanation of the calculations completed in the step of "Minimum and actual systems for Alberta are estimated as the sum of the minimum and actual systems across all planning areas."[10] For example, did the AESO determine the actual (or current costs) for the transmission system in each planning region?

3.7 In the preferred rate design, the classification between demand-related and energy-related costs is completed before functionalizing between bulk and regional costs. Has the AESO assessed whether it would be appropriate to define new functional categories to replace (or augment) the existing bulk and regional categories to better align with the preferred rate design? If new functional categories were determined, would it be possible for the functionalization step to precede the classification step, as typically done to design rates? Please explain.

3.8 Is the number of points of delivery (PODs) a driver of regional transmission costs? For example, is there a relationship between the number of PODs in a region and regional

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[9] Exhibit 22942-X0025, Appendix D - Transmission System Cost Causation Study 2018 Update, page 12.

[10] Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 39.

transmission costs? How would regional transmission costs change if load within each region remained the same, but there was only one POD in each region that served the region's load? Based on the response, would it be appropriate to recover some portion of regional costs through a fixed per POD charge that is invariant to any metered quantities? Why or why not?

3.9 For the year 2019, please provide the total energy usage of all end-use customers on the interconnected electric system that either receive system access service through Rate DTS (because they are a direct customer of the AESO) or receive a flow through of the Rate DTS rate structure through their distribution facility owner (DFO) (such as FortisAlberta Inc.'s Rate 65).

3.10 If all users of the electric system (such as all DFO customers) were interval metered, and received a flow through of all the elements of the AESO tariff, please explain whether the AESO considers that the preferred rate design would still meet its rate design objectives of cost responsibility, efficient price signals, minimal disruption, simplicity, innovation and flexibility.[11] If not, please explain what modifications the AESO would propose to the preferred rate design to make it appropriate. Do any elements of the preferred rate design become inappropriate if substantially more customers have an incentive and the ability to respond to the price signals?

4. Load Growth

Preamble:
To better explore the relationship between historical load growth and transmission system costs, it may be useful to review historical forecasts of load growth and actual load growth. Additionally, a common dataset and consistent terminology may benefit all parties. Terms below in **bold** are referenced from the AESO's Consolidated Authoritative Document Glossary, and are presented in a paraphrased manner. If the data requested below is not readily available, please consider providing it in support of the future application.

Questions:
4.1 Please provide hourly load data from 2010 to 2020 in the categories identified in the included Excel spreadsheet. The questions below refer to the spreadsheet. Please note that Row 2 has been included in the Excel spreadsheet as an example of the AUC staff's understanding. Please provide any clarifications in how the mechanisms work or can be reconciled.

(a) These questions relate to "**system load,**" which is the total, in an hour, of all metered demands under Rate DTS, Rate FTS and Rate DOS of the ISO tariff, plus transmission system losses.

[11] Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 45.

(i) Is the "coincident peak **metered demand**" (e.g., in Rate DTS) measured as the maximum of "**system load,**" the sum of Rate DTS and Rate FTS alone, or other? Please explain.

(ii) AUC staff understand that the "coincident peak" is currently measured in a 15-minute interval, and not in a 60-minute interval. In the included Excel spreadsheet, please indicate the hours in which the monthly coincident peak would have occurred if measured on a 60-minute interval (column M). Please also indicate the hours in which the 15-minute CP demand that was used for billing purposes occurred (column N).

(b) These questions relate to "**Alberta internal load**" (AIL) which represents, in an hour, "**system load**" plus load served by on-site generating units, including those within an industrial system and the City of Medicine Hat, which the AESO, using SCADA[12] data calculates as the sum of each generating unit and aggregated generating facility in Alberta and the Fort Nelson area in British Columbia, plus import volumes minus export volumes.

(i) Please provide an example of how, in calculating AIL, the AESO accounts for the load at a single site with on-site load being served by on-site generation, such as for an industrial system. Is the AESO able to determine the portion of the site's total internal load which is being served by on-site generation and if so, how? (e.g., using SCADA data and revenue meter readings.)

(ii) Please provide an hourly column of the aggregate internal load that is masked by on-site generation (column I in the attached Excel spreadsheet). This would include the portion of internal load at self-supply and export sites, sites with industrial system designations, Fort Nelson, and Medicine Hat, that is supplied by on-site generation and thus not metered under Rate DTS.

(iii) Please provide an example of how in calculating AIL, the AESO adjusts for the output of distribution-connected generation, and any load on distribution systems it may mask.

(iv) Please provide an hourly column of the aggregated internal load that is masked by distribution connected generation (column J in the attached Excel spreadsheet).

(c) For each column in the attached Excel spreadsheet, please explain where this information is publicly available, if at all. (e.g. "system load" is published as part of PSM Charge summary, Rate FTS is the public asset identifier "BCH" on energy trading system, transmission system losses are the public asset code "ABLL" on energy trading system, etc.)

(d) The AESO makes public various reports referring to total load and/or "**system load,**" such as on the energy trading system report "payments to suppliers on the

[12] SCADA: Supervisory control and data acquisition.

margin" or PSM Charge summary,[13] the operating reserve charge supplement[14] as well as through public data requests.[15] In reviewing these reports, the results for total load or "**system load**" do not match across the various reports. Please explain why that would be the case.

(e) Are there other types of load not accounted for, either in "**system load**" or "**Alberta Internal Load**"? If so, what are they? (e.g. sites with on-site load for which SCADA data does not exist, distribution-connected generation that is less than 5 megawatts (MW), micro-generating units, etc.)

(f) Currently, not all load on distribution systems may be metered under Rate DTS because of distribution-connected generation. However, when the adjusted metering practice is triggered at a substation, the amount of load being masked by DCG may decrease. As a result, "**system load**" may increase, with a commensurate decrease to the term mentioned in (b)(iv) above (column J of the attached Excel spreadsheet). Does the AESO intend on tracking these changes in order to differentiate changes in load from changes in metering configuration which result from the adjusted metering practice?

(g) With respect to transmission planning conducted by the AESO:

(i) Does the AESO plan the future of the transmission system based on "**system load,**" "**Alberta Internal Load**" or other?

(ii) How would a potential industrial system with 100 MW of on-site generation, 60 MW of on-site load, but only 30 MW of contracted DTS capacity, be incorporated into the AESO's forecasts and planning?

4.2 Please provide annual data from 2006 to 2020 in the following categories. If the sum of the Excel column C for "Rate DTS" in hourly detail from the Excel spreadsheet above does not match the annual "Metered Energy (All Hours)" for any given year in the table provided below, please explain the discrepancy.

Rate DTS Billing Determinant	**Units**	**2020 Recorded**	**2020 Forecast**	**2019 Recorded**	**2019 Forecast**	…
Coincident metered demand	MW-months					
Total Billing Capacity	MW-months					
Total Contracted Capacity	MW-months					
Highest Metered Demand	MW-months					
Metered Energy (All Hours)	GWh					

[13] http://ets.aeso.ca, Historical, Select Report, "--- PSM Charge Summary."
[14] https://www.aeso.ca/rules-standards-and-tariff/tariff/operating-reserve-charge-supplement-2/
[15] https://www.aeso.ca/market/market-and-system-reporting/data-requests/

Rate DTS Billing Determinant	Units	2020 Recorded	2020 Forecast	2019 Recorded	2019 Forecast	…
DTS Market Participants	Customer-months					

5. 12 CP Demand as a Driver of Bulk and Regional Transmission Costs

Preamble:
The AESO presented data suggesting a weak correlation between line loading and demand levels,[16] as well as an illustration of historical peak line utilization which also suggested a weak correlation between CP periods and peak line loading.[17]

Questions:

5.1 Various consumer groups have stated that there may be up to 400 MW of demand response or price responsive load on the system. Is it possible to simulate system conditions that would have occurred during a representative subset of the historical CP conditions[18] if CP responsive load did not respond to the CP? If so, please provide.

5.2 Has the AESO performed any analyses that might inform an assessment of the relative risk of transmission system failure during monthly CP load periods compared to during all other periods? If not, can the AESO comment on what it might expect from such an analysis? If not, would the AESO be willing to perform such an analysis?

5.3 The graph on Slide 35[19] shows the total flows on bulk lines experiencing usage greater than 90 per cent of their annual peak. For some lines, it may be the case that a line's peak usage may not be near the line's maximum loading capability. Additionally, lines with relatively high load factors may experience loading that is within 90 per cent of their annual peak during many periods in a year. Is there an alternative indicator that the AESO could compute that may more accurately quantify the stresses being experienced by the transmission system at different times? If so, please provide.

5.4 Please comment on the feasibility and appropriateness of implementing a time-of-use tariff component designed to recover the marginal portion of bulk and regional transmission costs in a manner that might correspond more closely to the correlation between system load and transmission line loading indicated in the AESO's analysis.

5.5 Please comment on the feasibility and appropriateness of implementing a tariff component (such as an energy charge) with a dynamic rate, where the rate fluctuates in real time based on the loading of transmission facilities relative to their maximum capabilities. Could this type of tariff component provide a price signal that is more effective at reducing future

[16] For example, Load to Power Flow Correlation Summary Charts - 2018, Consultation Session 1.
[17] Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 35.
[18] As shown on Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 35.
[19] Bulk and Regional Tariff Design, Stakeholder Engagement Session 5, March 25, 2021, Slide 35.

transmission cost than the other tariff components considered by the AESO? Please explain.

6. Storage

Preamble:
The AESO has proposed that a modernized demand opportunity service rate (Rate DOS) with expanded eligibility might be suitable for providing service to energy storage customers so that they could make use of transmission capability that would not otherwise occur and contribute to recovering its cost without driving the need for additional transmission capacity. The AESO has also identified that a use of Rate DOS is to allow customers with their own generation to avoid curtailing load when their generation is unavailable without affecting their DTS billing capacity.

Questions:

6.1 How does the AESO reflect low load factor consumers (such as customers that normally self-supply) in its planning studies?

6.2 If the AESO were to plan the bulk and regional transmission system to accommodate energy storage users, how would it include them in its planning studies?

6.3 Does the AESO have a definition of what a standby or interruptible rate would be? How would the definition of standby or interruptible service rate differ from an opportunity service rate?

6.4 Does the AESO have an analysis of locations where the installed capacity may be higher than the contracted capacity at various substations?

Bulk and Regional Tariff Design Stakeholder Engagement Session 5 hosted on March 25, 2021

I. Purpose and objectives of the session

The purpose of this session is to present and discuss the AESO's preferred rate design. The session objectives include:

- Present preferred rate design, including energy storage treatment, to stakeholders
- Present and discuss path to achieving minimal disruption
- Present bill impact summary and assumptions
- Provide Bill Impact Tool
- Begin to discuss implementation considerations

II. Session agenda

Time	Agenda Item	Presenter
8:00 – 8:10	Welcome, introduction, purpose, and session objectives	AESO / Stack'd
8:10 – 8:30	Opening Remarks • Case for change • Key highlights	AESO
8:30 – 8:50	What we heard • Cost Responsibility • Efficient Price Signals • Embedded and Marginal Approaches	AESO
8:50 – 10:30	Methodology and Analysis • Summary of rate design • Review and elimination of marginal approach • Improvement to embedded approach	AESO / NERA
10:30 – 11:00	Break	
11:00 – 12:30	What we heard, methodology and analysis • Q&A	AESO / NERA
12:30 – 1:00	Break	
1:00 – 1:45	Bill Impact Summary • Summary • Methodology and assumptions • Impacts • Bill Impact Tool • Q&A	AESO

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Time	Agenda Item	Presenter
1:45 – 2:15	Path to Achieve Minimal Disruption • Targeted engagement • Mitigation proposal principles • Mitigation options assessment • Q&A	AESO
2:15 – 2:30	Break	
2:30 – 3:30	Energy storage tariff treatment • What we heard • Non-firm rate conclusions • Demand Opportunity Service (DOS) • Q&A	AESO
3:30 – 3:50	Implementation Considerations • Considerations • Flexibility • Q&A	AESO
3:50 – 4:00	Session close-out and next steps	AESO

III. Attendees

Company
2332823 Alberta Ltd.
Acestes Power
Air Liquide
Alberta Direct Connect Consumers Association (“ADC”)
Alberta Electric System Operator (“AESO”)
Alberta Energy
Alberta Forest Products Association
Alberta Newsprint Company
Alberta Utilities Commission (“AUC”)
AltaLink Management Ltd.
AltaSteel Inc.
Arcus Power Corp.
ASCENT Energy Partners Ltd.
ATCO Electric Ltd.
BECL and Associates Ltd.
Best Consulting Solutions Inc.

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Company
BluEarth Renewables Inc.
Boost Energy Ventures
Brubaker & Associates, Inc. on behalf of ADC
Canadian Renewable Energy Association (“CanREA”)
Capital Power
Cement Association of Canada
Cenovus Energy
Chapman Ventures Inc.
City of Cold Lake
City of Lethbridge
City of Medicine Hat
City of Red Deer
CNRL
Consumers Coalition of Alberta (“CCA”)
Customized Energy Solutions
DePal Consulting Limited
Dow Chemical Canada ULC
Dual Use Customers (“DUC”)
EDF Renewables
Elemental Energy Renewables Inc.
Enbridge Pipelines Inc.
Enel
Energy Storage Canada
ENMAX
EPCOR
ERCO Worldwide
FortisAlberta Inc.
Government of Alberta
Heartland Generation Ltd.
Imperial Oil
Independent Power Producers Society of Alberta (“IPPSA”)
Industrial Power Consumers Association of Alberta (“IPCAA”)
Inter Pipeline Ltd.

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Company
Invinity Energy Systems
Kalina Distributed Power Ltd.
Lafarge Canada Inc.
Lehigh Cement
Lionstooth Energy Inc.
Matt Ayres Consulting
Millar Western Forest Products
NERA Economic Consulting
NextEra Insights Inc.
Norton Rose Fulbright Canada LLP
NRGCS
Nutrien
Osler, Hoskin & Harcourt LLP
Perimeter Solar Inc.
Power Advisory LLC
Prairie Sky Strategy
RMP Energy Storage Inc.
Rodan Energy Solutions
Shell
Signalta Resources Limited
Solas Energy Consulting Inc.
Stantec
Suncor Energy Inc.
TC Energy
The Office of the Utilities Consumer Advocate (“UCA”)
TransAlta Corporation
Turning Point Generation
URICA Asset Optimization
VIDYA Knowledge Systems
Voltus Energy Canada Ltd.
West Fraser
Weyerhaeuser
Whitecourt Power

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Company
Wolf Midstream Inc.
Stack'd Consulting, Inc.
Attendees by phone
14033897720
14033901368
14033978785
14038284900
14039093203
14164183201

IV. Overall outcomes from the day

The main objective of the session was for the AESO to present its preferred rate design and to give stakeholders the opportunity to respond to the AESO's design. Participants engaged in meaningful discussion and overall, stakeholders agreed that this was a valuable session that allowed them to share their perspectives and feedback.

V. Session highlights

Captured below are the highlights of the questions and discussion on a topic-by-topic basis. For a detailed review of the session, please refer to the session recording, posted at www.aeso.ca.

Topic 1: Improvements to the embedded approach

i. Stakeholder commentary

- Clarifying comments:
  - *ADC:* The data on Slide 35 (Bulk transmission system use) may not be as accurate in the absence of the data of customers responding to 12-CP. The price signal caused a response on the system and, had the price signal not been there, the chart would have looked different.
  - *IPCAA:* Perhaps I am misunderstanding the graph on Slide 35, is it saying that the flows appear to be around 6,000 MW on a transmission system built for 15,000 MW?
  - *IPCAA:* Do other jurisdictions switch the classification / functionalization order? Which other jurisdictions in North America use energy as an allocator for bulk transmission?
- Discussion of 12-CP as compared to the improved embedded approach:
  - *AltaLink:* Are you taking into consideration the benefits in the cost causation study?
  - *AltaLink:* If you're looking at the planning, in the hours that line flows aren't correlated to the coincident peak, is the generation flowing to meet a local load? How does your analysis address the fact that the critical use of transmission is driven by specific local supply and load conditions not hourly energy?

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- *TC Energy:* If 12-CP does not perfectly correspond to peak bulk line utilization, could you please explain why the solution is not to adjust 12-CP so that it better corresponds to peak utilization, but rather to shift such a large percentage of costs to energy?
- *ERCO Worldwide:* Rather than using energy as an allocator wouldn't it make more sense to expand the CP intervals instead? BC Hydro uses 30-minute demand peaks.

ii. AESO / NERA clarification

- Response to clarifying comments:
  - Need to keep in mind that the graph on Slide 35 is only showing the bulk line flows, it is not showing the entire system.
  - The key point is that even if there were higher levels of flows on transmission lines as a result of customers not responding, that wouldn't change the fact that there is still a great deal of highly utilized transmission lines at times that aren't coinciding with the 12-CP hours. The point here is not to show 12-CP doesn't matter; we're saying that even though 12-CP and peaks and demand remain important, there are other factors and that the design should reflect these other factors to best meet cost causation.
  - We are not seeking to emulate what other jurisdictions are doing, that is not the main objective. We are trying to come up with a proposed design that is appropriate and that reflects the features and context of the power system in Alberta.
- Response to questions regarding the improvements to the embedded approach:
  - The AESO recognizes that the transmission system needs to be built to meet peaks in demand. We also want to reflect that in order to meet demand at different times in the year, the AESO needs to plan a different set of transmission lines to meet different sources of peaks of demand. The positioning and nature of these lines needs to consider where the generation sources are. It is not just peaks in demand that are causing the AESO to have to plan additional lines, it also includes the need to relieve congestion and facilitate the flow of energy.

Topic 2: Methodology and analysis

i. Stakeholder commentary

- Clarifying questions:
  - *DePal Consulting:* Referencing Slide 39 (Minimum and actual system calculation), is what you're doing taking the peak load from each region? As we add more renewables in the system, the generation capacity will increase and there will be more and more costs. Will these costs be allocated to energy?
  - *NextEra:* Are you measuring the peak load and peak generation at the same time? And are the measurements on a gross or net basis?
  - *Capital Power:* Self-generating customers who are connected to the grid have access to the market as well so they have option to draw from their own supply or the market. Are the self-supply sites covering their fair share of costs?
  - *DePal Consulting:* Referencing slide 42 (Billing determinants to reflect cost causation), what does phasing in of the five-year trailing average mean?

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- *ADC:* Don't see how the price signals result in lower transmission costs for consumers?
- *AUC:* Are there any other forums that are ongoing right now or is this the only venue by which stakeholder groups/customers are currently engaging?

- Many participants were concerned with the data and methodology of the AESO's analysis:
  - *DUC:* The *Electric Utilities Act* says you should not distinguish between geography, so why does the AESO have 42 areas?
  - *Alberta Newsprint:* these arbitrary 42 areas were not divided for this tariff's purposes and these areas are getting different treatment.
  - *Solas Energy:* Referencing Slide 35, the two years of data used are 2017-2018. Has the AESO looked at the utilization and power flows in 2019-2020 and what is more representative of how we go forward?
  - *Lafarge:* How did we land on the five-year lookback? A five-year lookback with so much change – is it still relevant to be looking back at it?
  - *ADC:* Every tariff design will result in consumer response. What has the AESO done to complete analysis what the potential unintended consequences of what this rate design are?
  - *ADC:* If we're making a major change to the tariff design, there needs to be better empirical evidence that the off-peak hours and incentives to using the system during off peak hours. Will the AESO be making a detailed cost analysis supporting the tariff design available for stakeholders for review?

- Some participants questioned the AESO's proposed rate design:
  - *Suncor:* Transmission is all about congestion elimination. Is the AESO suggesting that energy used in all hours regardless of congestion is relevant as a transmission cost or transmission build driver? Or are we looking at certain hours as still way more important than others? Should some energy attract higher rates than others?
  - *ASCENT:* Referencing Slide 39, it appears that the more aligned the locations of generation and load are, the less allocation will go to energy and the more to peak demand. Is this intentional to reflect the lower infrastructure needed when generation locates close to load?
    - *ASCENT:* If generation is free to locate where it chooses but load pays for the system, how do you propose to close the feedback loop so that interests are aligned to minimize system cost?
    - *AltaLink:* Concerned about the preferred design from economic efficiency perspective. Given the postage stamp rate structure, 12-CP signals may incent responses in certain regions that may result in an increase in the need and cost for new transmission.
  - *ADC:* If the AESO is assuming every hour contributes equally to congestion, are all hours created equal? Do we perceive a response away from the current optimization based on these incentives?
    - *Alberta Newsprint:* How do we justify the large increase from $2 to $10? Is this method robust enough or is it just what suits us on what we think at a high level?

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- *Alberta Newsprint:* Most jurisdictions have moved to reduce their peak demand loads, but why is the AESO proposing the same charge during the day and night? All other provinces are incenting increasing nighttime load to decrease daytime peak load but here, the $10 energy charge does the opposite.
- *ASCENT:* The rate design is sound, but we still don't have a mechanism with which to make decisions in the future to minimize system costs. If generation can locate anywhere at once, the costs to transport the energy is not being reflected on the generators. How do we close this feedback loop?

- Some participants were concerned with the risk of incentivized grid defection:
  - *CCA:* Concerned with price signals coming out of significant energy classification, especially for residential customers. What kind of signal would that give to self-generators in terms of load defection?
    - *CCA:* The energy charge is a blunt instrument and it's going to the wrong people. Generation is causing these costs, not load. Generators could be incented to be located in more favorable locations rather than the blunt price signal which will only incent more grid defection.
    - *ADC:* How does this design provide the incentive for colocation and the impact that can have on the future of the grid?

ii. AESO / NERA clarification

- Response to clarifying questions:
  - Referencing Slide 39, we're comparing peak demand and peak generation in 42 areas and using it as a proxy for the size of the transmission systems and we're adding those altogether. This calculation is based on energy not on capacity. It depends on which area it's going to locate in, it's difficult to say that more renewable capacity would necessarily change the allocation.
    - We are measuring the peak load and peak generation at different times on a net basis.
  - When we're thinking about a customer's self-supply, that has a role in the overall cost and a portion of that is appropriately reflected in the other charges that they pay. Some of the connection value to the grid is also assessed in the point-of-delivery (POD) costs and regional billing capacity-based costs.
  - "Phasing in": the AESO wants to allow these rates to take effect and be based on the signals in place at the time. This could motivate customers to make changes earlier in the five years.
  - Regarding how price signals result in lower transmission costs for consumers, this rate design better aligns with the cost causation principles, which should lead to a more effective outcome.
  - Regarding other forums for discussion, this is the only broad stakeholder engagement activities that we're running regarding the Bulk and Regional tariff design.
- Response to questions regarding methodology and analysis:

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- In regard to the use of a specific line, we know that congestion will arise in specific times, but we're trying to abstract from any particular one set of conditions and think about it in a broader context.
- The methodology we've set out is reflecting the fact that in order to meet peak demand, a certain amount of transmission cost needs to be incurred. Beyond the systematic seasonal differences in demand and supply, we don't really see any clear evidence, nor are we likely to see systemic patterns, therefore we went with the flat charge.
- Regarding the 42 areas, this is a methodology in which we're using granular information about the transmission system to come up with something that applies across the province.
- Regarding the 2017-2018 data used for the chart in Slide 35, the flows across the transmission lines are high at times other than just the 12CP, which is the extent of the conclusion that we're drawing from this chart. Would not expect this overarching conclusion to change if we were to repeat the analysis with different years. We have shown that the tariff design that is proposed is designed to account for differing demand and supply patterns, the design intended to keep up with those changes.
- The rationale for the five-year period is that this better aligns with the process the AESO uses to plan the system. It is based on an average across a number of years because the average over time is more reflective of the information used in the course of the planning process.
- In terms of cost analysis, we have released information of cost and bill impact of the proposed tariff rate design. We've shared as much analysis today that stakeholders need to understand the design, can follow up with specific data requests at a later time.

- Response to questions regarding the AESO's proposed rate design:
  - Within the context we're operating in there's a certain framework for transmission planning and transmission cost recovery. This rate design methodology is designed to reflect how the transmission system is actually used to the extent we can. We're working within that framework to develop a methodology that reflects our specific context.
    - We're aggregating all this information from all areas to come up with a single calculation. No area is being treated differently. The costs are paid by load because they're the beneficiaries of transmission. The allocation of costs in the bulk and regional tariff is not able to send signals to generators to locate in certain areas in our framework.
  - Different areas feature differently in the calculation, but that allows us to capture that some parts of the transmission system are sized to support the flow of energy from them and some parts are sized to support load in those areas. It is necessary to ensure a cost reflective tariff that information about the size of different areas is included in the calculation to meet cost causation principles.
  - Regarding congestion – the occurrence of congestion is rare due to how the AESO manages the system. The allocation to energy is really capturing that there are parts of the transmission system that are planned and specified because it's unpredictable when congestion will take place (i.e., we can't predict when a windy day will take place).

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- The allocation of energy is to cover the additional transmission costs that are unrelated to peak periods. We haven't seen any clear evidence of patterns of transmission utilization that the energy charge should be different at different times of day.

  - The AESO wants to clarify that what over the course of this engagement started with establishing bookends that reflect a range of possibilities. We received a lot of feedback from stakeholders about the bookends and heard different proposals and throughout that time, we've been refining our thinking and analysis to come up with a methodology that's appropriate. We do recognize this will have an impact on customers and we think that that impact deserves more attention, and we have a process to achieve that.

- Response to stakeholder concern about the risk of grid defection:
  - When we look at the resulting charges, it's true that a portion of the costs are allocated to the energy component and that creates an opportunity for customers to respond to manage their costs. We're not at this point seeing an energy charge that's so significant that it would lead to grid defection from customers.

Topic 3: Bill impact summary

i. Stakeholder commentary

- Clarifying comments:
  - *IPCAA:* Fortis is preparing a calculator to help customers understand distribution rates, would ATCO do the same thing? Encourage the AESO to approach customers to develop these.
  - *ADC:* Slide 54 (Estimated average transmission cost impact by load factor, 2019) shows the cost impacts as a percentage of bill – why isn't this same slide shown as a dollar impact? Can the AESO comment on the dollar impact on the 80-100 per cent?
  - *CCA:* We are seeing more and more distributed energy being added to the system at the area level which could result in a higher energy allocation. The energy billing determinants could potentially go down as there is more distributed energy resources (DER) being added and net metered generation. Wondering if the AESO could provide a forecast of energy billing determinants for the next five years with the new energy charge and without the new energy charge?
  - *Solas Energy:* What sectors are being hit more on a dollar basis – can the AESO provide the dollar amount?
  - *UCA:* Will the AESO conduct a price response study and modify the bill impact analysis to reflect this dynamic?
  - *Solas Energy:* If the majority of PODs by total bill have a lower amount, how is AESO covering all of the cost? Is this mostly at the residential level?
  - *Weyerhaeuser:* Have you considered the Department of Energy review of the recommendation on the status of self-supply and export policy in your tariff considerations?
- Discussion of perceived "penalization" of high load factor customers:
  - *IPCAA:* Concerned that we're penalizing the folks who are using energy more efficiently.

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- *DePal Consulting:* It's not surprising that not all load customers will benefit but seems strange that that's the outcome we want – to decrease the charges to low load customers to 20 per cent and increase them to high load factor customers. Why is this outcome acceptable to the AESO?
- *Alberta Newsprint:* The table on Slide 54 shows the opposite of if you use more, you have to pay less, this is not settling well.
- *EPCOR:* Was there any consideration to shift costs from the CP charge to the capacity charge rather than to an energy charge? That way high load factor customers may not be impacted as much.

ii. AESO clarification

- Response to clarifying comments:
  - Regarding Slide 54, the dollar values do matter, but because they tell a slightly more nuanced story, we didn't provide that dollar information to not confuse the story. An average is only going to tell you so much information – we're relying on the Bill Impact Tool to give the relevant dollar impact information.
  - The information the AESO has put together today is a starting point. Regarding how customers will respond to this in the future, the one thing to keep in mind is the size of the energy billing determinant in relation to other billing determinants is larger.
  - It's important to not lose sight of the fact that along with change in the rate design, we're also shifting and reducing the 12-CP charge. We can't just look at the change in the energy charge in isolation, we need to look at the full mix of the rate design.
  - Regarding the request for a price response study, the AESO is unlikely to perform this type of analysis.
  - In response to how the AESO is covering all costs if the majority of PODs have a lower amount: the AESO collects the entirety of the revenue requirement and the percentage changes are a function of the averaging and the data is presented as a percentage range.
- Response to perceived "penalization" of high load factor customers:
  - The AESO is thinking about this from the basis of the transmission system as a whole and developing rates that are more reflective of cost behavior drivers over the longer time. The resulting rates are expected to better reflect how the use of the system is related to cost. Customers are savvy and will respond to these changes. If you are connected to the grid, you are paying the fixed cost of connection and once you are using the grid, the appropriate allocation is to reflect how that use drives future transmission costs. We think we're achieving this through principles of cost causation and the outcomes are manageable and going to set us forward on the right path for the future.
  - The AESO has reviewed the impacts that result from this rate design, and looking across the whole range of impacts, we see it as being an acceptably sized impact.
  - The AESO has looked at several different alternatives within the current legislative framework and we are moving forward with the one we think is the most cost reflective.

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Topic 4: Path to achieve minimal disruption

i. Stakeholder commentary

- Clarifying comments:
  - *Dow Chemical*: Is the transition measured in months, years, or decades?
  - *ADC:* Has the AESO done any research on the economic job impacts for those customers who will be largely impacted?
  - *Solas Consulting*: There is discussion about having one-on-one conversations with load to customize what their billings may be. Should this be transparent and consistent between loads? If you are deferring charges, who picks up the bill?
  - *IPCAA:* There is a concern here that we're talking a low end of a $30M cost shift and $8M of mitigation. We don't have information from the government, and we seem to be spending a lot of administrative dollars and mitigation dollars to get to a very small change in terms of mitigation. Is it worth it? There's a worry that we're not being fair to the customers who are being impacted the most here.

ii. AESO clarification

- Response to clarifying comments:
  - The transition measurement is something the AESO wants to explore with the impacted customers – it's an open discussion.
  - The AESO has not done any analysis on the economic or job impacts for high-impact customers.
  - The AESO is looking to get feedback from the broader group before we finalize the process to achieve minimal disruption.
  - The materials for conversation around the case for change were provided in December. It comes down to the fact that we do think it's important to get the right signals in place. If we wait and make the change later, that impact will be even bigger.

Topic 5: Energy Storage treatment

i. Stakeholder commentary

- Clarifying comments:
  - *Chapman Ventures:* Referencing Slide 72 (Rates that allow additional use of available capability), are there differing thoughts on treatment of market participation classification of hybrid renewables plus storage?
  - *RMP Energy Storage:* Storage is most likely going to look like a generation unit– still a competitive issue here that needs to be resolved. DOS right now you can only get for the 12 months you've applied – do we need to reapply every year? Other than price, the issue that we've had with DOS historically has been that we're building a 30+ year asset. How can you

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have the uncertainty on one of your largest cost on a year-to-year basis? Having to renew every 12 months adds additional uncertainty.

- *TransAlta:* There are situations when an energy storage asset is providing a service where they could be forced into an over-frequency event. In the case of an energy storage asset, they may need to actually consume off the grid which would be a very high cost. How might this be able to be modified?
- *AUC:* Has DOS ever been curtailed?
- *Heartland Generation:* We're discussing the energy storage rate as part of the B&R rate. Would it be easier to do it in a more targeted fashion (i.e., a separate forum)? If there isn't necessarily a discussed linkage, is the AESO contemplating a parallel process that can be discussed in a separate forum than the B&R?
- *Solas Energy:* What happens in the future if there's additional load and less room on the additional line – is there any protection for the energy storage?
- *Suncor:* The AESO doesn't want people to sign up for DOS if they would otherwise sign up for Demand Transmission Service (DTS). This perspective is unnecessarily and inappropriately restrictive. Just because it's economic to use rate DTS, doesn't mean it is desirable from a grid perspective or a societal perspective for someone to sign up for DTS.

- Discussion of DOS modernization:
  - *Power Advisory:* Do you also think there are going to be changes to DOS as well as you modernize?
  - *Power Advisory:* You wouldn't see storage using only DOS, there would still be some DTS component of storage and DOS would sit on top?
  - *Solas Energy*: Investor confidence is low as they are seeing DOS as a very big risk. There is insufficient certainty of any investor in energy storage and there would need to be significant changes to include more certainty both for time frame for interrupt-ability as well as the term. When the AESO can choose to curtail you at any moment is not something that would make the project financeable – need a limitation or a curtailment on that in order for it to work.
  - *DePal Consulting:* I do think the DOS rate could work for storage. What needs to be modified is the take-per-pay charges – the variable energy charge is a good way to go. When designing this rate, how do we study it? Is it going to be curtailable? Good start but needs substantial redesign.
  - *Capital Power:* Has the AESO evaluated how their tariff proposal will impact overall DOS rates? Is there an estimate on what they may look like should the proposal be approved? With DOS modernization, are we at a blue-sky exercise of what DOS could look like in the future?
  - *RMP Energy Storage:* How does this then work through the interconnection process and determining capacity availability if it's under a modernized DOS rate?
  - *CCA:* Could you please explain how the criterion, that DOS must meet a temporary economic opportunity, is applied in practice?

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ii. AESO clarification

- Response to clarifying comments:
  - The DOS rate itself would typically sit above the DTS rate and when this application is applied to the grid. One of the key components of DOS is that this is energy that would otherwise go unused under DTS.
  - In terms of re-application every year, the AESO wants to look at the criteria in the effort of modernizing DOS and making it a better and more usable rate for customers. We want to hear where the sticky points are with DOS from stakeholders to alleviate the uncertainty.
  - DOS has been curtailed historically.
  - In response to discussing energy storage as a separate topic from the Bulk and Regional Tariff Design: Because there's a tight component that DOS doesn't decrease demand on DTS, there's some desire to keep the topics together, but it is something to consider.
- Response to DOS commentary:
  - The AESO is not changing the spirit of DOS, but at the same time, a lot of the issues of DOS are around the eligibility of the mechanisms and processes that customers and the AESO needs to access that energy. The AESO wants to make it more effective.
  - More than likely, all storage facilities have some minimum charging capacity that we would need to meet, there would at least be some level of DTS.
  - There's nothing firm about DOS, if there's available capability and you pass the eligibility criteria, then DOS is provided as an opportunity service.
  - The AESO realizes that there is risk in an over-frequency event. That will be factored into our future design in one way or another, but that work is yet to be done.
  - There's a lot of history in DOS rates, but the AESO needs more feedback on how to calculate the DOS rates. The principles of DOS must stay the same. We don't want to re-envision DOS; we want to modernize and hone in on the eligibility question and the transactional components.
  - As an opportunity service, DOS can be curtailed in the short-term period. The question is, in the longer term, how frequently does this need to happen? Is it every 12 months?
  - The eligibility for DOS is a very case-by-case and it's based on each individual application to the AESO.

Topic 6: Implementation considerations

i. Stakeholder commentary

- Clarifying comments:
  - *NextEra Insights:* The AESO is moving from 15 minutes to hourly while we've seen a lot of jurisdictions moving to sub-hourly settlements (e.g. 10 minutes or 5 minutes). I would have thought the AESO would want to go in this direction. Has there been a study or discussion that we wouldn't have to switch back to 10 minutes or 5 minutes in the future?

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- *Alberta Newsprint:* Is the highest meter demand hourly or 15 minutes?
- *AUC*: If the coincident peak is based on system demand, system demand isn't a normal report that can be pulled up. Does the AESO have any plans to make that data more available so people can do their own analysis and we can make these better distinctions?
- *ADC:* We would agree that the Payment in Lieu of Notice (PILON) should be implemented and not even wait for the tariff. There are many out there billing on contract capacity – we should let them know and get this right-sized as soon as possible.

ii. AESO clarification

- Response to clarifying comments:
  - In response to the change to hourly, what the AESO is really looking for is consistency – it's not a big cost change to be consistent today in the new tariff.
  - In response to the request for data, the meter volumes report is a bit closer to what stakeholders may be looking for. We agree the data should be out there to help people understand.

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Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Colette Chekerda
Comments From:	Alberta Direct Connect “ADC”			**Phone:**	780-920-9399
Date:	2021/04/15			**Email**:	colette@carmal.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments

1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable, but based on the significant change in direction of the bulk and regional tariff proposal, the AESO should have been prepared with more details and supporting evidence. Specifically: 1. Supporting evidence that 31% of Alberta's bulk and regional costs were incurred to support in-merit energy flows. The CTI projects were built to minimize land use impact and for future growth. The AESO needs to provide evidence that the costs incurred for these projects are consumption based. The AESO must publish the peak flows on the CTI lines relative to the design parameters so that Albertans understand how the investment in transmission is being used. Further, the AESO must specifically examine the Heartland line. It was designed for 500 kV operation and has only ever been operated at 240 kV. A minimum system approach would consider the system that Alberta needs to support our energy market and peak load and compare that to the system we have built. The difference then can be examined for cost responsibility and tariff treatment. 2. An energy-related allocation of transmission costs is inefficient because it gives equal weight to all hours of the year, even late night and early morning hours of the day when the loading of transmission lines is typically at its lowest. The AESO has not demonstrated that specific transmission lines have been constructed in Alberta to alleviate congestion in order to support in-merit energy flows. In particular, no evidence has been presented to demonstrate that bulk transmission lines have been constructed specifically to alleviate congestion in off-peak hours in order to facilitate in-merit energy flows. Absent such evidence, there is no factual basis to support an energy-based allocation of fixed transmission costs. 3. The minimum system approach that the AESO has employed to identify demand-related transmission costs is unorthodox. Minimum system analyses are typically used in the context of functionalizing a portion of distribution wires costs as customer-related, not demand-related. Fixed, sunk transmission investments are demand-related costs that vary with increases in peak demand and are not related to connecting customers to the system. The AESO's minimum system approach is a significant departure from accepted allocation methods for transmission costs that have been employed

		by Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs) in the U.S. 4. The coincident peak (CP) demand allocation method is the standard allocation method for network transmission costs approved by the Federal Energy Regulatory Commission (FERC). The FERC's pro-forma Open Access Transmission Tariff (OATT) applies a 12CP allocation method for network transmission costs, and the 12CP method is the established allocation method for bulk transmission costs that is predominantly employed by RTOs and ISOs in the U.S. to allocate transmission costs. The Electric Reliability Council of Texas (ERCOT) region relies on a 4CP allocation method for transmission costs. Even where bulk transmission costs are allocated to RTO/ISO sub-regions using other methods such as production cost simulations to determine the distribution of project benefits within the RTO/ISO region, the project costs are predominantly allocated to bulk transmission customers using a load ratio share demand allocation that is based on customer demands at the time of the peak. Energy-related allocation of transmission costs are unorthodox and are not widely used. Therefore, the AESO's proposed tariff design in fundamentally inconsistent with the transmission cost allocation methods that are generally employed by RTOs and ISOs in the U.S. 5. The AESO has acknowledged that they have completed no analysis on the long term tariff change implications to Alberta's economy. This rate significantly increases costs of Alberta's most electricity intensive and trade exposed industrial facilities. ADC members alone are facing over $10M in annual transmission cost increases as a result of the AESO proposal. Alberta Industry will respond to this price signal in three ways: (i) further cost cutting measures such as job losses or shutdowns of high cost facilities; (ii) move production and future expansion plans to other jurisdictions where power prices and electricity policy are more favorable and stable; or (iii) defect from the Alberta grid and self supply, including completely defecting from the grid if Alberta's self supply and export policy limits companies' ability to manage electricity costs. All three of these responses will result in the exact outcome that the

		AESO proposes is the driver for this redesign – allocation of costs to a shrinking base of rate-payers. 6. The explanation for the 5 year 12 CP was confusing and it still isn't clear what the supporting evidence is for this change. Historically, the 24 month ratchet was unusually long, in fact twice as long as compared to other jurisdictions such as BC, Saskatchewan and Manitoba. Under current terms and conditions, the AESO requires 5 year notice to changes in DTS capacity. Having the 12 CP ratchet also be 5 years is not providing any better information for planning than what already exists with the notice requirements. This appears to be an unnecessary complication. 7. The AESO had over two years to study the Bulk and Regional costs. It is concerning that after that period of time, the AESO has not produced any fully developed cost causation study to support the proposed design. This should have accompanied the presentation. The AESO's rate design proposal relies on an inadequately supported assertion that 31% of Alberta's bulk system transmission costs have been incurred to facilitate in-merit energy flows and are energy-related. The AESO has not provided an analysis of system power flows or an analysis of the drivers for specific transmission investments to support this assertion. Moreover, the AESO has not provided an updated cost of service study to demonstrate how underlying system conditions and operating characteristics have changed in a manner that would support an increase in the energy-related percentage of the bulk transmission cost allocation from 7% under current rates to 31%. The AESO should identify what it believes has changed on the bulk transmission system since the last cost of service study approved by the AUC that would justify the proposed change in rate design, and it should provide an updated cost of service study that reflects any new cost drivers for system transmission additions that it claims to have identified. Further, the AESO is in a unique position to bring forward legislative recommendations to the Government to implement in the upcoming review of the transmission regulation that would provide for a real cost responsibility discussion.

2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	This was helpful. The AESO needed to have the tariff parameters based on 2020 and the 2021 revenue requirement as well as an updated cost projection model.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	The ADC is **not** supportive of the AESO tariff design. The move to energy allocation is not reflective of the sunk nature of the transmission system costs and penalizes the high load factor and price responsive customers which are the most efficient users of the transmission system. Transmission costs are fixed costs that do not vary with changes in energy consumption. Therefore, energy-related allocation methods for transmission costs are fundamentally inconsistent with the fixed, sunk nature of transmission investment. The size of the bulk transmission system, as well as the magnitude and timing of transmission system additions, are primarily driven by system peak demand patterns that are reflective of congestion on the system, which congestion primarily occurs during the peak hours. An energy allocation of transmission costs inappropriately gives equal weight to all hours of the day and the year and fails to properly focus the price signal on the peak demand hours that are most likely to exhibit transmission congestion and drive the need for system additions. The beneficiaries of the AESO's proposed rate design are low load factor customers who use the system inefficiently. Many of these low load factor customers have individual customer peaks that closely correlate to the system peak, particularly residential heating/cooling loads. However, their energy usage drops off dramatically after the peak hours. By contrast, high load factor customers whose costs would increase under the AESO's proposal consume a significant proportion of their energy during off-peak hours when transmission congestion is unlikely to be a concern. A rate design that rewards low load factor usage and penalizes price responsive, high load factor usage is inefficient and will discourage efficient use of available transmission capacity during off-peak periods.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	a) No. The notion that the transmission system is designed for in-merit energy with an energy cost element that is the same in each hour does not reflect cost responsibility. If the AESO can provide evidence that 40% of system costs are energy related and for in-merit energy, then the recommendation should have been that these costs be allocated to in-merit generation and then flowed through pool price offers when those generators are running. This will create a shaped price that is reflective of when generators are using the grid. b) Yes, the tariff proposal is signaling that Alberta does not value high load factor or flexible loads and that those companies should find alternatives to grid usage. c) No, this proposal is extremely disruptive to the seven sites identified for mitigation as well as the 28 sites identified as high load factor customers. For the seven sites, a permanent mitigation plan is required otherwise these sites will run to failure. For the other 28 high load factor sites, a change to the proposal is necessary. d) No, the 5 year 12 CP look back is unnecessarily complex and doesn't provide any better planning information than the current notice requirement. e) No, Alberta's energy intensive industrial sites have extensively pursued energy efficiency projects, demand response projects, and have participated in AESO programs such as operating reserves and LSSI. These sites have used every lever available to them to try to reduce power costs. They are simply running out of alternatives to remain competitive in Alberta outside of grid defection.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	The AESO should include the impact to Alberta's competitiveness as part of the rate design objectives. The only way Alberta solves the overbuilt Alberta Grid problem is to grow our way out of it. This will only happen if industry invests in Alberta and brings jobs and growth with it. ADC submits that the proposed rate will disincent investment in Alberta and thus have an opposite impact.. In a perfect world, the AESO would resolve the tariff matter with a thoughtful engagement with policy makers to inform legislative changes with a goal of making Alberta and attractive place to invest and grow business.

6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	The ADC view is that the tariff proposal was rushed, ignored prior consultation and has no supporting study shared with loads to support the new direction.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	The AESO has used a look back approach to determine rate impacts based on response to the current tariff. Different price signals, specifically a lower CP charge and the 5 year CP averaging will alter the response and the rate impact. The AESO should have provided a forward looking model that starts with the 2021 revenue requirement and forecasts the tariff out for the next 10 years including sensitivities for DTS load growth or reduction. This would allow customers to model the impact of response to new signals and the resulting impact to their business and productivity. This modelling would inform the rate design and provide tariff outlooks in various load growth scenarios.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Yes, the ADC is supportive of the AESO modernizing the DOS tariff. The ADC offers no perspective on the suitability of DOS on energy storage.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	In particular, minimum billed energy usage should be eliminated as it makes DOS very expensive as an insurance product for exceeding DTS levels during planned outages.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	ADC's concern with the approach is that there may be other similar loads as the ones targeted for mitigation that didn't get screened in the AESO analysis. The preferred mitigation is to provide a rate alternative to interruptible loads that is not exclusive to the seven sites in question.

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	A 10% increase in transmission costs to the seven sites will impact the commercial viability of these operations. This puts jobs, investment, tax base, and community support at risk, and has second order impacts to other dependent industries. In the end, the 10% increase also puts at risk the existing revenue contributed under the current tariff. These companies have invested millions of dollars in demand response to remain competitive in their respective industries. They sacrifice production daily to respond to pool prices and respond to coincident peak demand. They also put their load at risk to support Alberta grid reliability in operating reserves and under frequency response. They are essentially a 400 MW generator that shows up when the Alberta grid is stressed. They are energy intensive and trade exposed and can't flow through the cost increase to their customers. The narrative that they don't pay "their fair share" is frankly offensive. These customers raised competitiveness concerns a decade ago when Bill 50 was enacted. They told elected officials and the AESO that they couldn't afford the CTI projects being legislated and advocated for a less expensive solution. They do not understand how shifting millions of dollars to these customers (as well as the other high load factor customers) for an unnoticable decrease in residential and commercial transmission costs is going to magically make everyone happy about a $2.4B and climbing annual revenue requirement. A rate reduction for all could be achieved by tackling the hard topics of cost containment, transmission regulation, and returns on equity for regulated monopoly utiltiies.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	Ideally the rate works for everyone, without mitigation and the industry focuses on reducing the overall transmission system costs. Anything temporary signals a run to failure path forward to these industries.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Impacted members will participate in the process.

14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Yes, the ADC recommends an opportunity for all customers to right size their DTS contract capacity. In particular, those without section 101 waivers that are behind a distribution DTS contract should also have the opportunity to contract directly with the AESO or have line of sight and visibility of their DTS contract obligations. Yes, the ADC agrees and supports that any sites who have been in operation for a minimum period of time be exempt from the PILON.
15	Do you have any additional implementation considerations the AESO should consider?	The AESO should formally request a delay for filing the tariff proposal until all of the issues raised have been addressed.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	The ADC posed a number of questions in the session, many articulated in the above comments. The ADC would appreciate a formal response to our concerns.
17	Additional comments	None

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Surendra Singh
Comments From:	Alberta Newsprint			**Phone:**	780-778-1537
Date:	2021/04/13			**Email**:	surendras@albertanewsprint.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was helpful to know the details of the AESO preferred DTS rate design. As with most of the earlier sessions on this topic, the session lacked detailed analysis in support of your preferred rate design. It was a complete surprise to see what the AESO is now proposing as their "preferred design" compared to their direction a few months ago. Again this preferred design is not supported with any credible analysis. It is very concerning to say the least.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, the session was useful. Thank you for providing "Bill –Impact Assessment Tool". It would have been useful to provide a forecast of future costs to see the real impact going forward.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	No. ANC is not supportive of AESO's preferred rate design. First, the AESO has not provided the data supported evidence that demonstrates a need to change the current rate design. Second, the proposed rate design is also not based on thorough analysis and the AESO has failed to share with the stakeholders

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	We don't think that the AESO's preferred rate design meets their rate design objectives a) Reflect Cost Responsibility The current rate design is based on cost causation while AESO's preferred rate design is moving away from this core objective. Lowering the cost of transmission to those who use power during system peak with low load factor is in direct opposition to the principal of cost causation. b) Efficient Price Signals Again, the current rate design has a price signal to avoid, minimize and defer future transmission infrastructure. The AESO's preferred rate design is diluting that signal by a) lowering the co-incident peak charge and b) by increasing the charge of energy irrespective of time-of-day usage. Many facilities like ours have spent millions of dollars in capital projects to improve plant flexibility and train staff to respond to time-of-day usage signals to manage both energy and transmission costs. Time-of-day usage signals have been employed all over the world to minimize the need for both generation and transmission. c) Minimal Disruption Having the transmission cost increase over 50% for large industrial consumers is not a minimal disruption. By mitigating these increases to 10% for a limited period does not achieve the objective of minimal disruption. For highly energy-intensive industrial consumers like ourselves, a 10% increase has a material impact straight off our bottom line. A 50% increase after the end of the mitigation period will be devastating. d) Simplicity The AESO's preferred rate design is no simpler than the current design since it is retaining all the charges. In fact, it is introducing more complexity by using a 5 year rolling average of co-incident peak charges. e) Innovation and Flexibility The preferred rate design is moving away from innovation and flexibility. A simple example is the fixed charges on energy irrespective of the time of use. Flexibility will be maintained by having higher charges during peak hours to encourage industrial consumers to reduce their energy usage during the peak.

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	There are a number of things that the AESO can do: a) Do not reduce the charges for monthly CP b) Do not implement a 5 year rolling average of CP charges c) Do not charge the same rate for energy, irrespective of time-of-day usage
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	The assumptions and methodology used by AESO for dividing bulk system charges in to demand and energy based on load and generation profiles of various planning regions (40+ regions with artificial boundaries) is very concerning. This methodology is not sound at all, as one will get different results if these imaginary boundaries are shifted/moved. AESO preferred rate design is based on this very flawed assumption. This also confirms that the AESO has not done a thorough job of analyzing cost causation and that's why they are coming up with totally different rate designs every time they present their latest design.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	ANC is available to discuss alternatives with the AESO

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	Please refer to our response to #13
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	The proposed mitigation options, on a temporary basis, will not work as it will just delay the eventual full rate impact which will be devastating to electricity-intensive industrials, like ANC.

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	The preferred mitigation would be to continue with the current rate design, which is based on cost causation principles. Whenever you stray from cost causation, future users of the electricity grid will have to deal with the undesirable behaviour that results. Electricity intensity needs to always be considered when contemplating mitigation, since a 10% increase to a consumer whose electricity input costs are 5% of their total input costs, may be negligible. However, a 10% increase to a consumer whose electricity input costs are 50% of their total input costs, signals a financial disaster – especially considering your proposal to add 10% each year for 5 years. It is unreasonable to expect an electrically intensive industrial to be able to absorb that level of cost increase in a trade exposed industry where the price is set in a worldwide market. More practical mitigation measures are to continue to present material rate design elements that allow an electricity intensive industrial consumer to manage their flexible load in a mutually beneficial fashion – such as an interruptible rate. Socializing the cost of electricity excludes electricity intensive industrials from locating or even remaining in the Province of Alberta.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	We are in support of the AESO's proposal for more flexibility to adjust contract capacity and waive PILON.
15	Do you have any additional implementation considerations the AESO should consider?	We are in favour of cost causation as being the driver behind rate design, so that users of the electricity grid remain incented to design and implement facilities that minimize costs. This principle should never be abandoned no matter how overbuilt the current system may appear, since desirable characteristics of industrial consumers require significant investment and cannot be changed in a short period of time, if at all, once non cost-causal pricing signals have been ingrained.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	A change of this magnitude should only be driven by the outcome of a cost-causation study. Where is that study? Where is the analysis that is compelling the AESO to socialize so much of the transmission tariff – at the expense and possible removal of the electricity intensive industrial consumers?

17	Additional comments	The AESO should not proceed with its preferred rate design for a number of reasons; • During this pandemic, the main focus should be on managing our businesses. It is not the time to take resources/time from our main business of making goods and keeping Albertans employed. • AESO has not done/shared any study/analysis to justify the need to change the current tariff design. • AESO assumptions/analysis for their proposed design does not meet the level of study needed for such a major change. At minimum, a cost causation study needs to be undertaken. • AESO have not done any study of the impact of their proposed design change on the Alberta economy/jobs and its competiveness.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Hao Liu/Rob Senko
Comments From:	AltaLink			**Phone:**	(403) 710-1247/(403) 874-6762
Date:	[2021/04/15]			**Email**:	Hao.liu@altalink.ca / Rob.senko@altalink.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was useful because the AESO and their consultant presented their preferred rate design.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was useful because the AESO provided some clarification on the mechanics of the proposed rate design.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	AltaLink is not supportive of the AESO's preferred rate design. The proposed rate design will not stop the increase in bypass of transmission costs or the existing cost shifting that has been occurring under the AESO's current rate structure. AltaLink supports a principled rate design approach that reflects both costs and benefits of the transmission system. Tariffs should be fair, equitable and minimize inter-customer cost shifting. A principled rate design will seek to balance fair recovery of fixed transmission costs with price signals that encourage efficient use of the existing system without incenting inefficient behaviour. Current transmission rates have led to strong customer response to avoid coincident peaks, but have not brought about reduced transmission costs – a situation recognized by the AESO in their previous presentations to stakeholders. The energy charge in the proposed rate design is similarly inefficient. The proposed rate structure will encourage development of otherwise uneconomic behind the fence generation that will shift transmission costs to other customers. AltaLink believes the value of being connected to the grid should be reflected in the AESO's rate design so that all connected load pays a fair share of costs. A fair and equitable rate design should recognize that transmission costs are fixed and should be recovered in that fashion.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	Please refer to AltaLink's response to question 3 above.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	Please refer to AltaLink's response to question 3 above.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	Please refer to AltaLink's response to question 3 above.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	Please refer to AltaLink's response to question 3 above.

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	AltaLink supports the use of a Demand Opportunity Service as a means of increasing use of the transmission system.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	No comment.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	Please refer to AltaLink's response to question 13 below.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	Please refer to AltaLink's response to question 13 below.

12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	Please refer to AltaLink's response to question 13 below.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	AltaLink supports rate mitigation that results in a just and fair transition to new rates. Customers who made investments under current rates must be treated fairly.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Please refer to AltaLink's response to question 3 above.
15	Do you have any additional implementation considerations the AESO should consider?	No.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	No.
17	Additional comments	None.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021 through April 15, 2021	**Contact:**	Leonard Olien
Comments From:	Canadian Renewable Energy Association	**Phone:**	587-971-0049
Date:	2021/04/15	**Email**:	lolien@renewablesassociation.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	CanREA is supportive of modernizing DOS as there are many components that are outdated. CanREA believes that energy storage should be eligible to apply for the modernized DOS. However, whether storage developers see the modernized DOS as suitable for their projects will depend on the resolution of the issues we describe in Q9. **Quick review of points**. As a result, it is critical that CanREA and other stakeholders are provided the opportunity to review and provide comment on the AESO's "modernized" DOS proposal before the tariff is filed with the AUC in June. It is essential that either a modernized DOS, or some other appropriate tariff treatment for storage be implemented as soon as possible to remove the barrier to storage development that exists because of the current tariff treatment. CanREA recognizes that the modernization of DOS, including storage eligibility and suitability, is occurring within the existing regulatory and legislative context. The Alberta Department of Energy and initiated a process, to update Alberta legislation and regulations to reflect the unique nature of the energy storage class of technologies. CanREA requests that the AESO update stakeholders as to the impact of new regulations and legislation on the tariff treatment of storage. New tariff treatment is needed immediately to remove the barrier to potential investments in energy storage technologies and regulatory/legislative changes are needed to facilitate the efficient, long-term market participation of energy storage technologies.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Several aspects of the current DOS service need to be modified. 1) Eligibility: The AESO requires that a participant has a business opportunity that would not be taken advantage of under a DTS contract. This is a perpetual condition for any stand-alone or generation co-located energy storage resource. Therefore, stand-alone energy storage and generation-hybrid energy storage resources should qualify for DOS as a blanket condition. This is a quality that is fundamentally different for energy storage compared to existing DOS users. CanREA recommends that AESO consider whether this fundamental difference can be managed within a modernized DOS framework or whether a different opportunity service is more appropriate. 2) Pre-Qualification: Storage projects would need to receive approval for DOS qualification from the AESO before the final investment decision is made by the market participant, which may around two years before COD. 3) Temporary: This condition presents a fundamental barrier to the use of DOS for energy storage resources. Projects will not be developed if there is a risk each year that the project will not qualify for DOS and would have to resort to DTS to charge the facility. CanREA recommends that the temporary nature of DOS be removed, and the term of service be submitted by the market participant as part of the DOS application. 4) Availability of System Capacity: This concept needs to be modernized and quantified. While it is reasonable that DOS continue as an interruptible service, the concept of adequate capacity on the transmission system needs to reflect the interruptible nature of the DOS service and the actual behaviour of existing load resources. For example, consider a location that has 100 MW of capacity for load and an existing DTS customer with an 80 MW contract, but a 50% average utilization rate. The addition of a 50 MW storage resource at that grid location would result in far more efficient use of the transmission system even though the DTS availability is only 20MW. The AESO will need to: a. Develop a description of the process for how the availability of capacity will be evaluated. b. Decide what data will be used by the AESO to make the evaluation and what of that data is appropriate to be shared with the market participant and what can be shared with the public.

		c. Engage with stakeholders to determine if the current suite of publicly available data is sufficient for project developers to make informed business decisions around curtailment risk, or determine what, if any, further data should be made available. 5) Curtailment Mechanism: The AESO needs to decide if curtailment of a withdrawal from the energy system under DOS will occur by dispatch instruction or by automatic operator control. Once this has been decided then it may be reasonable to revisit the existing levels of service. In any case, the "Utilization" step of the current process is unnecessary and should be removed. System operators will be aware of DOS resources on the grid and do not need a monthly warning that a DOS resource may be withdrawing energy from the grid. 6) Failure to Comply: Currently, failure to comply with a curtailment directive could lead to disqualification from using DOS. Failure of a DOS resource to comply with a dispatch instruction to curtail should be treated like any other deviance from a dispatch instruction without the risk of losing access to DOS. 7) Rate: On April 13th, the AESO published rate estimates under the new Tariff structure which included an estimated charge of $15/MWh for 7-minute DOS service. CanREA recommends that the AESO consider both an additional, quicker response service level, with a corresponding lower cost, and a service level at a cost lower than XOS service but would be subject to curtailment before XOS. For simplicity, the two services could be offered as a single product, however this might not be ideal. The modernization of DOS is certainly overdue, and a modernized DOS could be of interest to energy storage resources.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	

15	Do you have any additional implementation considerations the AESO should consider?	
16	Do you have additional clarifying questions that need to be answered to support your understanding?	
17	Additional comments	CanREA is encouraged that the AESO is contemplating an alternative to DTS service for energy storage that can be implemented immediately. We look forward to further discussions on the suitability of a modernized DOS or, if necessary, an alternative tariff treatment suitable for energy storage resources. The modernized DOS, or alternative, needs to be filed for AUC approval as soon as possible to remove the existing barrier to development for the many energy storage projects that have already been proposed. Further, CanREA suggests that DOS modernization, or equivalent, be filed separately, and no later than, the filing of the re-designed Bulk and Regional tariff. Given the magnitude of change proposed for the Bulk and Regional tariff, an AUC proceeding could require a significant amount of time and result in considerable delay between filing and implementation. Relatively speaking, the filing for a modernized DOS, or equivalent, would be much simpler, could be approved in a much shorter time, and remove the barrier to development in a more timely fashion. Because the modernized DOS is being proposed within the context of a full Bulk and Regional tariff re-design, a fuller review of the tariff treatment for the energy storage class of technologies will be required in the near future. Certainly, a review will be warranted after regulatory and/or legislative changes that define the energy storage class of technologies.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Matthew Davis
Comments From:	Capital Power			**Phone:**	403.540.6087
Date:	2021/04/15			**Email**:	mdavis@capitalpower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Capital Power appreciates the opportunity to provide comments on the March 25, 2021 stakeholder session. The session was useful in that it provided the AESO a forum to explain their preferred rate design and the opportunity for stakeholders to ask questions. However, the material provided was limited and did not sufficiently support the AESO's preferred rate design. This was evident in the stakeholder questions, where numerous attendees requested further analysis or evidence to support the proposed rate design. Given this, Capital Power recommends the AESO complete further analysis and provide this information to stakeholders prior to submitting the rate design for AUC approval.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Capital Power has no comments at this time.

3.	Are you supportive of the AESO's preferred rate design? Why or why not?	Capital Power is not supportive of the AESO's preferred rate design at this time. While Capital Power is supportive of the AESO's objective to move away from the current 12-CP model which has been identified as eroding billing determinants and incentivizing self-supply / grid defection, the AESO's preferred rate design fails to accomplish this objective. In fact, it could exacerbate the issue as it encourages energy and capacity bypass and a distortion of the market. There are a significant number of net-metered and self-supply/export customers in Alberta currently managing their transmission costs by responding to the incentive that 12-CP generates. Capital Power is concerned that rather than maintaining grid connected customers, the AESO's preferred rate design will continue to result in level playing field concerns as the tariff signals will continue to drive customers to develop less efficient generation on-site to avoid the additional energy-related transmission costs. This likely commercial response of these net-metering customers to the signals sent by the proposed rate design is notably absent in the AESO's analysis and is of concern because it will result in further cost-shifting to less responsive loads and is contrary to cost responsibility and causation principles. Finally, Capital Power re-iterates its support for rate design mitigation approaches over billing adjustments that the AESO is proposing here. As discussed in Capital Power's January 12th submission in response to the AESO's fourth stakeholder engagement session, bill adjustments are less aligned with FEOC principles, particularly permanent reductions, and appear more arbitrary than a mitigation approach based on rate design. Capital Power looks forward to further discussion of the AESO's proposed mitigation approach in the upcoming sixth stakeholder session. Respectfully, the amount of analysis provided by the AESO to support a full review and assessment by stakeholders of their proposal is inadequate, and as observed at the March 25th stakeholder session there remains numerous unanswered questions by stakeholders from all industry groups (generators, loads, wires owners, consumer groups etc.).

4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	Capital Power provides the following comments: **Reflect Cost Responsibility** – The AESO's proposed change to its functionalization of transmission costs between bulk and regional demand related costs and those that facilitate in-merit energy is appropriate, but the decision to assign 100% of the in-merit costs to energy is problematic and should be reviewed. The AESO has not considered how customers will respond to the proposed tariff in their analysis. Customer behaviour may in fact lead to further billing determinant erosion and cost-shifting. In addition, the benefits that customers receive merely by connecting to the grid, like access to a reliable source of electricity and to the competitive wholesale market are not wholly captured in the AESO's preferred rate design. **Efficient Price Signals** – Capital Power is concerned the AESO did not consider how the preferred rate design impacts the energy-only market price signal, which is the signal that should incent generation investment in Alberta. As noted previously, Capital Power believes the preferred rate design will further incentivize investment in onsite generation as a means to avoid transmission costs. In addition, the AESO did not explain how the price signal will create an incentive for customers to alter their behaviour to avoid future transmission build. **Minimal Disruption** – Capital Power does not agree that the preferred rate design results in minimal disruption to customers that respond to 12-CP. Rather, it appears that the customers that respond heavily to 12-CP will be the most impacted. The AESO's rate design and/or mitigation options should reduce the impact on existing load to prevent load destruction and also attract new investment. **Simplicity** – Capital Power agrees that the AESO's preferred rate design is simple. However, it may be oversimplified in that it does not properly account for 1) net-metering or self-supply/export; 2) energy flows on transmission system during different times of day; 3) customer behaviour; 4) grid efficiency; and 5) impact to price signals. **Innovation and Flexibility** – Capital Power does not agree that the preferred rate design provides optionality while not pushing costs to other customers. The opposite is true – there is minimal opportunity for customers to innovate, and where they may be able to change their behaviour, costs are still being pushed to other customers.

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	Capital Power reiterates its previous comments that the AESO and their consultant NERA revisit the allocation to the energy component of the proposal. Capital Power believes that facilitating in-merit energy is more complex than the simple assignment to energy infers. Further, the AESO should include how the proposed tariff will alter behaviour in the market as it is a balance to ensure that the energy-only market provides the appropriate signals to invest generation capacity.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	Capital Power supports the AESO's decision to retain an embedded cost approach as it best aligns with the need to recover already sunk investments.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	Capital Power appreciates the additional detail that the AESO released on April 13th, 2021. The future rate projections are valuable to ascertain how the AESO's proposed tariff could play out over time. The additional detail on the five-year average 12 CP also assists in answering outstanding questions regarding that aspect of the AESO's proposal.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Capital Power believes that the AESO must provide more information on how DOS could be modernized to fully comment on the AESO's proposal. It is important that the development of an opportunity service must be technology neutral (i.e. should equally be available to other interuptable loads). While DOS 7 appears to be the term of DOS that could be most appropriate for many ES applications, in interacting with the AESO's revised tariff, it could result in curtailable intra-AB storage being charged a higher tariff than exports for the same, if not more flexibility in responding to system events. Capital Power suggest that the AESO when developing new opportunity service(s) include a comparison to export opportunity service (XOS). Based on the limited use of DOS that exists today, Capital Power considers it unlikely energy storage assets would find it economic under the current eligibility requirements.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Subject to additional details that Capital Power expects as the AESO articulates its revisions to opportunity service, several of the existing terms and conditions will likely require consideration. These include: • *Qualification:* for investment certainty, it is important to understand early in the project development cycle what costs are to be expected. • *Annual Term:* Development will require more than a single year of certainty on whether a project is subject to opportunity service or full DTS. • *Potential loss of system access:* Capital Power would need to better understand the consequences of what would occur to a project that was under DOS if a DTS customer connects as well. • *Compliance:* Current terms around revocation of DOS qualification for non-compliance may need to be addressed. Should a market participant under a future opportunity service rate be subject to dispatch by the system controller then Capital Power would expect that "must comply" obligations would apply as with any other market participant. Further, the AESO has indicated a desire for any future opportunity service to not erode DTS, Capital Power continues to suggest that the AESO evaluate how market participation can be used to further this issue as inherently, any sink asset that has a bid in the merit order is subject to receiving directions from the system controller to curtail under varying circumstances. This may further encourage the "full-range" market participation from energy storage assets that the AESO aspires to through their energy storage market participation initiative.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	While Capital Power views rate design-based mitigation as more appropriate under FEOC than targeted billing adjustments, it does appreciate the AESO's efforts to work with customers with a larger impact to develop and identify consistent mitigation options that will be shared in a transparent manner with the broader stakeholder community. Capital Power looks forward to those options being shared at the upcoming sixth engagement session.

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	Capital Power suggests that the AESO also consider the benefits/drawbacks of each proposed mitigation options. These should be expanded to include the benefits/drawbacks on the entire system and not just the customer that the mitigation option is being applied to. Providing this information will assist the broad stakeholder group in their assessment of the options and ensure that cost responsibility is being maintained.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	While it is premature to comment on the mitigation options that have yet to be identified, as previously discussed, Capital Power cautions against the use of permanent mitigation measures. This would perpetuate an unlevel playing field for transmission customers.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Capital Power supports rate design mitigation over bill adjustment mitigation. As previously noted, the use of bill adjustments is more arbitrary and less aligned with FEOC principles. Outside of modernizing opportunity service, the AESO's current approach does not appear to create mitigation options that would be based on rate design. Baring a change in the AESO's approach, Capital Power suggests that transparency and consistency be applied when developing mitigation options.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Capital Power has no comments at this time.

15	Do you have any additional implementation considerations the AESO should consider?	Capital Power believes that transitioning from the 15-minute to hourly CP interval are reasonable and will provide more alignment with market settlement which is hourly.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	Capital Power would like to better understand the AESO's expected regulatory timelines and when the AESO would expect any new tariff to come into effect. Of particularly interest is to what extent can opportunity service modernization be separated from the rest of the AESO's proposed tariff modernization. Capital Power would re-iterate its previous comments that much of the opportunity service effort can be separated from the broader bulk and regional tariff application. Further, given that there is only one planned consultation session between now and the expected filing date, Capital Power is concerned that there is insufficient time in the consultation process to test what the AESO develops in its modernization of opportunity service. This could lead to in-efficiencies as the AESO's recommendation will have to be tested in front of the commission and not through stakeholder consultation.
17	Additional comments	Capital Power appreciates the AESO's transparency in providing the AUC staff questions. Should the AESO choose to respond to any of the questions, Capital Power would expect the same level of transparency with stakeholders as currently demonstrated.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Raj Retnanandan
Comments From:	Consumers Coalition of Alberta			**Phone:**	Contact Phone Number
Date:	[2021/04/15]			**Email**:	retnanandan@emrc.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes-the session was helpful from the perspective of understanding the AESO's views
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes-the session was helpful from the perspective of understanding the AESO's views

3.	Are you supportive of the AESO's preferred rate design? Why or why not?	**Supportive:** i) CCA supports, the allocation of the portion of the bulk system that is used to accommodate area peaks outside of the coincident peak as part of the costs to be recovered on the basis of non-coincident peaks. CCA supports this approach because it is consistent with cost causation iii) CCA supports the concept implicit in the AESO's proposal to treat, the difference between costs attributable to area peak generation (arising from in merit generation) and costs attributable to area peak load, as area related costs. However, CCA disagrees with the view that such costs, which arise from in merit generation, ought to be considered as energy related and recovered from load customers on the basis of energy. ii) AESO's proposal to mitigate rate increases aising from rate restructuring to within 10% **Not supportive:** i) Classification to Energy: CCA supports the concept implicit in the AESO's proposal to treat, the difference between costs attributable to area peak generation (arising from in merit generation) and costs attributable to area peak load, as area related costs. However, CCA disagrees with the view that such costs, which arise from in merit generation, ought to be considered as energy related costs and recovered from load customers on the basis of energy. The classification of a portion of system costs to energy, based on in merit energy inflows (supply), is based on the assumption it is a cost causation factor to which load customers could respond. However, load customers have no ability to influence the location, quantum or timing of plant additions required to meet the needs of in merit energy inflows, through their behaviour in terms of using the proposed DTS tariffs. In CCA's view, rather than classifying costs related to in merit energy inflows as energy related, the AESO may wish to look at the correlations between peak in-merit energy inflows and area peak loads and come to a better understanding of the correlation between peak in-merit energy in-flows and area demand billing determinants and bulk system demand billing determinants. This would allow the costs classified to energy to be recovered through appropriate demand billing

		determinants which could be influenced by DTS customer behaviour. Using appropriate demand billing determinants as part of DTS for recovery of costs deemed as generation related costs could provide a more effective tool for DTS customers to influence generators' in merit peak flows. CCA has argued in the context of the DCG credits proceedings (ID26090) that there should be contractual arrangements with TCG and DCG customers, outside of the AESO tariffs, to capture the benefits and costs of in merit energy flows and thereby provide appropriate forward looking signals for generator location. CCA is concerned that a high energy component in DTS rates as proposed by the AESO, could exacerbate load defections resulting in higher costs for remaining load customers for the following reasons: • High DTS energy charges could encourage uneconomic by pass of the system; • There is uncertainty associated with the Govt.'s, decision on gross versus net metering for new self supply and export customers. If net metering were to be allowed, that would contribute further towards erosion of energy billing determinats and therefore higher DTS energy rates; • Under the AESO's proposals, as area peak generation increases with addition of DCGs and TCGs over time, increasingly greater proportions of bulk system costs could be shifted to energy classification triggering higher energy costs/charges and further load defections; • The Distribution Systems Inquiry report talked about preventing uneconomic by pass and, all the consultants who appeared in that proceeding recommended a shift towards fixed charges as opposed to energy charges to mitigate stranded investment ii) CP Demand Cost Recovery using 5 year averages-discussed under 4 iii) Reservation charges based on billing capacity and NCP charges for actual usage of non bulk system related costs-discussed under 4 iv) Complete exclusion of marginal cost price signals-discussed under 4
	Questions	**Stakeholder Comments**

4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	a & b) The AESO's proposed rate design does not appropriately reflect cost responsibility based on cost causation nor does it provide efficient price signals. First, the recovery of fixed plant costs, deemed as caused by generators and classified as energy related costs, from load customers whose consumption behaviour has no influence over generator location (which is the primary driver of in merit generator flows) results in a mismatch between cost causation and price signals. Second, the AESO's proposed rate design does not provide efficient price signals for minimizing future plant additions that are deemed to be driven by coincident peak demands. In CCA's view the 5 year average CP demand approach using a single hour in each month, for recovery of a portion of bulk system costs, neither reflects cost causation nor does it provide efficient price signals for customers to reduce consumption during any other peak hour that has a high probability of giving rise to future plant additions. For example, if the CP hours were based on a group of hours in each month, with a high probability of driving system additions (example: hours with 90% probability of driving system additions) that would result in better alignment between cost causation and price signals as opposed to using historical average CP hours as proposed by the AESO. Third, the AESO has proposed a single billing capacity charge for recovery of non bulk system costs. A high billing capacity charge could incent load defections and requests for contract reset including waiver of PILON. This issue could be addressed by having a reservation charge based on billing capacity and a non ratcheted NCP demand charge applied to actual usage. Fourth, the AESO has not given recognition to marginal cost pricing to any degree. However marginal cost pricing could encourage efficient consumption decisions at the margin. For example, if the CP and NCP demand charges could reflect marginal costs, any residual could be reflected in a capacity reservation charge which could be the same as the billing capacity charge. In other words, acutal usage, whether under CP recovery or NCP recovery, would reflect marginal costs to the extent feasible, while reservation costs (or fixed billing capacity charges) would reflect the residual costs. c) The AESO appears to have designed the rates with minimum structural change to existing rates. The AESO states, it is not expected that any customer would have a total bill increase of more than 15 per cent. While minimizing changes to exiting rate components may suite the AESO's convenience, this should not be the

		measure of whether the proposed rates are minimally disruptive or not. Rather, the measure of whether the proposed rates are disruptive or not must be based on judgement by weighing efficiency of rates in providing appropriate price signals and reflecting cost causation against, minimizing customer impacts. It must be recognized that the existing rates were designed to meet requirements of a system where load was the primary driver of plant additions. This has changed and given way to two way flows of electricity and self generation. Therefore, some degree of disruption is necessary provided rate stability at the customer level is achieved. In this regard CCA supports the AESO's intention to minimize transmission cost increases to no more than 10% increase in transmission costs. Further, some level of disruption is necessary in order to minimize uneconomic bypass of the system due to decreasing costs of variety of self generation options. The prospect of self generation eroding system billing determinants could have serious consequences for future ratpayers, unless addressed at this time. d) The use of 5 year monthly averages for determining CP demands does not appear to be simple, nor does it provide the appropriate forward looking price signals. e) Innovation and flexibility would be best served if apropriate marginal price signals are provided for consumption at the margin

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	CCA recommends the following: • Broaden the CP hours to capture all hours with a high probability of driving system peaks in each month to replace the proposed average of historical 12 CP demand hours • Keep energy classification to 10% or below and shift about two thirds of costs proposed to be classified as energy (31% as per AESO) for recovery via non ratcheted NCP demand and billing capacity (or capacity reservation). This reclassification of a portion of the 31% energy costs in this manner for recovery through area costs demand billing determinants, stands to reason because the in merit energy peak inflows appear to be essentially impacting area peak loads as per Slide 39. • Split the costs proposed to be recovered by billing capacity, to be recoveed partly through a reservation charge based on billing capacity and partly through non ratcheted NCP demand charges, for actual use. The treatment of reclassified energy costs partly for recovery through billing capacity and partly for recovery through non ratcheted NCP also stands to reason as this could help minimize potential load defections and requests for contract resets, by minimizing connection charges (or billing capacity) • Use marginal costs based on historical long term incremental costs to set CP and NCP demand charges (i.e. usage charges) to the extent possible; Use any residual costs to be recovered on the basis of billing capacity (or capacity reservation charges)
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	These are discussed in 3
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	They appear to be reasonable

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	CCA is supportive of the AESO's proposed criteria for DOS. The following may be worth further consideration: • A time differentiated DOS charge that would incent DOS use during off peak hours versus on peak hours to encourage use during off peak times. • When energy storage is providing ancillary services, it requires greater certainty for charge cycles. Consideration should be given to the DOS rates that would apply to storage under these circumstances to ensure the charge cycles are not interrupted when the storage asset is providing ancillary services.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Please refer to 8
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	CCA supports this approach

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	CCA generally agrees with these principles.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	In CCA's view mitigation options could be viewed as another tool that could be considered either as part of the overall rate restructuring or separate from the overall rate restructuring. Considering mitigation options as a separate tool outside of rates, provides the AESO with greater flexibility to restructure go forward rates. If mitigation were used as a separate mechanism it should be phased out after a reasonable period of time.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Yes-based on the 10% maximum increase for customers after mitigation
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Requests for adjustnment of contract capacity or waiver of PILON requirements must be considered on a case by case by the AESO taking into consideration, the opportunity for uneconomic bypass of the system and the go forward revenues under restructured rates. The objective should be to ensure there is no undue shifting of costs from one group of customers requesting PILON waiver or contract reset, to other customers.

15	Do you have any additional implementation considerations the AESO should consider?	In CCA's view it is better to delay the GTA filing for implementation of new rates in order to get it right, rather than rush into a rate design that appears to have little support and which does not give due recognition to go forward risks associated with load defections.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	CCA requested at the March 31, 2021 meeting, a model that would show by POD, categorized and listed under each DFO and listed for all other individual PODs showing annual bills under existing and proposed rates. If this information could be provided that would help CCA assess overall rate impacts arising from rate restructuring.
17	Additional comments	CCA is mindful of the time constraints the AESO is working under. CCA is also appreciative of the excellent work done by the AESO to bring the Phase I filing to this stage. However, the Commission Staff has raised a number of questions. In order to avoid a contentious hearing and to arrive at an optimal rate design, CCA would not object to the AESO requesting further time for filing of its upcoming GTA.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Dan Chapman
Comments From:	Chapman Ventures Inc.			**Phone:**	403-831-8413
Date:	[2021/04/15]			**Email**:	dan@chapman-ventures.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session provided a valuable platform for stakeholders to pose questions and explore the AESO's tariff design proposal. We appreciate the opportunity to provide commentary and continued engagement.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable and allowed good dialogue between Market Participants and the AESO regarding rate impact.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	Chapman Ventures is not supportive of the AESO's rate design for Bulk and Regional Charges. Chapman Ventures is supportive of using DOS rates for energy storage if the DOS rate and terms and conditions are appropriately modified. Although, it would be our preference to have a storage-specific tariff acknowledging the unique capabilities and value offered by energy storage, Chapman Ventures believes that an interruptible tariff is an improvement to rate DTS. At a high-level, Chapman Ventures supports the use of a modernized DOS tariff; however, this support is predicated on the assumption that elements of the existing DOS tariff are modified to facilitate fulsome market participation by energy storage assets. It is our understanding, from the rate sheet provided by the AESO, that Rate DOS charges will increase substantially under the proposed tariff structure. Chapman Ventures is concerned that the proposed DOS tariff rate will continue to render energy storage charging from the electricity grid as a broadly uneconomic activity, reducing the positive impact that energy storage could have for Alberta's load customers.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	No, Chapman Ventures does not believe that the AESO's preferred rate design meets the rate design objectives. Drastically increasing the energy charge will not lead to a tariff that properly reflects cost responsibility. Grid costs are mostly fixed in nature. Taking a fixed charge and collecting it from AESO customers on a variable cost/MWh basis does not properly reflect cost causation. The AESO constructs transmission facilities based upon an assessment of peak load. Collecting on a $/MWh basis does not properly allocate costs to low load factor customers and is therefore not a rate that is based upon a cost causation principle. DOS rates are heavily influenced by the size of the energy charge. A drastic increase in DOS rates that is proposed by the AESO can only be justified if actual variable costs have increased. The AESO's proposed rate design arbitrarily increases the variable component of the AESO's tariff and therefore is not justified.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	The AESO should collect fixed charges from its customers to reflect the fixed nature of transmission costs. Creating a variable cost from fixed charges does not properly reflect the fixed cost nature of transmission costs. The AESO's rates should be modified to properly reflect cost causation.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	N /A
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	N /A

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Chapman Ventures applauds the AESO's acknowledgement that the DTS rate, in its current form, does not support economic charging behaviour of energy storage from the AIES; and the subsequent consideration that non-firm rates could encourage participation of flexible market assets, such as energy storage. Overall, Chapman Ventures supports the use of a modernized DOS tariff; however, this support is predicated on the assumption that elements of the existing DOS tariff are modified to facilitate fulsome market participation by energy storage assets. Chapman Ventures supports the following eligibility criteria for DOS as listed on slide 74 of the March 25 stakeholder session presentation: 1. "Use would not occur under any other rate". Rate DTS is economically destructive to energy storage participation in the energy wholesale energy market. Energy storage follows price signals to store electricity from the grid when it is economically prudent to do so (i.e. during instances of low Pool Prices). Adding the Rate DTS to the Pool Price renders energy storage asset participation broadly uneconomical. 2. "Must have alternative energy source or a "market opportunity" where the cost of receiving additional electric energy under Rate DTS renders the opportunity uneconomic." Investing in energy storage under Rate DTS renders projects broadly uneconomical. Firm electricity is required for the facility auxiliary loads and thus requires a relatively small Rate DTS contract. However, the incremental grid electricity consumption required to charge an energy storage asset is uneconomical under Rate DTS. Chapman Ventures believes that the following DOS eligibility criteria, as listed on slide 74 of the March 25 stakeholder session presentation, require modification: 1. "Sufficient transmission capacity." Ideally, energy storage would qualify for a storage-centric firm service rate, at a much lower tariff rate charge than the proposed Rate DTS and Rate DOS charges. It should be acknowledged that energy storage is capable of providing broad benefits to the Alberta electric system, and subsequently the users of that system (both load and generation). Under the AESO's proposed tariff structure, if an energy storage asset elects to connect to the system, it is understood that Rate DTS contracts take precedence over those contracts for Rate DOS, which are interruptible. Therefore, an energy storage market participant that elects to construct a facility and connect under rate DOS should be permitted to do so using its own

		assessment of available transmission capacity which would be based upon a grid study. The AESO should consider modifying this criterion in the modernized DOS tariff. 2. "Is temporary or repeated short-term use." Most energy storage assets that qualify for the modernized Rate DOS will exclusively use Rate DOS for all charging energy purchased from the grid. This would remain the case unless an alternative rate structure is developed and instituted that better serves energy storage assets, such as a future Energy Storage-centric tariff.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	The following components of the current DOS implementation limit the use of excess transmission, particularly as relates to energy storage: 1. **Determination of Rate DOS Charges**. The existing Rate DOS Charges are based on the "Energy" portion of the AESO Bulk and Regional Tariff. Slide 74 of the March 25 stakeholder session presentation illustrates that the "Energy" portion of the charge was $2.18/MWh (based on the 2019 Test Year), but increases to $10.19/MWh (based on the AESO preferred rate modelling for 2019). This is a 467% increase to this cost element, which happens to be a component for the cost basis for Rate DOS. The AESO's latest tariff rate estimation, made available to stakeholders on April 13th, estimates that the DOS Rate will increase to $15/MWh. This triples the DOS rate, and therefore triples the rate that applies to energy storage grid charging. **Chapman Ventures is highly concerned that increases to the DOS 7-minute charge will prove cost prohibitive to energy storage participation in the Alberta electricity grid. Chapman Ventures also questions the cost causation basis of drastically increasing the energy charge in the Bulk and Regional tariff.** 2. **Rate DOS Types**. It is our understanding that the existing three Rate DOS Types (DOS 7 Minutes, DOS 1 Hour, DOS Term) were created to serve a certain set of load service considerations, such as temporary provision of excess grid electricity (beyond a proponent's Rate DTS contract) during outage of a load customer's onsite generation. The existing rate DOS types do not reflect the advanced operational capabilities of energy storage, including the ability to satisfy recall directive response times far shorter than 7 minutes. **In modernizing DOS, Chapman Ventures recommends that the AESO considers implementing faster responding DOS types (i.e. DOS 1 Second, DOS 30 seconds, DOS 1 Minute).** 3. **Take or Pay Provision**. Energy storge assets will use Rate DOS for charging over the life of the installed asset. Therefore, as far as an energy storage asset is concerned, this is not a "temporary or repeated short-term use" case. **Chapman Ventures requests that the take or pay provision does not apply to assets that satisfy the other eligibility requirements to participate in rate DOS.** **4. Eligibility – Economic**. Energy storge assets will use Rate DOS for charging over the life of the installed asset. Therefore, as far as an energy storage

		asset is concerned, this is not a “temporary or repeated short-term use” case. The market participant can certainly indicate it would not increase metered demand under Rate DTS, if Rate DOS was not available, as this would be economically destructive to the energy storage asset.
10	Do you have any comments on the AESO’s targeted engagement approach for mitigation discussions?	Chapman Ventures elects to reserve commentary to the suggested energy storage tariff treatment.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party’s transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	Chapman Ventures elects to reserve commentary to the suggested energy storage tariff treatment.
12	Based on the AESO’s mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	Chapman Ventures elects to reserve commentary to the suggested energy storage tariff treatment.

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Chapman Ventures elects to reserve commentary to the suggested energy storage tariff treatment.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Chapman Ventures elects to reserve commentary to the suggested energy storage tariff treatment.
15	Do you have any additional implementation considerations the AESO should consider?	Chapman Ventures would appreciate further discussions on the DOS rate design, prior to the AESO filing its tariff. To date the DOS concept has only been broadly discussed and a detailed rate sheet and terms and conditions have not been released. Chapman Ventures would appreciate an opportunity to comment on the DOS rate details as they become available.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	Chapman Ventures is not following the logic of the AESO's proposed DOS rate sheet. A discussion on the DOS rate calculation would be appreciated. It would be helpful to confirm which portions of tariff cost allocation are suitable for recovery through the DOS tariff.
17	Additional comments	Thank you for the opportunity to comment. We look forward to future engagement regarding tariff design and implementation impacting energy storage.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

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April 15, 2021

Spencer Hall
Alberta Electric System Operator
2500, 330 - 5th Ave SW
Calgary, AB T2P 0L4

Dear Mr. Hall

SUBJECT: Bulk and Regional Tariff Design Stakeholder Session

I write on behalf of the cities of Lethbridge and Red Deer, who wish to share their feedback on the presentation and materials from the AESO's March 25th and 31st sessions. Following that session, the AESO requested parties to respond to seventeen questions. The cities' response is provided below.

Questions 1 & 2:

Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?

Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?

The cities consider the AESO's sessions to be useful for understanding the positions of various stakeholders.

Question 3:

Are you supportive of the AESO's preferred rate design? Why or why not?

In prior consultations and correspondence, the cities have framed their previous comments based on four over-arching principles that they support.

1. Reduce and eventually eliminate the amount of transmission cost recovered from a charge that is based on use during only one hour of the month.

2. Transition toward a tariff where the billing determinants are defined in advance so that the distribution utility has more opportunity to flow through the same price signal to its customers.

   The prospect of discovering which hours are premium priced only after consumption occurs is a concern because it creates an unofficial class of customers who are uniquely equipped to guess the peak period and avoid tariff charges. The majority are either not equipped to guess or do not have the same opportunity to avoid tariff charges even if they could guess.

3. New tariff charges should be simple and accessible so that more end-use customers can understand broadly which behaviours and usage patterns are to be rewarded.

4. New tariff charges should promote better utilization of the system that exists.

The AESO's proposed rate design is marginally simpler and does reduce the amount of transmission cost recovered during one hour of the month. However, the period to which the price applies is still not known in advance, so the issue is not actually addressed. Moreover, reducing emphasis on a per-MW charge in favour of a per-MWh charge is a step backward in that it would charge more for higher load factor customers compared to current day. In effect, better utilization is penalized. On this basis, it is difficult for the cities to support the AESO's proposal.

Overall, the cities would rank "Bookend A" from Session 2 and Proposals 3 and 4 from Session 3 ahead of the AESO's current proposal. Bookend A and Proposals 3 and 4 have the same upside as the current proposal but have an end-goal of eliminating the coincident metered demand charge entirely. Moreover, they also promote better utilization.

Question 4:

Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not?

a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid)*

b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build)

c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted)

d) Simplicity (Simplicity and clear price signals while achieving design objectives)

e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers)

For the most part, the AESO's rate design objectives are not incompatible with the cities' principles. However, the AESO's interest in minimizing disruption may be hindering the AESO's ability to focus on the right or corrective solution for the long run. Minimizing disruption is a laudable goal, but it should be considered sequentially: start with the desired end-state, then work toward a transition or path to that outcome that will minimize disruption.

One message that factored predominantly in the AESO's presentation is that usage during many hours affect the need for system expansions. The AESO's conclusion is to depend more on a per-MWh charge, a price signal that does not discriminate whether it is the user's first or last MWh or whether the MWh was recorded at 3 am or 3 pm. The AESO appears to recognize that, notwithstanding the circumstances affecting system stress and the need for future expansions are nuanced, broad postage-stamp price signals are the pragmatic solution. Where the cities do not agree with the AESO is that a per-MWh charge is *the* pragmatic solution because this signal is too blunt.

Alternatively, the same cost-based argument could be used to support a ratcheted per-MW demand charge because such a charge does not discriminate as to when and how many times a peak is reached: one peak per year can matter just as much as reaching the same peak every week. This price signal also communicates that usage at 3 am is not necessarily problematic, although a peak at 3 am could be just as impactful to system planning as a peak at 3 pm. This would be particularly true if major loads in a particular planning region all

shifted load to the overnight period. Unlike the proposed per-MWh charge, however, holding the current per-MWh charge constant and recovering more cost from a ratcheted demand charge will reward better utilization.

Question 5:

Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.

As mentioned above, the cities are of the view that the AESO could improve upon its rate design proposal by focusing on minimal disruption only after the other objectives are best met. The desired end state need not be achieved in a single step, but a transition plan need not be complicated. Impacts can be mitigated by gradually reducing the old charge while gradually increasing the new charge.

Question 6:

Please describe any areas in which you are aligned with the AESO's preferred rate design.

Please see the cities' response to question 3.

Question 7:

Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?

To the extent that a billing determinant changes from a 15-minute measurement to a one-hour measurement, billing determinants have changed in the AESO's proposal even though

the subsequent analysis proceeds as if they are the same. As long as all parties understand that the AESO's proposed rate is indicative only and the AESO is not making firm rate mitigation commitments to transmission-connected customers based on this analysis, the cities do not have any concerns.

Questions 8 and 9:

Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not?

And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.

Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS).

How might those components of DOS be improved?

The cities do not have enough information to form an opinion on the AESO's proposal.

In earlier sessions, the cities suggested that the AESO first resolve whether storage is a unique and useful means to optimize the transmission system, and if so, how optimization is best achieved. Once these questions are resolved, it becomes much easier to conceive of a pricing scheme that supports this objective.

Slide 71 suggests some attributes of storage that may be beneficial, though they are broadly described and could apply to more than just storage. The chosen approach to rely on an opportunity rate also seems to imply that the AESO does not consider storage to be unique because it deems a general rate class to be sufficient. Opportunity rates are difficult to implement for the reasons the AESO has noted: particularly the difficulty to ensure that it is attracting new customers and not existing customers who would otherwise be willing to pay the regular rate. The potential problem here is that so many qualifications will be necessary that the opportunity rate becomes a de facto storage rate anyway.

On the other hand, the AESO also notes that the benefits are situation and location specific, and that the qualification for the opportunity rate will need to take this into account. This might have implications for uptake because if the location changes and the storage provider's

costs are sunk, this might be perceived as additional risk and negatively affect the project economics.

Ultimately, the cities remain uncertain as to how the AESO believes energy storage should be deployed and utilized to benefit the transmission system. If it has a need related to specific operating conditions, the best treatment might be to publicly tender and procure service outside the tariff so that the AESO can contractually define what service is required. If the transmission system has no need for storage, then perhaps few or no accommodations are required. This is not to say that storage is unwelcome, just that the value or benefits are not transmission-related and the transmission system should not be making extra efforts to favour one technology over others if it brings no benefit. The point being is that we have yet to establish whether the AESO believes there is a unique benefit to storage, and if so, to describe how the benefit is unique.

Questions 10-15:

Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?

Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale.

Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale

Are you in favour of some type of mitigation? Why or why not?

If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?

In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?

Do you have any additional implementation considerations the AESO should consider?

Ordinarily, the cities would be concerned that the above principles focus on protecting a customer from the price impact without necessarily requiring a behavioural change as well. In other words, appearing to guarantee no more than a ten percent rate impact with no strings attached may not be prudent. Nevertheless, the AESO's proposal does not appear to encourage any behavioural shift for price-responsive loads and so such concern is not as high of a priority for this situation.

With improvements to rate design to encourage better utilization, the cities suggest that phasing in new charges while phasing out old charges is a more effective and less burdensome approach than the case-by-case process indicated here. The pace of change can be selected based on the expected impact for the most-affected customers, but because the tariff applies to everyone (as opposed to a discounted tariff applying to some customers), then price responsive loads are rewarded to modify behaviour as well.

Question 16:

Do you have additional clarifying questions that need to be answered to support your understanding?

Please see the cities' response to questions 8 and 9.

Question 17:

Additional comments

The cities undertook to provide fulsome responses to the above questions and have no additional comments. Should any of our comments require further clarification, please feel free to contact me at (403) 781-7691.

Yours truly,

Michael Turner
President

cc: Jim Jorgensen, City of Red Deer
Jason Drenth, City of Lethbridge

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Blair Wood
Comments From:	Conoco Phillips Canada			**Phone:**	403 532 3575
Date:	2021/04/15			**Email**:	Blair.wood@conocophillips.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, the session was valuable. A smaller group breakdown would be helpful, if possible, with available technology, to allow for a more fulsome conversation with stakeholders.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, the session was valuable. It was helpful to hear more comments from participants since the previous session had a stronger focus on AESO presentations.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	Conoco is not supportive of the proposed rate design. The approximate 500% increase in the variable energy rate does not match the fixed nature of incurred transmission costs. The proposed design should be altered to reflect cost causation more accurately.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	No, Conoco does not believe the AESO's proposed design meets the rate design objectives. When the AESO splits energy and demand charges, it does so based on the total amount of load and generation. Generation is higher, and the AESO's design implies that therefore transmission has been constructed for generation and this should lead to an energy charge. Some system projects were built for primarily for generation and others primarily for load, but most of the transmission rate base was constructed as CTI projects. Since the CTI projects were required by legislation, it is not clear the purpose for each CTI project. The AESO's proposed design assumes a clear distinction in the rate base, but the cost causation of factors influencing rate base growth is actual very unclear. Assuming that energy charges should be increased based upon the AESO's simplistic analysis does not reflect reality or true cost causation. Transmission costs in Alberta are primarily fixed in nature. Future growth of the transmission system is not expected with forecasted muted load growth and limited new transmission is therefore required. Continuing with a strong coincident peak signal and a new high energy charge does not reflect this reality and given these facts, it is confusing why the AESO has chosen its rate design. The remaining objectives cannot be met if the cost causation principle is not achieved. Conoco therefore cannot support the AESO's preferred rate design.

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	Conoco expects that in the future as renewables expand, and other types of generation are required to balance renewables intermittency, the AESO's proposed design will continually shift more costs onto energy (since total generation will increase as compared to load). The focus on energy in the proposal will likely lead to ever increasing energy charges. It would be helpful if the AESO would adjust its forecasted future energy charges in its rate forecast given the significant future build of renewables. The design should be altered to reflect the fact that wires costs are fixed. Drastically increasing the energy charge is therefore not justified and should be modified, perhaps to a non-coincident peak charge. A non-coincident peak charge would also support an objective of reducing uneconomic bypass as compared to an energy charge, since customers attempting to reduce transmission charges by installing generation will not be credited for each MWh produced.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	NA
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	NA
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	The AESO's preferred design will inappropriately increase the variable portion of the AESO tariff. This will in turn drastically increase the DOS charge. The AESO has shown that DOS rates will increase by about 300%. If the AESO proceeds as planned, the proposed change to the DOS rate is likely to prove to be a futile exercise. Few energy storage firms will build facilities if the DOS rate charged is exorbitant. Since export rates are similarly impacted with an increase in the energy charge the AESO should share the calculated rate for exports in its consultation.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	NA
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	The AESO is representing all ratepayers in these discussions since any concessions made will be paid for by the remaining customers. Given this, the AESO must clearly show each targeted rate exception and its justification.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	The AESO should add transparency to the list of objectives. The AESO must show clear justification to stakeholders and the Commission for any mitigation proposed.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	NA

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Yes, some form of mitigation is reasonable. Conoco supports short term mitigation for significant cost increases (over 10% of total energy and transmission charges combined). All mitigation must be complete within a reasonable timeframe (less than 3-5 years).Customers that require mitigation in the longer term to allow their business to be economic may need to apply for other rates, such as DOS.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	It is reasonable to allow for a contract reset period since over time, PILON costs will substantially increase. It is not clear why it is important that a customer not change its contract level in the last five years to receive this benefit. It would be helpful for the AESO to release an updated PILON calculator based upon its preferred design, perhaps with example calculations. It is clear than once the 5-year rolling average CP rate is implemented, PILON rates for most customers will substantially increase.
15	Do you have any additional implementation considerations the AESO should consider?	NA
16	Do you have additional clarifying questions that need to be answered to support your understanding?	NA
17	Additional comments	The Commission clarified its rate expectations in the final distribution inquiry report. The AESO must ensure that its rate proposal aligns with the Commissions thoughts included in this report. Conoco views the current preferred rate alternative as not in alignment with these expectations.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Rick Cowburn – VIDYA Knowledge Systems
Comments From:	Canada West Ski Areas Association			**Phone:**	(403) 397-8785
Date:	2021-04-15			**Email**:	Rcowburn@vidya.ca

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was clear and helpful. There are obviously many details to work out, but the approach and reasoning is clear and often compelling.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	It is most inefficient for every customer group to have to seek its own understanding of how the distribution utilities will flow this tariff through. Although this is outside the AESO's direct responsibility, it is also outside every other market participant's responsibility. Since the AESO created this situation, perhaps the AESO could seek to rectify it by working with the distribution utilities.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	Alberta's electric industry restructuring could be subtitled "The Dance of Unintended Consequences." We went into this adventure blissfully unaware of the complex long-term impacts of our decisions. A fundamental economic trade-off in creating a competitive generation market is: Giving up control of generator construction and dispatch must lower costs enough to pay for the more robust transmission system that will be required. The 2003 Transmission Development Policy enshrined this tradeoff in legislation saying "Transmission planning must be proactive in nature and must therefore lead load growth and generation development." [p.4] At the bulk system level, the Big Build has more than delivered on that goal. Now that annual load growth has dropped below 1%, and is predicted to remain so indefinitely, the industry is becoming more aware of the role that generation development has played and will continue to play in driving transmission costs. The AESO's proposal supports this realization. The splitting of costs into 'minimum system' and 'actual system' components will be controversial and will surely evolve over time; but however it is implemented, the concept reasonably reflects the fundamental economics of Alberta's electric industry.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	a) The recent 'Big Build" was driven by political decisions, in respect of which cost causation is unknown. Planning studies indicate that in the future, generation additions will be a primary cost driver. Load has not been and will not be the primary cost driver. b) Given this context, sending 'price signals' to load will be largely ineffective in avoiding future transmission build. c) Reasonably minimizing customer disruption is an important objective. However major customer representatives have often stated that no one would build a project just to obtain transmission cost savings. If 'investment' were indeed the criterion for rate impact shielding, then the original project business cases must be reviewed by the AESO to confirm that transmission savings were central and essential to the business decision. Of course the benefits of operational flexibility are many, some of which will be business related and some of which will be electricity related, including the ability to mitigate pool price excursions as well as the ability to exploit the transmission tariff's cost avoidance opportunities. In practice, 'investment' is likely not a usable criterion for providing rate impact relief as it would require extensive and frequently inconclusive analysis, and would unduly discriminate against parties based on whether they had implemented some particular type of project 'behind the fence.' d) The revised tariff is consistent with the current tariff structure, but price signals are largely irrelevant on the load side. e) The revised tariff retains the valueless 12CP cost-shifting incentives of the current tariff, albeit with a lower financial benefit. Finding new ways to shift costs to others is not productive innovation.

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	The CP and energy tariff components are undergoing the most change. Basing CP on the 5-year monthly average may somewhat reduce gaming, but given the AESO's evidence that "hours of 12-CP do not necessarily correspond to hours of peak utilization across high-voltage lines" [Slide 35] there will be little if any benefit to offset the costs being shifted to other customers. A more balanced approach might be to use a broader billing determinant that can better incent behaviours that might actually reduce transmission costs. The transmission system has been 'oversized' to enable generators to move all in-merit energy anywhere, any time. This oversizing does not automatically imply cost recovery based on energy in all hours – other options deserve consideration, particularly considering these charges' impact on high-load factor customers. Non-Coincident Peak would be a possible option; but if 12-CP was also moved in that direction, almost the entire tariff would be NCP based, which would be too extreme. A declining block energy charge would be a more balanced and traditional approach, with high-load factor energy charged at a much lower rate, while the first energy blocks are priced higher to provide a fair contribution by all customers.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	Dividing costs based on system usage is a well justified, reasonable step forward.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	Rate impacts need to be assessed on a POD by POD basis, with some provision for assessing end use customer impacts as they will be communicated through distribution tariffs.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	DOS is a familiar concept, but it may create more problems than it solves. With transmission oversupply, many customers could take the risk of interruption without fear of consequences – and then get off the rate when the risk rises. (This is exactly what happened in the 1980's with similar rate options.) Storage is an innovative service, which is likely best served by a policy adapted to its specific nature.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Indeed, that's the problem with using an inappropriate rates tool. Don't go there…a storage-specific tariff treatment would be less burdened by irrelevant DOS baggage.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	A targeted approach considering only seven PODs [Slide 63] seems likely to be unduly discriminatory. Customers served through a distribution system are proposed to receive no mitigation; only direct-connect industrials are elgible. That would be a profoundly unfair policy. Cutting confidential 'deals' would also be improper.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	While the concept of mitigation seems reasonable, its implementation would be very difficult. One fair way to implement mitigation would be as a tariff rider that applies in specified situations at the individual POD level, irrespective of whom that POD might serve. This will not be simple, as to calculate a bill increase one needs both a 'shadow' rate and some form of billing determinants. How would the 'shadow' rate be determined? Presumably this is another component of the annual AESO tariff processes, for as long as mitigation continues. What should the billing determinants be? If a customer adds a new load, any related bill increase should not be mitigated. Conversely, if a customer's load drops there should still be some level of mitigation, though at a reduced level. It is easy to see why such site-specific mitigation is virtually unknown in Alberta's electricity ratemaking.

12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	Mitigation is a form of 'grandparenting', which is inherently unfair and discrimatory against new entrants, in favor of incumbents. To the extent that grandparenting is used at all, it should be for a limited duration. (see Nigel Bankes blog article https://ablawg.ca/2019/12/02/further-thoughts-on-the-law-and-practice-of-grandparenting/)
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	In principle, mitigation seems reasonable. In practice, it will be profoundly difficult to implement. Assessment criteria may include identical treatment of all PODs, open and objective calculations, and a limited time duration.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	The Big Build's high cost is leading many parties to consider ways of reducing their costs by reducing their use of the system. Certainly in cases where a load reduction can avoid transmission expansion costs, usage reduction should be encouraged. As a general policy, though, it is fraught with difficulties.
15	Do you have any additional implementation considerations the AESO should consider?	Impact mitigation is an extraordinarily difficult challenge. Precision as to its specific proposed form will soon be necessary.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	The AESO has found a reasonable alternative tariff approach, but the devil will indeed dwell in the details. Many questions will arise in due course!
17	Additional comments	Thanks to the AESO for its openness and sincerity in industry discussions.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021 through April 15, 2021	**Contact:**	Christine Runge (Power Advisory)
Comments From:	DCG Consortium The DCG Consortium is comprised of the following members: BluEarth Renewables Inc., Canadian Solar Solutions Inc., Elemental Energy Renewables Inc., RWE Renewables Canada Holding Inc. and Siemens Energy Canada Limited. This submission represents the consensus view of the group and is submitted on behalf of the group by Power Advisory LLC	**Phone:**	403-613-7624
		Email:	crunge@poweradvisoryllc.com
Date:	2021-04-15		

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	The total energy charge is designed to account for congestion; however, congestion does not realistically have an equal probability of occurring in any of the 8,760 hours throughout a year. At a minimum, the AESO can safely design an on-peak and off-peak time frame that removes value from some hours, such as at nighttime and on weekends. This type of rate design in used elsewhere in Alberta. For example, ENMAX's D310 rate class contains an on-peak and off-peak charge where on-peak is defined on the rate sheet as "from 8 a.m. to 9 p.m. Monday to Friday inclusive, excluding statutory holidays." The AESO could create a similar definition that eliminates hours highly unlikely to contain congestion, therefore increasing the value of the energy charge in all remaining hours. This will result in a stronger price signal in hours with congestion.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	The DCG Consortium understands that the implementation of the AESO's approved adjusted metering practice will impact DCG Credits for many DCGs in Alberta. The DCG Consortium further understands that the decision in Proceeding 26090 may change the methodology by which DCG Credits are calculated. However, it is also possible that DCG Credits remain unchanged or are changed at some point in the future but continue in their current form until a new DCG Credit mechanism can be approved by the Commission. In this case, changes to the bulk and regional rates will impact the magnitude of DCG Credit revenue to DCGs. The DCG Consortium encourages the AESO to consider the impacts of changes to the bulk and regional rates that may result in decreasing DCG Credits through the same lens which the AESO views increases to customer bills. Considered in this manner, any DCGs expected to experience rate shock in excess of 10% (*i.e.,* a decrease in annual DCG Credit revenue by 10% or more) should be subject to any rate mitigation.

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	The DCG Consortium is supportive of bill impact mitigation for bill impacts >10%. As the DCG Consortium has commented many times in the past, a focus on investor certainty should be a key consideration in all significant regulatory and rule changes. If the regime changes frequently and/or drastically, this makes Alberta a difficult jurisdiction in which to invest, ultimately resulting in difficulties attracting capital into the province in the future. This applies both to industrial load customers and generation assets. Potential investors will consider the likelihood of major changes occurring in the future and will either determine that Alberta is likely to respect past investments and the regime under which that investment was made or will determine that it is simply too risky to bring capital to Alberta when there are many other jurisdictions to choose from.

14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	
15	Do you have any additional implementation considerations the AESO should consider?	
16	Do you have additional clarifying questions that need to be answered to support your understanding?	

17	Additional comments	**<u>The implication of a five-year average 12CP reduction on DCG Credits</u>** It is unclear if the AESO has thoroughly considered the implications of using a five-year average of 12CP in calculating DCG Credits. It is further unclear how a DFO would perform these calculations. In the consultation session, it was explained that the use of a five-year average 12CP response does not change the total savings, but does smooth them over five years, i.e., response to a 12CP hour in January will result in savings spread over the following five January bills. DCG Credits cannot ignore this fact. When a DCG generates under this five-year average approach, it will cause bill savings in that month's bill and also four additional monthly bills over the next five years. The DCG Credits cannot continue to be calculated in their current form, which consider only the impacts to that specific month's bill. A DCG needs to continue to be compensated for all of the savings it generates, which will occur over time under the AESO's proposal. (Please note that this comment is based on the fact that the current DCG Credits are based on the bulk and regional tariff and noting that Decision 26090 has not yet been released. However, even in the event that DCG Credits change as the result of that decision, a grandfathering or transitional period may continue to exist and DCG Credits should not be artificially decreased over a transition period based on this five-year average calculation.) **<u>Transition to a five-year average</u>** The AESO should further consider that the transitional period to the use of a five-year average will place increased importance on the ability to avoid a 12CP charge in the first few years of the new rate design. In the first year, the January 12CP charge will be based 100% on consumption during that time period. In the second year, the January 12CP avoidance from the first year will count for 50% and the January 12CP avoidance from the second year will count for 50%. In this way, while the steady state use of a five-year average will have each month count for 20% of a charge five times (20% x 5 = 100%), the months in the first year will be weighted much higher (100% + 50% + 33% + 25% + 20% = 228%). As a result, failure to respond to a 12CP hour in the first year of this new rate design will have much more significant financial impacts than failure to respond to a 12CP hour in later years. The AESO may wish to consider a different transition mechanism under which the first year isn't so strongly weighted. One such option would be to fix the value of previous years at 20% from the beginning, *i.e.,* in year 1, year 1 is 100% but in year 2, instead of 50%/50%, year 1 can be worth 20% and year 2 can be worth 80%. This would lower the value of year 1 from 228% to 180%. Any reduction in the first-year weight would help to lower the cost and risk of failure to avoid all net imports during a 12CP hour in the first year.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021 through April 15, 2021	**Contact:**	Dale Hildebrand
Comments From:	Dual Use Customers (DUC)	**Phone:**	403-869-6200
Date:	2021/04/15	**Email**:	dale.hildebrand@desiderataenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable. It would be helpful to have the AESO provide some additional information, including: • The DUC does not understand the non-standard 12 CP ratchet rate design that gives the initial years greater relative importance. We are also interested in understanding how this calculation will translate through DFO rates. • Information to support the assumption that 31% of Alberta's bulk and regional transmission costs are energy-related and were incurred to facilitate in-merit energy flows. We would like to review a cost of service study to understand the underlying conditions that changed and consequently created the impetus for a significant shift in cost allocation. • Information to support the efficiency of a much larger energy-related allocation. Charging energy on a flat $/MWh basis gives equal weight to all hours of the year, even off-peak hours when the loading of transmission lines is typically at its lowest. A more efficient solution would encourage additional consumption when transmission lines are not heavily loaded. • Information and analysis that identifies what has changed on the bulk transmission system since the last cost of service study was approved by the AUC that would justify the proposed change in rate design.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable. It would be helpful to have the AESO provide some additional information, including: • Providing impacts for customers who are connected through DFOs. DUC recognizes that the AESO does not have control over DFO rate design; however, the vast majority of customers pay their transmission bills through DFO rates. Without understanding the translation of the AESO proposed rate design through the DFO rates, customers are not able to see what their impacts will be. In a vertically integrated utility, customers would understand their impacts. Alberta's electricity system needs to provide the equivalent information to its customers.

3.	Are you supportive of the AESO's preferred rate design? Why or why not?	At this point, DUC has some major concerns with the proposed rate design, specifically the proposed ratchet for bulk system demand charges.
	Questions	**Stakeholder Comments**
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	a) Without reviewing a cost of service study, it is difficult to weigh in on Cost Responsibility. b) It would be useful if the AESO could explain how adjusting the rate design in a way that benefits lower load factor customers and penalizes higher load factor customers, is improving the objective of sending appropriate and efficient price signals. c) Without mitigation, it appears that 7 or 8 customers will see significant disruption and significant impacts to their business. In addition, many other customers will see cost increases up to 10% because of this rate design. Over time, the proposed 12 CP ratchet may impose larger price increases. It would be useful for the AESO to conduct analysis on the economic impacts to the impacted customers. d) Charging on CP, energy or billing / contact capacity are all fairly simple. However, the proposed 5 year trailing average CP is not simple or well-understood. It would be helpful for the AESO to provide an example so customers can understand how it works and the impact this rate design will have on cogeneration customers over time. e) There will be opportunities for innovation and flexibility for some customers, but not all customers.

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	It is difficult to understand why the AESO persists with a major tariff change at this time. Customers are still in a global pandemic, with significant other priorities to attend to. There are also many outstanding issues that have not been resolved that will ultimately impact the ISO tariff causing further revision, including: • The Transmission Regulation being re-examined by government by the end of 2021 • Government changes related to self-supply and net-export expected in the spring of 2021 • AUC changes resulting from the Distribution System Inquiry (such as aligning transmission and distribution rates). • AUC changes to sub-station fraction and DCG credit issues. The AESO should work with both the DOE and AUC to resolve the issues impacting the tariff, prior to changing the tariff. The timing for a change is pre-mature. Customers do not want to see two major tariff overhauls in short order.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	Retaining the 12 CP charge is an area of alignment; however, the volume of the charge and the proposed ratchet are not. The CP allocation method is the standard, FERC-approved allocation method for network transmission costs and it is the established allocation method for bulk transmission costs. Energy-related allocation of transmission costs are not widely used. The AESO needs to explain why Alberta is so unique as to require a different allocation method from other jurisdictions.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	As stated above, more information is required to understand the 5-year trailing average CP data, as well as impacts on DFO rates.

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Modernizing DOS so that it is used efficiently is a worthy goal. DUC will need to see more information on the proposed costs prior to weighing in on whether it will be suitable. If the costs are too high, it will not be used – and hence it will not be suitable.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Fundamentally, the cost is too high, and the terms are too limited. Proponents cannot finance ES projects, for example, based on the availability of term DOS. This is a concern for consumers in that these types of projects could bring value to customers. We need to improve our use of the existing transmission system. The test should be: Does this add value to consumers?
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	DUC submits that if the targeted engagement approach does not result in mitigation options that will keep the customers expecting major cost impacts operating in Alberta, then the AESO should consider delaying and revising the tariff. At a high level, this tariff "modernization" looks like targeted cost increases on price responsive load and high load factor customers. These are the customer groups that have been actively managing their risk – all the while telling the AESO not to overbuild the transmission system in Alberta.

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	Providing distinct tariff treatment for some customers is sub-optimal. Ideally, Alberta would have a transmission tariff that works for all customers. However, we do not want customers to leave the province and increase transmission costs for all other customers in doing so.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	No comments at this time.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	As stated above, ideally, Alberta would have a transmission tariff that works for all customers. However, we do not want customers to leave the province and increase transmission costs for all other customers in doing so. At this point, DUC reserves judgement on mitigation options.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Yes. DUC is very concerned that over-contracting is leading to transmission over-build. Allowing a contract reset period would help alleviate this concern.

15	Do you have any additional implementation considerations the AESO should consider?	No comment at this time.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	See comments above.
17	Additional comments	DUC thanks the AESO for facilitating the March 31st Technical Information Session and for providing customers their Site Data Input directly. This has been a drastic improvement over the analysis for the Bookends.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Mark McGillivray
Comments From:	ENMAX Corporation			**Phone:**	
Date:	2021/04/14			**Email**:	MMcGillivray@enmax.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The update provided by the AESO was valuable for stakeholders to hear which rate design option it preferred and reasoning for the change in approach. We look forward to written explanations during the regulatory proceeding. It may be more beneficial to stakeholders if the AESO held a separate session to discuss possible rate design options for energy storage. See response to Question 8.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was useful to understand how the AESO's bill impact calculator works.

3.	Are you supportive of the AESO's preferred rate design? Why or why not?	ENMAX is evaluating the AESO's preferred rate design and its potential unintended consequences. In general, ENMAX reiterates its views that major changes to the existing tariff design are premature at this time without knowing the plan for changes to the *Transmission Regulation* which may provide new tariff options for the AESO to explore. Future changes to the transmission policy and regulation could help facilitate a more efficient and fairer rate design than what the AESO is currently proposing, and implementing changes now only to revisit the tariff design in the near future would not be in keeping with a number of the AESO's overall design objectives.
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	See response to Question 3.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	See response to Question 3.

6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	See response to Question 3.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	See response to Question 2. While the assumptions used to forecast future rate impacts appear reasonable, they are subject to change over time. The AESO is using 2019 hypothetical rates linked to actual historical billing determinants and there is no guarantee that this will reflect the future. Further, the AESO's rates which are not expected to come into effect until sometime in 2023, are not reflective of the future revenue requirement.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Modernizing DOS may be a suitable option for an energy storage charging capacity; however, there are limitations to the usefulness of such a rate depending on how the eligibility criteria and costs are to be applied. If DOS is used, the AESO should not have the ability to take direct control over the storage asset (outside of a system constraint) in the modernized DOS structure. The availability for a non-firm interruptible rate over the long term (e.g., not confined to a renewal every 12 months) may be worth exploring. If interruptible tariffs are contemplated for energy storage facilities, such rates should remain technology agnostic and must be equally applicable to other facilities and customers that can meet the interruptible conditions. It should also work for various sized storage facilities (e.g., less than 1MW to greater than 100 MW). As noted above, a separate session to discuss possible rate design options for energy storage would be useful. It is important to note that the potential for changes to be made to the transmission policy and regulation could also help facilitate proper rates for energy storage.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	See response to Question 8.
10.	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	It is understood that these conversations will be limited to a few select customers and not be transparent to the marketplace. ENMAX would suggest that a summary

		be made public that includes mitigation outcomes prior to the AESO's filing to the AUC.
11.	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	See response to Question 3.
12.	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	No comment.
13.	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Any mitigation action that shifts costs with any significance would not be appropriate.
14.	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON	No comment.

	waiver if the contract level has not changed in the previous five years?	
15.	Do you have any additional implementation considerations the AESO should consider?	See response to Question 3.
16.	Do you have additional clarifying questions that need to be answered to support your understanding?	No comment.
17.	Additional comments	A noted above, ENMAX is still evaluating the AESO's preferred rate design and its unintended consequences, one of which includes grid defection. With the potential for grid defection to be a rational cost avoidance action by large consumers, does the AESO have a view on what quantity of defection is acceptable to the AESO as a result of this preferred tariff approach? Is there sensitivity analysis available to look at tariff rate impacts if certain levels of defection are realized?

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

EPCORPeriod of Comment:	March 25, 2021	through April 15, 2021	
Comments From:	EPCOR Distribution & Transmission Inc.		
Date:	2021/04/16		

Contact: Gerald Zurek
Phone: 780-686-1186
Email: gzurek@epcor.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	EDTI found the session valuable.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	EDTI found the session valuable.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	EDTI is generally supportive of the AESO's preferred rate design however has some reservation about the increased energy-based charges. It's not clear to EDTI how energy-based charges reflect use of transmission infrastructure.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	EDTI generally believes that the preferred rate desing has met the AESO's stated objectives.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	EDTI has no comment.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	EDTI is generally aligned witht the AESO's preferred rate design.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	EDTI believes that the AESO's assumptions are reasonable.

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	EDTI has no comment.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	EDTI has no comment.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	EDTI has no comment.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	EDTI has no comment.

12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	EDTI is not aware of any further considerations.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	EDTI is generally supportive of some type of mitigation for cusomers with impacts greater than 10%. EDTI believes that any mitigation approach will impact other customers in some fashion however this is likely can be managed by use of a transition period for the mitigating measures.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	EDTI supports more flexibility for customers to adjust contract capacity at the time the new rates are iimplemented.
15	Do you have any additional implementation considerations the AESO should consider?	No
16	Do you have additional clarifying questions that need to be answered to support your understanding?	No
17	Additional comments	EDTI has no additional comments.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021 through April 15, 2021	**Contact:**	Justin Rangooni
Comments From:	Energy Storage Canada (ESC)	**Phone:**	647.627.1815
Date:	2021-04-15	**Email**:	jrangooni@energystoragecanada.org

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable for ESC. For energy storage resource tariff treatment, it would have been helpful to include numerical examples for storage treatment. Further, with proposed changes to the DTS rate it would have been helpful to understand how the DOS rate may change as well.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	ESC did not attend
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	ESC is encouraged about the discussion of modernizing the DOS rate; however, there are a number of issues that must be addressed before ESC can be supportive. In particular the increase in metered energy rate by over 300% from ~$5/MWh today for 7-minute DOS to $15/MWh in the future is not supported by ESC.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	No comment at this time
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	No comment at this time
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	No comment at this time
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	No comment at this time

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	ESC is encouraged to see AESO considering an opportunity service for energy storage. ESC firmly believes that the natural operation of energy storage to consume during low demand periods in addition to the benefits of higher utilization of transmission system assets logically concludes with an opportunity service. A modernized DOS rate, or a new firm opportunity service, is required for energy storage resources. By its nature energy storage consumption is opportunistic, the goal is to consume when electricity is cheap and plentiful and return the energy to the market when it is expensive and scarce. If the transmission system is constrained energy storage can stop consuming until the constraint is cleared. The transmission system does not need to be expanded for energy storage beyond connection assets that would be fully funded by the storage facility at project energization. ESC has a number of concerns that must be addressed before the association and its members can be supportive. • The term for DOS rate is limited to 1 year. Energy storage resources operating life is typically 20+ years. The uncertainty of tariff treatment and transmission system access potentially changing on an annual basis significantly increases the risk for energy storage resources. Modernizing the DOS rate must include a longer term. ESC has a preference for indefinite treatment over the life of the asset. • Most energy storage technologies can respond faster than the current 7-minute service. The AESO should offer a DOS rate with a shorter interruption time to reflect the capabilities of energy storage resources. The AESO could also consider combining the shorter interruption with control to force interruption as part of accepting the rate. • The preferred rate design increases the rate for Metered Energy by over 300%. The AESO is suggesting that the DOS rate would increase by the same amount. Based on how energy storage resources will use the system during unconstrained hours ESC is not supportive of such a steep increase. A fair opportunity service would have a consistent rate treatment that represents the minimum costs of the transmission system. Further, the treatment does not reflect cost causality principles. Energy storage will not drive transmission system expansion. • A core benefit of energy storage resources is the flexibility of operation. Energy storage resources do not require firm capacity service on the transmission system and should be offered a less firm system that

		leverages that flexibility for the benefit of the broader Alberta transmission system. Modernizing the DOS rate should be used to encourage utilization of existing transmission system assets during low usage hours while at the same time using the interruptibility of energy storage (and other loads) to stop consumption when the transmission system capacity becomes constrained. • Currently, DOS service is offered in addition to an existing DTS service. AESO stated during Session 5 that it expects energy storage to have a DTS rate for station service and other consistent demand requirements. ESC is supportive of this approach but requires the details on how the AESO would determine eligibility for DOS versus DTS for an energy storage resource. • Eligibility for the DOS rate is based on transmission capacity availability. AESO stated during Session 5 that the assessment of transmission capacity availability is technology agnostic. ESC would like to confirm that the DOS rate eligibility would assume as an input consumption during off-peak hours for energy storage resources. Further, as an opportunity service there is risk transferred to energy storage resources through potential interruption if the transmission capacity becomes constrained when they want to consume. Eligibility criteria related to available transmission capacity should be low given the risk assumed by energy storage resources. • Finally, it is not clear how the AESO will treat energy storage used for system balancing services (e.g., regulating reserve). In the previous bulk & regional tariff sessions the AESO has discussed offering an exemption for energy storage providing ancillary services to the Alberta electricity market. Further, energy storage used as an alternative to transmission has not been discussed. ESC is interested to understand if a different rate or potential exemption for tariff charges may be considered for energy storage resources offering ancillary services or as an alternative to transmission. Clarification of treatment for both service types is needed.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Please see comments above
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	No comment at this time
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	No comment at this time
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	No comment at this time

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	No comment at this time
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	No comment at this time
15	Do you have any additional implementation considerations the AESO should consider?	As mentioned, AESO should consider a shorter interruption period for a modernized DOS rate to benefit for energy storage attributes.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	Energy storage treatment in the tariff presented by AESO suggests modernizing the DOS rate. At this time, there are many details about the modernized DOS rate that has not been provided. ESC is interested to know if the AESO will provide a timeline for when modernization details will be issued for stakeholder review.
17	Additional comments	ESC is encouraged by the direction of the AESO is taking but believes there is significant work to still do before a finalized rate design can be established.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Darren Hoeving
Comments From:	FortisAlberta			**Phone:**	403-514-4644
Date:	2021/04/15			**Email**:	darren.hoeving@fortisalberta.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	FortisAlberta found the session helpful in that it provided an opportunity to hear the issues and concerns from the perspectives of end-use Customer groups. As well, the AESO's presentation of potential bill impacts to low versus high load factor PODs, as a result of the AESO's preferred rate design, demonstrated the potential for a resultant cost shift from low load factor to high load factor consumers and rate classes as a result of recovering the energy-classified transmission costs through an energy charge to be applied to all energy consumed.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	FortisAlberta observes that Technical Information Session II was valuable in that it allowed large consumers, who receive service directly via a dedicated connection to the transmission system, in assessing the potential bill impacts of the AESO's preferred rate design on their particular POD, but did not provide any insight into how the mass market (distribution-connected customers and rate classes subject to the distribution tariffs) might be impacted if the preferred rate design were approved and flowed through the distribution tariffs based on the transmission cost allocation and rate design methods as currently approved by the Commission.

	Questions	Stakeholder Comments
		To this end, and in response to a customer request, FortisAlberta subsequently provided its Analysis of Estimated Bill Impacts to FortisAlberta DT rate classes / Customers of AESO Preferred DTS Rate Design, which the AESO has now posted to the AESO's stakeholder engagement website. (Note: This document was prepared by FortisAlberta Inc., not the AESO, and is subject to the Disclaimer included in the document.)
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	While FortisAlberta is generally supportive of the AESO moving away from recovery of transmission costs through 12 CP (proposed to reduce from 47% to 29%), the Company is not supportive of recovering the energy-classified costs (proposed to increase from 7% to 31%) as a flat energy charge applied to all energy consumed. FortisAlberta's concerns are two-fold: (1) From the preliminary bill impact analysis, the proposed flat energy charge, applied to all energy consumed, creates a directional cost shift from low load factor to high load factor consumers, who are arguably making more efficient use of the existing transmission. As such, the AESO should advise stakeholders whether this resultant cost shift (on day 1) was intentional, and if not intentional, the AESO should consider rate design alternatives (for example, a load factor declining energy block structure as suggested by FortisAlberta) to mitigate this shift. (2) FortisAlberta considers that recovery of all energy-classified costs via a flat energy charge applied to all energy does not reflect cost causation generally, and does not send an efficient price signal to consumers to make the most efficient use of the transmission system as currently built (i.e., rather, the flat energy charge applied to all energy consumed provides a price signal that disincentivizes customers to improve their load factor even if the incremental energy is consumed in off-peak hours and does not require an increase to the customer's DTS capacity). In the Company's view, this may have the unintended consequence of driving further grid defection by high load factor consumers and further erosion of DTS billing determinants, which of course is one of the main concerns with recovery of transmission wires costs based on 12 CP.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	a) With respect to the objective of **Reflecting Cost Responsibility** (or Cost Causation), FortisAlberta observed that the AESO has reduced the weight given to the allocation of 12 CP in its rate design and agrees that that the recovery of wires costs based on some form of a monthly NCP billing determinant is more reflective of cost causation than any 12 CP rate design can convey. This assertion is grounded in the physical reality that any wires element (whether it be at transmission or distribution voltage, or whether it is a power line / cable, switch, bus or transformer) must, at minimum, be planned and built to accommodate the maximum NCP flowing through the wires element, irrespective of the time that that maximum flow occurs. With respect to the energy charge proposed in the AESO preferred rate design, please refer to our response to question 3 above. b) With respect to the objective of providing **Efficient Price Signals** (i.e. sending price signal to alter behavior to avoid future transmission build), FortisAlberta considers that the use of 12 CP, while it provides a signal that larger sophisticated Customers can respond to, is not necessarily an economically-efficient price signal for purposes of altering Customer consumption behavior for purposes of avoiding future transmission build. Further, while FortisAlberta understands that part of providing efficient price signals is providing a signal that Customers can meaningfully respond to, the form of the price signal or billing determinant(s) should not allow Customers to avoid costs for which they should be responsible for, which is possible under the 12 CP structure. Therefore, FortisAlberta supports the reduced weight given to the allocation of 12 CP in its rate design. With respect to the energy charge proposed in the AESO preferred rate design, please refer to response to question 3 above. c) With respect to the objective of ensuring **Minimal Disruption** (i.e., Customers that have responded to the 12 CP price signal and invested to reduce transmission costs are minimally disrupted), CP-responsive loads, who have been responding to the currently approved 12 CP rate structure for over 15 years, should not be severely impacted by any abrupt change to the tariff structure. Allowing a gradual transition to a rate structure that reflects cost responsibility and provides economically efficient outcomes for the development of the transmission system would promote rate stability and allow such Customers to plan their operations to gradually adjust to responding to the new target rate structure / price signals over a reasonable time period. With respect to the energy charge proposed in the AESO

	Questions	Stakeholder Comments
		preferred rate design, please refer to response to question 3 above. Further, FortisAlberta submits that rate design objective of Minimal Disruption might be better achieved or enhanced if the AESO considered alternative rate design alternatives for the energy component of its tariff (for example, a load factor declining energy block structure as suggested by FortisAlberta). d) With respect to the objective of **Simplicity** (i.e. simple/clear price signals while achieving design objectives), FortisAlberta recognizes that the proposal to gradually shift from 12 CP to NCP and increase the weight given to the energy component for allocation purposes is easy to understand, however, recovery of the energy-classified costs through a flat energy charge applied to all energy consumed, while simple and transparent, it does not send an efficient price signal in terms of incenting customers to improve their load factor this optimizing their use of the transmission system and their respective DTS contract capacity. e) With respect to the objective of **Innovation and Flexibility** (ISO tariff provides optionality for transmission Customers to innovate while not pushing costs to other Customers), as the grid continually evolves with the addition of DERs, FortisAlberta considers that the AESO's proposed rate design structure could be refined by the AESO over time to provide a level of innovation and flexibility for Customers. This could include further expansion of opportunity (i.e. such as DOS), interruptible and load attraction rates to maximize and/or optimize use of the existing system. Such optional rates beyond the base DTS rate would allow for improved efficiency or Customer use of the system while recovering additional contributions towards revenue (which would be to the benefit of all ratepayers). With respect to the energy charge proposed in the AESO preferred DTS rate design, FortisAlberta submits that if the AESO considered alternative rate design alternatives for the energy component of its tariff (for example, a load factor declining energy block structure as suggested by FortisAlberta), additional opportunity in innovation and flexibility for customers could potentially be built into the AESO base DTS tariff.

	Questions	Stakeholder Comments
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	FortisAlberta provides the following additional comments for consideration: • With respect to a preferred rate design, FortisAlberta provided comments on November 20, 2020, partially repeated here for convenience. FortisAlberta's preference is for whatever target rate design the AESO ultimately proposes and implements, that all Customers are treated in a transparent and consistent manner and subject to the same tariff(s). That is, FortisAlberta's preferred option of gradually transitioning to a load factor rate structure does not favor any specific Customer groups and is aimed to encourage Customers to avoid over contracting demands and maximizing or optimizing their hourly use of their contract capacity (i.e., improving load factor), so the grid can be utilized more effectively and developed in an orderly, economic, and efficient manner. As such, rate structures that generally incent Customers to improve their load factor and optimize the use of the existing system, such as load factor or on-peak period rates, align with the principle of economic efficiency and should, therefore, be considered in the future development of transmission and distribution (wires) rates in Alberta. This load factor rate structure, or sometimes known in industry as the "Wright" rate, is structured to apply an energy charge ($/MWh) for all energy delivered up to a minimum load factor (or hours usage), and a reduced (or zero) $/MWh charge for all remaining energy (MWh) consumed above that threshold load factor. For example, this structure could be expressed as: – 1st Energy Block: For the first XX MWh / month / MW of Billing Capacity: a charge of XX $/MWh – 2nd Energy Block: For all additional MWh: a reduced (or zero) $/MWh charge. This load factor component rate structure (with a low minimum floor load factor for the 1st energy block, and a reduced (or zero) price for any energy in the remaining block) could be used for recovery of the energy-classified portion of total Bulk and Regional costs. For more information on the "Wright" rate, please refer to the book entitled *Electricity Pricing, Engineering Principles and Methods* by Lawrence J. Vogt P.E., pages 597-601.

	Questions	Stakeholder Comments
		• With respect to simplicity and transparency, the AESO may want to reconsider the CP rate structure that require five years of billing data to calculate the current month's billing determinant for any POD or customer, as in FortisAlberta's view, this creates an unnecessary level of data and complexity to administer with no real offsetting benefit identified for doing so. That is, the current DTS rate design employs a two-year 90% ratchet provision to calculate DTS billing capacity, and therefore the Company recommends that the AESO not consider use of billing determinants or measurement data beyond two years prior, for purposes of establishing its CP billing determinant in any given month.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	Please refer to our responses to questions 3 and 4.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	For purposes of this consultation the assumptions used by the AESO appear to be reasonable, however, it is unclear to FortisAlberta why the AESO used a recalculated tariff based on its 2019 revenue requirement for purposes of assessing the rate impacts.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Yes, DOS should be available to energy storage. That is, FortisAlberta is not supportive of developing specific rates for specific end uses (including energy storage) given that from a wires costs perspective, energy storage shows up to the system as either supply or demand, no different than a dual use customer who has both supply and demand requirements at their point of interconnection with the AIES. If energy storage requires service on a firm basis then the DTS rate is available to them for purposes of serving their charging cycle just like any other load market participant and if energy storage seeks service on an opportunity (non-firm) basis then DOS is available. With respect to DOS eligibility requirements FortisAlberta is supportive of the AESO's review and modernization of such, for not only energy storage, but for all market participants.

	Questions	Stakeholder Comments
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	With respect to FortisAlberta Rate 65 Customers who periodically make use of DOS, the Company is not aware of any concerns or issues with the current DOS implementation that limit their eligibility or use of excess transmission capacity that may be available at certain PODs.
10.	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	Please refer to our response to questions 4(c) and 5.
11.	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	Please refer to our response to questions 4(c) and 5.
12.	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	No comment.

	Questions	Stakeholder Comments
13.	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	FortisAlberta provided comments on November 20, 2020, partially repeated here for convenience. Through careful analysis and mitigation, the tariff could be developed to evolve gradually in a manner that allows Customers to improve their load factors while not experiencing significant billing impacts. FortisAlberta expects that if the AESO also saw merit in pursuing the load factor structure, that they could analyze the bill impacts from moving from CP to NCP/load factor structure for every POD, and adjust both the weighting of cost recovery between NCP component and the load factor energy component, or adjusting the threshold load factor in the energy component to minimize the resultant bill impacts of the AESO preferred DTS rate design in the first instance. Such an approach, if investigated by the AESO, might obviate, or at least mitigate, the need for further mitigation.
14.	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	FortisAlberta may be supportive of the AESO assessing the ability to provide greater flexibility to adjust contract capacity provided that the AESO can demonstrate in the particular customer circumstances that it does not create a cost shift to other customers. In addition, FortisAlberta understands that, in the first instance, notice provisions are intended to ensure that the AESO's transmission planners have sufficient notice of any changes to market participants' capacity requirements within the typical transmission planning horizon. This ensures that the AIES can be developed in an orderly, economic and efficient manner, and the requirement for a customer to pay PILON is the secondary option if the customer fails to give sufficient notice for any DTS contract reductions.
15.	Do you have any additional implementation considerations the AESO should consider?	Not at this time.
16.	Do you have additional clarifying questions that need to be answered to support your understanding?	As posed by FortisAlberta in AESO Session 5: Rather than recovering the Energy-classified costs through All Energy / hours, did NERA or the AESO consider any Load Factor rate structures (i.e., the "Wright" structure) which sends an economically efficient price signal that broadly encourages Customers to improve their load factor (flatten their load profile), thereby incenting all Customers to make the most efficient use of the existing transmission elements and capacities that serve them, and potentially deferring the need for future transmission? If not, please explain why such a structure has not been investigated.
17.	Additional comments	None.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Scott Perry
Comments From:	Greengate Power Corp			**Phone:**	403-519-6194
Date:	2021/04/14			**Email**:	scott@greengatepower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session provided a valuable platform for stakeholders to pose questions and explore the AESO's tariff design proposal. We appreciate the opportunity to provide commentary and continued engagement.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable and allowed good dialogue between Market Participants and the AESO regarding rate impact.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	Greengate is not supportive of the AESO's rate design for Bulk and Regional Charges. Greengate is supportive of using DOS rates for energy storage if the DOS rate and terms and conditions are appropriately modified. Although, it would be our preference to have a storage-specific tariff acknowledging the unique capabilities and value offered by energy storage, Greengate believes that an interruptible tariff is an improvement to rate DTS. At a high-level, Greengate supports the use of a modernized DOS tariff; however, this support is predicated on the assumption that elements of the existing DOS tariff are modified to facilitate fulsome market participation by energy storage assets. It is our understanding, from the rate sheet provided by the AESO, that Rate DOS charges will increase substantially under the proposed tariff structure. Greengate is concerned that the proposed DOS tariff rate will continue to render energy storage charging from the electricity grid as a broadly uneconomic activity, reducing the positive impact that energy storage could have for Alberta's load customers.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	No, Greengate does not believe that the AESO's preferred rate design meets the rate design objectives. Drastically increasing the energy charge will not lead to a tariff that properly reflects cost responsibility. Grid costs are mostly fixed in nature. Taking a fixed charge and collecting it from AESO customers on a variable cost/MWh basis does not properly reflect cost causation. The AESO constructs transmission facilities based upon an assessment of peak load. Collecting on a $/MWh basis does not properly allocate costs to low load factor customers and is therefore not a rate that is based upon a cost causation principle. DOS rates are heavily influenced by the size of the energy charge. A drastic increase in DOS rates that is proposed by the AESO can only be justified if actual variable costs have increased. The AESO's proposed rate design arbitrarily increases the variable component of the AESO's tariff and therefore is not justified.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	The AESO should collect fixed charges from its customers to reflect the fixed nature of transmission costs. Creating a variable cost from fixed charges does not properly reflect the fixed cost nature of transmission costs. The AESO's rates should be modified to properly reflect cost causation.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	N /A
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	N /A

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Greengate applauds the AESO's acknowledgement that the DTS rate, in its current form, does not support economic charging behaviour of energy storage from the AIES; and the subsequent consideration that non-firm rates could encourage participation of flexible market assets, such as energy storage. Overall, Greengate supports the use of a modernized DOS tariff; however, this support is predicated on the assumption that elements of the existing DOS tariff are modified to facilitate fulsome market participation by energy storage assets. Greengate supports the following eligibility criteria for DOS as listed on slide 74 of the March 25 stakeholder session presentation: 1. "Use would not occur under any other rate". Rate DTS is economically destructive to energy storage participation in the energy wholesale energy market. Energy storage follows price signals to store electricity from the grid when it is economically prudent to do so (i.e. during instances of low Pool Prices). Adding the Rate DTS to the Pool Price renders energy storage asset participation broadly uneconomical. 2. "Must have alternative energy source or a "market opportunity" where the cost of receiving additional electric energy under Rate DTS renders the opportunity uneconomic." Investing in energy storage under Rate DTS renders projects broadly uneconomical. Firm electricity is required for the facility auxiliary loads and thus requires a relatively small Rate DTS contract. However, the incremental grid electricity consumption required to charge an energy storage asset is uneconomical under Rate DTS. Greengate believes that the following DOS eligibility criteria, as listed on slide 74 of the March 25 stakeholder session presentation, require modification: 1. "Sufficient transmission capacity." Ideally, energy storage would qualify for a storage-centric firm service rate, at a much lower tariff rate charge than the proposed Rate DTS and Rate DOS charges. It should be acknowledged that energy storage is capable of providing broad benefits to the Alberta electric system, and subsequently the users of that system (both load and generation). Under the AESO's proposed tariff structure, if an energy storage asset elects to connect to the system, it is understood that Rate DTS contracts take precedence over those contracts for Rate DOS, which are interruptible. Therefore, an energy storage market participant that elects to construct a facility and connect under rate DOS should be permitted to do so using its own assessment of available transmission capacity which would be based upon a

		grid study. The AESO should consider modifying this criterion in the modernized DOS tariff. 2. "Is temporary or repeated short-term use." Most energy storage assets that qualify for the modernized Rate DOS will exclusively use Rate DOS for all charging energy purchased from the grid. This would remain the case unless an alternative rate structure is developed and instituted that better serves energy storage assets, such as a future Energy Storage-centric tariff.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	The following components of the current DOS implementation limit the use of excess transmission, particularly as relates to energy storage: 1. **Determination of Rate DOS Charges**. The existing Rate DOS Charges are based on the "Energy" portion of the AESO Bulk and Regional Tariff. Slide 74 of the March 25 stakeholder session presentation illustrates that the "Energy" portion of the charge was $2.18/MWh (based on the 2019 Test Year), but increases to $10.19/MWh (based on the AESO preferred rate modelling for 2019). This is a 467% increase to this cost element, which happens to be a component for the cost basis for Rate DOS. The AESO's latest tariff rate estimation, made available to stakeholders on April 13th, estimates that the DOS Rate will increase to $15/MWh. This triples the DOS rate, and therefore triples the rate that applies to energy storage grid charging. **Greengate is highly concerned that increases to the DOS 7-minute charge will prove cost prohibitive to energy storage participation in the Alberta electricity grid. Greengate also questions the cost causation basis of drastically increasing the energy charge in the Bulk and Regional tariff.** 2. **Rate DOS Types**. It is our understanding that the existing three Rate DOS Types (DOS 7 Minutes, DOS 1 Hour, DOS Term) were created to serve a certain set of load service considerations, such as temporary provision of excess grid electricity (beyond a proponent's Rate DTS contract) during outage of a load customer's onsite generation. The existing rate DOS types do not reflect the advanced operational capabilities of energy storage, including the ability to satisfy recall directive response times far shorter than 7 minutes. **In modernizing DOS, Greengate recommends that the AESO considers implementing faster responding DOS types (i.e. DOS 1 Second, DOS 30 seconds, DOS 1 Minute).** 3. **Take or Pay Provision**. Energy storge assets will use Rate DOS for charging over the life of the installed asset. Therefore, as far as an energy storage asset is concerned, this is not a "temporary or repeated short-term use" case. **Greengate requests that the take or pay provision does not apply to assets that satisfy the other eligibility requirements to participate in rate DOS.** **4. Eligibility – Economic**. Energy storge assets will use Rate DOS for charging over the life of the installed asset. Therefore, as far as an energy storage

		asset is concerned, this is not a “temporary or repeated short-term use” case. The market participant can certainly indicate it would not increase metered demand under Rate DTS, if Rate DOS was not available, as this would be economically destructive to the energy storage asset.
10	Do you have any comments on the AESO’s targeted engagement approach for mitigation discussions?	Greengate elects to reserve commentary to the suggested energy storage tariff treatment.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party’s transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	Greengate elects to reserve commentary to the suggested energy storage tariff treatment.
12	Based on the AESO’s mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	Greengate elects to reserve commentary to the suggested energy storage tariff treatment.

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Greengate elects to reserve commentary to the suggested energy storage tariff treatment.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Greengate elects to reserve commentary to the suggested energy storage tariff treatment.
15	Do you have any additional implementation considerations the AESO should consider?	Greengate would appreciate further discussions on the DOS rate design, prior to the AESO filing its tariff. To date the DOS concept has only been broadly discussed and a detailed rate sheet and terms and conditions have not been released. Greengate would appreciate an opportunity to comment on the DOS rate details as they become available.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	Greengate is not following the logic of the AESO's proposed DOS rate sheet. A discussion on the DOS rate calculation would be appreciated.
17	Additional comments	Thank you for the opportunity to comment.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021 through April 15, 2021	**Contact:**	Kurtis Glasier
Comments From:	Heartland Generation Ltd. (“Heartland Generation”)	**Phone:**	(587) 228-9617
Date:	[2021/04/15]	**Email**:	Kurtis.Glasier@heartlandgeneration.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Heartland Generation found Session 5 to be valuable. Further comments regarding recommendations to enhance stakeholder engagement efficiency are found in response to question 17.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The Technical Information Session II was valuable, and the focus of this session on using the bill impact tool was particularly useful. Heartland Generation would be supportive of further technical information sessions as the tariff design evolves through the consultation and approval process. Going forward it would be helpful for the AESO to create an archive of the bill impact tools as they are changed and improved, as well as a log of changes as part of the tool itself.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	While there are refinements that will likely be made throughout the consultation and approval process, Heartland Generation is generally supportive of the AESO's preferred rate design. However, Heartland Generation appreciates that this preferred rate design may not be the only rate design in the public interest. Further, the AESO should provide analysis conducted by itself or its expert consultant, NERA Economic Consulting, to support the preferred rate design. The questions submitted by the Alberta Utilities Commission ("AUC") on April 7, 2021 form a good basis for the type of analysis and information that would be helpful to stakeholders. For example, slide 35 of the AESO's presentation is used as a basis for the larger "energy charge" component of the preferred rate design. Heartland Generation may agree with the conclusion that "demand at coincident peak is not the only driver of bulk transmission system utilization"; however, this analysis seems incomplete to conclude that a flat energy charge is the only reasonable billing determinant to allocate the remaining transmission costs.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	Heartland Generation is supportive of the changes to the rate design objective of "Reflect Cost Responsibility" as it now correctly prioritizes cost causation over "benefits". Efficient transmission cost allocation and proper price signaling needs to be grounded in how an individual market participant's utilization of the grid impacts overall transmission costs. The first two rate design objectives (cost responsibility and efficient price signals) should be characterized as the critical design elements, as failure to achieve either of these principles cannot be corrected by meeting the other objectives. Heartland Generation believes it is possible that the preferred rate design meets, or at least is attempting to meet, these two critical design elements. Further analysis and expert evidence would be needed in order to determine whether the preferred rate design meets these rate design objectives. In general, the AESO has identified that demand and energy are both drivers of transmission costs on the system. Therefore, it is entirely consistent with cost causation to allocate the costs of the transmission system according to these relevant cost drivers. In theory, the marginal transmission costs of these cost drivers would produce the most efficient price signals; however, this could result in the incorrect collection of transmission costs.[1] The latter three objectives (minimal disruption, simplicity, and innovation and flexibility) are important from an implementation perspective and, properly applied, will avoid unnecessary rate shock to consumers. The preferred rate design, by maintaining the previous tariff rate design components and billing determinant terminology, appears to meet these implementation objectives. This is exemplified through the materials for Technical Session II, whereby the output of the Bill Impact Tool clearly shows the line item changes between the two rate designs.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	The preferred rate design currently allocates the same transmission signal for the "energy charge" across all hours. In other words, asides from the coincident peak demand hour, transmission is valued at all other hours equally. This finding does not appear to reflect the reality of the transmission system. Heartland Generation appreciates that the transmission regulation details how transmission costs can be allocated (e.g., all regions are allocated the same postage stamp rate). The AESO should explore if there are other ways to assess the energy charge than through a flat charge across all hours. There are likely sets of energy charges that better reflect the value of the transmission system as it varies throughout the day and system demands.

[1] The total amount collected from marginal costs would total less than the total transmission costs, as it is a generally acceptable assumption that marginal cost is less than average costs.

6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	After an initial assessment Heartland Generation believes that the concept of cost causation is theoretically contained within the preferred rate design. An efficient rate design will charge participants according to their impact to transmission costs and should therefore contain efficient price signals.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	At this time, Heartland Generation does not have comments about the AESO's assumptions made in order to assess the rate impact of the preferred rate design.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Heartland Generation is supportive of a modernization of DOS. The AESO should explore the basis of opportunity service products in Alberta from an inclusive perspective (e.g., comparing DOS to intertie opportunity service rates, IOS and XOS). This would ensure alignment between all opportunity service products that currently exist and lay a basis for future opportunity service products. It is important that the AESO design improvements to DOS that are technology agnostic and available to all facilities that qualify, not just limited to energy storage.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	The consultation regarding improvements to DOS should be separated from the tariff design consultation. Heartland Generation believes that stakeholder consultation on DOS, and more broadly on opportunity service rates in Alberta, would be better addressed through a separate consultation. During Session 5, the AESO indicated that there were no explicit linkages between the preferred rate design and the energy storage tariff treatment or DOS modernization. Heartland Generation views these topics as separate and not intrinsically linked. Given the highly contentious nature of the tariff design, a separate consultation for the modernization of the opportunity service rates would be a better way to engage stakeholders on this insulated topic. This would also allow for a targeted discussion and materials to focus on those stakeholders seeking opportunity service and improvements to DOS, this is likely a subset of stakeholders currently involved in the bulk and regional tariff design consultation.

10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	Heartland Generation does not have specific comments regarding the targeted engagement approach for mitigation; it appears logical given that the largest impacts from the preferred rate design will be concentrated on a few participants, for the AESO to work directly with those participants. However, Heartland Generation is curious about the method of approval for mitigation plans and whether this will be through specific AUC approval or whether the AESO will apply to the AUC for broad discretion in its ability to create mitigation plans.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	The AESO may want to consider whether a percentage increase should be the only threshold to access mitigation. For example, a less than 10 per cent individual impact could still be millions of dollars and reasonable to enter a mitigation plan to avoid excessive rate shock. It may be worthwhile for the AESO to include a dollar figure threshold alongside the individual percentage increase.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	At this time, Heartland Generation does not have specific comments regarding the targeted engagement approach for mitigation.

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	In general, Heartland Generation is not opposed to some type of mitigation, on the basis that the mitigation does not create a favorable outcome for those subject to it; by extension, the mitigation plans should not create an unfavorable outcome for the rest of the market by allowing a market participant to entirely avoid paying the just and reasonable rate. Mitigation plans should be used to smooth the effects of a rate design change, not avoid or deter the rate impact entirely.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Heartland Generation fully supports the changes to PILON. This change allows the PILON signal to further align with AESO transmission planning timelines and produces a more efficient outcome. These amendments to PILON should proceed regardless of the bulk and regional tariff design changes. This initiative to align transmission planning with requirements when contract capacity is reduced or terminated will reduce regulatory red tape.
15	Do you have any additional implementation considerations the AESO should consider?	The AESO should consider how to best implement the 5-year trailing average of monthly coincident peak. The current methodology will put an increased significance on the first year that the preferred rate design is implemented; there exists the possibility that the first year of implementation may be an outlier year regarding coincident peak demand. Does the AESO intend to allow for case-by-case mitigation should a participant be able to demonstrate that during the implementation years the evaluation (average of less than five-years) is not representative of expected five-year average?
16	Do you have additional clarifying questions that need to be answered to support your understanding?	Heartland Generation does not have any specific clarification questions at this time; however, the AESO's planned responses to the questions submitted by the AUC on April 7, 2021 will provide valuable insight into the preferred rate design. Heartland Generation is in favor of the AESO responding to these questions prior to filing its ISO Tariff application.

17	Additional comments	The amendments to PILON and exploration of opportunity service rates are distinct issues that does not necessarily connect to the Bulk and Regional Tariff Design. Heartland Generation proposes that these two initiatives should be separated from the overall tariff design consultation, into their own focused stakeholder engagements. Simply put, these issues should be considered separately and should not form a part of the “Bulk and Regional Tariff Design” application to the Alberta Utilities Commission (AUC). It is worth noting that Heartland Generation is supportive of both initiatives, however there is a risk of these topics getting muddled in the more complex and contentious bulk and regional tariff design proceeding. It is recommended that the AESO examine how best to engage with stakeholders now that it has been identified that DOS modernization and changes to PILON are not intrinsically linked to the bulk and regional tariff design consultation. It would be preferred to migrate the work already conducted as part of the tariff design consultation related to these initiatives to separate consultations. These consultations could begin immediately and could be filed with the AUC along a different timeline.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021 through April 15, 2021	**Contact:**	Vittoria Bellissimo
Comments From:	Industrial Power Consumers Association of Alberta (IPCAA)	**Phone:**	403 966 2700
Date:	2021/04/15	**Email**:	Vittoria.Bellissimo@IPCAA.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable. It would be helpful to have the AESO provide some additional information, including: • An example of the 5-year trailing CP calculation. It has been explained, but IPCAA continues to receive questions on how it works and what the consequences will be of giving the initial years greater relative importance. Consumers are also interested in understanding how this calculation will translate through DFO rates. • Information to support the assumption that 31% of Alberta's bulk and regional transmission costs are energy-related and were incurred to facilitate in-merit energy flows. This is a significant change from the previous 7%. Customers would like to review a cost-of-service study to understand the underlying conditions that changed and consequently created the impetus for a significant shift in cost allocation. • Information to support the efficiency of a much larger energy-related allocation. Charging energy on a flat $/MWh basis gives equal weight to all hours of the year, even off-peak hours when the loading of transmission lines is typically at its lowest. A more efficient solution would encourage additional consumption when transmission lines are not heavily loaded. • Information and analysis that identifies what has changed on the bulk transmission system since the last cost of service study was approved by the AUC that would justify the proposed change in rate design.

2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable. It would be helpful to have the AESO provide some additional information, including: • Providing impacts for customers who are connected through DFOs. IPCAA recognizes that the AESO does not have control over DFO rate design; however, the vast majority of customers pay their transmission bills through DFO rates. Without understanding the translation of the AESO proposed rate design through the DFO rates, customers are not able to see what their impacts will be. In a vertically integrated utility, customers would understand their impacts. Alberta's electricity system needs to provide the equivalent information to its customers. • Providing longer-term impacts for customers to understand the forward-looking costs. Historically, the AESO provided a Transmission Rate Impact Projection (TRIP) model that customers used to understand their longer-term costs. This was more in-depth than the Transmission Rate Projection (TRP) that is currently provided on the AESO's website. IPCAA notes that the TRP has recently been updated, which is helpful; however, the last update was in August of 2019. Customers would appreciate much more frequent updates (every six months) and a more in-depth analysis. Significant assumptions need to be made to turn the TRP into forecasted rates. Customers should not have to produce this type of rate forecast individually. IPCAA is happy to discuss and provide additional feedback to the AESO on the Bill Impact Tool. In the interim, the following comments are provided: • As noted during the session, on the Bill Impact Tool, "Annual Average Pool Price" does not change with different years. This should be adjusted. • Load Factor accuracy is a concern. In the AESO calculations, the Load Factor calculation uses the ACTUAL HMD divided by 12 months, creating an average. Using the maximum HMD, instead of the average would result in a higher denominator, and hence a lower load factor. Customers have noted this issue when they are using the "Adjust Load Profile" tab to override their Load Factor data – particularly when they are planning changes to their facilities and want to come up with a more accurate forecast of their potential impacts.

3.	Are you supportive of the AESO's preferred rate design? Why or why not?	At this point, IPCAA has some major concerns with the proposed rate design: • In general, the beneficiaries of the new rate design are low load factor customers who use the system less efficiently. Higher load factor customers are generally seeing additional costs from this proposed rate design. It is difficult to understand how the AESO sees this as an efficient outcome. • In addition, many low load factor customers may have peaks that correlate to the system peak and energy usage that is considerably reduced in off-peak hours, particularly residential loads. Effectively rewarding customers for less efficient use of the transmission system is very concerning. • Allocating more costs to energy on a flat basis is not efficient. HE1 is clearly not the same as HE17. • Increasing the energy charge by $8/MWh will provide a predictable $8/MWh incentive for on-site generation. This could erode billing determinants further. • With regard to impact through distribution rates, at this point we only have information from FortisAlberta, which we thank them for. We do know that other DFOs are working on providing calculations. Our members are particularly concerned that high load factor customers in Fortis Rate 45, Rate 61 and Rate 63 will see increases to the transmission component of their bills. Again, it is difficult to understand how the AESO sees this as an efficient outcome. • It is also concerning that the AESO is expecting customers to weigh in on this rate design when many customers do not know how this rate design will impact them yet. The AESO should be working with DFOs to provide calculators to customers, so that the tariff can be understood. We only have one DFO Estimated Bill Impact information sheet to date. The AESO should consider hosting a Technical Information Session for DFO-connected customers. All Alberta customers deserve to understand the impact on their bills. • Members are concerned with the proposed 5-year trailing CP calculation. This lengthy term will discourage energy efficiency investments and will disincentivize flexibility and innovation.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	a) Without reviewing a cost-of-service study, it is difficult to weigh in on Cost Responsibility. b) It would be useful if the AESO could explain how a rate design that benefits lower load factor customers and penalizes higher load factor customers, is sending efficient price signals. c) Without mitigation, it appears that 7 or 8 customers will see significant disruption and significant impacts to their business. In addition, many other customers will see cost increases up to 10% because of this rate design. It would be useful for the AESO to conduct analysis on the economic impacts to the impacted customers. d) Charging on CP, energy or billing / contact capacity are all fairly simple. However, the proposed 5 year trailing average CP is not simple or well-understood. It would be helpful for the AESO to provide an example so customers can understand how it works. e) There will be opportunities for innovation and flexibility for some customers, but not all customers. There will be an $8/MWh (plus Balancing Pool Charge) incentive for customers to build on-site generation.

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	It is difficult to understand why the AESO persists with a major tariff change at this time. Customers are still in a global pandemic, with significant other priorities to attend to. There are also many outstanding issues that have not been resolved that will ultimately impact the ISO tariff causing further revision, including: • The Transmission Regulation being re-examined by government by the end of 2021 • Government changes related to self-supply and net-export expected in 2021 • AUC changes resulting from the Distribution System Inquiry (such as aligning transmission and distribution rates). • AUC changes to sub-station fraction and DCG credit issues. The AESO should work with both the DOE and AUC to resolve the issues impacting the tariff, prior to changing the tariff. The timing for a change is pre-mature. Customers do not want to see two major tariff overhauls in short order.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	Retaining the 12 CP charge is an area of alignment; however, the volume of the charge is not. The CP allocation method is the standard, FERC-approved allocation method for network transmission costs and it is the established allocation method for bulk transmission costs. Energy-related allocation of transmission costs are not widely used. The AESO needs to explain why Alberta is so unique as to require a different allocation method from other jurisdictions.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	As stated above, more information is required to understand the 5-year trailing average CP data, as well as impacts on DFO rates.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Modernizing DOS so that it is used efficiently is a worthy goal. IPCAA will need to see more information on the proposed costs prior to weighing in on whether it will be suitable. If the costs are too high, it will not be used – and hence it will not be suitable.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Fundamentally, the cost is too high, and the terms are too limited. Proponents cannot finance ES projects, for example, based on the availability of term DOS. This is a concern for consumers in that these types of projects could bring value to customers. We need to improve our use of the existing transmission system. The test should be: Does this add value to consumers?
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	IPCAA submits that if the targeted engagement approach does not result in mitigation options that will keep the customers expecting major cost impacts operating in Alberta, then the AESO should consider delaying and revising the tariff. At a high level, this tariff "modernization" looks like targeted cost increases on price responsive load and high load factor customers. These are the customer groups that have been actively managing their risk – all the while telling the AESO not to overbuild the transmission system in Alberta.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	Providing distinct tariff treatment for some customers is sub-optimal. Ideally, Alberta would have a transmission tariff that works for all customers. However, we do not want customers to leave the province and increase transmission costs for all other customers in doing so.

12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	No comments at this time.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	As stated above, ideally, Alberta would have a transmission tariff that works for all customers. However, we do not want customers to leave the province and increase transmission costs for all other customers in doing so. At this point, IPCAA reserves judgement on mitigation options.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Yes. IPCAA is very concerned that over-contracting is leading to transmission over-build. Allowing a contract reset period would help alleviate this concern.
15	Do you have any additional implementation considerations the AESO should consider?	Has the AESO considered whether the entire rate should be transitioned? Has any analysis been conducted to examine a transition over several years?
16	Do you have additional clarifying questions that need to be answered to support your understanding?	See comments above.
17	Additional comments	Overall, the AESO needs to consider the long-term public interest and whether this rate design satisfies that consideration. Stakeholders deserve to hear from the AESO as to why this change is, in fact, in the long-term public interest of Alberta. If this case cannot be made, then any major changes must be delayed until such a case can be made. IPCAA thanks the AESO for facilitating the March 31st Technical Information Session and for providing customers their Site Data Input directly. This has been a drastic improvement over the analysis for the Bookends.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Robert Stewart
Comments From:	RMP Energy Storage Inc.			**Phone:**	587-920-4833
Date:	[2021/04/15]			**Email**:	Robert.stewart@rockymountainpower.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	RMP is not supportive of the preferred rate design. The DOS rate for energy storage is not new and would apply under current rate design where energy storage is treated as a DTS customer when charging. The uncertainty of the DOS rate is a significant issue. Under the proposed change to the percentage of system cost recovered through an energy determinant the DOS rate increases significantly. The DOS rate calculation does not recognize that the asset using DOS is not causing the system to be built.

4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	a) No, energy storage does not necessarily create additional system build and therefore should not be responsible for the cost of the system. b) No, price signals do not appear to be efficient as, to our knowledge, transmission planning is still completed based on peak demand. c) No comment at this time. d) This appears to be over simplified with no choice for consumers. e) There appears to be less room for innovation and flexibility within the proposed rate design compared to the existing.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	The AESO should consider an energy storage rate or interuptable rate that does not cover the cost of the system as it is not causing system build. This could be based on rate STS or XOM and IOS. Although these were recommended during the consultation as potential options for the treatment of energy storage, they do not appear to have been considered by the AESO.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	RMP agrees that change to the rate design is needed to address the treatment of energy storage.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	How were the functionalization percentages between bulk, regional and energy determined?

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Under the current rate design, energy storage is classified as a DTS customer when charging and therefore would have access to DOS. DOS as it currently stands is not suitable for energy storage due to term, capacity determination uncertainty and with the proposed rate design now system cost allocation as well. It is unclear what modernization of DOS the AESO is referring to. While an opportunity rate for energy storage does make sense, it must be longer term than one year and not cover the cost of the system that the energy storage asset is not causing to be built. An opportunity rate that is interuptable, available until there is a DTS change and does not cover the cost of the system should be considered . In addition, the rate should not cover any operating costs that energy storage can be interrupted faster than the other services react in (e.g. LSSi, supplemental reserves, etc.).
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	System capacity that is not used by a firm load customer should be made available to other users. It is unclear why there should be scheduling or term associated with this for energy storage when the asset is interuptable. There is uncertainty related to how capacity available for DOS is calculated. All energy storage facilities that may be interconnected with the AIES will require some form of long term financing. Because DOS has only a one year term and there is no guarantee that it will be renewed, new projects cannot be financed due to uncertainty as to the long term availability of DOS service and DOS service rates.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	No comment at this time.

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	No comment at this time.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	No comment at this time.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	No comment at this time.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	No comment at this time.

15	Do you have any additional implementation considerations the AESO should consider?	No comment at this time.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	No comment at this time.
17	Additional comments	If energy storage is not provided a reasonable rate there will be less competition within the energy market, reducing the ability of the market to deliver low cost energy. This is particularly important given the increasing carbon prices that will flow through to consumers under a scenario where most generation comes from combustion based generation.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Horst Klinkenborg
Comments From:	Suncor Energy Inc			**Phone:**	(403) 819-7125
Date:	2021/04/15			**Email**:	hklinkenborg@suncor.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Overall the session was helpful. From Suncor's perspective, time could have been allocated better among the topics. More information regarding the need for change and in support of the proposal would have been useful. Additional time discussing DOS and potential other alternative rate classes would have also been helpful. In contrast, too much time was spent on bill impact and mitigation.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The technical session was useful and the right forum to discuss bill impacts.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	There has been insufficient information so far in order to assess the appropriateness of the design. While the overall design may be okay, Suncor has a concern with the flat all-hour energy charge. If these charges were focused in a way that reduces distortion, the overall design might be acceptable.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	Suncor is concerned the proposal does not meet the legislative objectives and at this stage Suncor believes that at a minimum, the flat energy charge would need to be revised.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	Suncor does not believe that energy in all hours should be treated equally under the tariff. Instead, any energy charge would have to be shaped to focus on relevant consumption and avoid providing incentives that distort behaviour.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	So far there has been insufficient information to determine whether the AESO's preferred rate design meets the legislative objectives better than the status quo. Regardles however, Suncor does not believe that a flat all-hour energy rate makes sense. The 5-year average calculation seems unnecessarily complicated and in general does not seem to serve a useful purpose. If the aim is to flatten consumer's bills, than a 60 month rolling average calculation would be more effective than focusing on individual months.

7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	Suncor considers the rate impact information for transmission customers sufficient.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	Suncor has previously supported more variation in rates and considers DOS modernization a step in the right direction. Not all customers have similar needs and in theory efficiency could be gained by offering more diverse service options. As a first step, the threshold requirement that DOS is only available when DTS would be uneconomic should be revisited.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Suncor believe that the premise is wrong. The goal should not be to sell as much DTS as possible and then offer a burdensome DOS product to try and marginally improve utilization of the grid. Instead, a broader variety of products should be considered that results in a transmission system that better meets the needs of customers.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	Rate impact mitigation is a difficult topic. On one hand, it is definitely desirable to retain loads. On the other hand, any reduction in rates/costs for one participant has to be financed through cross subsidies. Given the significant outstanding questions regarding the preferred rate design, a discussion around mitigation seem premature.

11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	See response to 10.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	See response to 10.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	See response to 10.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	If the tariff results in significant changes relative to the existing tariff design, significantly modifies DOS, or introduces new rate classes, flexibility should be provided to allow contracts to be adjusted efficiently without penalty.

15	Do you have any additional implementation considerations the AESO should consider?	
16	Do you have additional clarifying questions that need to be answered to support your understanding?	Suncor has reviewed the questions by the AUC staff and believes that responses to the questions would be useful to be able to better assess rate proposals in general and the AESO's preferred rate design specifically.
17	Additional comments	Given that the *Transmission Regulation* is set to expire by the end of the year, Suncor believes that filing a revised tariff in June would be premature. Consultation should continue but filing should only occur after any potential regulation changes have been taken into consideration.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Mark Thompson
Comments From:	TC Energy			**Phone:**	403-589-7193
Date:	2021/04/15			**Email**:	markj_thompson@tcenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The March 25, 2021 session provided a valuable forum for the AESO to present its preferred rate design and explain its rationale, and for stakeholders to ask questions and express their concerns. The AESO's preferred rate design proposes some of the most substantial changes to the ISO Tariff in more than a decade, which will significantly impact many ratepayers. As such, it would have been helpful for the AESO to have provided more analysis to substantiate its preferred rate design. In particular, TC Energy notes that the AESO provided no analysis on the long-term impact of its preferred rate design. TCE Energy's response to Question #3 below provides more details regarding the analysis that should be conducted.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, the AESO's explanation of the use of the Bill Estimating Tool was valuable. The "override" tab is helpful to allow for the increase/decrease of various billing determinants. The post-session Q & A was also helpful. A more detailed explanation of the 5-year average CMD determination, with example calculations, would have been appreciated.

3.	Are you supportive of the AESO's preferred rate design? Why or why not?	Bulk & Regional At this point in time, there is insufficient information for TC Energy to determine whether it supports the AESO's preferred rate design. As mentioned above, the AESO has not provided an analysis of the long-term impact of the rate design. While TC Energy understands the AESO's rationale for proposing the changes to the rate design, we have some concerns of its long-term impacts. The AESO's preferred rate design would significantly change the price signals to ratepayers, which would impact behaviour over time. TC Energy submits that it is important to understand the extent and implications of these impacts. For example, by shifting a large portion of costs from coincident peak to energy and recovering these costs on a flat basis, this rate design would increase the price signal to loads during non-peak hours and decrease it during peak hours. As a result, TC Energy expects that some energy consumption would shift from non-peak hours to peak hours. How significant would this shift be? Is this consistent with the efficient use of transmission? Will this result in increased or decreased transmission costs over time? Additionally, this rate design may increase the use of behind-the-fence generation to serve load and may degrade billing determinants. Considering the current self-supply and export policies, how will this impact the wholesale energy market? Is this consistent with the efficient operation of the market? Further, some ratepayers will experience significant rate increases. Will this lead to load destruction and if so, what will be the long-term impact to the Alberta economy? Answers to questions such as these are necessary to determine whether the proposed changes to the rate design are consistent with cost causation, support the efficient use of transmission, and are in the public interest. TC Energy also has some concerns with the manner in which the AESO proposes to recover the cost allocation to energy. The AESO's preferred rate design would recover those transmission costs allocated to energy on a flat basis over all hours (i.e., each hour of the day would be charged the same $/MWh amount) . As a result, the price signal for the energy component would be the same during peak hours as non-peak hours and ratepayers with high load factors, including those who do not actively avoid 12-CP, will face significant rate impacts. This seems inconsistent with the efficient allocation of transmission costs. TC Energy recommends that the AESO instead consider recovering the costs allocated to energy on a shaped basis where the $/MWh charge for each hour would vary proportionally with the hourly load levels over the course of a day.

		TC Energy is similarly concerned that the AESO's preferred rate design may significantly increase the charge under Rate Export Opportunity Service (XOS). If so, this could cause Alberta's rates to be far higher than other jurisdictions and forestall exports out of Alberta. Recovering the costs allocated to energy on a shaped basis would help to mitigate these concerns. TC Energy requests that the AESO provide an estimate of the Rate XOS charge under its preferred rate design. <u>Energy Storage</u> The AESO has not yet identified its preferred rate design for energy storage. Instead, the AESO has indicated that it is considering a form of opportunity service such as a modernized Rate Demand Opportunity Service ("DOS") for energy storage. TC Energy supports the use of an opportunity service for energy storage, but notes that there are some elements of Rate DOS that may not be appropriate for energy storage. TC Energy recommends that the AESO not limit its consideration to Rate DOS as there may be more parallels between energy storage and exports regarding the manner in which they use the transmission system. Following the consultation session, the AESO released its estimates of the Rate DOS charges under its preferred rate design. The charge for DOS 7 minutes would increase by almost 200 per cent from $5.48/MWh to roughly $15.45. This could significantly impact the development of energy storage resources in Alberta. Recovering the costs allocated to energy on a shaped basis would help to mitigate this concern.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	For the reasons expressed above, without further analysis from the AESO it is difficult to determine whether or not the AESO has met its design objectives. a) TC Energy requests that the AESO define Cost Responsibility and to describe how this term differs from Cost Causation. b) Further analysis required as described in the response to Question #3 above. c) The AESO has proposed to limit the rate impact to a 10% rate increase. Some ratepayers may not agree that this would qualify as a minimal disruption. d) The AESO's preferred rate design appears to be fairly simple and straight forward. The resulting price signals may not be quite so simple. For example, this rate design implicitly creates a price signal for behind-the-fence generation and may create differing price signals for the same generation depending on whether or not it is behind-the-fence. e) Further analysis required as described in the response to Question #3 above.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	Please refer to the response to Question #3 above.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	TC Energy is aligned with the AESO's consideration of an opportunity service rate for energy storage.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	TC Energy has no comment at this time.

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	TC Energy is supportive of the AESO considering an opportunity service rate for energy storage relative to the status quo. This is consistent with the principle of cost causation since the energy storage assets are expected to charge when the system is not stressed. Modernizing Rate DOS is one potential route to establish an appropriate rate for energy storage. However, it is essential that the new rate recognize the differences between energy storage resources and the loads for which Rate DOS is intended. For example, energy storage resources are likely more flexible and are less likely to be using the transmission system during peak hours. One issue that the AESO did not appear to address during its March 25, 2021 session was whether energy storage would be charged for transmission services while providing ancillary services. It has been previously suggested that energy storage resources be exempt from transmission charges while providing such services. TC Energy recommends that the AESO incorporate this component into any rate it proposes for energy storage.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	<u>Pre-Qualification</u> Market participants are required to pre-qualify on an annual basis to receive system access service under Rate DOS. Energy storage resources are long-term assets and require an assurance that an opportunity service rate (or some other appropriate rate) is available for the life of the asset. Accordingly, annual pre-qualification is inappropriate for energy storage resources. <u>Eligibility Criteria</u> The Rate DOS eligibility criteria appear to be a construct to distinguish which loads should and should not have access to the rate. These criteria consider specific business circumstances under which a load may utilize Rate DOS as opposed to Rate DTS. This contrasts with Rate XOS where exports universally and automatically qualify for the opportunity service. This is reasonable considering that exports utilize the transmission system when it is not under stress and are recalled prior to other loads. Energy storage is expected to utilize the transmission system in a similar manner and could adopt the same recall priority. Rate DOS customers, on the other hand, may use the transmission system when it is under stress. For this reason, the eligibility criteria is necessary for existing Rate DOS customers, but not for energy storage Further, the AESO needs to ensure that there is a level playing field among energy storage assets. Accordingly, any such the Rate DOS eligibility criteria would need to apply universally to all energy storage assets. TC Energy submits that the eligibility criteria is not necessary nor appropriate for energy storage. Rate DOS also requires that there is sufficient transmission capability. TC Energy questions whether this requirement is necessary for energy storage as it would utilize transmission when the system is least stressed and could be recalled prior to other Rate DOS ratepayers. <u>Rate</u> Rate DOS provides three types of demand opportunity service: DOS 7 Minute; DOS 1 Hour; and DOS Term. Under the AESO's preferred rate design the charge for these types would be $15.45/MWh, $22.85/MWh, and $90.09/MWh, respectively. Each type has a different recall response time and recall priority. Given the charges, recall response time and recall priority, DOS 7 minute would likely be the most appropriate for energy storage resources. However, due to the flexibility of energy storage resources, TC Energy recommends that the AESO consider a unique type for energy storage that has a quicker recall response time, would be

		recalled prior to other Rate DOS ratepayers, and with a commensurately lower charge.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	Subject to the comments provided below regarding the AESO's mitigation plan, TC Energy does not object to the AESO reaching out to those parties that would be most impacted by the AESO's preferred rate design.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	The AESO's mitigation proposal appears to apply to only a subset of ratepayers – those impacted by greater than 10 per cent. TC Energy understands that the mitigation would be funded by all ratepayers. TC Energy submits that this conflicts with the principle of consistent application and would be discriminatory. Mitigation measures should be embedded within the rate design and implemented consistently across the rate class. TC Energy suggests that the AESO could instead provide mitigation measures by transitioning to its preferred rate design over a period of time.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	TC Energy has no comment at this time.
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Please refer to the response to Question #11 above.

14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Yes, this would be reasonable considering the circumstances and may help to reduce future transmission costs.
15	Do you have any additional implementation considerations the AESO should consider?	No comment at this time.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	All of TC Energy's clarifying questions are provided in the responses above.
17	Additional comments	TC Energy is concerned that there is insufficient time between now and the AESO's targeted filing date in June 2021 to adequately consult on a new energy storage rate. While the AESO has made some progress, it has yet to determine its preferred rate design for energy storage. Based on the comments above, TC Energy believes that there is still considerable work to be done. Filing this rate in June may unnecessarily require issues to be resolved in a hearing room that could otherwise be resolved through consultation. This would be inefficient. If the AESO decides to maintain its June fiing date, TC Energy recommends that the AESO delay the filing of the energy storage rate until adequate consultation has been completed. Given the complexity of the bulk and regional rate design and that it will likely be more contested, TC Energy anticipates that there would be little to no delay in the regulatory process as a result.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Akira Yamamoto
Comments From:	TransAlta Corporation			**Phone:**	403-267-7304
Date:	2021/04/15			**Email**:	Akira_Yamamoto@transalta.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	**Yes, the session was valuable but releasing the data and analysis that NERA Economic Consulting (NERA) performed along with the presentation would have made the session more helpful.** Session 5 was valuable as the AESO presented its preferred rate design during the session. The new approach is a significant change switching from the allocation of costs from bulk and regional system to a model that allocates based on demand and energy. The changes as a result of this allocation change were significant: • a coincident peak charge that is almost 40% smaller, • an energy charge that is 5 times greater; and • billing capacity is 30% smaller. The session focused on what the proposed changes were and walking through illustration of the perspective to NERA's approach of allocating costs to demand and energy based upon a minimum and actual system calculation. However, there was no accompanying analysis with system data that showed how these costs were allocated according to this minimum and actual system calculation. Even though the AESO posted additional material on April 13, 2021, including a more detailed explanation of the methodology used to classify transmission costs between demand and energy, we still have questions about this approach to splitting out costs. The methodology assumes that the "minimum system" is that required to meet peak load and therefore classifies all associated costs as demand related when regional peak load exceeds peak generation, while infrastructure beyond the minimum system is assumed to support the in-merit flow of energy and therefore deemed as being energy related. Furthermore, the analysis establishes these relationships using non-coincident peak demand and generation which we are concerned does not represent how these flows occur in real life and may not adequately represent how this data is used in transmission planning. TransAlta would like to see the peak load and peak generation data by region (as well as the total cost for each region) and the minimum and actual system estimates used in NERA's calculation. We would also like to see this information over time, which NERA has stated has changed minimally since 2015. While we appreciate the presentation and the billing estimator, given the dramatically different design being proposed stakeholders should be provided the analysis (and relevant data) that NERA performed so that they can be confident that the approach is a fair allocation of costs and consistent with the underlying data.

2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	**Yes, the Bill Impact Tool and the sample site data were helpful. The AESO should develop a DOS Bill Impact Tool.** TransAlta appreciates the efforts of the AESO to help stakeholders understand the impact of the change in rate design through the Bill Impact Tool. It was very helpful to have sample data provided to use in the Rate Tool. TransAlta recommends that the AESO provides a DOS Bill Impact Tool for energy storage providers that may be used to test the associated costs at various levels of recallability (less than 7 minutes) or priority (lowest priority versus the existing DOS rates priority). Notwithstanding the estimating rate calculation tool provided on April 13 includes estimated Rate DOS, we believe that it would be useful for energy storage providers to estimate their tariff costs under the various DOS service that the AESO is considering for energy storage and allow those providers to provide feedback about whether those costs are attractive for energy storage.

3.	Are you supportive of the AESO's preferred rate design? Why or why not?	**TransAlta does not have enough information to determine whether the new allocation methodology is a fair and reasonable way to redesign the bulk and regional tariff rates.** As stated above, we are concerned that the preferred rate design represents a significant change in cost allocation which should only be undertaken if there is sufficient evidence that it is better or otherwise correcting weaknesses in the existing design. While the session explained the new allocation methodology at a very high level and through simplified, illustrative examples, we were not provided any of the data or analysis that would establish that the concepts of a "minimum" system is fair and good approach. For example, a "minimum system" that estimates the transmission system required to meet peak load sounds like an engineering concept but the determination of what the "minimum system" is under the methodology is based upon peak load relative to peak generation. We are unsure whether this regional perspective is truly a fair representation of a "minimum system" at a system level. We ask the AESO to provide more historic data (pre-CTI and post-CTI) as that we can fully understand how this allocation methodology would change with bulk and regional system build outs. We have several questions about this new methodology that we wish the AESO to address: • Is generation adjusted to factor in the capacity factor of the resource or all installed MW accounted for in the same manner (e.g. 1 MW of solar is the same as 1 MW of gas)? • Installed generation capacity is typically greater than demand in order to ensure resource adequacy is met (generation capacity needs to provide a reserve margin). Doesn't this methodology therefore suggest that at a system level (where generation will be greater than demand) the transmission system is always in excess of the "minimum system"? • If a region has a retirement of a generating unit such that it becomes a region that imports power, does that translate into a reduction in the energy charge and an increase in demand charges? (Wouldn't a change in flows indicate greater use of the bulk system and be directionally misaligned with the change in energy charge?)

	Questions	Stakeholder Comments

4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	Cost responsibility & Efficient Price Signals **Is allocating more costs to energy truly following cost causation?** TransAlta has reservations about a design that would increase the costs associated with energy from 7% to 31% and increase the energy charge by 5 times its current level. We question whether so much of the bulk and regional system cost is truly caused by the amount of energy that a customer consumes. At >$10/MWh, the transmission charges will be higher than the energy price in some off-peak hours. We are concerned that such a high energy charge could drive conservation behavior when we should be providing a signal for greater use of the transmission system (i.e., during off-peak hours). Furthermore, the result of the preferred rate design is to shift a greater portion of wires costs from the fixed demand to the energy portion. This energy charge as proposed is intended to reflect the "additional transmission system required to facilitate the in-merit flow of energy". However, unlike a variable cost, the costs associated with the energy charge do not vary with energy usage. In a situation where there was a large build-out of generation outstripping demand, energy charges could increase even higher, signaling to customers to lower demand in a situation where the opposite is needed for cost recovery. It would also be helpful if the AESO explained how the adoption of new technologies - energy storage in particular - would affect the preferred rate design. For example, whether energy storage would be included in the rate calculations as supply or load in the allocation methodology. Minimal disruption & Simplicity TransAlta supports a preferred rate design that is transparent, simple and fair to all customers. The design should be clear enough that a customer can understand how their behavior affects their transmission costs. TransAlta also supports the implementation of mechanisms that identify customers that are negatively affected by the new rate design and supports them in a transition to the new rates. Innovation & Flexibility The preferred rate design does not include additional rate classes (such as interruptible, standby, or energy storage service rates), as communicated to the AUC with its April 30, 2018 motion and to stakeholders in Session #1. Instead, the AESO has suggested that DOS and DTS be applied to storage customers – essentially forcing new uses to fit the current design instead of the reverse. TransAlta would like more explanation about the AESO's rationale for modifying its rate design to introduce the proposed classification step before functionalization, and whether it has considered other approaches to functionalizing costs that may represent the uses of the transmission system.

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	**Modernize the bulk and regional rate design to contemplate greater customer choice and a greater willingness for customers to trade off cost for reliability.** TransAlta maintains that the AESO could better advance the design objectives by innovating the tariff framework instead of modifying the current structure which was designed decades ago. One innovation which would achieve the AESO's rate design objectives would be Load Retention rates. As discussed in Session #1, transmission costs have increased dramatically since 2014, creating a strong incentive for self-supply. Load Retention rates could remove the incentive to avoid transmission costs while supporting the energy-only market design. The AESO should also consider the wider suite of rates not only as a mitigation option but as a basis for a more modernized tariff design that contemplates the wider adoption of energy storage and more options for customers with respect to how their electricity needs are met (customer choice).
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	We understand that the preferred rate design has shifted costs away from the 12 Coincident Peak (CP) and demand capacity allocators and pushed those costs to be recovered through the energy charge. As stated in our response to Question 3 above, we need additional information to fully understand the preferred rate design. While TransAlta appreciates the AESO's efforts to review its bulk and regional tariff design, the preferred rate design appears to shift costs in a different manner but it remains unclear if this is a better, fairer and/or more reasonable design or just a different design.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	TransAlta asks the AESO to provide an impact analysis on the preferred rate design like that presented in Session #1.

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	**The opportunity to modernize the tariff should consider interruptible, standby and energy storage rates.** The AESO stated in its Energy Storage Roadmap that: "In the future, the AESO will ensure that the unique characteristics of energy storage are considered in ISO Tariff applications submitted to the AUC for approval." TransAlta agrees with this objective and supports the AESO's work to arrive at an energy storage rate design that achieves this end. TransAlta supports the consideration of DOS rates for energy storage charging capacity. However, the current structure of DOS which requires the asset to already have a DTS contract appears to be too restrictive. In this regard, the "modernized DOS" appears to be the same DOS which is generally designed to limit the attractiveness of the rate compared to DTS and limits its use to a maximum term of one year. We would prefer that the DOS rate be designed to consider the costs that are truly driven by an energy storage asset and provide discounted rates for energy storage assets that display charging behaviors or interruptibility that limit the assets imposition of system costs. A widely recognized issue with the ISO Tariff is the lack of interruptible rates for energy resources. Energy storage resources have fully controllable load profiles and could be valuable resources to fully utilize existing/surplus transmission capacity in an efficient manner if an appropriate interruptible service rate was created. We fully agree that the AESO should explore tariff mechanisms that reflect the costs caused by energy storage on transmission system and to remove barriers that may impede the participation in the market. **Energy storage assets should not be charged transmission costs when they are required to consume from the grid to respond to over-frequency events.** TransAlta reiterates our recommendation that the AESO modify its transmission tariff such that an energy storage asset that provides frequency response operating reserves is not required to pay transmission tariff when it is dispatched or directed to consume in an over-frequency event. While these are rare and infrequent events, the cost consequences from being directed to consume from the grid by the AESO are material to the energy storage owner.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	**Energy storage rates should reflect an energy resources' fair share of transmission costs as a load consumer as well as recognize the condition of interruptible service the resource owner is willing to accept.** The AESO should develop energy storage rates that reflect the fact that energy storage assets are likely willing to accept a much greater level of interruptibility than existing DOS rates reflect. This is an opportunity to define the cost savings and system benefits that may be achieved if loads were controllable and dispatchable. We are concerned that the increase to the energy charge under the preferred rate design will make DOS less attractive. As stated in our comments on the preferred rate design, we need additional data and analysis to fully understand why the energy charge is increasing by such a significant amount. On its face, we see the increase in the energy charge as conflicting with the overall merit of pursuing DOS as an energy storage rate. Additionally, in Session #5 the AESO suggested that energy storage assets would be required to demonstrate use of excess transmission capacity to qualify for DOS rates. As mentioned above, we question whether forcing energy storage to conform to the DOS framework is approaching the development of an energy storage rate with the right mindset perspective. Furthermore, it would be helpful to clarify whether the concept of "minimum system" might impact the eligibility criteria for energy storage under the modernized DOS. An energy storage facility that charges exclusively from the grid will require some level of firmness in transmission capacity but that does not negate the value that its interruptibility may provide in terms of the costs of providing transmission service. At a minimum, the AESO's rationale adds a layer of complexity, uncertainty and cost for energy storage assets. **The energy storage rate should provide framework for all energy storage resources.** We note that there are many types of energy storage and not all energy storage types will choose the same rate option. We believe that creating a rate design that is flexible from an applicability, terms, and eligibility criteria perspective and factors in interruptibility (i.e., allows for a customer to trade off cost and reliability) will help modernize rates to accommodate a wide variety of technologies. In creating these rates, the AESO should consider how interruptiblility can be factored into system planning, the value of developing a system in which customers can select lesser reliability, and how the rate could be developed while providing energy storage proponents sufficient information to estimate their curtailment risk. Additionally, we would support the AESO providing information about how it considers energy storage in planning studies as requested by the AUC.

10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	**The objective for any mitigation scheme should be undue hardship on customers and avoiding the loss of customers as a consequence of adopting the preferred rate design.** TransAlta agrees that the AESO should approach the mitigation discussion in a targeted engagement. While some customers have been engaged in the bulk and regional tariff design work, there will also be many customers that have no awareness at all of the proposed change. We support the implementation of mitigation mechanisms particularly at this time (given the pandemic) and agree that flexibility is required to relieve customers from additional financial hardship. The AESO should be mindful that the costs of the existing transmission systems are already sunk and there is a significant risk that the preferred rate design could deter the efficient utilization of those system assets.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	TransAlta generally agrees with AESO's starting principles for mitigation. We would like to further understand how the AESO will conduct targeted engagements with customers, communicate with other stakeholders the consistent application of mitigation, and ensure that the mitigation that is employed is mutually acceptable.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	TransAlta would consider all rate mitigation options such as phase-ins or bill impact options be temporary while mitigation options such as new rates such as interruptible/opportunity rates could be permanent features of a new design.

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	TransAlta supports the AESO's efforts to help transmission customers mitigate the impact of the preferred rate design. We would assess the acceptability of a proposed mitigation approach based upon customers' interest in the approach as well as its ability to retain customers and maximize the efficient utilization of the existing system.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	TransAlta supports the implementation of a contract reset period in which the PILON is waived with the implementation of new rates. This is a challenging time for businesses in Alberta, which are managing the impact of both the economic recession and COVID-19 and may not be focused on managing their electricity bills. We suggest that the contract reset period be open for a period of time such as a year (rather than a short transition period) to provide all market participants sufficient time to see and understand the tariff impact and provide a fair opportunity respond by adjusting their contract capacity.
15	Do you have any additional implementation considerations the AESO should consider?	No additional considerations for the AESO to consider.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	As stated above, we request additional data and analysis to fully understand the allocation methodology.
17	Additional comments	TransAlta supports the AUC's requests for additional information. We believe that the data, analysis and information requested is relevant and would help stakeholders to better understand the potential impacts of the preferred rate design. It would be advisable to confirm that the AESO intends to respond to these questions and by what time, and that the answers will be made public in order to give all participants the opportunity to assess them.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021 through April 15, 2021	**Contact:**	Kipp Horton
Comments From:	Turning Point Generation (TPG)	**Phone:**	403 233-2259
Date:	April 15, 2021	**Email**:	Kipp.horton@windriver.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, TPG appreciated the session to further explore appropriate tariff treatment of energy storage resources. The session would have been more valuable if there was greater analysis provided on the DOS rate as the AESO's preferred tariff treatment of energy storage.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	No comment.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	TPG is supportive of the AESO's general direction to treat energy storage as an interruptible/opportunity service. Although this an encouraging step forward, TPG believes there is more analysis to be done before TPG can support the AESO's current preferred rate design related to energy storage. A "modernized DOS" may or may not be the most appropriate treatment upon completion of additional analysis.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	No comment at this time.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	No comment at this time.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	TPG is aligned with the AESO's direction to treat energy storage as an interruptible/opportunity service.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	No comment at this time.

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	TPG is supportive of the AESO's general direction to treat energy storage (ES) as an interruptible/opportunity service. Although we are supportive to explore the potential of a modernized DOS rate, TPG recommends equal exploration of other potential solutions. On the surface, it appears that a modernized DOS could be suitable but TPG has concerns that many details have yet to properly assessed. For example, there needs to be recognition of the differences between energy storage resources and the loads for which the DOS rate was originally intended. Our major concerns relate to; • Term – the current DOS rate is limited to 1 year. If applied to energy storage, TPG believes that this very short term will create excessive administration burden for the AESO while providing the ES market participant with insufficient planning certainty. • Ancillary Service (AS) – the AESO has previously indicated that energy storage should be exempt from transmission charges while providing AS. No mention of this exemption appears in the preferred rate design. • Metered Energy – it appears that the preferred rate design will see a very large increase in the rate assessed for metered energy. Furthermore, this increased metered energy rate will be assessed on a "flat" basis. The unique nature of energy storage's natural operation means typically charging during unstressed system times. Therefore, TPG believes it is more appropriate to assess energy storage on a "shaped" metered energy basis to reflect cost causality principles. • Eligibility – TPG is concerned that the DOS rate eligibility criteria may impose an inappropriate amount of uncertainty for ES applications. While acknowledging that the AESO's proposal is to modernize the DOS rate for ES purposes, an important aspect should be to avoid the requirement of any ongoing assessment of individual ES market participants' business case, and instead adopt a universal and automatic qualification of ES eligibility. TPG believes that this approach maintains the principles of FEOC and technology neutrality.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	Please see above comments to Item #8.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	No comments at this time.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	No comments at this time.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	No comments at this time.

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	No comments at this time.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Yes, TPG is a strong supporter in general of increased flexibility to adjust an asset's rate class ,contract capacities and reset periods. This flexibility may help to reduce future transmission costs. In particular, more discussion is required to understand the potential interdependencies between DTS/DOS for ES market participants relating to station service, etc. as was recently highlighted by the AESO. Increased flexibility may help to mitigate any potential unintended consequences.
15	Do you have any additional implementation considerations the AESO should consider?	Nothing further at this time.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	At this time, there are many details outstanding regarding the preferred rate design for energy storage. TPG would like to understand AESO's proposed timelines for further consultation on these details and the significant work involved.
17	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Megan Gill
Comments From:	Utilities Consumer Advocate			**Phone:**	403.819.5383
Date:	[2021/04/15]			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	This session was generally helpful for the UCA.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	This session was generally helpful for the UCA in understanding the AESO's bill impact tool and how the proposed tariff changes will affect both rural/urban residential and small business consumers. In future sessions, it may be helpful if the AESO is able to coordinate with distribution companies to incorporate both distribution and transmission rates in a way that would provide load customers with a comprehensive understanding of the total impact of the proposed tariff changes. This session provided valuable insight into the expected bill impacts in the near-term, however, it would also be helpful to understand the estimated bill impacts for customers over the long term. For example, if more behind-the-fence generation is installed to offset the energy component of the tariff for some load customers, what will the impact be for different customer classes that are not able to install behind-the-fence generation? This analysis and information is needed to more fully understand the impacts and sustainability of the AESO's preferred rate design.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	The UCA sees the current rate designs as an improvement from the existing tariff, as it aims to address the pressing need to better address transmission cost causation and with minimal disruption to existing customers. However, the UCA has concerns with some aspects of the design as it will not fully address the issue of system bypass/cost avoidance and cross-subsidization. In fact, over the longer term, the preferred rate design may exacerbate this issue if a higher portion of costs are recovered from energy (bypassable) charges and not fixed charges. The UCA is concerned this would impede long term sustainability of the grid and negatively impact customers that are unable to bypass the system. See UCA's response to question 4 below for further details.

	Questions	Stakeholder Comments

4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	The UCA sees the current rate designs as an improvement from the existing tariff, as it aims to address the pressing need to better reflect transmission cost causation and with minimal disruption to existing customers. However, we have concerns that it may not meet the objectives in the long-term for the reasons stated above and below. The AESO's proposed design of recovering more costs through energy charges does not fully reflect cost responsibility, as the costs that are being recovered are mostly fixed costs and should not be avoidable. Furthermore, the UCA recognizes that there is a need for legislative amendments (outside the scope of this consultation) in order for the AESO to propose a rate design that more fully reflect cost responsibility by allocating transmission costs associated with the facilitation of in-merit energy to generators. UCA believes the value of being connected to the grid should be reflected in the AESO's rate design so that all connected load pays a fair share of costs. a) A system charge that reflects the value of being connected to the transmission system can minimize system bypass and related cost avoidance. This would recognize that a larger, higher cost transmission system was built to: i) accommodate and operate a market-based generation dispatch without any transmission constraints, and ii) that the current system costs are greater than what is required to serve load. b) A transmission tariff for end-use customers based on 12CP allocation results in an inefficient price signal by encouraging "needle" peak shifting that does not reduce bulk future transmission system build or costs. The proposed tariff reduces the costs allocated via the 12CP mechanism, thereby weakening this unintended price signal for a more efficient result. However, the UCA submits that a more efficient price signal could be achieved by eliminating the 12CP mechanism all together. c) By not entirely removing the 12CP allocation the proposed tariff minimizes disruption for existing customers who have responded to the current stronger price signal. However, it does not fully address the problem of uneconomic system bypass of the transmission system. d) The proposed tariff retains the existing and familiar overall rate structure for simplicity. e) The rate design attempts to address cross subsidization in the near term. The higher costs to existing transmission customers (from the proposed design) could

		encourage them to innovate and reduces the costs on site. However, as stated above, the UCA is concerned that the proposed rate design will continue result in more fixed costs being shifted to other customers over the long term with an increase in the energy charge component. The AESO should consider re-allocating a portion of the proposed energy charges under the current preferred design to NCP for transmission cost recovery given the current allocation may incent further behind-the-fence generation and cost avoidance. There could also be consideration of moving from net metering to gross metering practices for those with exemptions under Section 4 of the Hydro Electric Act in order to avoid further uneconomic bypass of the transmission system. The UCA recognizes that there would likely be significant impacts for customers with net metering in place and, as such, there would need to be continued stakeholder engagement to ensure the overall metering and tariff design is fair and reasonable for all customers in the near term and long term.
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	See UCA's responses to questions 3 and 4 above.
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	See UCA's responses to questions 3 and 4 above.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	See UCA's response to question 2 above.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	The UCA generally supports the modifications to DOS and eligibility requirements to better accommodate energy storage developments. With respect to DOS eligibility, the UCA believes that the AESO should consider energy storage owned by distribution or transmission companies for the purpose of providing ancillary services, and the treatment thereof, to ensure all options are evaluated, and the lowest cost overall solution is selected.

9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	A more dynamic indication of available unused transmission capacity in real time would allow more flexible and efficient joint use of the transmission and energy storage systems.
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	The targeted engagement process appears to be a reasonable approach. The targeted engagement should be a transparent process to ensure it is fair and reasonable to all customers. The UCA believes that there are cost saving measures that the AESO should consider implementing that can benefit all consumers, specifically with regards to the reduction of contract capacities should they exceed the actual highest metered demand significantly. The AESO should be pro-active in identifying these opportunities and bringing them to the customer's attention for consideration.
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	No initial comment.

12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	No comment
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	Yes. Mitigation will be necessary to limit disruption.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	A contract reset period with the implementation of the new rates would assist in minimizing disruption and better align contract capacity with actual usage.
15	Do you have any additional implementation considerations the AESO should consider?	Not at this time.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	Not at this time
17	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Shannon Fehr
Comments From:	West Fraser Mills Ltd.			**Phone:**	780-849-7719
Date:	2021/04/15			**Email**:	Shannon.fehr@westfraser.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was helpful to know the details of the AESO preferred DTS rate design. As most of earlier sessions on this topic, the session lacked the detailed analysis in support of their preferred rate design. It was a complete surprise to see what AESO now proposing as their “preferred design” compared to their direction a few months ago. The preferred design is supported with no credible analysis presented. It is frustrating to stakeholders that the input on rate design that is provided was neither integrated nor addressed in this session.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, the session was useful. Thank you for providing the “Bill –Impact Assessment Tool”. It would have been useful to provide forecasted future cost to see the real impact going forward. Issuance of the underlying assumptions and the data used for the analysis completed would have been useful prior to the session so stakeholders could ask focused questions on the design of the experts presenting.
3.	Are you supportive of the AESO’s preferred rate design? Why or why not?	No. West Fraser does not support the AESO’s preferred rate design. West Fraser is a member of ADC and supported the rate design submitted by ADC. AESO has not provided evidence that supports the need to change the current rate design. The proposed rate design is not supported by a cost causation study that has been shared with stakeholders. The rate design does not value the efficient use of the grid by high load factor customers, nor does it value the value of demand response that is provided by flexible loads.

	Questions	Stakeholder Comments

4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	West Fraser does not believe that AESO's preferred rate design meets their rate design objectives; a) Reflect Cost Responsibility The current rate design is based on cost causation while AESO's preferred rate design is moving away from this core objective. Lower the cost of transmission to those who use power during system peak with low load factor is opposite to the principal of cost causation. b) Efficient Price Signals Again the current rate design has a price signal to avoid/minimize future transmission build. The AESO's preferred rate design is diluting that signal by a) lowering the co-incident peak charge and b) by increasing the charge of energy irrespective of time of day usage. Many facilities like ours have spent millions of dollar to improve plant flexibility to practice of time of day usage to manage both energy and transmission cost. Time of day use has been encouraged all over the world to minimize the need for both generation and transmission. c) Minimal Disruption Having the transmission cost increase over 50% for large industrial consumers is not a minimal disruption. By mitigating these increases to a 10% for a limited period does not achieve the objective of minimal disruption. For a high energy intensive industry like ours, 10% increase is a material. A 50% increase after the end of mitigation period will be devastating. d) Simplicity The AESO's preferred rate design is no simpler than the current design since it is retaining all the charges. In fact, it is introducing more complexity by using 5 year rolling average of co-incident peak charges. e) Innovation and Flexibility The preferred rate design is moving away from innovation and flexibility. A simple example is the fixed charges on energy irrespective of the time of use. The flexibility will be achieved by having higher charges during peak hours for consumers to reduce their energy usage.

5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	There are many considerations that could have made, including: a) Reviewing the efficiency of maintaining the 12 CP method. Other CP methods, including the 5 CP method and the ADC rate design submittal could result in more efficient economic outcomes. b) Simplifying the CP charge method proposed (ie: remove the 5-year average) c) Use cost-causation principles to value energy-based charges d) Creating a rate class for industrials that have high load factors or provide demand response
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	The tariff should be based on cost-causation principles. There should not be regional cost signals like regional CP used to allocate cost.
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	The assumptions and methodology used by AESO for dividing bulk system charges in to demand and energy based on load and generation profile of various planning regions (40+ regions with arbitrary boundaries) is not based on sound reasoning. There will likely be perverse outcomes of providing a price signal that affects load but can only be affected by generation.
8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	No Comment.
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	No Comment.

10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	The need for mitigation discussions raises many questions, such as: • If mitigation for the most impacted customers, then how will the tariff design allow for cost shifting to customers that benefit, if the costs are avoided? • If the most affected customers are price sensitive, how would an increase in transmission cost greater than $0/MW be acceptable for any period of time? • Where does this money come from if increased cost is avoided through mitigation?
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	The AESO should not assume that customers that require mitigation will be able to accept any cost increase.
12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	Mitigation on a temporary basis is not feasible.

13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	The preferred mitigation should be the part of rate design such as interruptible rate.
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	West Fraser supports flexibility.
15	Do you have any additional implementation considerations the AESO should consider?	Participants should be eligible for cost recovery.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	The data that has been requested in the consultation sessions has not been provided. Please provide the information that has been requested.
17	Additional comments	AESO should not proceed with its preferred rate design for a number of reasons; • During this pandemic the main focus should be on managing our businesses. It is not the time to take resources/time from our main business of making goods and keeping Albertan employed. • AESO has not done/shared any study/analysis to justify the need of changing current tariff design. • AESO assumptions/analysis for their proposed design does not meet the level of study needed for such a major change. • AESO have not done any study of the impact of design change on the Alberta economy/job and its competiveness.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – March 25, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5

Period of Comment:	March 25, 2021	through	April 15, 2021	**Contact:**	Peter Burgess
Comments From:	Wolf Midstream			**Phone:**	403 472-0311
Date:	April 13, 2021			**Email**:	pburgess@wolfmidstream.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **April 15, 2021**.

The AESO is seeking comments from Stakeholders on Session 5. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5 hosted on March 25, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable to gain an understanding of the rationale the AESO has developed for the proposed tariff design.
2.	Please comment on Technical Information Session II hosted on March 31, 2021 (if you attended). Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable. The Q&A was particularly helpful.
3.	Are you supportive of the AESO's preferred rate design? Why or why not?	Not supportive of adopting the preferred rate design at this time. The overall outcome of the analysis, whereby high load factor/large load sites will be paying more than under the current tariff, appears to be the opposite direction the province needs to adopt to retain and attract customers to the transmission system. We would prefer to review the AESO's responses to the AUC information requests (letter dated April 7, 2021) prior to making further comments on the specific details of the preferred rate design.

	Questions	Stakeholder Comments
4.	Do you believe the AESO's preferred rate design meets the AESO's rate design objectives? Why or why not? a) Reflect Cost Responsibility (Cost recovery is based on cost causation, reflecting how transmission customers use the existing grid*) b) Efficient Price Signals (Price signal to alter behavior to avoid future transmission build) c) Minimal Disruption (Customers that have responded to the 12-CP price signal and invested to reduce transmission costs are minimally disrupted) d) Simplicity (Simplicity and clear price signals while achieving design objectives) e) Innovation and Flexibility (ISO tariff provides optionality for transmission customers to innovate while not pushing costs to other customers) *AUC Decision 22942-D02-2019 **Proposed rate design must fit within current legislation	
5.	Are there considerations that the AESO should include, exclude and/or modify in its preferred rate design to better achieve the AESO's rate design objectives? Please specify and include your rationale.	
6.	Please describe any areas in which you are aligned with the AESO's preferred rate design.	
7.	Are the assumptions the AESO used for the rate impact reasonable? Is there additional information that would help improve your understanding of rate impacts?	

8.	Are you supportive of the AESO's consideration of modernizing DOS, including its suitability for an energy storage charging capacity? Why or why not? And if so, provide your comments on the consideration of the AESO's DOS eligibility requirements, including for energy storage.	
9.	Please describe what components of the current DOS implementation (i.e., rate, terms, and conditions) limit the use of excess transmission capacity (i.e., capacity that would not otherwise be used under Rate DTS). How might those components of DOS be improved?	
10	Do you have any comments on the AESO's targeted engagement approach for mitigation discussions?	
11	Are there further considerations that the AESO should include, exclude and/or modify in the mitigation option starting principles? Please specify and include your rationale. 1. Limit the rate impact for customers: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition 2. Adapt with design and rates: Ensure options are adaptable to changes to the proposed design and forecast rates 3. Consistent application: Mitigation options can be applied consistently across all impacted loads and not be individually defined 4. Administrative simplicity: Feasible to implement with current tools and systems 5. Mutually acceptable: Account for feedback from broad stakeholder group	

12	Based on the AESO's mitigation options assessment, are there further considerations that the AESO needs to include, exclude and/or modify (e.g., temporary versus permanent)? Please specify and include your rationale.	
13	Are you in favour of some type of mitigation? Why or why not? If you are in favour of some type of mitigation, how would you assess whether a proposed mitigation approach is acceptable?	
14	In your view, should the AESO provide participants with more flexibility to adjust contract capacity, specifically by way of a contract reset period with the implementation of new rates and/or a PILON waiver if the contract level has not changed in the previous five years?	Most participants will be supportive of the proposal to reset contract volumes by way of a PILON waiver.
15	Do you have any additional implementation considerations the AESO should consider?	Regarding the contract reset period in 14 above: In the case of a contract reduction, the payment of the unrecovered capital investment would still apply. To encourage the contract reset, a method to transition these payments over a three-to-five-year period would be helpful to mitigate the impact of these payment obligations. Many DTS contracts are staged. The tariff would need to clarify how these types of contracts qualify for the reset with a PILON waiver. Contract volumes that have been in place for over five years within a staged contract should be treated on the same basis as non-staged contracts.
16	Do you have additional clarifying questions that need to be answered to support your understanding?	
17	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Agenda

Bulk and Regional Tariff Design Technical Information Session II

Session purpose and objectives

The purpose of this technical information session is to help ratepayers understand the impacts of the preferred rate design presented by the AESO on March 25, 2021 on their invoices.

The session objectives include:

- Review how to use the Bill Impact Tool in order to:
  - Enable stakeholders to evaluate the impacts of the rate design and mitigation on their sites; and
  - Enable stakeholders to assess the materiality of changes to their invoices
- Respond to stakeholder questions

Date: **March 31, 2021**
Time: 9:00 a.m. – 12:00 p.m.
Location: Webinar
Facilitator: Stack'd

Time	Agenda Item	Presenter
9:00 – 9:10	Welcome, introduction, purpose and session objectives	AESO
9:10 – 9:45	Walk through how to use the Bill Impact Tool, illustrating • How to evaluate the impacts of the rate design and mitigation on their sites; • How to assess the materiality of changes to their invoices; and • How to analyze the impact of future changes to site load	AESO
9:45 – 10:45	Q&A	All
10:45 – 11:00	Break	
11:00 – 11:50	Q&A	All
11:50 – 12:00	Session close-out and next steps	AESO

Public

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Bulk and Regional Tariff Design Technical Information Session II

March 31, 2021

Public

Notice

In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session and making the session recording available to the general public at www.aeso.ca. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Bulk and Regional Tariff Design engagement sessions. This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4, by telephone at 403-539-2528, or by email at privacy@aeso.ca.

Disclaimer

The information contained in this presentation is for information purposes only. As such, the AESO makes no warranties or representations as to the accuracy, completeness or fitness for any particular purpose with respect to the information contained herein, whether express or implied. While the AESO has made every attempt to ensure the information contained herein is timely and accurate, the AESO is not responsible for any errors or omissions. Consequently, any reliance placed on the information contained herein is at the reader's sole risk.

Using Zoom – Asking questions

- Two ways to ask questions if you are accessing the webinar using your computer or smartphone
  - Click “Raise Hand” and the host will be notified that you would like to ask a question. The host will unmute your microphone, you in turn will need to unmute your microphone and then you can ask your question. Your name will appear on the screen, but your camera will remain turned off.
  - Click “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.
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  - If you would like to ask a question during the Q&A portion, on your phone’s dial pad, hit *9 and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone by hitting *6 and then you can ask your question. Your number will appear on the screen.

Stakeholder participation

The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:

- Listen to understand others' perspectives
- Disagree respectfully
- Balance airtime fairly
- Keep an open mind

Welcome and Introductions

Public

Session purpose and objectives

- Session purpose
  - The purpose of this technical information session is to help ratepayers understand the impacts of the preferred rate design presented by the AESO on March 25, 2021 on their invoices
- Session objectives
  - Review how to use the Bill Impact Tool in order to:
    - Enable stakeholders to evaluate the impacts of the rate design and mitigation on their sites;
    - Enable stakeholders to assess the materiality of changes to their invoices
  - Respond to stakeholder questions

Agenda

Time	Agenda Item	Presenter
9:00 – 9:10	Welcome, introduction, purpose and session objectives	AESO
9:10 – 9:45	Walk through how to use the Bill Impact Tool, illustrating • How to evaluate the impacts of the rate design and mitigation on their sites; • How to assess the materiality of changes to their invoices; and • How to analyze the impact of future changes to site load	AESO
9:45 – 10:45	Q&A	All
10:45 – 11:00	Break	
11:00 – 11:50	Q&A	All
11:50 – 12:00	Session close-out and next steps	AESO

Registrants (as of March 29, 2021)

- Acestes Power
- Alberta Direct Connect Consumers Association (ADC)
- Alberta Newsprint Company (ANC)
- Alberta Utilities Commission (AUC)
- AltaLink Management Ltd.
- ASCENT Energy Partners Ltd.
- ATCO Electric
- BECL and Associates Ltd.
- Best Consulting Solutions Inc.
- BluEarth Renewables Inc.
- Boost Energy Ventures
- Canadian Renewable Energy Association (CanREA)
- Capital Power Corporation
- Cenovus Energy
- Chapman Ventures Inc.
- Chymko Consulting (Cities of Red Deer and Lethbridge)
- City of Lethbridge
- City of Medicine Hat
- City of Red Deer
- CNRL
- Consumers Coalition of Alberta (CCA)
- Customized Energy Solutions
- CWSAA
- DePal Consulting Limited
- Dow Chemical Canada ULC
- Dual Use Customers
- EDF Renewables
- Enbridge
- ENMAX
- EnPowered
- EPCOR Distribution & Transmission Inc.
- ERCO Worldwide
- FortisAlberta Inc.
- Government of Alberta
- Guidehouse Inc.
- Heartland Generation Ltd.
- Imperial Oil
- Inter Pipeline
- Invinity Energy Systems
- Industrial Power Consumers Association of Alberta (IPCAA)
- Kalina Distributed Power Ltd.
- Lafarge Canada Inc.
- Lionstooth Energy Inc.
- Matt Ayres Consulting
- Millar Western Forest Products Ltd.
- NextEra Insights Inc.
- NRGCS
- Power Advisory LLC
- Prairie Sky Strategy
- Quality Urban Energy Systems of Tomorrow (QUEST)
- RMP Energy Storage Inc.
- Rodan Energy Solutions
- Signalta Resources Limited
- Solas Energy Consulting Inc.
- Suncor Energy Inc.
- The Office of the Utilities Consumer Advocate (UCA)
- TC Energy
- Trans Mountain Pipeline LP
- TransAlta Corporation
- URICA Asset Optimization
- VIDYA Knowledge Systems
- Voltus Energy Canada Ltd.
- Weyerhaeuser
- Wolf Midstream Inc.

Overview of Engagement Process

Public

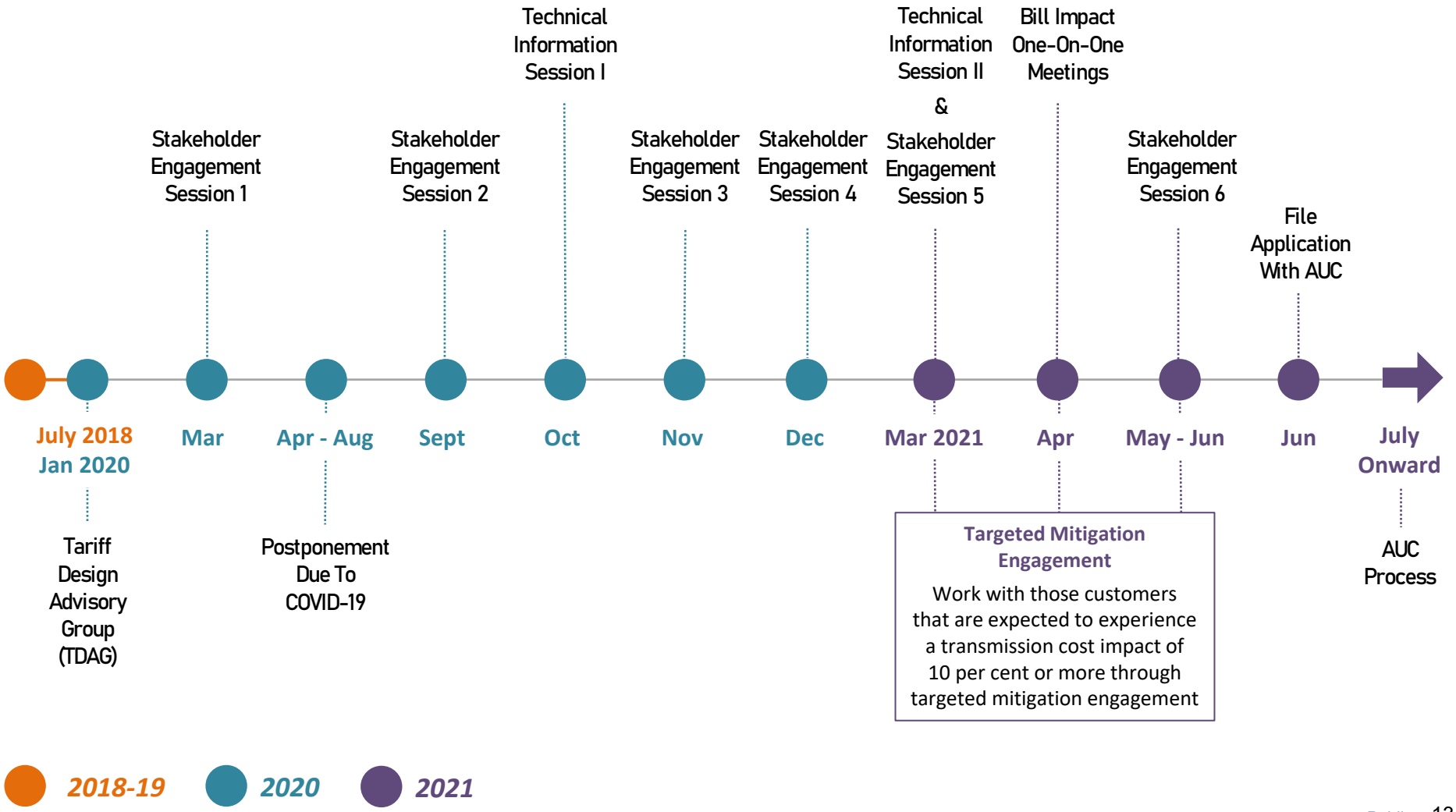
AESO Stakeholder Engagement Framework

Stakeholder engagement

The AESO's stakeholder engagement will:

- Ensure that stakeholders' needs and interests are consistently, transparently and meaningfully considered in the development of a rate design proposal for bulk and regional cost recovery;
- Provide clear objectives to be examined and evaluated in the development of a rate design proposal for bulk and regional cost recovery;
- Assist stakeholders in understanding and evaluating the AESO's preferred rate design;
- Supply stakeholders with tools that will allow them to consider and assess the impact of the AESO's preferred rate design; and
- Identify areas of alignment in order to support an efficient regulatory process.

Stakeholder engagement timeline



Bill Impact Assumptions

Public

Bill impact methodology and assumptions

- Calculate the impact of changes in bills attributable to Rate DTS (Demand Transmission Service) changes
  - Proposed and current rates were applied to the same billing determinants (for the 2019 test year) at each **point-of-delivery** (POD) for the bulk and regional charges
    - Transmission bill for each POD includes POD costs, Operating Reserve (OR) charges and other tariff charges
    - Total bill for each POD includes transmission bill and energy commodity costs
  - Estimated per cent impact based on change in transmission costs and total bill by POD under current and proposed tariff
  - Assumed 12-CP consumption maintained at current levels (i.e., no retroactive averages)
- Bills for an individual Rate DTS point-of-delivery will be different from estimates depending on actual demand and usage at the point-of-delivery and actual effective rates

Test year rate calculations methodology

	2019 Test Year	Preferred Rate Design
Revenue requirement (allocated to load)	$2,269.6 million	
2019 actual billing determinants	93,507.6 MW - months CMD 157,948.9 MW - months billing capacity 59,687.8 GWh	
Coincident metered demand (CMD)	47%	29%
Billing capacity	7%	17%
Energy	22%	31%
POD	24%	24%

Implementation considerations (Session 5 - Slide 79)

- To support the transition, the AESO will provide a forecast of rates in advance of them coming into effect
- The AESO will reduce red tape through administrative changes to rate sheets
- Updates to underlying data and transparent information
  - The AESO will propose to update the data underlying the cost allocations every five years
    - Calculations underlying the demand and energy allocations
    - Calculations underlying the allocations of demand to bulk and regional categories
  - Timing of highest coincident metered demand to hourly from 15-minute interval
    - Provides participants with more transparent information
    - Simpler calculation aligns with public information
    - More appropriately reflects information used for transmission planning

Bill Impact Tool v0.3

Public

Bill Impact Tool v0.3

- The Bill Impact Tool has been posted to allow stakeholders to calculate the estimated bill impact for their sites
- You can find the Bill Impact Tool v0.3 on the AESO website at www.aeso.ca
  - Path: Stakeholder Engagement > Rules, standards and tariff consultations > Tariff (filter) > Bulk and Regional Tariff Design > **March 31, 2021 Technical Information Session II** and/or **March 25, 2021 Session 5**
- We have also posted a Bill Impact Tool v0.3 with Sample Data to allow you to follow along for today's session
- Feedback from today's session will be considered for potential improvements to the tool

Bill Impact Tool v0.3 cont.

- Our Bill Impact Tool uses an Excel spreadsheet to analyze and compare five years of historical load data to determine an annual transmission bill under the current ISO tariff and preferred rate design
- This Bill Impact Tool is not authoritative and is for information purposes only and intended to provide guidance. In the event of any discrepancy between this tool and any authoritative document in effect, the authoritative document governs.
  - It is intended to allow ratepayers to assess historical annual impact with respect to the AESO's preferred bulk and regional tariff rate design (Preferred Rate Design) presented at the AESO's Stakeholder Session 5 on March 25, 2021
  - It will allow a market participant to estimate the annual historical charges for system access service under the AESO's Preferred Rate Design, including Rate DTS, *Demand Transmission Service*, and Rate PSC, *Primary Service Credit*.

Site Data Input tab

- Billing determinants in annual format (sum of monthly billing determinants) along with:
  - Historical charges for energy settlement, operating reserve charges, transmission constraint rebalancing charge, voltage control charges, and other system support services charge to allow for site-specific $/MWh rate for those charges
  - Rate PSC (Primary Service Credit) is applied to sites who do not utilize transmission facility owner (TFO) facilities. This calculation is necessary when reviewing impact percentages.
- The AESO continues to provide the data directly from AESO's billing system for AESO transmission-connected customers
  - For DFO transmission-connected customers, approval from the DFO is required;
  - This tool will not work for assessing bill impact for DFO distribution-connected customers.

Annual Summary tab

- Provides 5-year summary information plus impact after any adjustments
  - Site information, including an evaluation of transmission costs impact:

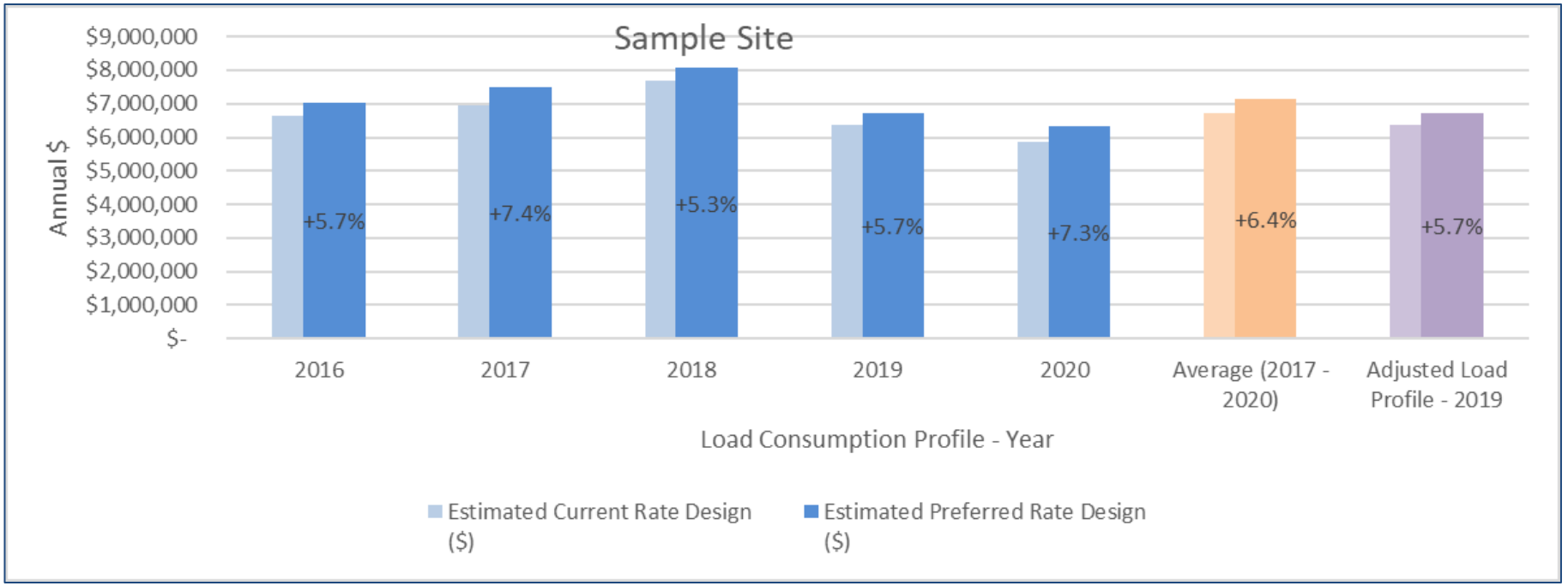
Market Participant:	**DFO**
Site Description:	**Sample Site**
Account ID:	**1000XXXXX**
Date:	March 28, 2021

Threshold for targeted mitigation engagement*:	
2019 Load Profile Year:	No
2017-2020 Average:	No

*Sites with greater than 10% impact (estimated transmission costs) will be invited to targeted mitigation engagement

Annual Summary tab cont.

- Transmission costs graph:



Annual Summary tab cont.

- Transmission costs year by year summary:

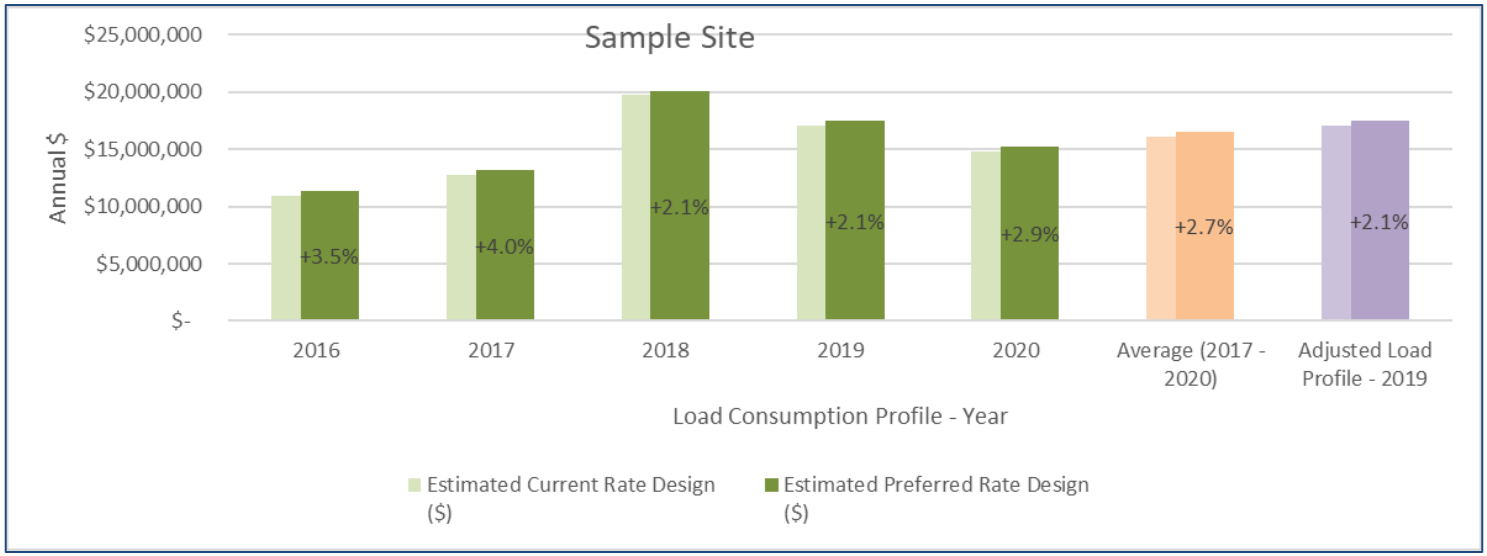
Estimated Transmission Costs									
Load Profile Year	Contract Capacity (MW)	Annual Billing Capacity (MW)	Annual Coincident Peak (MW)	Coincidence Factor (%)	Annual Energy (MWh)	Load Factor (%)	Estimated Current Rate Design ($)	Estimated Preferred Rate Design ($)	Estimated Impact ($)
2016	43.4	469	300	83.7%	237,025	90.4%	$ 6,635,891	$ 7,016,289	$ 380,398
2017	43.4	469	315	79.5%	261,944	90.4%	$ 6,965,785	$ 7,480,937	$ 515,152
2018	43.4	469	321	82.4%	251,907	88.4%	$ 7,674,997	$ 8,085,251	$ 410,254
2019	43.4	469	247	73.3%	207,360	84.3%	$ 6,353,887	$ 6,713,093	$ 359,206
2020	43.4	469	214	67.9%	199,593	86.4%	$ 5,883,626	$ 6,314,913	$ 431,287
Average (2017 - 2020)							$ 6,719,574	$ 7,148,548	$ 428,975

Annual Summary tab cont.

- Total bill graph and costs year by year:

Estimated Total Bill (Includes energy settlement costs)

Load Profile Year	Estimated Current Rate Design ($)	Estimated Preferred Rate Design ($)	Estimated Impact ($)
2016	$ 10,977,762	$ 11,358,160	$ 380,398
2017	$ 12,727,994	$ 13,243,146	$ 515,152
2018	$ 19,718,431	$ 20,128,684	$ 410,254
2019	$ 17,110,780	$ 17,469,986	$ 359,206
2020	$ 14,844,783	$ 15,276,070	$ 431,287
Average (2017 - 2020)	$ 16,100,497	$ 16,529,472	$ 428,975



Adjust Load Profile tab

- Select Load Consumption Profile Year: Load Consumption Profile Year: **2019**
- Use Override section to increase or decrease:
  - c) Monthly average highest metered demand;
  - d) Average coincident metered demand;
  - e) Contract capacity; or
  - f) Load factor or average metered energy

Billing Quantity		Factor	Monthly Average	Applicable Volumes		Overrides Factor	Overrides Monthly Average	Applicable Volumes	
(a)	Substation fraction (SF)			1.00000				1.00000	
(b)	Rate PSC Applicable			No				No	
(c)	Highest metered demand		28.1	337.1	MW			337.1	MW
(d)	Average coincident metered demand	73.3%	20.6	247.0	MW	73.3%		247.0	MW
(e)	Contract Capacity		43.4	43.4	MW			43.4	MW
(f)	Metered energy	84.3%	17,280	207,360	MWh			207,360	MWh
(g)	Billing capacity		39.1	468.7	MW			468.7	MW
(h)	% of pool price for operating reserve charge			6.45%				6.45%	
(i)	Apparent power factor difference			0.0	MVA			0.0	MVA
(k)	Site Average Pool Price on Energy Settlement			$51.88	/MWh			$51.88	/MWh
(l)	Annual Average Pool Price			$54.88	/MWh			$54.88	/MWh

- *Billing capacity volumes will adjust as overrides are entered*
- *Site % of pool price for operating reserve charges and site average pool price resulting from energy settlement are held constant*
- *Adjusted transmission costs and total bill amounts are carried over to 'Annual Summary' as the adjusted load profile*

Further information about bill impact

- Stakeholders can request from the AESO their site-specific data input for the tool. The AESO will provide the data to the Rate DTS market participant for the site (**working with the applicable distribution facility owner (DFO) if required**).
- Ratepayers can also request a one-on-one meeting with the AESO to ask questions about how the Bill Impact Tool works for their site. These bill impact one-on-one meetings will be scheduled during April 1-14, 2021.
  - Provides an opportunity to focus on a Ratepayer's particular site data
- **Email us at tariffdesign@aeso.ca** to request your site-specific data input for the Bill Impact Tool and/or to request your one-on-one bill impact meeting

Questions?

Public

Break

Public

Questions?

Public

Session Close-out and Next Steps

Public

Session feedback

- We want to thank you for attending the Bulk and Regional Tariff Design Technical Information Session II and we would appreciate your feedback on the session
- To limit stakeholder fatigue, we are collecting your initial feedback on the session by conducting a Zoom poll during the session rather than emailing you a short session survey following the session
- Zoom poll

Reminder: Stakeholder feedback

- We value stakeholder feedback, and we invite all interested stakeholders to provide their input on this session via the questions set out in the **Stakeholder Comment Matrix Tariff Session 5 on or before April 15, 2021**. The matrix is available on our website at www.aeso.ca.
  - Path: Stakeholder Engagement > Rules, standards and tariff consultations > Tariff (filter) > Bulk and Regional Tariff Design > March 25, 2021 Session 5
- Within this comment matrix we are looking for your feedback on the following:
  - Session 5 and Technical Information Session II
  - Preferred rate design
  - DOS rate eligibility
  - Targeted approach on mitigation discussions
  - AESO mitigation principles and options
  - Areas of alignment
  - Implementation considerations

Reminder: Next session

- The next session (Session 6) will be hosted in late May or early June 2021. Notice will be provided three weeks in advance in our Stakeholder Newsletter and on our website.
- Session 6 purpose
  - The purpose of the session is to engage stakeholders in a discussion of the AESO's mitigation discussion outcomes, energy storage assessment recommendation, Session 5 stakeholder feedback or follow-up, and areas of alignment
- Session 6 objectives
  - Provide an overview and seek stakeholder input on the outcomes of the targeted mitigation engagement
  - Present and discuss the energy storage assessment recommendation for the purpose of getting stakeholder feedback
  - Share our learnings and seek stakeholder input on Session 5 stakeholder feedback or follow-up and areas of alignment
  - Understand outstanding stakeholder concerns

Contact the AESO

- ***Twitter:*** *@theAESO*
- ***Email:*** *tariffdesign@aeso.ca*
- ***Website:*** *www.aeso.ca*
- Subscribe to our stakeholder newsletter

Thank you

Public

Individual Site Bill Impact Tool

This bill impact tool is not authoritative and is for information purposes only and intended to provide guidance. In the event of any discrepancy between this tool and any authoritative document[1] in effect, the authoritative document governs.

1 Purpose

This bill impact tool is intended to allow ratepayers to assess historical annual impact with respect to the AESO's preferred bulk and regional tariff rate design ("Preferred Rate Design") described in the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5 published on March 18, 2021 and presented in the corresponding AESO's Stakeholder Session 5 on March 25, 2021.

The purpose of this bill impact tool is to allow a market participant to estimate the annual historical charges for system access service under the AESO's Preferred Rate Design, including Rate DTS, *Demand Transmission Service* , and Rate PSC, *Primary Service Credit* .

The calculations in this bill impact tool provide estimated charges under the Preferred Rate Design only. The AESO calculates certain actual charges on an hourly basis rather than on average annual amounts, and ***actual charges under any future tariff design may differ from the estimated amounts presented in this bill impact tool*** .

2 Current Design and Preferred Rate Design Rate Calculations

Current Design (Test Year 2019) and Preferred Rate Design (Test Year Future) rates are calculated using actual 2019 billing detemrinants for all sites and 2019 revenue requirement. The rates only differ by changing the functionalizaiton and classification from current approved in the 2021 ISO tariff to the preferred rate design.

3 Completing the Individual Site Bill Impact Tool

This section describes how a market participant may complete the bill impact tool to estimate and compare annual charges (based on historical load information) for system access service under the existing 2021 ISO Tariff bulk and regional tariff design and under the AESO's Preferred Rate Design.

Initial Steps

Paste single site annual billing determinants on cell "A2" of the 'Site Data Input' tab.
This summary data can be provided by the AESO (in coordination with the DFO if necessary)

In the Technical Information Session on March 31, 2021, the AESO will provide examples and a detailed walk through of the bill impact tool.

The information included in the 'Site Data Input' tab will allow calculations on the 'Annual Summary' tab and will provide annual summary of bill impact resulting from the preferred rate design.

Adjusting Input Data

The 'Adjust Load Profile' tab provides the opportunity to override historical load profile or billing determinant information.

For assistance with this tool and Site Data Input data, please contact the AESO at: tariffdesign@aeso.ca

Attachments

Annual Summary - Summary of bill impact by year
Adjust Load Profile - Allow ratepayers to override input values to assess impact
Site Data Input - Tab to allow annual billing or load profile information by year

Revision History

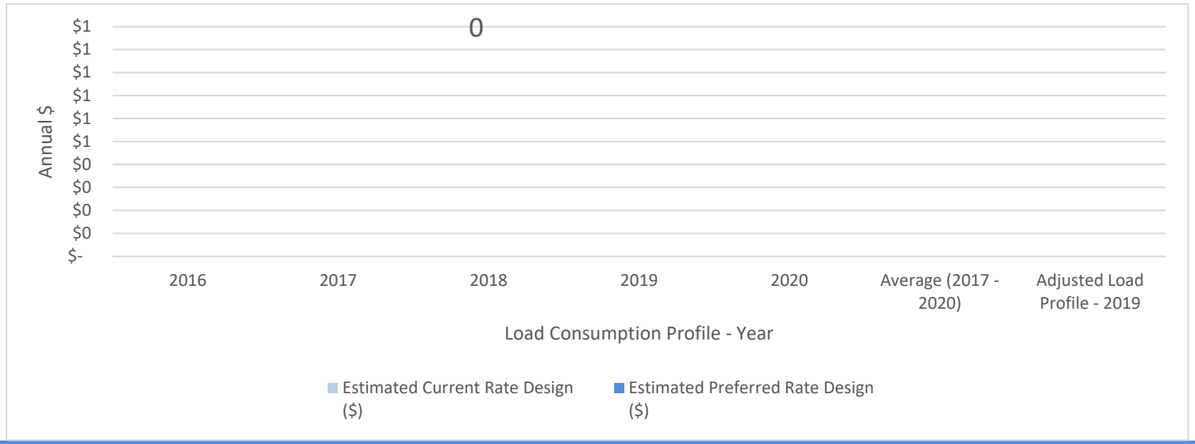
Date	Description
2021-03-18	v 0.1 - Initial release with draft Test Year 2019 values
2021-03-22	v 0.2 - Fixed to work with all Excel versions and Contract Capacity to pull appropriate year selected (not just 2019)
2021-03-30	v 0.3 - Fixed to ensure adjusted load profile data aligned with results from 'Adjust Load Profile' data
2021-04-06	v 0.4 - Fixed to pull actual annual average pool price into 'Adjust Load Profile' tab

[1] "Authoritative document" is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and associated regulations, and that contain binding legal requirements for either market participants or the AESO, or both. Authoritative documents include: the ISO rules, the reliability standards and the ISO tariff.

Market Participant: **0**
Site Description: **0**
Account ID: **0**
Date: August 16, 2021

Threshold for targeted mitigation engagement*:	
2019 Load Profile Year:	#N/A
2017-2020 Average:	#N/A

*Sites with greater than 10% impact (estimated transmission costs) will be invited to targeted mitigation engagement



Estimated Transmission Costs

Load Profile Year	Contract Capacity (MW)	Annual Billing Capacity (MW)	Annual Coincident Peak (MW)	Coincidence Factor (%)	Annual Energy (MWh)	Load Factor (%)	Estimated Current Rate Design ($)	Estimated Preferred Rate Design ($)	Estimated Impact ($)	Estimated Impact (%)
2016	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2017	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2018	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2020	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Average (2017 - 2020)							#N/A	#N/A	#N/A	#N/A
Adjusted Load Profile - 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

Confidentiality: Proprietary When Completed

Market Participant: **0**

Site Description: **0**

Account: **0**

Date: August 16, 2021

Tariff: Test Year 2019

Billing Quantity		Factor	Monthly Average	Applicable Volumes	
(a)	Substation fraction (SF)			#N/A	
(b)	Rate PSC Applicable			#N/A	
(c)	Highest metered demand		#N/A	#N/A	MW
(d)	Average coincident metered demand	#N/A	#N/A	#N/A	MW
(e)	Contract Capacity		#N/A	#N/A	MW
(f)	Metered energy	#N/A	#N/A	#N/A	MWh
(g)	Billing capacity		#N/A	#N/A	MW
(h)	% of pool price for operating reserve charge			#N/A	
(i)	Apparent power factor difference			#N/A	MVA
(k)	Site Average Pool Price on Energy Settlement			#N/A	/MWh
(l)	Annual Average Pool Price			$54.88	/MWh

Rate or Rider Component					Rate		Volume		Amount
Rate DTS: Demand Transmission Service									
Connection Charge									
Bulk System Charge									
3(a)	Coincident metered demand				$10,087.00	/MW/month	#N/A	MW	#N/A
Regional System Charge									
3(b)	Billing capacity				$2,668.00	/MW/month	#N/A	MW	#N/A
Energy Charge									
3(c)	Metered energy				$2.18	/MWh	#N/A	MWh	#N/A
Point of Delivery Charge									
3(e)	Substation fraction				$11,278.00	/month	#N/A		#N/A
3(f)	First (7.5 × SF) MW of billing capacity				$4,566.00	/MW/month	#N/A	MW	#N/A
3(g)	Next (9.5 × SF) MW of billing capacity				$2,860.00	/MW/month	#N/A	MW	#N/A
3(h)	Next (23 × SF) MW of billing capacity				$1,995.00	/MW/month	#N/A	MW	#N/A
3(i)	All remaining MW of billing capacity				$1,292.00	/MW/month	#N/A	MW	#N/A
Total Wires									**#N/A**
Operating Reserve Charge Estimate									
4	Metered energy	pool price	#N/A	=	$54.88	/MWh	#N/A	MWh	#N/A
Transmission Constraint Rebalancing Charge Estimate									
5	Metered energy				$0.002	/MWh	#N/A	MW	#N/A
Voltage Control Charge									
6	Metered energy				$0.06	/MWh	#N/A	MWh	#N/A
Other System Support Services Charge									
7(a)	Highest metered demand				$38.00	/MW/month	#N/A	MW	#N/A
7(b)	Apparent power difference				$400.00	/MVA/month	#N/A	MVA	#N/A
Total Rate DTS									**#N/A**
Rate Primary Service Credit									
	Substation fraction				($8,910.00)	/month	#N/A		#N/A
	First (7.5 × SF) MW of billing capacity				($3,607.00)	/MW/month	#N/A	MWh	#N/A
	Next (9.5 × SF) MW of billing capacity				($2,259.00)	/MW/month	#N/A	MWh	#N/A
	Next (23 × SF) MW of billing capacity				($1,576.00)	/MW/month	#N/A	MWh	#N/A
	All remaining MW of billing capacity				($1,292.00)	/MW/month	#N/A	MWh	#N/A
Total Rate PSC Credit									**#N/A**
Transmission Costs									**#N/A**
Energy Market Settlement									**#N/A**
Total Bill									**#N/A**

Confidentiality: Proprietary When Completed

Year	Market Participant	Site Description	Account_ID	Substation Fraction	Rate PSC (Yes/No)	CONTRACT CAPACITY (MW)	ENERGY (MWh)	CMD (MW)	BILLING CAPACITY (MW)	MAX HMD (MW)	ACTUAL HMD (MW)	Energy Settlement ($)	Operating Reserve Charges ($)	Transmission Constraint Reblancing Charge ($)	Voltage Control Charges ($)	Other System Support Services Charge ($)	Power Factor Deficiency Charge ($)

*Input annual data into Cell A2 for years 2016, 2017, 2018, 2019 and 2020

Individual Site Bill Impact Tool

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1 Purpose

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Market Participant: **DFO**
Site Description: **Sample Site**
Account ID: **1000XXXXX**
Date: August 16, 2021

Threshold for targeted mitigation engagement*:	
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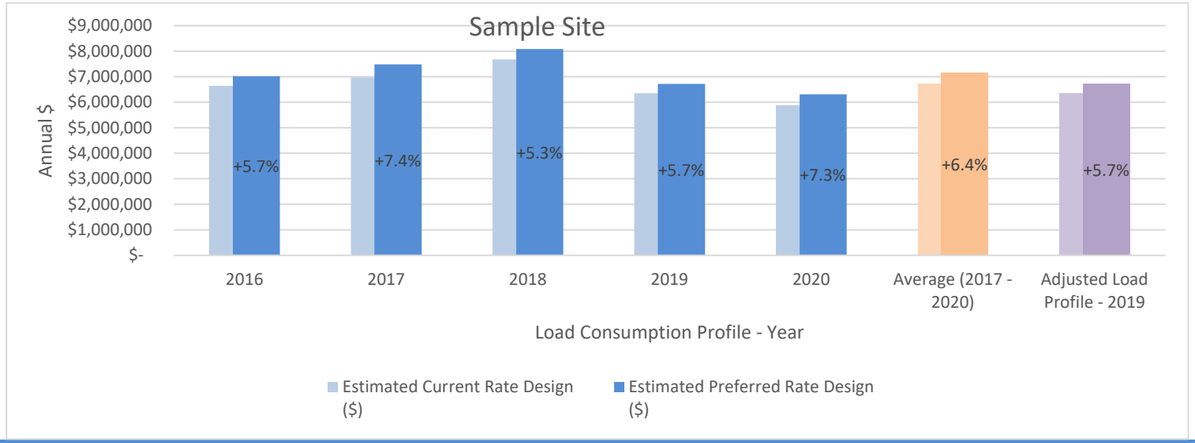
2017-2020 Average:	No

*Sites with greater than 10% impact (estimated transmission costs) will be invited to targeted mitigation engagement



Estimated Transmission Costs

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Average (2017 - 2020)							$ 6,719,574	$ 7,148,548	$ 428,975	+6.4%
Adjusted Load Profile - 2019	43.4	469	247	73.3%	207,360	84.3%	$ 6,353,887	$ 6,713,093	$ 359,206	+5.7%

Confidentiality: Proprietary When Completed

Market Participant: **DFO**
Site Description: **Sample Site**
Account: **1000XXXXX**
Date: August 16, 2021

Tariff: Test Year 2019

Billing Quantity		Factor	Monthly Average	Applicable Volumes	
(a)	Substation fraction (SF)			1.00000	
(b)	Rate PSC Applicable			No	
(c)	Highest metered demand		28.1	337.1	MW
(d)	Average coincident metered demand	73.3%	20.6	247.0	MW
(e)	Contract Capacity		43.4	43.4	MW
(f)	Metered energy	84.3%	17,280	207,360	MWh
(g)	Billing capacity		39.1	468.7	MW
(h)	% of pool price for operating reserve charge			6.45%	
(i)	Apparent power factor difference			0.0	MVA
(k)	Site Average Pool Price on Energy Settlement			$51.88	/MWh
(l)	Annual Average Pool Price			$54.88	/MWh

Rate or Rider Component				Rate		Volume		Amount
Rate DTS: Demand Transmission Service								
Connection Charge								
Bulk System Charge								
3(a)	Coincident metered demand			$10,087.00	/MW/month	247.0	MW	$2,491,467
Regional System Charge								
3(b)	Billing capacity			$2,668.00	/MW/month	468.7	MW	$1,250,545
Energy Charge								
3(c)	Metered energy			$2.18	/MWh	207,360	MWh	$452,044
Point of Delivery Charge								
3(e)	Substation fraction			$11,278.00	/month	1.00000		$135,336
3(f)	First (7.5 × SF) MW of billing capacity			$4,566.00	/MW/month	7.5	MW	$410,940
3(g)	Next (9.5 × SF) MW of billing capacity			$2,860.00	/MW/month	9.5	MW	$326,040
3(h)	Next (23 × SF) MW of billing capacity			$1,995.00	/MW/month	22.1	MW	$528,116
3(i)	All remaining MW of billing capacity			$1,292.00	/MW/month	0.0	MW	$0
Total Wires								**$5,594,489**
Operating Reserve Charge Estimate								
4	Metered energy	pool price	× 6.45% =	$54.88	/MWh	207,360	MWh	$733,733
Transmission Constraint Rebalancing Charge Estimate								
5	Metered energy			$0.002	/MWh	207,360	MW	$415
Voltage Control Charge								
6	Metered energy			$0.06	/MWh	207,360	MWh	$12,442
Other System Support Services Charge								
7(a)	Highest metered demand			$38.00	/MW/month	337.1	MW	$12,809
7(b)	Apparent power difference			$400.00	/MVA/month	0.0	MVA	$0
Total Rate DTS								**$6,353,887**
Rate Primary Service Credit								
	Substation fraction			($8,910.00)	/month	1.00000		$0
	First (7.5 × SF) MW of billing capacity			($3,607.00)	/MW/month	7.5	MWh	$0
	Next (9.5 × SF) MW of billing capacity			($2,259.00)	/MW/month	9.5	MWh	$0
	Next (23 × SF) MW of billing capacity			($1,576.00)	/MW/month	22.1	MWh	$0
	All remaining MW of billing capacity			($1,292.00)	/MW/month	0.0	MWh	$0
Total Rate PSC Credit								**$0**
Transmission Costs								**$6,353,887**
Energy Market Settlement								**$10,756,893**
Total Bill								**$17,110,780**

Confidentiality: Proprietary When Completed

Year	Market Participant	Site Description	Account_ID	Substation Fraction	Rate PSC (Yes/No)	CONTRACT CAPACITY (MW)	ENERGY (MWh)	CMD (MW)	BILLING CAPACITY (MW)	MAX HMD (MW)	ACTUAL HMD (MW)	Energy Settlement ($)	Operating Reserve Charges ($)	Transmission Constraint Reblancing Charge ($)	Voltage Control Charges ($)	Other System Support Services Charge ($)	Power Factor Deficiency Charge ($)
2016	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	237,024.8	299.7	468.7	33.6	358.1	$ 4,341,871	$ 416,880	$ 28	$ 12,371	$ 14,539	$ -
2017	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	261,944.0	315.5	468.7	38.0	396.9	$ 5,762,210	$ 530,156	$ 48	$ 16,604	$ 16,297	$ -
2018	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	251,907.2	321.5	468.7	35.1	390.2	$ 12,043,433	$ 1,201,944	$ 124	$ 20,530	$ 16,252	$ -
2019	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	207,359.8	247.0	468.7	33.2	337.1	$ 10,756,893	$ 733,733	$ 721	$ 9,389	$ 10,988	$ -
2020	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	199,592.6	214.3	468.7	29.3	315.6	$ 8,961,157	$ 611,540	$ 1,239	$ 9,037	$ 10,287	$ -

*Input annual data into Cell A2 for years 2016, 2017, 2018, 2019 and 2020

Bulk and Regional Tariff Design Technical Information Session II hosted on March 31, 2021

I. Purpose and objectives of the session

The purpose of this technical information session is to help ratepayers understand the impacts of the preferred rate design presented by the AESO on March 25, 2021 on their invoices.

The session objectives include:

- Review how to use the Bill Impact Tool in order to:
  - Enable stakeholders to evaluate the impacts of the rate design and mitigation on their sites; and
  - Enable stakeholders to assess the materiality of changes to their invoices
- Respond to stakeholder questions

II. Session agenda

Time	Agenda Item	Presenter
9:00 – 9:10	Welcome, introduction, purpose, and session objectives	AESO / Stack'd
9:10 – 9:45	Walk through the Bill Impact Tool, illustrating • How to evaluate the impacts of the rate design and mitigation on their sites; • How to assess the materiality of changes to their invoices; and • How to analyze the impact of future changes to site load	AESO
9:45 – 10:45	Q&A	All
10:45 – 11:00	Break	
11:00 – 11:50	Q&A	All
11:50 – 12:00	Session close-out and next steps	AESO

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III. Attendees

Company
Acestes Power
Alberta Direct Connect Consumers Association (“ADC”)
Alberta Electric System Operator (“AESO”)
Alberta Newsprint Company
Alberta Utilities Commission (“AUC”)
AltaLink Management Ltd.
ASCENT Energy Partners Ltd.
ATCO Electric Ltd.
BECL and Associates Ltd.
Best Consulting Solutions Inc.
BluEarth Renewables Inc.
Capital Power
Cenovus Energy
Chapman Ventures Inc.
Chymko Consulting on behalf of Red Deer & Lethbridge
City of Lethbridge
City of Medicine Hat
Consumers Coalition of Alberta (“CCA”)
CNRL
Customized Energy Solutions
DePal Consulting Limited
Direct Energy
Dow Chemical Canada ULC
EDF Renewables
Enbridge Pipelines Inc.
ENMAX
EnPowered Inc.
EPCOR
ERCO Worldwide
FortisAlberta Inc.
Heartland Generation Ltd.
Imperial Oil

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Company
Industrial Power Consumers Association of Alberta (“IPCAA”)
Inter Pipeline Ltd.
Lafarge Canada Inc.
Lionstooth Energy
Matt Ayres Consulting
Millar Western Forest Products
NextEra Insights Inc.
NRGCS
Power Advisory LLC
Rodan Energy Solutions
Signalta Resources Limited
Solas Energy Consulting Inc.
Suncor Energy
TC Energy
The Office of the Utilities Consumer Advocate (“UCA”)
Trans Mountain Pipeline LP
TransAlta Corporation
URICA Asset Optimization
Vanderwell Contractors (1971) Ltd.
VIDYA Knowledge Systems / CWSAA
Voltus Energy Canada Ltd.
Weyerhaeuser
Wolf Midstream Inc.
Stack’d Consulting, Inc.
Attendees by phone
14033865483
14033897720
14033901368

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IV. Session highlights

Captured below are highlights of the questions posed by stakeholders during the session. The AESO responded to stakeholder questions during the session. For a detailed review of the session please refer to the session webinar recording posted at www.aeso.ca.

- *Suncor:* I believe some percentages got mixed up on Slide 16 (Test year rate calculations methodology). Also, could we potentially get these percentages with one or more decimal place(s) in case you are updating the slide?
- *Dow Chemical:* Coincident metered demand (CMD), max highest metered demand (HMD), actual HMD are the max in the year?
- *AUC:* On Slide 16 for the 2019 actual billing determinants – is FTS (Fort Nelson Transmission Service) included in this?
- *CNRL:* On Slide 21 (Site Data Input tab) it mentions the tool will not work for assessing the bill impact for distribution facility owner (DFO) customers. Should customers reach out to the DFOs individually to get an idea of the impact? Or will a way to estimate this be coming in the future?
- *Voltus Energy:* The presentation last Thursday indicated that the five-year average coincident peak (CP) design will be "phased in". What does that mean? Example just shown included load profile from 2016-2020. Will CP from historical years from before the new design is implemented be included in that average for the first few years?
- *Alberta Newsprint:* It seems "Annual Average Pool Price" does not change with different years.
- *Solas Energy:* Where is the test data located? Can you provide sample data?
- *Power Advisory:* For the five-year rolling average, how would the early months in the year work? How will the DFOs treat this when they're dealing with distribution-connected generation (DCG) credits? Will the credits be arbitrarily reduced by one-fifth by looking at the average?
- *Alberta Newsprint:* You never pay more than 20 per cent of a year in a month – that's how the five-year average works. The problem is with the beginning years because there is no history of a five-year average. When you don't have a history, the average rate of year one is higher than the average for year five.
- *IPCAA:* The 12 CMD for 2019 is 157,948.9 MW is that based on 15 minutes? Based on hourly, the number would be lower so the 12 CP charge would be higher.
- *ADC:* Have you taken note of how many points of delivery are over-contracted and where there are opportunities to lower contract capacity for customers?
- *ADC:* Would the AESO look at mitigation for customers that were approaching 10 per cent, but based on the historical average did not meet the threshold?
- *ADC:* If you were using the 2021 forecasted billing determinants, how would the rate be different? It would adjust the rates of today's tariff, so you may see a bigger bill impact. We would like to see that so we can also see that impact on the bill. We not only want to do a look-back, but we also want to see a forecast.
- *Enbridge:* If the billing capacity is reduced with a Payment in Lieu of Notice (PILON), the change will not appear until year five, am I correct?

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- *CCA:* Could the AESO provide the five-year data by point-of-delivery (POD) for each of the DFOs to enable assessment of the impact in tariff structure by DFO? It would be helpful if the information on DFOs could be provided ahead of the filing and as part of the bill impact.
- *ASCENT Energy:* May I please ask - why are the Test Year 2019 Tariff rates different from the actual 2019 Tariff rates?
- *Power Advisory:* I echo ADC's request. The AESO has historically provided a 20-year forecast of rates. It would be very helpful to see a 20-year forecast under this new methodology. At the very least, I would hope to see this released based on the final rate design that the AESO files with the Commission. We understand that forecasts are subject to change, but it is still very helpful to see an expectation of how the rates will change over time.
- *ERCO:* Can the notice be rescinded within the five years?
- *Solas Energy:* For new applications (such as energy storage) with no history, does the five-year change occur? Or do they go directly to the first application?
- *ADC:* If a site built onsite generation in year two and no longer will be operating during peak demand, how does that change the five-year allocation for the PILON? Is it waived?
- *DePal Consulting:* Is your calculation on the "Adjust Load Profile" tab based upon reducing the MW hours? If this was a customer that was going to put in a generator, then they would probably get a bigger rate impact because they would limit their coincident peak charge as well – would they see a much greater decrease to their bill? Do you think this deals appropriately with uneconomic bypass?
- *IPCAA:* Most of the load goes through distribution companies and we've been trying to create calculators for these companies. Maybe there is some way the DFO and the AESO can work together to give a range so customers can sum up all of their sites and understand if their impact is positive or negative.
- *Enbridge:* Who can do the phase in for the rolling average and who can't do the phase in?
- *TC Energy:* For the current five-year 12-CP, you have a coincident peak at a certain hour in a certain month and your load contributes to that hour. The percentage that you contributed defines the percentage of the overall cost you have to pay. In the new system, what are we actually averaging? What I'd like to understand is how the new system actually changes from the current system – is it going from actuals to averages? Now that we're averaging, I'm not sure what I'm targeting – am I still targeting my contribution during the peak hours or am I targeting something else?
- *URICA:* We need an example – 95 per cent of these questions are because there's no example. To me, it's just using an average rather than using a single point in time.
- *Solas Energy:* Does the averaging mean that you could go extreme sometimes and very conservative sometimes and average out to be fine?
- *Enpowered:* If a customer decides to lower their coincident metered demand, they have had the historical data for one to two years. The charge they are going to be seeing is going to be less impactful because they will still have to respond to the first two years where they didn't respond – is that correct?
- *Customized Energy Solutions:* Is the 12-CP becoming a 60-CP and taking five years to get there? Is that an appropriate way to think of it? If that's the case, how would it look for a storage

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customer that is looking to zero out 12-CP in year five, but didn't have onsite generation for the first four years?

- *Enbridge:* For companies like Enbridge, we are focusing on ESG (environmental social governance) looking into solar panels, wind power, etc. onsite. If I'm putting a solar panel in and zeroing out the grid, because of the five-year average, the positive impact will be significantly reduced. This could prevent renewable energy development.
- *Solas Energy:* Can you provide examples of those where the future demand decreases, and one where the future demand increases? One more for a new generation. I think this would help.

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Agenda

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Session purpose and objectives

The purpose of this session is to engage stakeholders in a discussion of the AESO's demand opportunity service (DOS) modernization recommendation to allow expanded eligibility (e.g., energy storage). The session objectives include:

- Present additional background on the AESO's demand opportunity service – what it is, the service it provides and how it operates today
- Share our learnings on DOS modernization stakeholder feedback
- Present and discuss the AESO's DOS modernization recommendation for the purpose of seeking stakeholder feedback on the recommendation

Date: **Thursday, May 20, 2021**
Time: **8:00 a.m. – 1:00 p.m.**
Location: **Zoom Webinar**
Facilitator: **Stack'd**

Time	Agenda Item	Presenter
8:00 – 8:15	Welcome, introduction, purpose and session objectives including extension request on engagement and filing schedule	AESO / Stack'd
8:15 – 9:00	DOS 101 – describes how the current DOS rate works today • Origins of DOS • How the current DOS rate is derived • How DOS works ○ How to apply for it, use it, curtail it, how is it charged and what happens if you misuse it • Q&A	AESO
9:00 – 9:20	Recap of AESO conclusions on non-firm rates • Q&A	AESO
9:20 – 9:35	Break	
9:35 – 9:45	Key highlights of AESO's DOS modernization recommendation • Opportunity rate design principles • Proposed key changes to DOS	AESO
9:45 – 10:05	What we heard • DOS rate under preferred rate design • Fast recall rate • Annual term for DOS • DOS take-or-pay requirement • Provision of ancillary services as a DOS customer • Availability of capacity	AESO

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Time	Agenda Item	Presenter
10:05 – 11:30	AESO's DOS modernization recommendation • DOS Eligibility • DOS Connections • DOS Transactions • Suspension of DOS • DOS Rates Streamlined	AESO
11:30 – 12:00	Break	
12:00 – 12:50	Q&A Period • What we heard • AESO's DOS modernization recommendation	
12:50 – 1:00	Session close-out and next steps	AESO / Stack'd

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Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (Demand Opportunity Service)

May 20, 2021

Notice

In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session and making the session recording available to the general public at www.aeso.ca. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Bulk and Regional Tariff Design engagement sessions. This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4, by telephone at 403-539-2528, or by email at privacy@aeso.ca.

Using Zoom – Asking questions

- Two ways to ask questions if you are accessing the webinar using your computer or smartphone
  - Click “Raise Hand” and the host will be notified that you would like to ask a question. The host will unmute your microphone, you in turn will need to unmute your microphone and then you can ask your question. Your name will appear on the screen, but your camera will remain turned off.
  - Click “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.
- If you are accessing the webinar via conference call
  - If you would like to ask a question during the Q&A portion, on your phone’s dial pad, hit *9 and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone by hitting *6 and then you can ask your question. Your number will appear on the screen.

Stakeholder participation

The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:

- Listen to understand others' perspectives
- Disagree respectfully
- Balance airtime fairly
- Keep an open mind

Welcome and Introductions

Session purpose and objectives

- The purpose of this session is to engage stakeholders in a discussion of the AESO's demand opportunity service (DOS) modernization recommendation to allow expanded eligibility (including energy storage). The session objectives include:
  - Present additional background on the AESO's demand opportunity service – what it is, the service it provides and how it operates today
  - Share our learnings on DOS modernization stakeholder feedback
  - Present and discuss the AESO's DOS modernization recommendation for the purpose of seeking stakeholder feedback on the recommendation

Agenda

Time	Agenda Item	Presenter
8:00 – 8:15	Welcome, introduction, purpose and session objectives including extension request on engagement and filing schedule	AESO / Stack'd
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Agenda

Time	Agenda Item	Presenter
10:05 – 11:30	AESO's DOS modernization recommendation • DOS Eligibility • DOS Connections • DOS Transactions • Suspension of DOS • DOS Rates Streamlined	AESO
11:30 – 12:00	Break	
12:00 – 12:50	Q&A Period • What we heard • AESO's DOS modernization recommendation	
12:50 – 1:00	Session close-out and next steps	AESO / Stack'd

Registrants (as of May 13, 2021)

- Alberta Direct Connect Consumers Association (ADC)
- Alberta Energy
- Alberta Newsprint Company (ANC)
- Alberta Utilities Commission (AUC)
- AltaLink Management Ltd.
- ASCENT Energy Partners Ltd.
- BECL and Associates Ltd.
- Best Consulting Solutions Inc.
- BluEarth Renewables
- Brubaker and Associates, Inc. on behalf of Alberta Direct Connect
- Canadian Renewable Energy Association (CanREA)
- Capital Power Inc.
- Chapman Ventures Inc.
- Chymko Consulting Inc. c/o Cities of Lethbridge and Red Deer
- Consumers Coalition of Alberta (CCA)
- Customized Energy Solutions
- DePal Consulting Limited
- Dow Chemical Canada ULC
- Enel North America
- Energy Storage Canada (ESC)
- ENMAX Corporation
- EnPowered Inc.
- EPCOR Distribution & Transmission Inc.
- EQUS
- ERCO Worldwide
- FortisAlberta Inc.
- Heartland Generation Ltd.
- Imperial Oil ExxonMobil Canada
- Industrial Power Consumers Association of Alberta (IPCAA)
- Kalina Distributed Power
- Lionstooth Energy Inc.
- Mercer Peace River Pulp
- Millar Western Forest Products Ltd.
- NextEra Insights Inc.
- NRGCS
- Power Advisory LLC
- RMP Energy Storage
- Suncor Energy Inc.
- TC Energy
- TransAlta Corporation
- Turning Point Generation
- Utilities Consumer Advocate (UCA)
- URICA Asset Optimization
- Voltus Energy Canada, Ltd.
- West Fraser Mills Ltd.
- Weyerhaeuser

Overview of Engagement Process

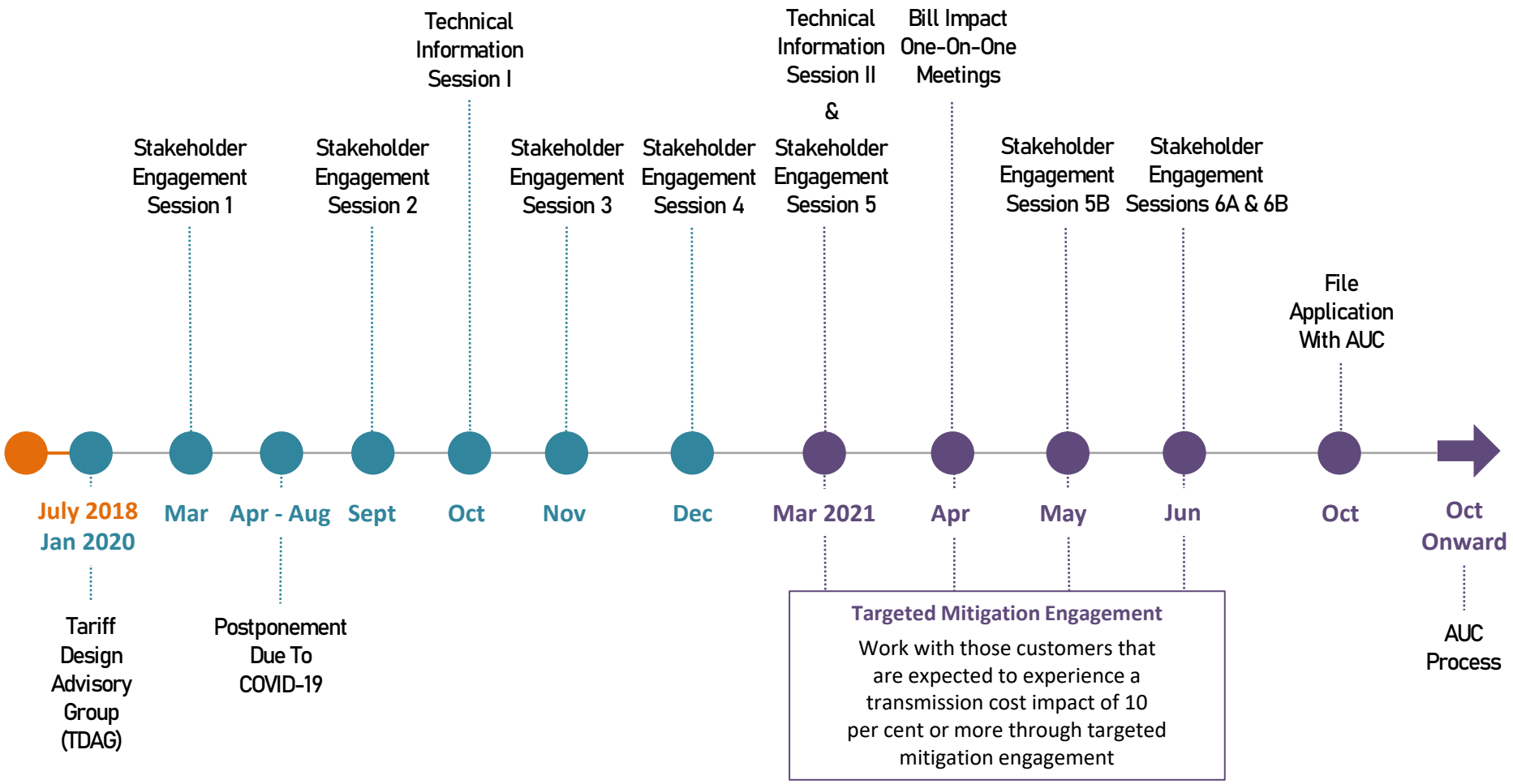
AESO Stakeholder Engagement Framework

Stakeholder engagement

The AESO's stakeholder engagement will:

- Ensure that stakeholders' needs and interests are consistently, transparently and meaningfully considered in the development of a rate design proposal for bulk and regional cost recovery;
- Provide clear objectives to be examined and evaluated in the development of a rate design proposal for bulk and regional cost recovery;
- Assist stakeholders in understanding and evaluating the AESO's preferred rate design;
- Supply stakeholders with tools that will allow them to consider and assess the impact of the AESO's preferred rate design; and
- Identify areas of alignment in order to support an efficient regulatory process.

Stakeholder engagement timeline



2018-19 2020 2021

DOS modernization

- The DOS rate has been a part of the tariff framework since de-regulation. However, the DOS rate has few users and would benefit from modernization
- This modernization effort looks to make improvements to the rate that:
  - Encourage greater opportunities for revenue maximization
  - Improve the operation and administration of this opportunity service

DOS 101 – Current DOS Rate Today

The origins of DOS (circa 2001)

- The original EAL* tariff application described opportunity service as
  - A short-term temporary service, provided on an as-available basis
  - Available to customers who could clearly demonstrate that their use of the transmission system would not be economically viable at the rates otherwise applicable
  - Used for short periods, in order to avoid the impact of contract demand or ratchet charges that would otherwise result
- The EAL stated
  - The objective of the opportunity service was to reduce the level of average rates charged to other customers by applying the extra revenue earned from the use of temporarily under-utilized transmission system assets
  - Pricing of the opportunity service should be on a value of-service rather than a cost basis
  - Criteria should be applied to prevent cannibalization of other revenues.

* ESBI Alberta Limited – the Transmission Administrator prior to the formation of the AESO

The origins of DOS (circa 2001) cont.

- The Energy & Utilities Board agreed and went further to state
  - Consistent and reliable application of qualification criteria is essential to the success of opportunity rates
  - To improve the chances of the accrual of benefits to other customers, effective screening criteria and regular audits are required

* ESBI Alberta Limited – the Transmission Administrator prior to the formation of the AESO

DOS 101

1. How the current DOS rate is derived (DOS pricing)
2. How DOS works
    i. How to apply for it (DOS Application Process)
    ii. How to use it (DOS transaction request process)
    iii. How to curtail it (DOS recall)
    iv. How is it charged (DOS settlement)
    v. What happens if you misuse it (DOS audit)

DOS 101 – How the current DOS rate is derived (DOS Pricing)

Derivation of the DOS pricing

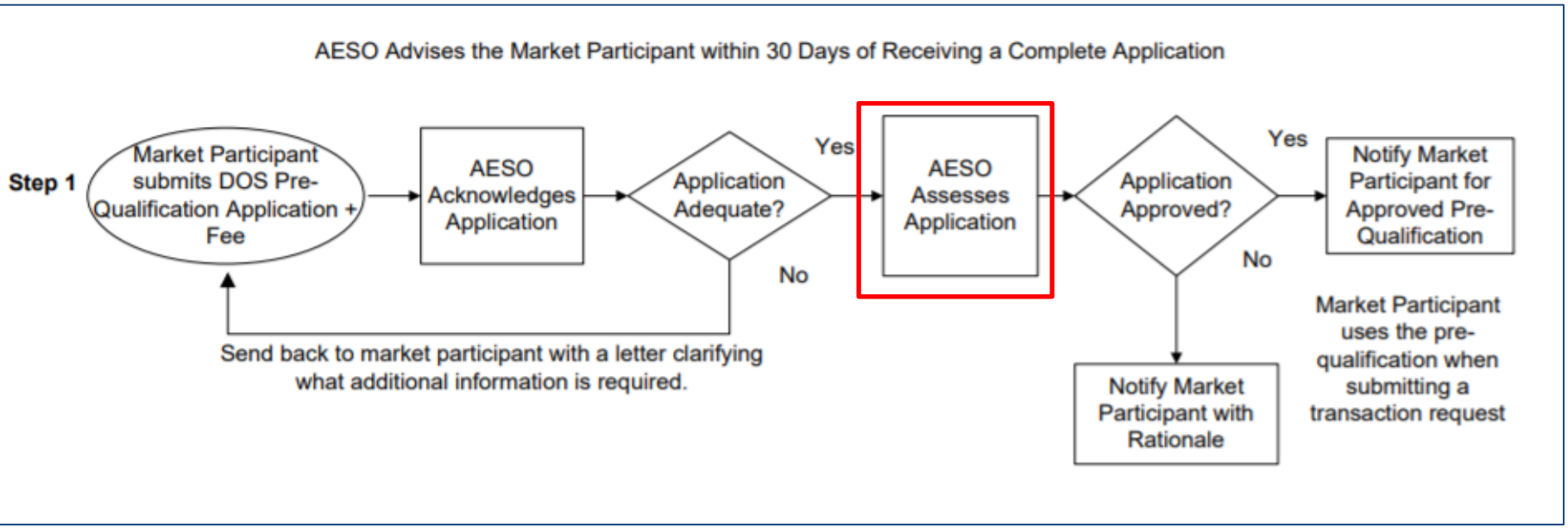
- Consistent with the original pricing principles the AESO's 2010 GTA stated
  - Rate DTS costs are first converted, by component, to $/MWh charges
  - The variable components of costs which are attributable to demand opportunity service — namely, the variable components of the bulk system and local system charges and the operating reserve charge are then allocated to the DOS rate
  - A contribution to transmission system fixed costs is added to each of the Rate DOS 1 Hour and Rate DOS Term services

DOS 101 – How to apply for it (DOS Application Process)

Annual DOS application

- Located in Appendix A of the ISO tariff
- Application requires:
  1. Start and end date
  2. Requested contract capacity
  3. Frequency of use
  4. MWh per month
  5. Technical information
     a) Load characteristic
     b) Anticipated load factor
     c) Power factor
  6. A case explaining that the use of this capacity is for a market opportunity and this energy consumption would not otherwise occur under Rate DTS

Current application process



Assess application from two perspectives

1) **Regulatory / Economic** – Does the application provide evidence that use of the service will not result in the reduction of other revenues?

2) **Reliability** – Can the system support this DOS load?
   - Assess power flows and voltage stability at peak load
   - If issues found may require further study

https://www.aeso.ca/assets/Uploads/DOS-Business-Practice-Document.pdf

Current eligibility requirements

A market participant must satisfy the AESO through a clear, thorough and convincing case, with supporting facts, that demonstrates that the proposed increase in demand:

1. Will be used on a temporary or repeated short term basis
   - The premise of this requirement is that if you are going to use the capacity on a long-term basis, then customers should contract for DTS
2. And, will
   - Replace an alternative source of energy where the market participant (i) has an available alternative source of energy, including means to employ it, that could be rationally used instead of electric energy from the AIES; and (ii) the cost of utilizing the alternative source of energy is less than the cost of receiving additional electric energy under Rate DTS; **or**
   - Take advantage of a market opportunity that requires additional electric energy where the cost of receiving additional electric energy under Rate DTS renders the opportunity uneconomic; and the market participant's alternative is to forego the opportunity

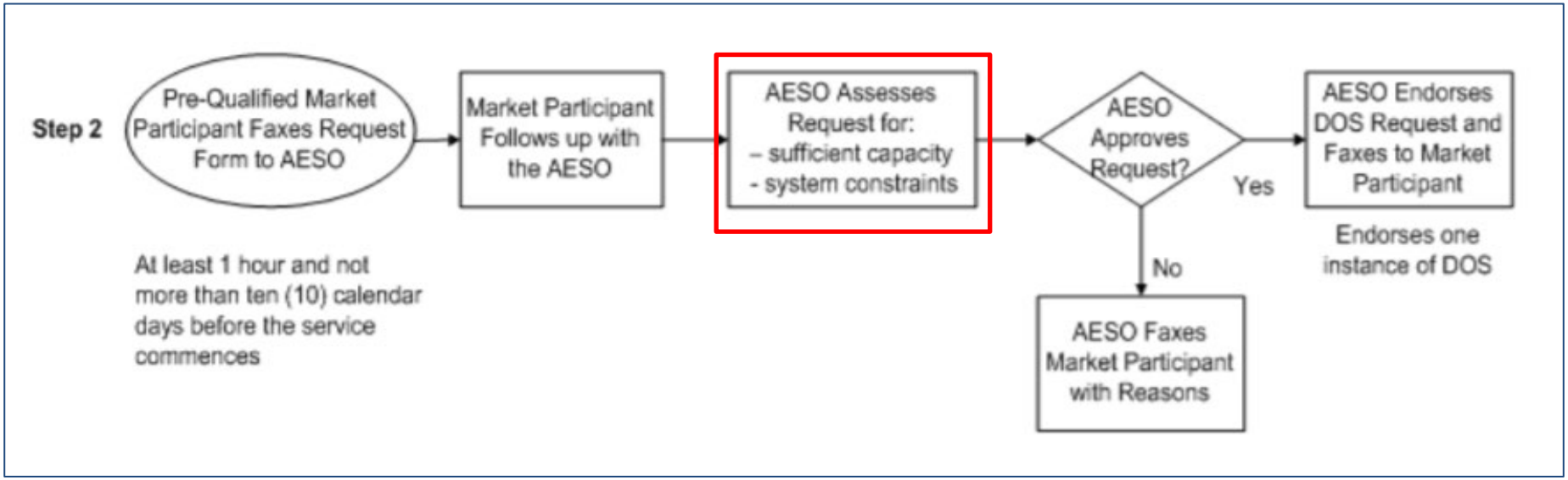
Ineligible reasons for using DOS

The use of DOS energy is not permitted if the request is to:

- Replace the energy provided by an on-site self-supplying generating unit on an unplanned outage or derate
- Be an alternative to the adoption of energy efficiency measures where the use of DOS could make the energy efficiency measures uneconomic

DOS 101 – How to use it (DOS Transaction Request Process)

Current DOS usage request process



Transaction request may be denied for two reasons:

1) **Erroneous request**
   - Incomplete form
   - No valid DOS contract
   - Volumes exceed contract capacity or MWh/month

2) **n-1 condition –** indicating insufficient capacity or constraints
   - Assessment performed upon receipt of the transaction request

DOS 101 – How to curtail it (DOS Recall)

DOS types and recall requirements

- The DOS rate type specifies the response requirement for recall

DOS type	Current rate	Recall requirement rationale
7 minute	$5.48/MWh	Seven minutes was chosen as a reasonable amount of time needed to remove the opportunity load off the electric system as quickly as possible but still allow time for the market participant to react to the instruction
1 hour	$18.14/MWh	Original consultations suggested there are customers that could be curtailed but needed more time to shut down processes
Term	$117.97/MWh	Seven minutes but would be recalled after 7 minutes and 1 hour DOS

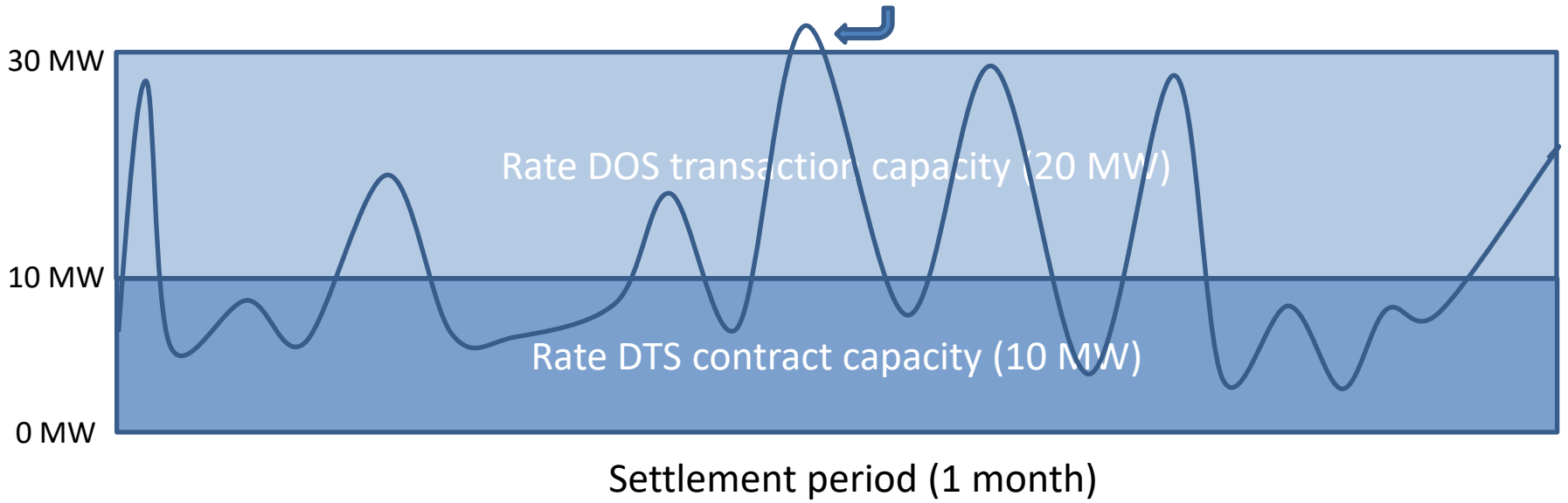
DOS energy recall

- DOS recalls occur for three primary reasons:
  1) Supply adequacy (Energy Emergency Alert (EEA) events)
  2) Real-time transmission constraint
  3) Voltage support
- Recall is issued to all DOS loads deemed effective in order of priority
- The system controller does not try to assess the duration of the contingency

DOS 101 – How is it charged (DOS Settlement)

Metered energy for DOS settlement

- DTS charges are applied to all metered energy at or below the DTS contract capacity
- DOS charges are applied to all metered energy above the DTS contract level and below the sum of the DTS and DOS contract capacities
- DTS charges are applied to any metered energy greater than the sum of the DTS and DOS contract capacities



Take-or-pay provision and losses

- The DOS settlement includes a take-or-pay provision for transaction requests
  - If a DOS customer submits a transaction request to use DOS energy in a month but does not actually use as much energy as indicated in the transaction request the customer may have to pay 75 per cent of the transaction request energy rather than pay for the actual energy consumed under DOS at the applicable DOS rate
  - The intent of this provision is to have the market participant submit realistic transaction requests
- DOS settlement includes the allocation of losses to the DOS energy consumed in the month
  - Each DOS load is assessed a loss factor

DOS 101 – What happens if you misuse it (DOS Audit)

Effect of disqualification

- The AESO may audit any market participant's circumstances to verify that the use of DOS complies with the ISO tariff and request additional information to:
  - Determine whether the use of DOS has ever failed to comply with the eligibility criteria
  - Identify any circumstances that would justify leniency or severity in applying any retroactive charges
- If the AESO finds that the market participant is no longer eligible for DOS, all metered energy delivered to the market participant will be billed under Rate DTS as of the effective date of the disqualification and the AESO will terminate billing under Rate DOS
- The AESO may recover retroactive amounts for the period during which such market participant did not qualify for, but was billed under, Rate DOS

Questions

Recap of AESO Conclusions on Non-Firm Rates

Forecasting and planning for load on Alberta's system

- Forecast load location and level, and generation location and dispatch are main inputs that are used to create scenarios for transmission system planning studies
  - Info provided in P1 – System Planning Report Transmission Tariff Work Group
- The AESO uses the following approach when planning for load on the system, be it low load factor, high load factor, standby with self-supply or price responsive/flexible:
  - Load forecasting methodology is a blend of top-down economic-based Alberta internal load (AIL) forecasts combined with bottom-up point-of-delivery (POD) level load shapes
  - Hourly gross load forecasts at each POD are the basis for load information used in planning the transmission system
  - Deterministic study conditions, developed based on expected stress conditions from anticipated combinations of load and generation output are analyzed
  - Characteristics of POD level load are captured in hourly forecast; individual POD level consumption in the study is dependent on its correlation with the study conditions (e.g., expected POD consumption during regional peak)

Related to AUC Questions 4.1 (g) & 6

Forecasting and planning for load on Alberta's system (cont.)

- Other considerations
  - AESO is leveraging existing forecast processes to account for energy storage, in alignment with its expected operation
  - DOS load is removed from POD level load data in study case if causing system issue
  - For local studies, the net flow of sites with self-supply may also be tested at the DTS contract level and a high outflow condition

Related to AUC Questions 4.1 (g) & 6

Session 4 feedback on energy storage tariff treatment

- What we heard
  - Current rates reflect one class of service: firm load
  - Consideration should be given to rates that reflect the different types of uses of the system: non-firm rates
  - Types of tariff treatment that could reflect different use of the system:
    - Rates that allow additional use of available capability that would not otherwise occur
    - Rates that reflect transmission cost savings from interruptions to relieve constraints
    - Rates that encourage participation in markets or provision of ancillary services

Summary of non-firm rate assessment

	Rates that reflect transmission cost savings from interruptions to relieve constraints	Rates that encourage participation in markets or provision of ancillary services	Rates that allow additional use of available capability that would not otherwise occur
Description	• Demand reduction (or increase) beneficial to reduce transmission constraints, value of which is reflected in rates	• Reduced DTS rate available everywhere to eligible loads / energy storage that participate in markets or reliability services (energy, OR)	• Discount relative to DTS for curtailable service to enable use of the system that would not otherwise occur to offset costs for other customers
Rationale	• Identify need in specific location • Interrupt load to manage transmission constraints • Lower future transmission costs	• Available everywhere • Encourage participation in market / service through additional bids and offers	• Encourage efficient use of capability without incurring additional transmission costs (AESO can recall and load must curtail)
Conclusions	• Rates that reflect transmission cost savings from interruptions to relieve constraints have a strong locational component	• Rates that encourage participation in markets or provision of ancillary services do not impose different transmission costs than those that do not, and provision of services is compensated through those markets / contracts	• Rates that allow additional use of available capability that would not otherwise occur are beneficial for all stakeholders provided the use of this capability would truly not otherwise occur under Rate DTS

Rates that allow additional use of available capability

- The AESO has considered options to reflect different use cases of the grid and has identified that energy storage could make use of transmission capability that would not otherwise occur for benefit of other customers or drive the need for additional transmission capacity
- DOS is one such rate
  - Allows customers connected to the grid to draw additional power over and above the amount they are contracted for under DTS as a means of reducing DTS charges for all customers
- Current treatment of DOS load
  - The AESO does not plan to build or modify transmission facilities for DOS customers beyond their DTS contract levels

Questions

Break

Key Highlights of AESO's DOS Modernization Recommendation

Opportunity service rate design principles

- Maintain original intent of the DOS rate while enabling greater use for revenue maximization and improve the operation and administration of the rate
- Ensure opportunity service rates result in use of transmission capacity that would normally not otherwise be used under Rate DTS
- Ensure the design
  - Applies the appropriate level of discretion in approvals
  - Does not disqualify existing DOS loads
  - Facilitates the timely review of applications given the potential increase in number of applications
  - Aligns with current AESO operations, planning, connections, and settlement processes

Proposed key changes

Current Rate DOS

- Technical Assessment
- Annual term and re-application
- Temporary or repeated short-term basis
- Business case or self-supply outage
- Recallable

Proposed Rate DOS

- Technical Assessment
- Business case or self-supply outage
- Maximum load factor
- Bidding and dispatch

What We Heard

DOS rate under the Bulk and Regional preferred rate design

Stakeholders commented that the DOS rate is too high especially with the preferred changes to cost allocation

- The DOS rate is estimated to change from ~$5/MWh to ~$13/MWh under the preferred rate design
- AESO's view is the DOS rate is still sound and redesigning the mechanics of the DOS rate is not part of recommendation
- Rate DOS is supportive of cost causation principles
  - Rate DTS reflects use of the system, and
  - Rate DOS reflects only the energy component costs in Rate DTS and not the demand components as transmission is not planned to meet the forecasted DOS load

Fast recall rate

Some stakeholders suggested the AESO consider developing fast recall product offered at a lower rate to the existing 7 min DOS

- Faster response capability is achieved with ancillary services
- DOS should not be considered an ancillary service
- The AESO procures required ancillary services competitively and does not obtain them indirectly through a transmission usage rate

Annual term for DOS

Proponents indicated that a one-year term for DOS is not long enough to make planning or investment decisions

- Current DOS term was intended to validate that the historical usage of DOS aligned with intention to use DOS capacity before granting the renewal
- Introducing dispatchable DOS removes the need for DOS to have a limited term
- With dispatchable DOS, a participant must actively manage their assets
  - Ex: customer has 10 MW DOS capacity to ensure compliance with ISO rules of dispatchable DOS capacity priced at the offer cap, and 20 MW of DTS capacity
  - To be compliant with DOS Terms and Conditions and energy market rules, the metered load at the site must be 30 MW when energy prices are below the offer cap
  - Conversely, if the price is at the price cap the DOS load must be curtailed by the bid amount

DOS take-or-pay requirement

Stakeholders question the continued need for a take-or-pay requirement

- The AESO is proposing to replace the transaction request with an energy market bid
  - To qualify for Rate DOS the AESO is proposing customers bid their DOS capacity into the energy merit order
  - Energy market dispatch compliance will prevent a Rate DOS participant from bidding for more DOS than will be used
- Dispatchable DOS bids effectively remove the need for the take-or-pay incentive
- Losses will continue to be assessed against DOS energy

Provision of ancillary services as a DOS customer

Some stakeholders requested the AESO clarify how DOS loads providing AS products would be managed

- DOS load would not be excluded from providing ancillary services
- By making DOS capacity dispatchable the AESO can use existing mechanisms for reserving capacity from ancillary service resources
  - For example, when a resource is dispatched for operating reserve that capacity is automatically removed from the energy merit order
  - During an EEA event load dispatched for operating reserve would not be curtailed until EEA2

Availability of capacity

Stakeholders suggested the AESO publish the location and availability of transmission capacity for DOS

- The AESO will not be prioritizing the development of this information as part of DOS modernization

AESO's DOS Modernization Recommendation

DOS Eligibility

DOS eligibility: Providing opportunity service while avoiding DTS cannibalization

- The AESO proposes to continue to require the provision of a business case to assess eligibility based on the eligibility criteria set out in the terms and conditions for the rate
- Eligibility assessment to include a combination of qualitative and quantitative measures:
  i. Technical Assessment
  ii. Business Case Assessment
  iii. Limited Use

Providing opportunity service while avoiding DTS cannibalization (cont.)

- Eligibility assessment to include a combination of qualitative and quantitative measures:
  - i. **Technical Assessment:** Continue to assess reliability impacts of taking DOS load at time of application
  - ii. **Business Case Assessment:** Continue to provide a business case explaining the need and use for DOS energy
    - Demonstrating that the energy would not be consumed if not for DOS
    - Indicating MW requested and maximum MWh/month or MWh/yr
  - iii. **Limited Use:** Create a quantitative measure of use of DOS that removes some of the subjectivity
    - Replace temporary or repeated short-term criteria
- This combination balances enabling DOS while discouraging the cannibalization of DTS for DOS

Technical assessment

- The technical assessment at time of application is done for reliability reasons and not to determine if and when DOS capacity would be available
- The AESO will continue to perform this assessment on any new or revised DOS application
- The AESO is proposing to make the DOS application part of the SASR process
  - The requirements specified within Alberta reliability standards (ARS) will drive the breadth of the study scope of a new or modified connection

Business case assessment

- The business case assessment will remain a qualitative assessment
- When reviewing the business case at the time of application the AESO will assess
  - Is the business case plausible?
  - Is there a convincing case that the customer would forgo the opportunity:
    - Under Rate DTS?
    - If DOS were not available?

Quantitative measure to replace temporary or repeated short-term use

- The AESO recommends replacing the temporary and short-term use requirement with a maximum load factor for DOS energy
- AESO identified three ways to guide an appropriate maximum usage level for DOS:

1. **Historical DOS usage**
   - Historical DOS usage as an indication of what future use should be
2. **Ratio of actual energy use compared to DTS capacity**
   - The unused capacity that exists because customers infrequently use all the capacity they pay for could be available for DOS
3. **Statistical assessment of system load use**
   - Infrequent use of the system occurs in the hours where load is one standard deviation above the average load

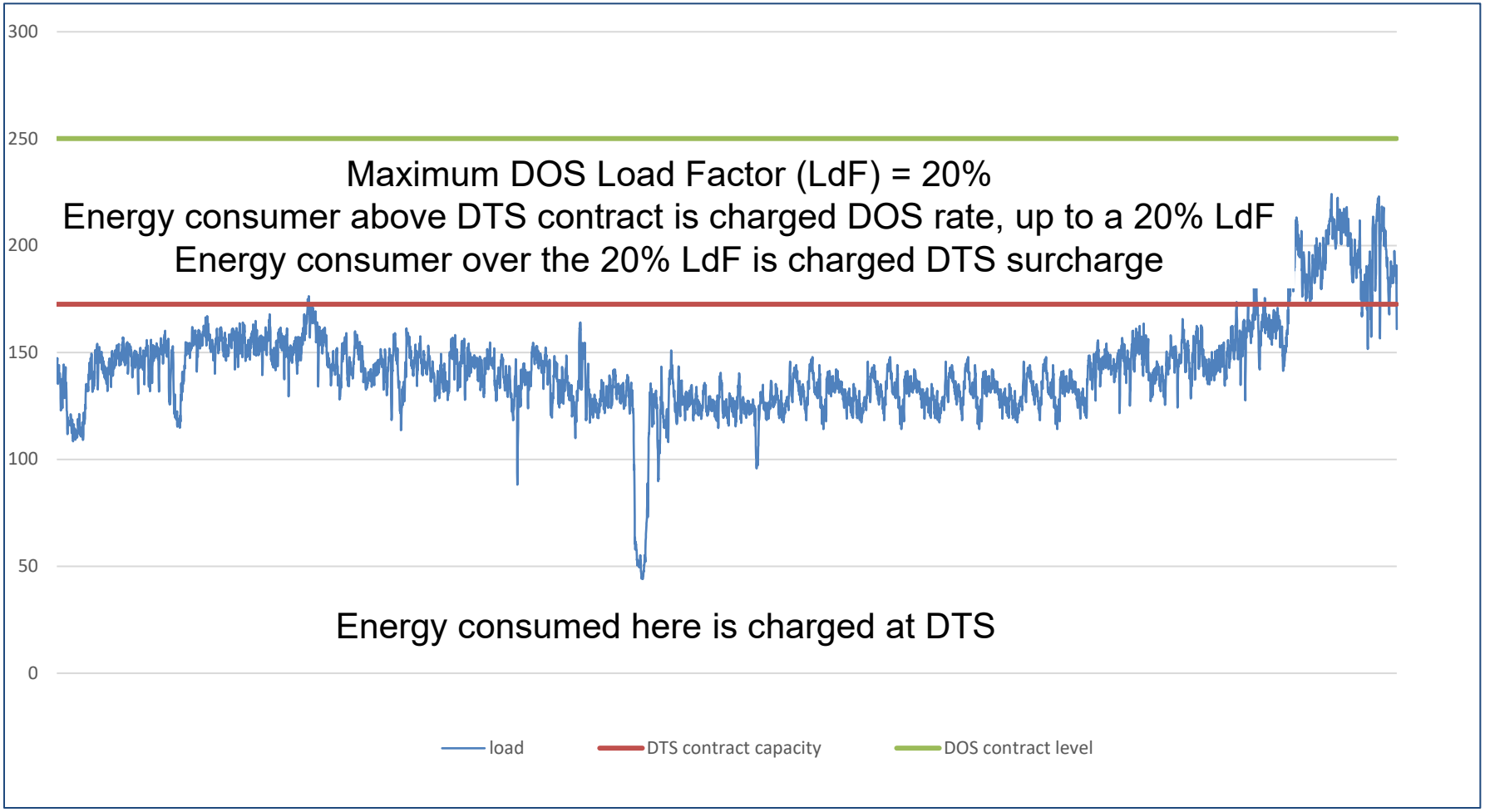
- Using these three guides the AESO proposes to develop a quantitative measure for this criteria

DOS maximum load factor

- Historical DOS utilization shows maximum load factors of 30 per cent monthly and 15 per cent annually
- Usage ratio of DTS energy consumed to DTS capacity (1 - ratio) indicates 23 per cent
- A statistical assessment of load - one standard deviation from the mean is 18 per cent (~~2017~~ 2007– 2019)

- **Given this guidance the AESO proposes a maximum annual load factor of 20 per cent for DOS load**

DOS maximum load factor – Example



* *DTS surcharge settlement is explained on the following slide*

Proposed modifications to DOS settlement given the new eligibility criteria

- Charges to DOS customer:
  - Energy consumed above the DTS contract levels will be charged at the DOS rate up to the maximum DOS load factor
  - Energy consumed above the maximum DOS load factor will be charged at DTS Surcharge rate
  - DTS Surcharge is equivalent to the current DOS Term rate in only as it relates to the $/MWh charge
    - DOS Term rates capture full DTS costs in a $/MWh form

AESO assessment summary

- **Technical assessment**
  - Taking DOS energy does not impact voltage and transient stability
- **Quantitative assessment**
  - Max load factor >= expected DOS load factor of customer
  - Max connection capacity >= DTS + DOS contract capacity
- **Qualitative assessment**
  - Is the business case for use of DOS plausible
  - Is there a convincing case that the customer would forgo the opportunity
    - Under rate DTS
    - If DOS were not available

Quantitative methods to replace temporary or repeated short-term use

- Temporary and short-term use requirement to be replaced with a more quantitative assessment
- Using the three guides the AESO proposes a quantitative measure for this criteria
  - **a maximum annual load factor of 20 per cent for DOS load**

DOS Connections

Applying for DOS

- The AESO proposes that the DOS application be included in a participant's SASR
- There are currently three processes for SASR:
  1. Connection Process applies to new connections
  2. Behind the Fence (BTF) Process applies to participant changes to existing facilities
  3. Contract Process applies to changes to SAS contract capacity
- The AESO proposes to modify the SASR and the SAS processes to include DOS requests

DOS for connections

- New connections
  - The AESO recommends the DOS capacity be assessed as part of gaining system access service or when participants change contract capacity
  - The pool participant will be provided a dispatchable sink asset with a maximum capability equal to the contracted DOS capacity for the purposes of energy market participation
  - The participant is responsible to manage the asset
  - Should the market participant wish to increase or reduce that capacity, those changes would be managed through the existing contract and asset management processes
- Existing connections
  - The AESO proposes to adapt the current SASR contract process to include DOS

DOS Transactions

Modernizing the operation of DOS

- The AESO is recommending to shift the operation requirement for the DOS rate from the tariff and into the energy market rules to rely on existing rules, procedures and practices
  - Export Opportunity Service and Import Opportunity Service have their real-time market operation defined within the energy market rules
  - The notification and recall requirements of the existing Rate DOS reflect capabilities of load market participants that existed over two decades ago
- Bid submissions would make DOS capacity continuously visible to system operators and more easily integrated into automated system studies and operation on a real-time basis
- AESO is proposing to include DOS loads as part of the energy market merit order with asset specific ramp rates

Suspension of DOS

Suspension of DOS

- Failure of an AESO audit
  - The AESO will retain the ability to audit a DOS customer
  - Examples of audit failure:
    - Use of DOS during a self-supply generator unplanned outage or derate
    - Consistently exceeding maximum annual load factor on DOS load
    - Exceeding combined DTS and DOS contract capacity
    - Operating in a manner that is clearly inconsistent with application business case
- Non-compliance to an AESO directive
  - Directives are made for safety or reliability reasons
  - Dispatch non-compliance would not necessarily result in suspension of DOS
    - Rule non-compliance is assessed by the AESO and referred to the MSA

Streamline of DOS Rates

One hour DOS is redundant

- The AESO is recommending removing the 1-hour DOS type
- 1-hour DOS has gone unused since 2004
- The proposed Dispatchable DOS design that dispatches load based on a participant submitted ramp rate removes the need for a rate-specific response time

Dispatchable term DOS

- Term type DOS is intended for sites looking to take planned outages of their self-supply generators and rely on the grid for back-up power supply
- The AESO proposes to keep the term DOS rate for this purpose but replace the current transaction request process with an energy market bid
- DOS energy cannot be used to serve load during unplanned generation outages or derates

Summary

Review | Summary of proposed changes

Measures	Remove	Add	Leave
Prevent DTS cannibalization from DOS	Annual term and fee, temporary or short-term usage	Load factor eligibility limit	DOS capacity terms, alt energy source or market opportunity (w/ business case), audit and disqualification
Assess available capacity for DOS	Monthly energy transaction request	DOS request in SASR, bidding requirement for DOS load (dispatchable DOS)	Reasons for DOS energy recall
Recallability of DOS	Monthly energy transaction request, 7 min and 1 hour and term DOS (combine to dispatchable DOS), Transaction fee	Recall in accordance with ISO rules (dispatchable DOS)	
Settlement of DOS	Take-or-pay requirement	DTS surcharge for exceeding load factor limit Operating reserves charged in same way as Rate DTS	Term Type DOS rate, Metered energy check, losses charged to DOS

Break

Question Period

What We Heard and AESO DOS Modernization Recommendation

Next Steps

Engagement schedule

- **March to June 2021 |** Targeted Mitigation Engagement – Continue to work with those customers that are expected to experience a transmission cost impact of 10 per cent or more
- **May 28, 2021 |** Stakeholder feedback due on questions set out in Stakeholder Comment Matrix Session 5B (DOS)
- **June 3, 2021 |** Host stakeholder engagement session to discuss Session 5 stakeholder feedback or follow-up and key questions raised by Commission staff, and to provide additional clarity and build mutual understanding of the AESO's preferred rate design and stakeholder concerns
- **June 24, 2021 |** Host stakeholder engagement session to discuss AESO's targeted mitigation discussion outcomes, Session 5B (DOS) and Session 6A stakeholder feedback, and areas of alignment
- **October 2021 |** File application with AUC for public proceeding and approval

Session feedback

- We want to thank you for attending the Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS) and we would appreciate your feedback on the session
- We invite all interested stakeholders to provide their input on this session via the questions set out in the **Stakeholder Comment Matrix Tariff Session 5B (DOS) on or before May 28, 2021**. The matrix will be available on May 13, 2021 on our website at www.aeso.ca.
  - Path: Stakeholder Engagement > Rules, standards and tariff consultations > Tariff (filter) > Bulk and Regional Tariff Design > Session 5B (DOS) | May 20, 2021

June sessions

- The next session (Session 6A) will be hosted on **June 3, 2021**. Registration details are now available on our website
- **Session 6A purpose**
  - The purpose of this session is to engage stakeholders in a discussion of Session 5 stakeholder feedback or follow-up and key questions raised by the Alberta Utilities Commission (AUC) staff, and to provide additional clarity and build mutual understanding of the AESO's preferred rate design and stakeholder concerns.
- **Session 6A objectives**
  - Share our learnings on Session 5 stakeholder feedback or follow-up
  - Present and seek stakeholder input on additional information on preferred rate design, including analysis of the potential response to the incentives provided in the rate design
  - Present responses to key questions raised by AUC staff
  - Seek to understand outstanding stakeholder concerns

June sessions cont.

- Following Session 6A, the AESO will host Session 6B on **June 24, 2021.** Registration details will be available at the end of May on our website
- **Session 6B purpose**
  - The purpose of the session is to engage stakeholders in a discussion of the AESO's targeted mitigation discussion outcomes, Session 5B (DOS) and Session 6A stakeholder feedback, and areas of alignment
- **Session 6B objectives**
  - Provide an overview and seek stakeholder input on the outcomes of the targeted mitigation engagement
  - Share our learnings and seek stakeholder input on Session 5B (DOS) and Session 6A stakeholder feedback and areas of alignment
  - Present and discuss implementation considerations
  - Seek to understand outstanding stakeholder concerns

Questions

Contact the AESO

- ***Twitter:*** *@theAESO*
- ***Email:*** *tariffdesign@aeso.ca*
- ***Website:*** *www.aeso.ca*
- Subscribe to our stakeholder newsletter

Thank you

Appendix 1 – DOS Usage Statistics and Comparison to Other Opportunity Service Rates

Historical DOS statistics

Number of transaction requests by type:

Type	# of Sites	# of transaction requests
DOS 7 minute	31 (2 sites currently)	2501
DOS 1 hour	11 (last used in 2004)	207
DOS term	22 (1 site currently)	66

Number of recalls by reason:

Year	Reason	# of DOS recalls
2006 - 2012	Supply Adequacy	32 EEA events
	Constraint and Voltage	70
2013 - 2021	Supply Adequacy	41 EEA events
	Constraint and Voltage	1

Export Opportunity Service (XOS) background

- Exports are charged greater of:
  a) $8.28/MWh x interchange transaction for the month + intertie loss charges, where

     intertie loss charges = sum of intertie loss factor x hourly interchange transaction MW x pool price

  b) A take or pay amount equal to the sum of $7.33/MWh x 75 per cent of scheduled capacity + the sum of 75 per cent of scheduled hourly capacity x pool price x intertie loss factor
- Like DOS the rate was derived from DTS
  - Rate DTS costs are first converted, by component, to $/MWh charges
  - The export opportunity rates are then allocated the variable components of costs which are caused by exports when they occur, as well as a contribution to fixed costs (20 per cent)

Appendix 2 – Load Factor Determination

Historical DOS use

- Historical DOS utilization shows maximum load factors of 30 per cent monthly and 15 per cent annually
  - Based on data from 2001 to 2020

Statistical assessment guide

The one-sided normal distribution of all DTS load in 2019 revealed:

	MW	# of Hours	% of Hours
Average	6,812.79	4231	48.3%
Average + 1 St Dev	7,432.16	7220	82.4%
Average + 2 St Dev	8,051.53	8631	98.5%
Average + 3 St Dev	8,670.90	8760	100.0%

- Per cent of the hours within one standard deviation for 2018 is 83.5 per cent and 2017 is 81.8 per cent
- The AESO surmises that load greater than one standard deviation is a reasonable measure of infrequent use acknowledging the use of DOS should be infrequent

Usage ratio guide

- System built to serve 100 per cent of in merit energy
- Load pays for that system
- Real-time utilization of the system is coordinated through dispatch of the market
- DOS is a tool for DTS customers to “sell” the unused capacity and the proceeds of the sale applied as a reduction to cost of DTS
- The ratio of DTS energy consumed to DTS capacity is another proxy for the level of energy use that is temporary or short-term
- Usage of DTS energy consumed to DTS capacity equals 23 per cent

Appendix 3 – Dispatch and Dispatch Compliance

Distinction between dispatchable and controllable

- Dispatchable Assets are:
  - All source assets 5 MW or greater
  - All sink assets participating in DOS (DOS capacity must be at least 5 MW)
  - Any sink assets 5 MW or greater that choose to be dispatchable
- Controllable assets are dispatchable assets that can comply with dispatch instructions within the allowable dispatch variances (i.e., +- 5 MW)
- When an asset request is made the AESO makes an assessment as to whether the asset is controllable or not. This decision is often tied to the underlying technology
- For example:
  - Wind and solar AGFs are considered dispatchable but not controllable and therefore have different dispatch compliance rules than generating units
  - Energy storage* and loads with onsite generation are considered controllable

* AESO is proposing an alternative dispatch compliance method for Energy Storage and VER Hybrids

Dispatchable DOS advantages

- Dispatchable DOS loads participate in the energy market by submitting a bid for the approved Rate DOS transaction capacity. Doing so accomplishes two things:
  1. It simplifies the DOS for real-time operations because the in merit bid volume indicates the amount of DOS load being served in real-time and provides a curtailment order based on bid price
  2. Bidding DOS load ensures the load under Rate DOS is truly curtailable, leveraging the existing ISO rule and compliance processes rather than build duplicative curtailment requirements within terms and conditions of the DOS rate
- Should DOS capacity become unavailable, or restricted, the system controller has the ability within the existing tools to “limit” the DOS consumption in accordance with congestion management protocols through mitigative measures such as directives or automated schemes
- Failure to comply to an ISO directive to curtail DOS could result in suspension of DOS participation and a recalculation of the DTS contract capacity, administrative penalties, and the recovery of DTS revenue charged while under DOS

Dispatchable load bidding

- Note, the AESO anticipates proposing recommended changes to the current ISO rules for bidding as described in division 203 – Energy Market of the ISO rules, through the Energy Storage Rule Amendments initiative. Stakeholders will be engaged in consultation on proposed amendments to the ISO rules at that time

Appendix 4 – Eligibility Options

DOS eligibility options evaluation

Accepted	Pro	Con
Maximum annual load Factor	Provides certainty; mitigates risk of excessive DTS cannibalization	Not an accurate measure of individual energy for market opportunity
Application business case	Able to characterize unique market opportunity for opportunity service	Evaluation somewhat subjective, uncertainty of acceptability
Eliminated	**Pro**	**Con**
Third party audit of market opportunity	Ability to evaluate unique market opportunities	Costly to user
Owner attestation	Places evaluation with customer who is best able to evaluate market opportunity	Structuring an effective attestation may be difficult
Post use audit	Able to evaluate with actual information on use of opportunity service	Uncertainty of outcome and cost for user
Timing limitations on DOS/DTS contract changes	Provides certainty on the opportunity nature of the energy use	Limits ability to take advantage of opportunity during time limitations; time limitation may be somewhat arbitrary
AUC approval	Authoritative	Uncertainty of outcome and cost for user

Appendix 5 – Acronyms

Acronyms

- AGF = Aggregated Generating Facilities
- AIES = Alberta Interconnected Electric System
- AIL = Alberta internal Load
- ARS = Alberta Reliability Standards
- AS = Ancillary Services
- AUC = Alberta Utilities Commission
- BTF = Behind The Fence
- CP = Coincident Peak
- DFO = Distribution Facility Owner
- DOS = Demand Opportunity Service
- DTS = Demand Transmission Service
- EAL = ESBI Alberta Limited (Transmission Administrator prior to the formation of the AESO)
- EEA = Energy Emergency Alert
- GTA = General Tariff Application
- IOS = Import Opportunity Service
- LdF = Load Factor
- MSA = Market Surveillance Administrator
- OR = Operating Reserve
- PILON = Payment in Lieu of Notice
- POD = Point-of-Delivery
- SASR = System Access Service Request
- VER = Variable Energy Resource
- XOS = Export Opportunity Service

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Company Representative
Comments From:	Company Name			**Phone:**	Contact Phone Number
Date:	[yyyy/mm/dd]			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	
6.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Demand Opportunity Service (DOS) Bid Examples

Purpose

The purpose of this document is to build on the DOS modernization recommendation explanation of DOS load bidding in the energy market, provided during the Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS) hosted by the AESO on May 20, 2021. The examples are intended to provide an overview of how DOS load could bid in a simple manner, recognizing that more sophisticated bidding strategies could be developed.

The information contained in this document is provided to stakeholders in the Bulk and Regional Tariff Design engagement for information purposes only and to further stakeholder understanding of the information presented at Session 5B (DOS) on May 20, 2021. The information in this document is not intended to be used or relied upon for any other purpose.

Bid submission and dispatch

Loads, using a dispatchable sink asset provided by the AESO, are able to bid into the energy market as a means of having their consumption dispatched in line with the price levels submitted through their bids. Bids are submitted with volume and price pairs like offers, where the bid indicates the volume of energy the sink will consume when price is below the bid price, and correspondingly indicating how much load will reduce should price exceed the bid price. Unlike offers, bids will not be paid for their response. Bid submission operates at the inverse to energy market offers.

Like energy market offers from a source asset, a participant may bid up to seven blocks of energy from a sink asset. Those seven blocks are then assigned to a dispatchable sink asset. For energy market offers, block zero is always the lowest priced block submitted. For bids, block zero is always the highest priced block submitted. Subsequent bid blocks are at least one cent lower in price than the previous block.

Bid blocks are “dispatched on”, meaning load is dispatched to consume, when the block price is above the system marginal price (SMP). Bid blocks are “dispatched off”, meaning load is dispatched to reduce, when the block price is at or below the SMP. When a bid block is “dispatched on” it means the energy in that block can be consumed as price has not yet reached the bid price, and the overall load should increase by the block size. When a bid block is “dispatched off” it means the energy in that block is to no longer be consumed as the price is above the bid price and the load should decrease by the size of the dispatched block.

Figure 1 below provides two different examples of bids for a 30 MW sink asset. The “in-merit” bid indicates the participant wants to be dispatched in much the same fashion as a “price-taker” offer by placing all the block MW at the energy market price cap. The “out-of-merit” bid indicates the participant does not want to be dispatched to consume by placing the bid block MW at the price floor.

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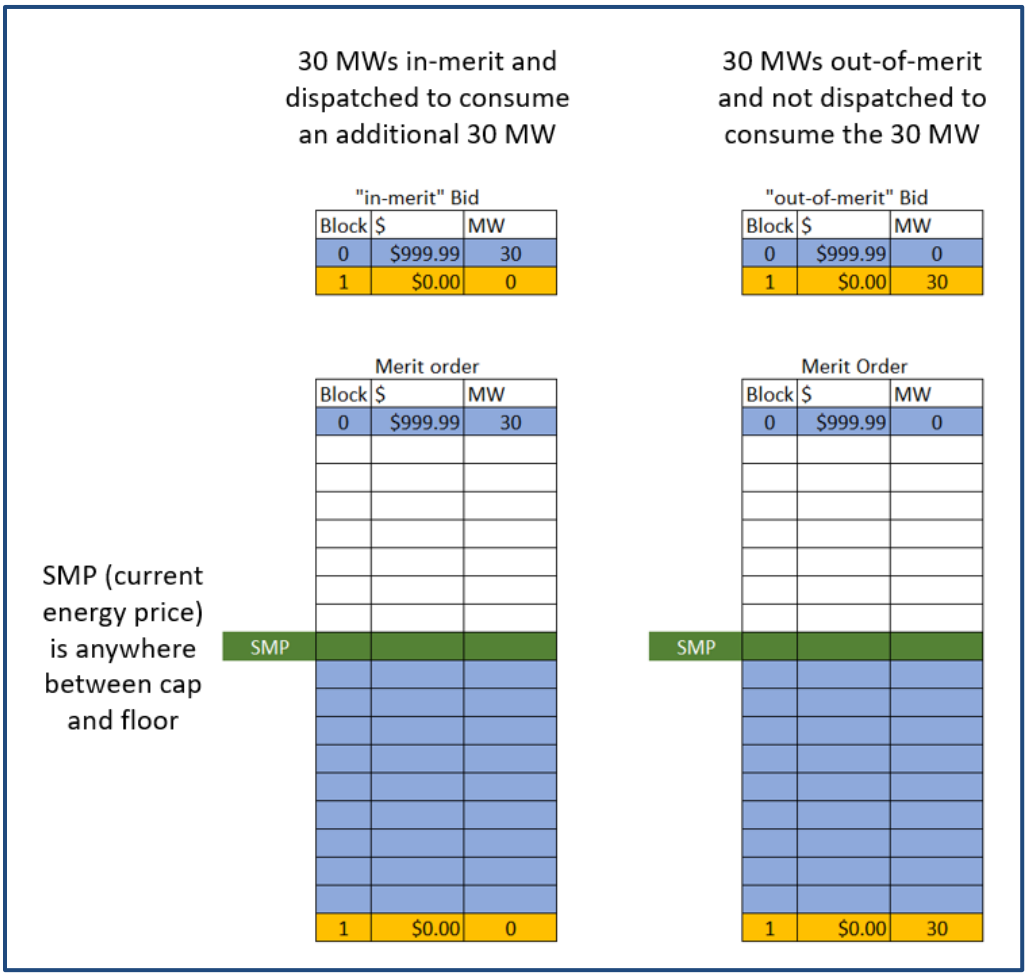
Figure 1: Bid prices and dispatch



The “must offer” requirement that applies for energy market offers, which requires all available capacity to be offered into the market does not directly apply for energy market bids. For sink assets in the energy market, bids may be submitted for all or part of the load attributed to the participant. Because of this bid feature the concept of “must bid the entire load” does not apply like “must offer” does for generators. However, the requirement to comply (i.e., “must comply to the dispatch instruction”) applies to both bids and offers.

The compliance requirements for bids are less stringent than those for offers. This is because the nature of bid load is dependent on the underlying base “un-bid” load. It is not possible to measurably distinguish un-bid load from the bid-in load because the load measurement only captures the total load at the dispatch point. This is illustrated in the following example shown in Figure 2.

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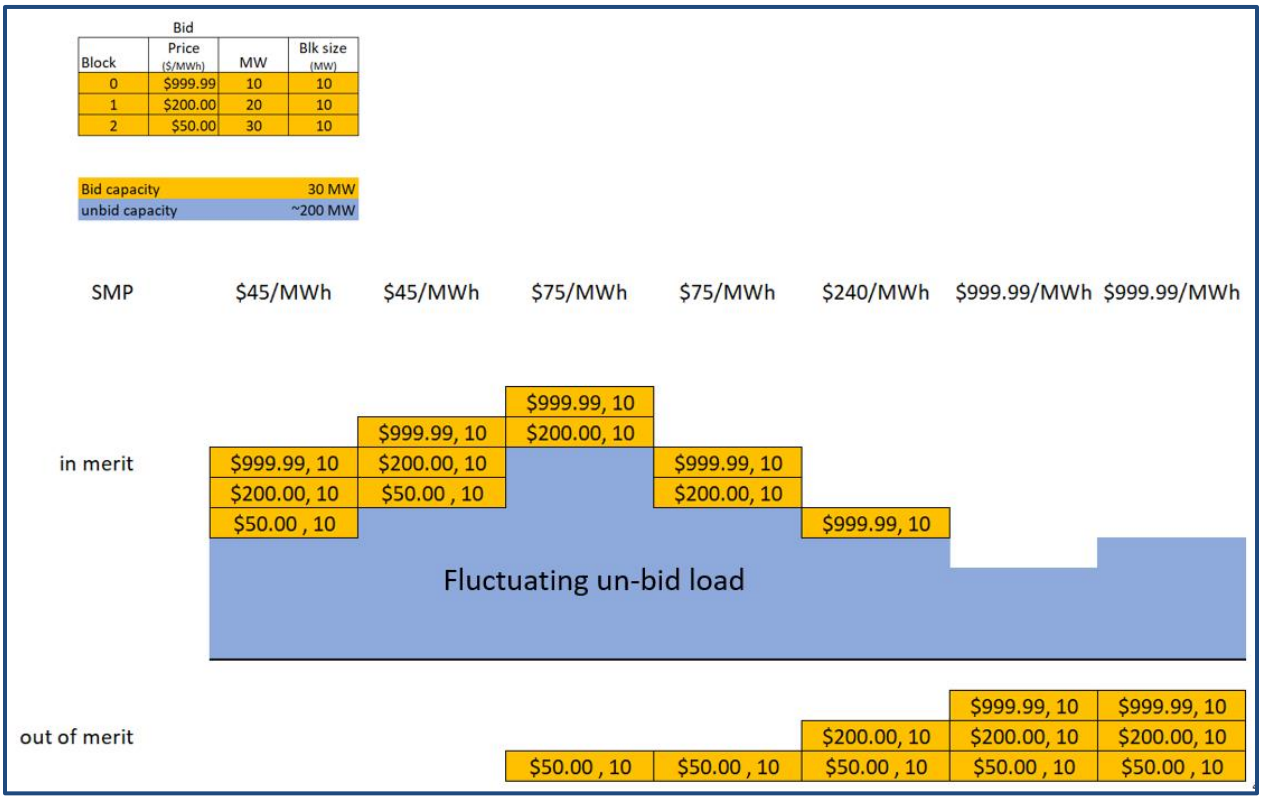
Figure 2: Bid dispatch and effect of underlying un-bid load on total load level



Dispatched bid load floats on top of the un-bid load. The metered demand represents the sum of the un-bid and bid load. For example, the AESO may dispatch on the bid load while at the same time the un-bid load is dropping. If this occurs it appears as if the participant did not adequately respond to the dispatch on instruction. Conversely, if the un-bid load is increasing at the same time as the bid load is dispatched on it appears as if the load increased to a level much greater than the dispatch. Because of the unpredictable nature of the un-bid load, the rules are relatively silent on what constitutes bid compliance.

For example, in Figure 2 when the system marginal price (SMP) increases from $45/MWh to $75/MWh, block two (the 10 MW block priced at $50.00/MWh) is dispatched off and the load would be expected to decrease by 10 MW, but according to the real-time measurements the load increased by 10 MW. The price then jumps from $75/MWh to $240/MWh and the load would be expected to decrease another 10 MW following the dispatch instruction to do so. The price continues to climb to the price cap at $999.99 at which point the remaining 10 MW in block zero is dispatched off and the load would be expected to decrease another 10 MW. Meanwhile, fluctuations in the un-bid load occur.

Treatment of DTS and DOS capacity within a bid

The AESO's DOS modernization recommendation uses the bid as the means to replace the transaction request where the bid acts as an on/off switch for intent to use DOS capacity. The "dispatch on" would represent the start of the DOS transaction and the "dispatch off" would represent the end of the same transaction.

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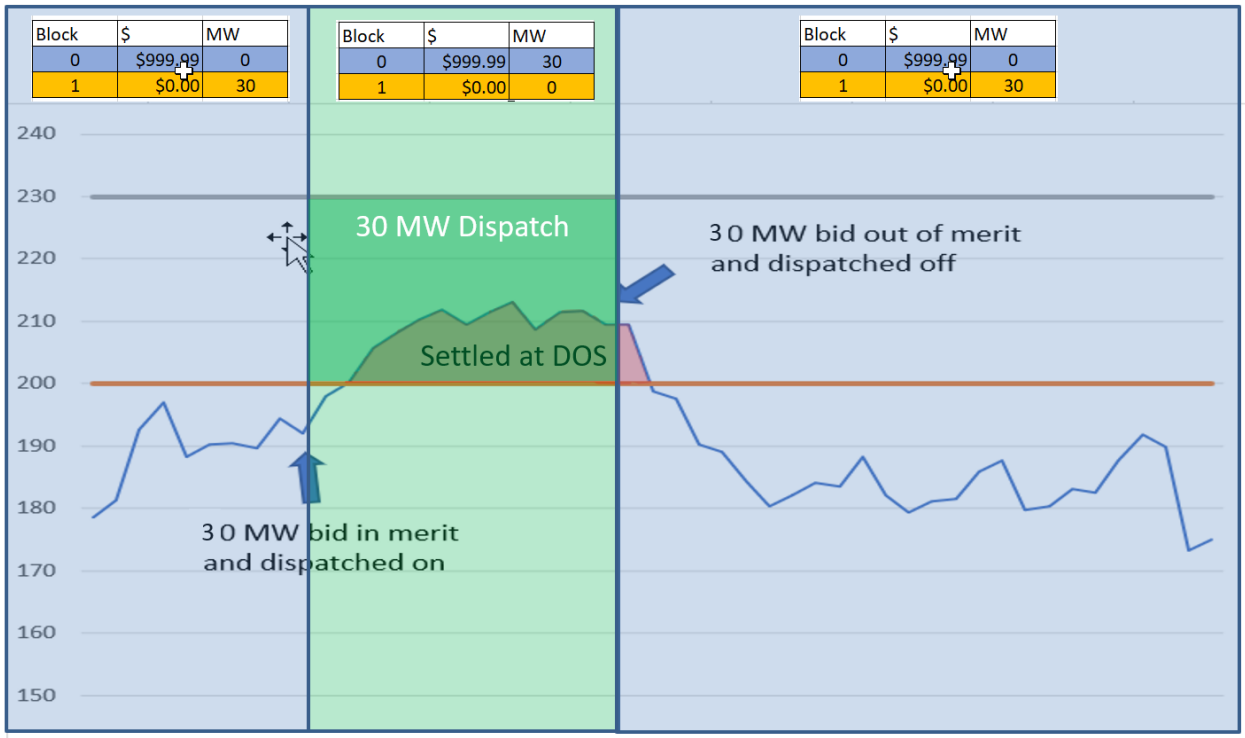
The AESO will assign the DOS participant with a sink asset whose capacity is equal to the volume of DOS contract capacity with which to submit a bid. The simplest way to approach bidding for the purposes of indicating the use of DOS capacity is for the participant to submit a bid with two blocks. Block zero is priced at $999.99/MWh and block one is priced at $0.00/MWh.

- If the participant is not planning to take DOS capacity in an hour the $0.00/MWh block will hold the DOS capacity and the $999.99/MWh block will have a block MW equal to zero. This effectively sets the DOS transaction switch in the off position.
- If the participant wishes to utilize the DOS capacity, the participant will move all, or the portion of the DOS capacity that the load wishes to consume, from the $0.00/MWh block to the $999.99/MWh block. This effectively sets the DOS transaction switch in the on position, for the amount of DOS capacity the participant wishes to use.

Toggling the energy between the two blocks will indicate to the system controller when the participant is taking or planning to take DOS energy and how much volume.

In the example shown in Figure 3, the participant starts off taking only DTS capacity by placing the 30 MW of DOS capacity in block one at $0.00/MWh. As per Section 203.3 of the ISO rules, *Energy Restatements*, at least two hours in advance of the hour the participant intends to use the DOS capacity, the bid for that hour is modified so the 30 MW of DOS capacity is priced at $999.99/MWh. At the top of the hour the bid will be in-merit and the system controller will issue a dispatch to the participant. This is equivalent to the start-time within the current DOS transaction request. The participant can leave the capacity in block zero for as many hours as the participant intends to use the DOS capacity.

Figure 3: Bid dispatch activates and deactivates the DOS transaction



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If the participant no longer wants to use the DOS capacity, the participant will move the energy from block zero ($999.99/MWh) into block one ($0.00/MWh) at least two hours in advance, as described in Section 203.3 of the ISO rules, *Energy Restatements*. At the top of the hour the system controller would dispatch the $999.99/MWh block off signaling to the participant that the DOS transaction has ended.

In the above example (Figure 3) it would appear the participant did not comply with the 30 MW dispatch instruction. Even though the bid was dispatched on for 30 MW, a maximum of 12 MW of DOS capacity was taken over the period. As explained in the example shown in Figure 2, the bid capacity was dispatched on but the underlying un-bid load was dropping off resulting in a net change of only 12 MW.

In the event the participant can no longer take DOS capacity due to an acceptable operating reason and wants to end the DOS transaction prematurely, the participant can, at any time, restate the volumes in the block and the system controller will dispatch the load off.

Settlement considerations of dispatch

If the DOS capacity was dispatched for any part of the hour, the hourly metered volume at or below the 200 MW DTS contract capacity will be settled in accordance with the DTS rate and the meter volume above the DTS contract capacity will be settled in accordance with the DOS rate.

Tariff settlement does not consider dispatch compliance, but DOS settlement is determined based on whether or not the DOS capacity was dispatched on.

Dispatch without using the DOS capacity

Like in the previous example, in Figure 4 below, the participant submits a bid with two blocks. Block zero priced at $999.99/MWh and block one priced at $0.00/MWh. If the participant is not looking to take DOS capacity in the hour the $0.00/MWh block will hold the DOS capacity. If the participant wants to utilize the DOS capacity, the participant will move all or a portion of the DOS capacity from the $0.00/MWh block to the $999.99/MWh block.

The participant starts off taking only DTS capacity by placing the 30 MW of DOS capacity in block one at $0.00/MWh. As per Section 203.3 of the ISO rules, *Energy Restatements,* at least two hours in advance of the hour the participant intends to use the DOS capacity, modifies the bid so that the 30 MW of DOS capacity is priced at $999.99/MWh. At the top of the hour the bid will be in-merit, and the system controller will issue a “dispatch on” to the participant and acts as the start-time of the current DOS transaction request. The participant can leave the capacity in block zero for as many hours as the participant intends to use the DOS capacity. However, in this example the participant’s load never exceeded the DTS contract levels the entire time block zero was in-merit and the 30 MW of load dispatched on. In accordance with the proposed DOS modernization rate design, the hours where the capacity in block zero was in-merit will all be settled at Rate DTS as no DOS capacity was actually utilized.

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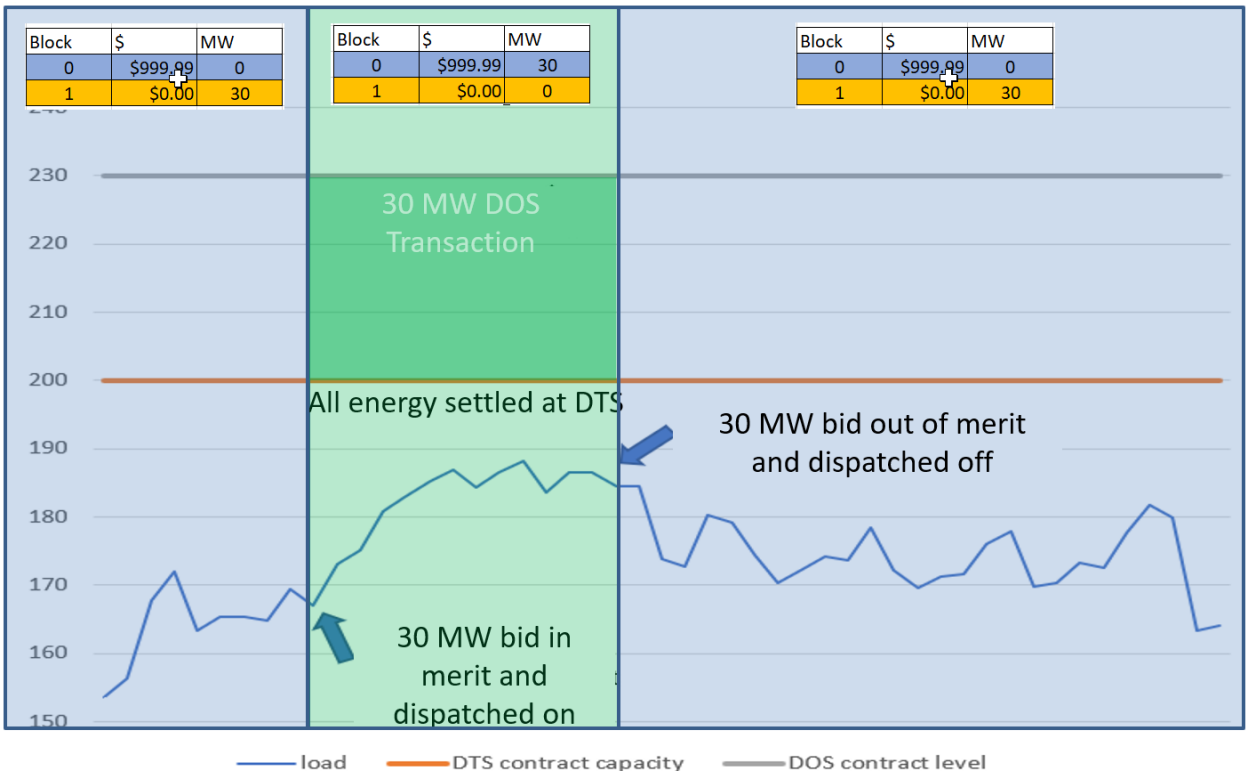
Figure 4:DOS energy is energy consumed above DTS levels



Using DOS capacity without a dispatch

In the proposed DOS modernization rate design, using DOS capacity without a corresponding dispatch is the same as using DOS capacity without submitting a transaction request under the current DOS rate. In both cases, all energy consumed above the DTS contract capacity will be allocated to DTS rather than DOS. For example, as shown in Figure 5 below, if the participant bids all MWs in block one, those MW remain out-of-merit and would not receive a dispatch on, assuming the price remains higher than $0.00/MWh. All energy consumed in this example would be assessed to Rate DTS.

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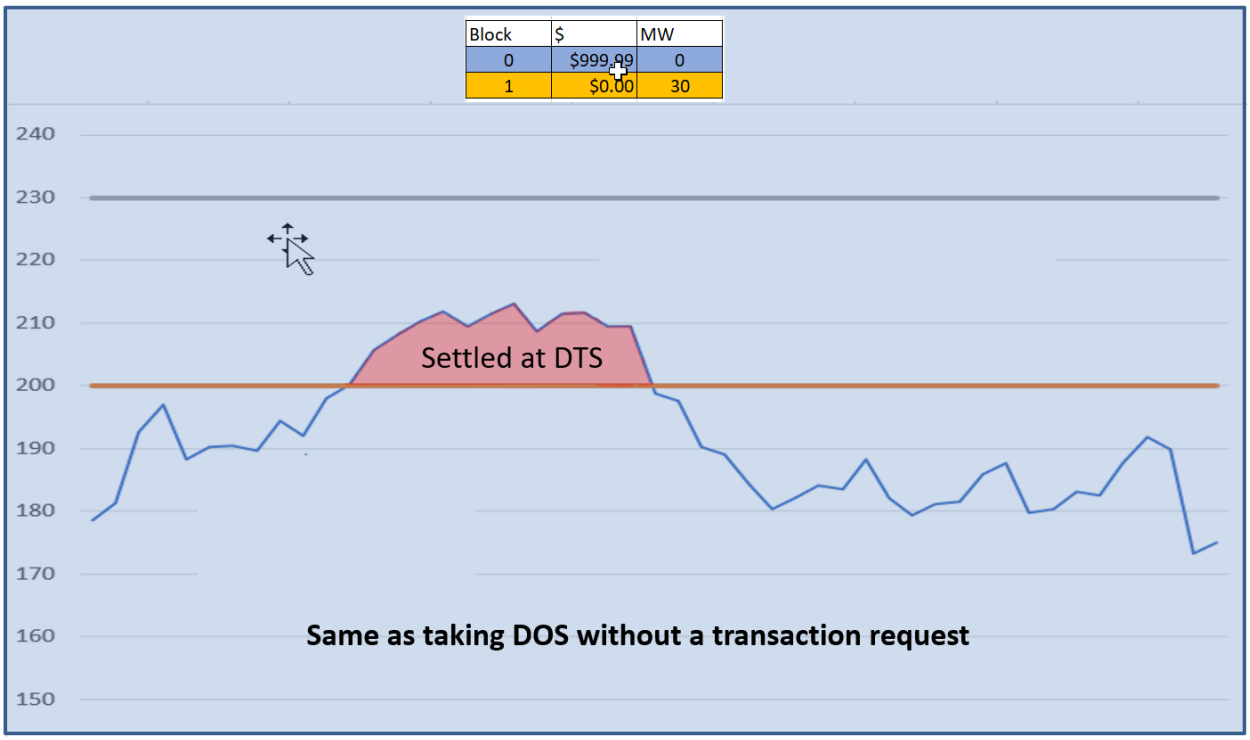
Figure 5: Using DOS capacity without a bid dispatch



Recalling DOS energy for constraint

If the participant has energy in the $999/MWh block and there is a need to recall the DOS capacity, the system controller would direct all or a portion of the $999/MWh block off by reducing the size of the block. The participant would receive a signal from the AESO's dispatch system (ADAMS) indicating the reduction in the available DOS capacity and a directive to only consume the remaining capacity, if any. When the capacity is restored the system controller will restore the volume in the energy merit order bid and the participant will be re-dispatched according to merit order.

The recall instruction is an instruction to not consume DOS capacity. It is not necessarily an instruction to reduce load. The participant load may already be below the DTS contract levels and there is no need to reduce load further. It will be the participant's responsibility to ensure the load is reduced to the appropriate level and sustained there. For example, if the directive was to no longer consume the entire 30 MW of DOS contract capacity the participant would need to ensure the total site load did not exceed DTS contract levels until dispatched to do so.

Recalling DOS energy for an EEA 1 alert

If the bid volume is priced at the top of the energy market merit order ($999.99/MWh) these are the last blocks dispatched before taking out of market actions to maintain system reliability during a supply shortfall. The instruction during an Energy Emergency Alert (EEA) 1 alert will be a dispatch off, to stop consuming energy in the $999.99/MWh block. Like the constraint recall example above, it will be the

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participant's responsibility to know whether they are consuming DOS energy at the time of the dispatch or not. The instruction is an instruction to stop consuming DOS energy and continue to not consume any DOS capacity until dispatched on (price drops below $999.99), which may or may not require a physical load reduction.

Failing to comply to DOS recalls

Failure to comply to an ISO directive to curtail DOS could result in suspension of DOS participation and a recalculation of the DTS contract capacity, administrative penalties, and the recovery of DTS revenue charged while under DOS.

Market terminology

Market terminology used in this document is defined in the *Consolidated Authoritative Document Glossary* located on the AESO website here:

https://www.aeso.ca/rules-standards-and-tariff/consolidated-authoritative-document-glossary/

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Session 5B (DOS) – May 20, 2021 Comments

Stakeholder comments on Session 5B (DOS) [Posted June 1, 2021]

1. Alberta Direct Consumers Association (ADC)
2. AltaLink Management Ltd.
3. Canada West Ski Areas Association (CWSAA)
4. Canadian Renewable Energy Association (CanREA)
5. Capital Power Corporation
6. Consumers Coalition of Alberta (CCA)
7. Dual Use Customers (DUC)
8. Energy Storage Canada (ESC)
9. ENMAX Corporation
10. Greengate Power Corporation
11. Heartland Generation Ltd.
12. Industrial Power Consumers Association of Alberta (IPCAA)
13. RMP Storage Canada
14. Solas Energy Consulting
15. Suncor Energy Inc.
16. TC Energy
17. TransAlta Corporation
18. Turning Point Generation
19. Utilities Consumer Advocate (UCA)
20. West Fraser Mills Ltd.

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Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021 through May 31, 2021	**Contact:**	Colette Chekerda
Comments From:	Alberta Direct Connect - ADC	**Phone:**	780-920-9399
Date:	[2021/05/31]	**Email**:	Colette Chekerda

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable in that DOS required it's own session, however clearer examples and description of how the DOS is expected to work would have been helpful.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	The ADC supports the initiative of moderninzing DOS, however the AESO proposal for DOS apears unnecessarily complicated and will continue to be underutilized in it's proposed form. The energy market compliance requirement to reduce the total block of DOS energy, even where that means to interrupt "firm" DTS load is not consistent with the intention of the tariff design. The dispatch should be a "down to" DTS contract level – similar to what the capacity market envisioned for load resources. The AESO's additional information may suggest this is how it would work in practice, but customers would need to be clear on compliance requirments. Further, the basis for the 20% load factor seems arbitrary. It is unclear what the purpose of the load factor requirement even is. If the participant meets the eligibility criteria for DOS, then it would be in the best interest of other rate payers that the volume be maximized to provide incremental revenues.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	ADC recommends the following modifications: *1. Remove the maximum load factor requirement* If the opportunity meets the eligibility criteria, and would be foregone revenue if the DOS is not granted, then it is in the best interest of ratepayers to maximize the use of DOS. *2. Eligibilty criteria should include a. a credible by-pass opportunity and b. should be extended to price responsive load.* First: If a load can demonstrate they would exit the grid in the absence of DOS, then DOS should be granted in this circumstance. This would keep more load on the grid, and delay grid defections, hopefully to the point where CTI projects have been depreciated and DTS costs become more attractive than a bypass option. Once a load makes the decision to defect from the grid, they are not coming back and their future revenue contribution is gone. Most loads do not want to be generators and are only doing so to remain competitive in Alberta. Although many parties/agencies are going to extreme lengths to hold loads hostage to an overbuilt transmission system (self-supply and export restrictions, adjusted metering practice that would move existing net metered sites to gross metered sites with a SASR change, the proposed DTS tariff), these restricitons will only lead energy intensive loads to more extreme measures to remain competitive. This includes moving production to other more attractive provinces or completely defecting from the grid. This result will be detrimental to Alberta ratepayers, the Alberta economy, jobs and future investment in the province. Second: Loads that demonstrate consistent CPD and energy market response should have that portion of their load eligible for DOS. This would result in several key benefits to all ratepayers. • Load retention and revenue enhancement: Energy intensive and trade exposed loads respond to price signals in order to remain competitive in Alberta. The proposed DTS tariff renders these loads uncompetitive. The mitigation solution needs to be a permanent rate option. An interruptible tariff is preferrable, however DOS could serve as a proxy with changes. Having qualified price responsive load granted DOS will keep these loads on the grid and continuing to contribute to the transmission revenue requirement. • Energy market stability: The 400 MW of price responsivle loads are aggressively responding to coincident peaks. This response is not

		confined to one 15 minute interval, but happens many hours each month. This creates several inefficiencies in both productivity for industrial facilities designed to maximize output, and inefficiencies in the energy market. • Productivity improvement: Having price responsive loads operate under a DOS tariff instead of DTS will enhance productivity and economic output of manufacturing facilties. This may increase the revenue contributed from these customers compared to the current DTS tariff while keeping their facilties viable in Alberta. 3. Allow a standing DOS bid in the energy market for 7 min DOS with a down to DTS contract level requirement under tx constraints or EEA events. Loads paying for firm DTS service should not have to remove a block of energy to below this level. Energy market rules would need to be developed such that compliance is not an issue if the site load level was at or below the DTS contract level. This appears to be the direction the AESO is moving based on the recent published examples, further exploration of the standing bid concept is required for DOS not used for planned generation outages. 4. Remove the loss factor charge. Losses are the responsibility of Generators, it is unclear what the AESO would do to publish and determine the loss factor for qualifying DOS load.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	The AESO DX-TX meeting of May 26, 2021 indicated that the AESO is intending on publishing transmission and substation capability maps to assist generators in deciding where to connect. This same work could be used for DOS customers to understand the capability in their area as well as a future outlook.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	No further questions
6.	Additional comments	DOS could provide an opportunity to grow into Alberta's transmission system. Using DOS with some certainty allowing customers to continue contributing revenue requirement. ADC would appreciate a response to the suggestions as to whether the AESO will consider and provide an explanation of why not. The ADC has provided several prior comment matrices on the proposed tariff and have not received any feedback on our comments or concerns.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 28, 2021	**Contact:**	Hao Liu/Rob Senko
Comments From:	AltaLink Management Ltd.			**Phone:**	403-710-1247 / 403-874-6762
Date:	[2021/05/31]			**Email**:	Hao.liu@altalink.ca / rob.senko@altalink.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 28, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable in that the AESO presented their existing and proposed DOS tariff.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	See response below.
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	The transmission system should be used efficiently and where possible, an opportunity service makes sense – but only if customers find the rate easy to use and there is an overall benefit to the system.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	No.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	No.
6.	Additional comments	None.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Rick Cowburn
Comments From:	CWSAA			**Phone:**	(403) 397-8785
Date:	2021/05/31			**Email**:	rcowburn@vidya.ca

Instructions:

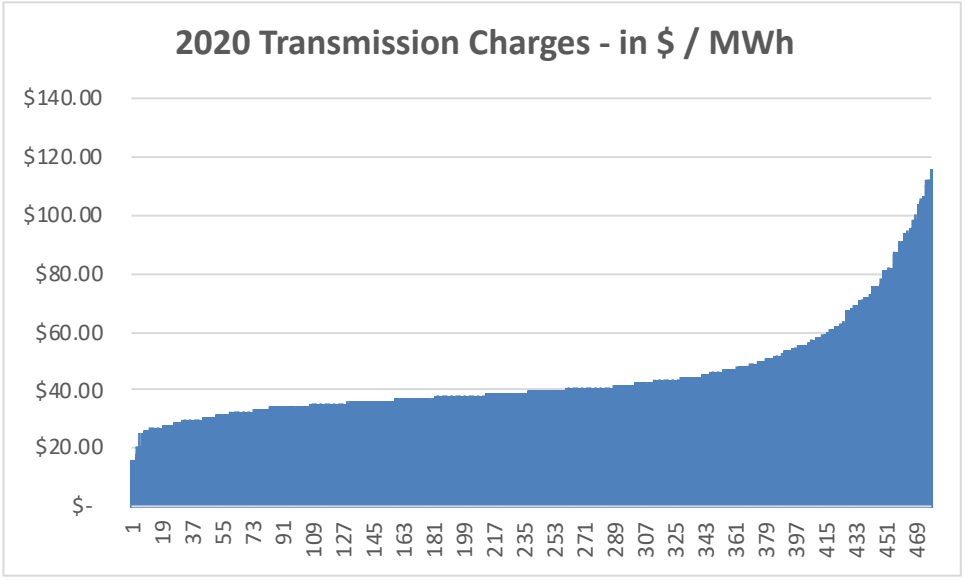
1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Yes, the session was valuable, and the AESO's presentation made the proposal reasonably clear for present purposes.

2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	No, this DOS recommendation cannot be supported as its paucity of clear, objective qualification criteria appears likely to further accelerate transmission revenue erosion and bring little if any net gain to customers. The original and enduring purpose of DOS is: "Available to customers who could clearly demonstrate that their use of the transmission system would not be economically viable at the rates otherwise applicable." [slide 16] As the Commission stated: "Consistent and reliable application of qualification criteria is essential to the success of opportunity rates. To improve the chances of the accrual of benefits to other customers, effective screening criteria and regular audits are required." [slide 17] What is the test for economic viability fundamentally about? < *Simplified Generator-Based Analysis* > Rather than getting lost in a theoretical ratemaking fog, consider a conceptual, simplified situation in which a customer has an inefficient generator that typically costs (say) $100 / MWh to operate (its capital costs are sunk and irrelevant to operations). We assume for discussion purposes that operating that generator would reduce transmission charges by $40 / MWh, for a net cost of $60 / MWh. If the Pool Price is over $60 / MWh, then it's cheaper to run the generator; if the pool price is under $60 / MWh, then it's cheaper to buy power from the pool and pay the transmission charges. The pool price determines when it is economically sensible to run the unit, as the market design intends. Now suppose that a DOS discount of $30 / MWh is offered on transmission charges, taking the marginal transmission cost down to $10 / MWh. The unit still costs $100 / MWh to operate, but doing so only saves $10 / MWh of transmission costs, for a net cost of $90 / MWh. So the effect of DOS is to move the pool price point at which the customer's generator would be operated. Without DOS, prices would have to be below $60 / MWh to turn on; with DOS, below $90 / MWh. In this simple situation, whether or not DOS has an overall customer benefit depends entirely on the pool price. When the pool price is in that $60 - $90 / MWh range, the DOS discount will turn off a unit that would otherwise have operated. Outside of that range, the DOS discount would have no impact on whether the unit should run.

		< Question: Overall Market Impact of DOS ? > Now comes an interesting question, which does not appear to have been recently considered: what is the **total** impact of DOS on customers? If the pool price is in the $60 - $90 / MWh range, the DOS discount could in effect shut down a unit which would otherwise have been run,and lead to taking more power from the pool (which after all is the whole point of DOS – to increase use of transmission, and hence to increase generation moving through the pool). Taking more power from the pool creates upward pressure on the pool price, so all Albertans taking power from the pool will tend to pay more as a result of the DOS discount. If this was a 10 MW generator, then using DOS to shut it down would add 10 MW X $13 / MWh = $130 per hour of additional transmission revenue. If shutting the unit down moved the pool price up by (say) $1, then the increase in pool prices could be on the order of 10,000 MW X 1 = $10,000 per hour. From a pool perspective, turning an on-site generator off has the same effect as turning a load on, and vice versa. A generator's economics are simpler than the economics of incremental customer production, but the question is the same. Seen holistically, it is not clear that DOS would bring an overall benefit to customers. It would be helpful if the AESO could consider this question and put the matter to rest – or raise it to consciousness. *< DOS Opportunities in a Market Context >* In practice, what is the magnitude of the DOS discount? Is it really significant enough to drive customers' production decisions, or is it just a subsidy? "The DOS rate is estimated to change from ~$5/MWh to ~$13/MWh under the preferred rate design." [slide 49] Analyzing the 2020 POD charge data provided by the AESO in Exhibit "25175_X0009_AppendixF-2020 Bill Impact Analysis", the average cost per MWh is distributed as follows:

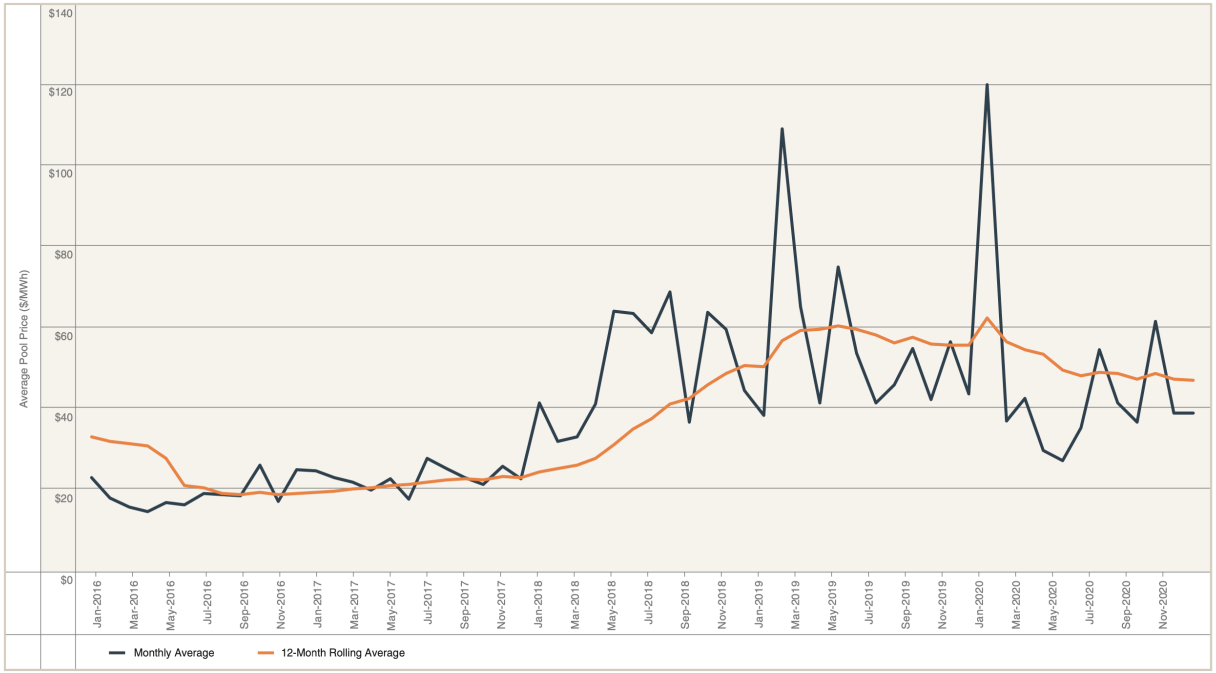


The median value is about $ 40 / MWh (omitting charges < $20/MWh and > $120/MWh), a rough high-level indicator of potential transmission savings. Of course in a real-world situation, the effective DOS discount could be much higher – or lower.

If DOS costs $13 / MWh, and transmission costs $ 40 / MWh, then DOS is providing a customer discount on the order of $ 27 / MWh.

The AESO's 2020 Annual Market Statistics report provides a context to consider such a DOS discount:

FIGURE 1: Monthly average pool price



It appears that month-to-month variations in pool price are often of the same order of magnitude as the example's DOS discount of roughly $27 / MWh.

"The original EAL* tariff application described opportunity service as

- A short-term temporary service, provided on an as-available basis
- Available to customers who could clearly demonstrate that their use of the transmission system would not be economically viable at the rates otherwise applicable
- Used for short periods, in order to avoid the impact of contract demand or ratchet charges that would otherwise result" [slide 16]

DOS is looking for situations in which a $27 / MWh short-term discount determines whether additional product will be produced – or not. Such situations will likely be very rare, as production which would be curtailed by a $27 / MWh transmission charge would presumably also be curtailed if pool prices increased by $27 / MWh. It is therefore not surprising that DOS has been little used over time, as in the

		scheme of things the discount offered is not that large and the economic qualification criteria will seldom be met. < *DOS Qualification Criteria* > It bears repeating that "the Energy & Utilities Board agreed and went further to state - Consistent and reliable application of qualification criteria is essential to the success of opportunity rates - To improve the chances of the accrual of benefits to other customers, effective screening criteria and regular audits are required" [Slide 17] The AESO has proposed a three-part qualification framework: i. Technical assessment, ii. Business case assessment and iii. Limited use. i. **Technical Assessment:** As a result of past government policy decisions, Alberta has a large, long-term surplus of bulk and regional transmission capacity. Physical supply will seldom constrain DOS; this test provides little if any protection against revenue erosion. It is good to know that DOS will not be considered in future system planning, but the problem is with the existing system, not future builds. ii. **Business Case Assessment**: It is profoundly concerning that this "will remain a qualitative assessment", that is to be "plausible" and "a convincing case." Determining whether a DOS discount really drives a production decision will generally be a profoundly difficult exercise, not unlike the analysis required in a rate regulatory proceeding. Where a facility produces a commodity whose prices are publicly visible, the **revenue** side of the business case can be objectively assessed, and should be a major driver of the qualification calculations. When commodity prices are low, there will be a flood of applications – but if commodity prices rise, will the AESO be watching, and rescind DOS 'deals' that are no longer economically necessary to justify additional production? Should the DOS discount not move when commodity revenues move? The **cost** side is much messier, as regulatory analysts know only too well. To objectively determine incremental productions costs requires 'picking out' all the incremental cost items and assessing them against reasonable norms. This is hard enough to do in the electric industry where business operations and costs are very well and publicly understood; in unfamiliar industries with multi-national reach and a broad range of activities, it would be extremely difficult except in rare, clear cases. The business case assessment also raises questions of competitive fairness. Facility A has high internal costs, and at current market revenues cannot operate its idle capacity without the DOS discount. But facility B down the road has lower internal costs,

		and does not really need the DOS discount to operate its idle capacity at a profit. So does the inefficient operator get the subsidy, while the efficient operator does not? Or do we subsidize an entire industry segment, treating all alike? And do we care at all about and seek to monetize the environmental impact of bringing old, inefficient facilities back into production? The fundamental premise of DOS is that customers maintain idle production capacity, ready to leap into action when a discount is offered. Really? The infrequent use of DOS suggests that this is a rare situation, as one would expect. There is no evidence that there are a substantial number of unrealized DOS-applicable situations. The anticipated increase in DOS applications has every appearance of a being a discriminatory 'giveaway' program whose specific qualification criteria are currently quite unknown. iii. **Limited Use:** The 20% load factor constraint supports the concern that there will be a "potential increase in the number of applications" [Slide 46] One would anticipate the appearance of a new cottage industry focused on fabricating credible DOS applications, leading to widespread and embedded dependence on this discount. (And to the same problems now being experienced in weaning customers off of the 12CP discount…) Rather than providing customers with reassurance that DOS 'giveaways' will be 'effectively secreened' with 'regular audits', this constraint highlights the potential for DOS to become a 'giveaway' program to provide relief from Alberta's high transmission rates. There may be merit in providing discounted transmission rates to certain types of customers – but that is a policy and legislative question, not a rates matter.
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	Whether or not DOS brings any customer benefits is entirely dependant on the qualification, screening and audit processes. Until and unless those processes are clearly defined, customers not using DOS cannot have confidence that DOS will not devolve into back-room deals designed to placate major users, and customers using DOS do not know the case they have to meet. Much attention has been given to the back end AESO administrative processes like dispatch, and comparatively little attention appears to have been paid to the critical up-front qualification processes. Meaningful, detailed analysis of production costs and product revenues will be vigorously resisted by customers, as it would imply disclosure of highly confidential competitive data. Vague, 'qualitative' assessments that open the door to transmission revenue erosion will be vigorously opposed by customers paying the bills, and would doubtless be of concern to the Commission. Difficult as it is, this impasse needs to be addressed in consultation, not brushed over until litigation begins.

4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	It is not clear how DOS modernization meaningfully addresses the specific situation of storage providers. Storage should be dealt with as a separate issue.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	Increasing transmission system use will necessarily place upward pressure on the pool price, offsetting customer benefits from increased DOS revenue. An assessment of overall impacts would be most useful in assessing in what circumstances DOS is indeed of overall benefit to customers. The detailed specifics of the DOS qualification process need to be clearly set out so that both prospective applicants and customers paying the bills are aware of the requirements and their required rigor (or lack thereof…).
6.	Additional comments	The AESO's efforts to develop this most challenging tariff application are recognized and appreciated. Onward!

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021 through May 28, 2021	**Contact:**	Leonard Olien
Comments From:	Canadian Renewable Energy Association	**Phone:**	587-971-0049
Date:	2021/05/31	**Email**:	lolien@renewablesassociation.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 28, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was helpful. It would have been more helpful if the AESO had prepared several examples to help focus the discussion on key issues and to illustrate how the modernized DOS will interact with the proposed market rules for energy storage. The examples provided by the AESO on May 26 may have reduced some of the confusion for load customers, however, examples specific to energy storage are required.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	In general, CanREA is supportive of the AESO recommendation for a modernized DOS as it may reduce the barrier to participation that results from the current DTS treatment. As detailed below, further details need to be discussed before CanREA can give unqualified support to the proposal, but there is the potential for the modernized DOS framework to result in a workable tariff treatment that would apply to energy storage technologies.

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3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	1) Qualification: The removal of the yearly qualification is very helpful for the participation of energy storage through a modernized DOS tariff. Regarding the need to submit a business case for storage, based on the AESO's own analysis, storage is eligible because storage projects will not be built under a DTS contract. CanREA suggests that there should be a simple, standard business case for storage qualification 2) DTS: The AESO stated in the session that they expected an asset using DOS to also have a DTS contract. This expectation is contrary to the rule that, to qualify for DOS, the asset must have a business case that the opportunity would not be economic under DTS. DTS is universally uneconomic in the case of energy storage technology. If having a DTS contract is essential for settlement reasons, then the minimum required DTS contract size needs to be less than 0.1 MW. 3) Must bid requirement: While we understand the motivation for the must bid obligation, there is considerable uncertainty about how this would work in practice. For example: a. For a stand-alone storage facility that does not want to charge in a given hour, is a bid still required? b. Are bids required to be submitted at T-2? CanREAS requests that the AESO provide a examples of expected bid behaviour for an energy storage facility that is participating in the ancillary services markets. 4) Hybrid Assets: The AESO stated that for facilities with a DTS and DOS contract, energy withdrawn from the grid would count towards DTS first and DOS second. A hybrid installation may require DTS capacity for station service, however using the DTS volume for energy storage may be un-economic. CanREA recommends that market participants with a hybrid installation be allowed to choose between adding DOS capacity to the station service DTS capacity or have DOS service as a separate asset within the AESO system. 5) Annual Capacity Factor: While CanREA recognizes the motivation for including a capacity factor limit, we are concerned that 20% is too low, especially for longer duration energy storage technologies, and is based on analysis of historical data that does not represent how energy storage technologies will operate. Long duration energy storage technologies, with the ability to store several days' worth of energy or more, will be

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		increasingly useful as the penetration of wind and solar generation increases. CanREA requests that the AESO re-assess the need and level of the proposed capacity factor including an analysis of potential behaviour of long duration energy storage technologies.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	Global energy storage investments are experiencing exponential growth. CanREA is concerned that the proceeding to approve the Bulk & Regional tariff application could take considerable time and would result in delays to potential investments in energy storage technologies, with negative implications to both system reliability and system costs. The AESO should consider strategies that will allow for earlier approval of the modernized DOS. For example, the AESO could consider a separate submission to the AUC for modernized DOS or could ask for expedited consideration and ruling on DOS.

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	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	The AESO indicated that DOS volumes are not used for transmission system planning purposes because DOS loads can be curtailed if needed to manage system stability. The naïve conclusion is that there should always be "room" on the system for a particular DOS resource with the risk for curtailment carried by the market participant. However, the AESO has indicated that an assessment of available transmission capacity will be undertaken for a DOS application. CanREA would like to understand how the assessment will be made and what considerations will be used. CanREA would also like to understand the interaction between ancillary services participation and the must bid requirement. For example, if a 1-hour battery is providing spinning reserve, and is dispatched for one half of the capacity in a given hour, how would the facility manage bid volumes so as to be able to charge in the next hour so that the full facility capacity will be available for the remainder of the day?
6.	Additional comments	On May 26, the AESO provided several useful examples. Further storage specific examples would be useful to illustrate: 1) How the must-bid requirement for DOS operates with both full-range and half-range market participation for energy storage assets 2) How the must-bid requirement for DOS operates for hybrid assets that utilize the variable block mechanism.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

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Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Matthew Davis
Comments From:	Capital Power			**Phone:**	403.540.6087
Date:	2021/05/28			**Email**:	mdavis@capitalpower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable but would have benefited greatly from additional examples as much of the session was spent addressing industry understanding of the proposal. While the AESO's publishing of some examples on May 26th provided additional details, it did not provide sufficient details on many aspects of the AESO's proposal and fails to fully alievate the various questions that were posed in the stakeholder session.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	At this time, Capital Power is supportive of the general direction the AESO is taking with DOS modernization but believes that several details will require substantial review and consideration. These include, but are not limited to: • The 20% load factor limitation appears limiting for longer duration energy storage applications and those that may have frequent charge / discharge cycele. The following table illustrate this.

Figure 1 – illustrative comparison of load factors for different storage configurations

		"Typical" Daily Cycling 4:1 energy to capacity	"More Frequent Cycling" Twice Daily Cycling 4:1 energy to capacity	"Longer Duration" Daily Cycling 6:1 energy to capacity
Capacity	*MW*	1	1	1
Energy	*MWh*	4	4	6
Efficiency	*%*	20%	20%	20%
Cycles per year	*#*	365	730	365
Charging Energy	*MWh*	1752	3504	2628
Load Factor	*%*	20%	40%	30%

Notes: charging energy = energy x (1+efficiency) x cycles per year; load factor = charging energy ÷ (capacity x 8760)

While it appears that the AESO has based this only on past behaviour, in this instance, this is highly unlikely to be result in a good predictor on how new asset classes and use cases may utilize a modernized DOS framework. Capital Power would suggest that the AESO evaluate how future DOS users may use the tariff prior to determining a specific limit. Further, Capital Power requires more information around how the AESO would evaluate a load factor measurement across a year while settlement is performed monthly.

- The AESO has yet to present details on how DOS applications will be assessed. For Capital Power to better understand the proposal, the AESO needs to clarify at what stage of the connection process DOS will be assessed. The AESO also needs to articulate what is required in the business case, how it plans on assessing them in a consistent manner, and what recourse is available in the event of a disagreement. To reduce red tape, Capital Power suggests that the AESO's test be simple and clearly codified.
- Capital Power is concerned with AESO statements made in the May 20th session that energy storage assets must take out a DTS contract as well as a DOS contract. For no other generator does the AESO require a certain level of fuel supply reliability. The AESO should clarify its intent around requiring energy storage assets to also have a DTS contract, when one of the reasons for being granted a DOS contract, is that operating under DTS is infeasible for the project.

	Questions	Stakeholder Comments
		• The AESO's proposal appears to support a "may-bid" requirement for DOS. While this is in-line with current load requirements, the AESO did not clearly articulate how this would effectively work. Further, the examples provided on May 26th appear to indicate that the AESO could expect DOS units to submit a bid and move MWs into the bid and get dispatched when they elect to take DOS. More carification on how the AESO intends DOS participants to bid and how related market rules such as restatements and load outage reporting would assist market participants in better understanding the proposal. • The AESO appears to indicate that DOS capacity would be given its own bid capacity and will be able to participate in the operating reserve markets. Capital Power would like to better understand how this will work if only a portion of the load that participates in the operating reserves markets qualifies for DOS. • Further, given the importance of this rate for energy storage, Capital Power suggests that the AESO clearly articulate how its ES market participation rules will align with rules around DOS. The use of DOS appears to tangentially align with the AESO's full-range market participation option, in that charging under DOS would require a bid, but a full explanation would be useful to fully assess. Overall, while the AESO has identified the DOS framework as one that could be used for opportunity service, significantly more detail on the mechanics of DOS modernization will be implemented in the market is required for it to be fully tested by stakeholders. This includes additional clarity on qualification processes, energy and operating reserve market participation rules, and compliance and settlement procesess .
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	Please see Capital Power's response to question #2.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	Capital Power appreciates the AESO's description of how it accounts for controllable loads in its transmission planning. While useful, it is important that the AESO further explore how these loads would participate in the market and what level of transmission service they require so that the AESO can better reflect these

	Questions	Stakeholder Comments
		in their planning studies. Based on the interest in leveraging DOS modernization by both energy storage, and other loads that can be curtailed there appears clear interest in more than just a single firm service level for transmission access. While the AESO has stated that it will not "be prioritizing" development of additional information of location and available transmission capacity for DOS, Capital Power believes that the AESO should, at a minimum, provide a plan on when it intends to do so as it would be inconsistent with a technology neutral approach to provide a renewable capacity availability assessement while not providing a similar type of assessment for energy storage and other interruptible loads.
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	Capital Power has appreciated that the AESO has published prospective rates for DOS and DTS. To fully understand the DOS proposal relative to export opportunity service (XOS), Capital Power requests that the AESO publish a prospective XOS rate as well.
6.	Additional comments	While Capital Power is supportive of the AESO's timeline extension request, it is concerned that the AESO's presentation of materials at session 6B will be insufficient to properly engage stakeholders on the DOS modernization before preparing and submitting an application in front of the Commission. Given the expected timelines that the AESO presented, Jan. 1, 2024, Capital Power would be supportive of the AESO treating DOS modernization through a separate application so that changes to DOS do not get delayed with other changes.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Raj Retnanandan
Comments From:	CCA			**Phone:**	Contact Phone Number
Date:	[2021/05/31]			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was helpful

2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	We estimate that the DOS rate of $13 per MWh would amount to about a 67%($39.6/MWh-13.0/MWh)/$39.6/MWh) discount relative to average transmission costs of about $39.6/MWh (calculated). The above noted discount may be higher for industrial customers to the extent their firm rates are lower than average. As long as the customer's cost of production (say $100) exceeds the DOS rate of $13 plus pool price, the customer would buy energy from the pool. Conversely, if the DOS rate ($13) plus pool price (say $90) exceeds the customer's cost of production the customer would self generate. The threshold point the customer would curtail DOS would be when pool price is at $87 ($100-$13), in this hypothetical example. Assume the customer has a billing capacity of 100MW. To the extent the customer needs standby energy, that requirement is presently covered under the existing billing capacity. Under this scenario the customer pays no incremental transmission charges, on a $/MWh basis, for use of standby energy. Therefore the threshold point the customer would curtail the use of system energy would be when pool price equals or exceeds cost of self generation. In this example the thresholdpoint would be $100. Assume that the customer opts for the proposed DOS and assume that the customer chooses to reduce the billing capacity by 20 MW (MW reduction corresponding to 20% load factor DOS energy) in order to serve its standby requirements. In effect the customer would have replaced its firm billing capacity associated with standby load, with the non firm DOS. The intent of DOS however, is to facilitate incremental use of system energy. Would the customer draw incremental energy from the system as a result of the DOS rate? The answer appears to be no. This is because the pool price threshold point now drops to $87 and the customer would stop drawing energy from the system when pool price reaches $87. Compare this with the situation with no DOS, where the pool price threshold point of the customer was $100.00. In summary, the proposed DOS while contributing to erosion of firm billing determinants is unlikely to result in incremental use of energy as contemplated. For the above reasons CCA does not support the proposed DOS.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	For a DOS rate to serve its intended purpose the customer must demonstrate that the DOS consumption is truly incremental and the short term transaction would not occur if not for the DOS rate. The AESO has not established suitable criteria that would help identify and screen incremental use as above. Unless such criteria are established and implemented, the proposed DOS would contribute to erosion of firm DTS billing determinants. Shifting billing capacity associated with standby use to opportunity use would be contrary to the principles of cost causation because the fixed connection costs that have been put in place in order to accommodate a level of standby use are not going to be recovered by the heavily discounted DOS rate.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	Please refer to 3

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	
6.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 31, 2021	through	May 31, 2021	**Contact:**	Dale Hildebrand
Comments From:	Dual Use Customers			**Phone:**	403 869 6200
Date:	2021/05/31			**Email**:	dale.hildebrand@desiderataenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	It would have been useful for the AESO to explicitly outline how a modernized DOS helps interruptible loads whose use of the transmission system under the AESO proposed tariff re-design is no longer economically viable.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	DUC is supportive of the concept of modernizing DOS; however, DUC has concerns with regards to the actual plan to do so. This modernization proposal may work for some energy storage (ES) facilities, but it does not work for price responsive load and does not work for co-generators. The AESO should set out what it is trying to achieve with this DOS proposal. Is this supposed to be a tariff solution for price responsive load and/or co-generators? Optimally, DOS should help optimize wires utilization in Alberta, and contribute to lowering the wires costs for Alberta consumers, regardless of the end use customer characteristics. Are there metrics to determine whether DOS is successful? It would be helpful to communicate this in advance.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	The AESO is excluding high load factor loads, presumably because they are concerned that the use of DOS will simply be about tariff avoidance. Opportunity service was described as: *"Available to customers who could clearly demonstrate that their use of the transmission system would not be economically viable at the rates otherwise applicable".* The AESO's proposed tariff re-design is effectively creating a class of industrial customers whose use of the transmission system is no longer economically viable. The AESO should acknowledge that they are creating this issue via their proposed tariff design, it is not being created by industrial customers trying to avoid their transmission cost commitments. The AESO's proposed 20% load factor limit is excluding the use of opportunity service by the very consumers who are now faced with an uneconomic transmission system. The DUC's main concern is that DOS continues to be unavailable for unplanned generation outages. Few cogenerators utilize DOS for planned outages due to the program's inflexibility. There may be opportunities for increased transmission tariff revenue that is currently foregone. Since the AESO is looking to optimize utilization of the existing transmission infrastructure, why would the AESO not study available transmission capacity and publish it? We need more load on the system. This is a good opportunity to acquire more load.

4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	Alberta has a transmission system that is over-built. In its Long-term Outlook (LTO) of 2014, the AESO forecasted an AIL demand of 15,033 MW in 2021. In 2019, the AESO forecasted an AIL demand of 12,414 MW in 2021. Historical AIL Peak demand to date is 11,729 MW. There is over 3,000 MW of difference between forecast and actual which could be used to accommodate DOS. If we assume the current Alberta transmission system is designed to accommodate at least 17,000 MW of AIL (AESO's 2014 LTO forecast of 2027 AIL), there is at least 5,000 MW of difference available - a substantial portion of which can be used for DOS. The AESO needs to consider how to both retain existing load and attract new load investment to Alberta, without the need for additional large transmission build. Proper implementation of DOS can be a method to achieve both retention and expansion of load. The AESO is partially responsible for the transmission overbuild; we would like the AESO to propose solutions to utilize the excess transmission capacity available, even in the short to medium term. The DOS eligibility rules in 2021 may need to be different from 2010 and 2030. In addition, The DUC is concerned with how this proposed rate will translate from the AESO tariff level through to the distribution tariffs. If it is not a direct translation, we will be sending different price signals to ES facilities, in particular, connected at different voltage levels. This will create an unlevel playing field and possibly perverse outcomes. Does the AESO have a plan on how to resolve this?

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	Please see comments above re: examples. Settlement between DTS and DOS is confusing. The dispatch tolerance introduces another level of complexity. Market participants will need better explanations. It would help to show settlement.
6.	Additional comments	DUC is concerned that the AESO has not studied the stress conditions with and without the price responsive load. In the absence the study of the with and without the PRL at times of system stress, how can the value of the DOC charges be adequately determined? What is the AESO's rationale of charging any load a loss factor? In the Alberta design, losses are paid by generation.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 28, 2021	**Contact:**	Justin Rangooni
Comments From:	Energy Storage Canada			**Phone:**	647-627-1815
Date:	2021/05/28			**Email**:	jrangooni@energystoragecanada.org

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 28, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Energy Storage Canada (ESC) found the Session 5B valuable. The AESO appropriately provided an overview of the DOS rate, the modernization recommendations, provided responses to stakeholder comments and further details on the modernization recommendations. The session could have been more helpful if the AESO had provided insight and commentary on how DOS modernization recommendations linked with broader Alberta electricity market decisions. For example, including DOS in the energy merit order has impacts and interactions with the Alberta market design.

2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	ESC is encouraged that the AESO is proposing an opportunity service type for energy storage resources. A core function of energy storage resources is to seek opportunities to increase the utilization of the electricity system. Practically this means that energy storage will consume from the transmission system during hours when load customers use the system the least. There are a number of issues and outstanding clarifications that must be addressed before ESC can support the DOS modernization recommendations. • During the 5B session the AESO stated an assumption that energy storage under the modernized DOS must retain a certain amount of capacity under DTS for charging "to ensure capacity is available to charge". Energy storage participating under an opportunity rate must be willing to accept the risk that the transmission system may not have capacity available to allow the energy storage resource to charge. If energy storage resources require capacity to be available to charge (i.e., firm transmission service), then that energy storage resources should request DTS service for that capacity. The modernized DOS service should not arbitrarily mandate energy storage to reserve DTS capacity under an opportunity rate design. In previous sessions the AESO stated that they expect energy storage resource auxiliary service and/or station service should be covered under DTS rate. ESC agrees with this approach since this station service load is consistent and required to operate the energy storage system. The cycling of energy storage resources is performed for market opportunities and the cycling would not occur without unconstrained transmission system access. • The AESO has stated a concern of DTS cannibalization from DOS if a maximum annual load factor is not used. This approach may be appropriate for end-use customers but is not appropriate for energy storage resources. Energy storage will not cannibalize DTS since a requirement for firm capacity through DTS is a significant barrier to market participation in Alberta. In other words, without changes to bulk & regional rate design it is unlikely that significant energy storage facilities will be developed. AESO should be encouraging participation of energy storage since any payment through a DOS modernization rate would provide cost reduction for other customers. • The AESO has recommended a business case assessment to determine if a new connection can fairly use the opportunity service. The AESO admits that the business case application is subjective and increases the uncertainty of acceptability. The business case application for energy storage resources will be very similar regardless of technology type or market conditions.

		Assessing the business case each energy storage resource application is a barrier for energy storage development and unneeded administrative requirement. The AESO should provide a direct application path for energy storage resources recognizing that energy storage participation will not change and therefore has a common business case. ESC does support the following components of the DOS modernization recommendations • Removal of the term limit for DOS rate which provides certainty to energy storage assets that could operate for 20+ years • The capability of energy storage resources to offer ancillary services under DOS rate • Retaining the technical assessment for connection; any resource connecting to the Alberta transmission system should be assessed to determine if there are any negative impacts on reliability or system stability.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	• The DOS modernization recommendations create a dispatchable DOS that would have market participants bid for their energy consumption under the DOS rate. ESC is not opposed to exploring participation of energy storage resources in the energy merit order as ESC recognizes the benefits to system operation for the AESO (e.g., full range participation). Participation in the energy merit order carries additional risks and costs for energy storage that does not appear to have been considered in the DOS modernization recommendations. • Further, there are many additional considerations with respect to including energy storage in the energy merit order that are beyond the bulk & regional tariff design. Inclusion in the energy merit order requires an immediate and prompt review and assessment of Alberta electricity market design by the AESO and stakeholders to determine how storage participation may influence market outcomes and objectives. • In many ways energy storage resources are similar to interties for import and export purposes. ESC is interested in exploring XOS rate participation with similar modernization updates as the DOS rate (i.e., indefinite term, energy merit order participation, technical assessment for connection, etc.). It is not clear to ESC if the XOS rate will increase similar to the DOS rate increase or whether there are other barriers for energy storage participation.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	• The preferred rate design proposed by the AESO shifts a significant amount of transmission system costs to load on an energy basis. This increase in energy basis should not apply to the opportunity rate. The opportunity rate does not get firm transmission and the system is not built for opportunity rate participants. The transmission costs that have been shifted to be functionalized on an energy basis should not be included in the DOS rate. The system is designed to allow the flow of in merit energy and not for the flow of opportunity rate energy. Only costs associated with the flow of DOS energy should be included and these are not transmission costs (other than losses and variable O&M) by definition.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	See above discussion points
6.	Additional comments	None at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Mark McGillivray
Comments From:	ENMAX Corporation			**Phone:**	
Date:	2021/05/31			**Email**:	MMcGillivray@enmax.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable to understand how the AESO envisions expanding the eligibility of DOS to include other resources such as energy storage. ENMAX appreciates the additional examples provided by the AESO to illustrate DOS load bidding into the energy market. We are currently reviewing the document in more detail and anticipate we will have further questions. One main question we have is how would DOS work for an under 5 MW energy storage project and what controls and visibility would the AESO require on smaller energy storage projects?
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	At this stage, it would be helpful to understand what other options the AESO has considered outside of the proposal to modernize DOS and the justification behind its preferred option. Is there analysis available to compare the costs and benefits between the AESO's proposal versus other options such as creating a non-firm interruptible rate over the long-term? Are there examples of options in other jurisdictions that the AESO considered and reasons why they should not be pursued? It does not appear that DOS was that well received or utilized in the past and while it could be modernized regardless, it may not be the best long-term solution for energy storage.
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	ENMAX is currently reviewing the "DOS bid examples document" which was recently posted on the AESO's website. If the AESO were to move forward with having DOS load bid into the energy market, more consultation would be needed to understand how the market rules would work and address any secondary impacts. Given the various ways in which energy storage can be configured, the recommendation may not necessarily work in all circumstances and could be overly burdensome for smaller energy storage projects and participants. ENMAX is concerned that the AESO may be unintentionally creating challenges for stand-alone energy storage applications.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	As noted in our previous bulk and regional comments to the AESO, the potential for changes to be made to the transmission policy and regulation could help facilitate proper rates for energy storage.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	See comments above.
6.	Additional comments	None.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 28, 2021	**Contact:**	Jordan Balaban
Comments From:	Greengate Power			**Phone:**	403-630-4581
Date:	[2021/15/28]			**Email**:	jordan@greengatepower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 28, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Greengate Power appreciates the AESO's continued attempts to address stakeholder concerns related to the DOS modernization, and specifically its proposed use as a tariff for energy storage charging purposes.

2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	Overall, Greengate is supportive of a modernized DOS tariff and many of the recommendations proposed by the AESO. It is our opinion that modernizing DOS is a significant improvement to the existing alternative of DTS as the only charging option for energy storage assets; however, we have some specific concerns with AESO's proposed DOS Tariff: 1. **DTS Contract Amount.** There was a discussion worth noting from the AESO's May 20th DOS session. It is understood and accepted that an energy storage facility will have a DTS contract for the auxiliary loads required to operate an asset, which is common practice for generating facilities interconnecting into the AIES. However, the AESO verbally stated that there is an expectation, or potentially a requirement, for energy storage assets to include a portion of the energy storage asset's charging volume under the asset's Rate DTS contract. Chapman Ventures raised a question and subsequent concern that an energy storage asset, that qualifies as eligible for the DOS rate, should not be mandated to incorporate a portion of the charging capabilities under Rate DTS. The decision to include a portion of the charging capabilities for an energy storage asset under Rate DTS is a commercial and operational decision; therefore, this decision should be left to the discretion of the project proponent. Greengate acknowledges and accepts that DOS is an opportunity service and does not secure firm load service, as would be achieved through Rate DTS. However, Greengate requests that an assessment is conducted during the SASR process that identifies the quantity of additional rate DTS load that could be added prior to impacting the Rate DOS capacity request. Greengate respectively requests that the AESO clarifies its position regarding this topic in writing. 2. **DOS Price and Recall Rate.** The AESO concluded that there are neither drivers for a reduction in the 7-Minute DOS Rate cost nor exploring a faster responding DOS product. We would like to see the AESO explore both of these items more fulsomely. Greengate is not supportive of assigning variable cost to the DOS rate, with the exception of the variable costs associated with the provision of ancillary services. Fixed sunk transmission costs should not be recovered from Rate

		DOS customers. Because investments in the transmission system are not, and will not be, driven by Rate DOS capacity, a significant portion of the AESO's proposed Rate DOS costs (approximately $10/MWh) should not be assigned through Rate DOS. With this in mind, it is Greengate's position that the cost for Rate DOS should solely contain the ancillary services cost of approximately $5/MWh. Greengate supports the following DOS modernization modifications presented by the AESO: 1. **Annual Term for DOS**. We agree with the AESO's proposed change to remove the annual term requirement for DOS. We also agree with AESO's rationale that introducing dispatchable DOS removes the need for DOS to have a limited term. We agree that in order to qualify for DOS a participant must actively manage their assets through the offer / bid process. It is worth noting that this requirement (and the removal of the take-or-pay requirement) would force an energy storage asset to abide by "Full Range Participation" requirements; therefore, this would negate the "Half Range Participation" alterative proposed as optional under the AESO's Energy Storage Market Participation framework. 2. **DOS Take-or-Pay Requirement**. We agree with the AESO's proposed change to replace the take-or-pay requirement with an energy market bid. It is worth noting that this requirement (and the removal of the annual term requirement) would force an energy storage asset to abide by "Full Range Participation" requirements; therefore, this would negate the "Half Range Participation" alterative proposed as an optional under the AESO's Energy Storage Market Participation framework. 3. **Ancillary Services Provision**. We agree with the AESO position that DOS load would not be excluded from providing ancillary services.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	1. **DTS Contract Amount**. Greengate requests that the AESO permits all energy storage charging capacity to be classified under Rate DOS, assuming that the asset meets the eligibility criteria to qualify for DOS. The amount of Rate DOS requested by the project proponent, for a Rate DOS eligible energy storage asset, should be left to the discretion of the project proponent. It is understood and accepted that an energy storage facility will have a DTS contract for the auxiliary loads required to operate an asset, which is common practice for generating facilities interconnecting into the AIES. 2. **DOS Eligibility – Business Case**. Greengate supports a rigorous business case and quantification to test and approve Rate DOS eligibility. We support that the AESO implements fulsome requirements driving a quantitative business case for Rate DOS. A purely qualitative "rubber stamp" approval does not reflect the importance of a careful assessment to ensure ensuring that DTS contract amounts are properly maintained and not circumvented via Rate DOS. We recognize that there will be effort required to develop suitable business case requirements; however, quantitative standards and processes are necessary to ensure that the rate is neither misused nor terminated. If a Business Case is to be required to qualify for DOS, it is requested that the business case criteria for an energy storage asset is evaluated once (to determine eligibility) and is not revisited over the operating life of the asset, unless there is a revision to the DOS application. We support administration of DOS applications through the SASR process and request further clarity on how the DOS applications will be studied in the SASR process.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	**Timeline to finalize and approve modernized DOS Tariff**. Greengate is concerned that the proceeding to approve the Bulk & Regional tariff application could take considerable time and would result in delays to potential investments in energy storage projects. The AESO should consider strategies that will allow for earlier approval of the modernized DOS. For example, the AESO could consider a separate submission to the AUC for modernized DOS or could ask for expedited consideration and ruling on DOS. For additional considerations, please see the responses provided to Question 2 and Question 3.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	Yes. **DTS Contract Amount**. As expressed in our responses to Question 2 and Question 3, Greengate requests clarification and rationale regarding the AESO's comment that a portion of an energy storage asset's charging capacity would be required to fall under Rate DTS. If the AESO still stands behind this comment, it would be essential to understand whether the AESO's position is that an energy storage asset "should" or "must" allocate a portion of the charging capacity to Rate DTS. If this is proposed to be a requirement, we request that the AESO specifies what portion of the charging capacity (as a MW value, percentage value, or other stipulated measurable quantity) would be required under Rate DTS. However, Greengate reiterates our position that determination of whether a portion of the charging capacity is to be applied under Rate DTS should be left to the discretion of the project proponent. **DOS Applications via SASR**. As per our response to Question 3, we request clarity regarding how DOS applications will be administered and studied though the SASR process.
6.	Additional comments	We appreciate the continued stakeholder engagement and opportunity to provide feedback to this important process.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021 through May 31, 2021	**Contact:**	Kurtis Glasier
Comments From:	Heartland Generation Ltd. (“Heartland Generation”)	**Phone:**	(587) 228-9617
Date:	[2021/05/31]	**Email**:	Kurtis.Glasier@heartlandgeneration.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The presentation on May 20, 2021 could have been improved by including the examples (published on March 26, 2021) during the presentation itself. The explanation of the DOS modernization recommendation was not complete during the session.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	Heartland Generation is supportive of the intent to include bids from loads in the energy market merit order, and as proposed this change does not seem to affect the actual functioning of those customers. Further, Heartland Generation supports the simplification of rate DOS to a single type, with the removal of differentiated types (1 hour, 7 minute, and term) and the take-or-pay requirement. The AESO's intent of publishing available transmission capacity on the grid will be helpful for future citing decisions for both loads and generation.
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	Heartland Generation is unsure if the DOS modernization proposal will address the need for a differentiated rate classes, as expressed by multiple parties during the consultation. Customers have asked for an "interruptible rate" or "opportunity service" which would allow for the purchase of a lower level of reliability than a firm DTS rate customer; this opportunity service would impose less future transmission costs on the system and commensurately have less transmission costs allocated to the rate class. This opportunity service would be mutually beneficial in ensuring that transmission planning only incorporates those requesting firm service (i.e., rate DTS), and customers rate classes would be tied directly to cost causation principles. Heartland Generation understood that DOS modernization would include discussion on the formation of a new rate definition. Re-defining rate DOS should be the focus of forthcoming stakeholder consultation efforts. The AESO should work with stakeholders to modernize rate DOS, such that it will allow customers greater choice in determining their level of service (specifically how energy storage and price responsive load customers can benefit from a different rate class from DTS).

	Questions	Stakeholder Comments
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	As proposed, the administrative changes to the DOS rate seem straightforward to implement. Given the desire for more changes to the DOS rate to allow for greater flexibility and customer choice, the AESO should explore how an overhauled rate class for interruptible service could be implemented.
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	Asides from those concerns identified elsewhere in this document, Heartland Generation does not have any additional clarifying questions regarding the proposed DOS modernization recommendation.

	Questions	Stakeholder Comments
6.	Additional comments	Heartland Generation takes issue with the current and proposed eligibility criteria for DOS rate. The AESO includes an "economic test" to evaluate the opportunity, whereby a project only qualifies for DOS rate treatment if the opportunity would be uneconomic under rate DTS. This is an inappropriate consideration for the AESO, as sole seller of electricity, to require free market participants to disclose information in order to assess the economics of their business or operations. The AESO should not require an economic evaluation for a load customer to qualify for a DOS rate (or by extension any other System Access Service rate). Once the services are defined, the individual customer is in the best situation to assess the feasibility of that service for themselves, including any applicable terms and conditions of that agreement. **The AESO should remove all consideration of an economic test or evaluation from qualification for rate DOS**. The current DOS rate also includes a limitation on the ability of DOS energy to replace the energy provided by an on-site self-supplying generating unit on an unplanned outage or derate. The AESO has not provided sufficient justification for this limitation. It appears arbitrary for the AESO to prevent the usage of DOS energy if the transmission capacity on the line is otherwise unconstrained and DOS energy is available. If there is no constraint or otherwise limiting system condition, the effect from the load consuming DOS energy is the same regardless of the reason for the generator outage (planned vs. unplanned). The availability of DOS energy should be one of the only restrictions on when a load customer has access to the service. The AESO needs to look at the opportunity service currently being offered and how introduction of an opportunity service with a lower level of reliability could benefit the tariff design. Alberta electricity customers represent a diversity of load needs and flexibility, which is not currently reflected in the tariff rates offered. In general, customers wanting a lower level of reliability should receive an associated decrease in rate as the customer does not require firm service to the same extent as a DTS customer; on the flip side, the AESO would be required to reflect this desire for a lower level of reliability in its transmission planning and real-time constraint management. Once the opportunity service has been clearly defined, each customer can assess the correct balance of services (between DOS and DTS) that it will purchase from the grid.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021 through May 28, 2021	**Contact:**	Vittoria Bellissimo
Comments From:	Industrial Power Consumers Association of Alberta (IPCAA)	**Phone:**	403 966 2700
Date:	2021/05/28	**Email**:	Vittoria.Bellissimo@IPCAA.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 28, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was somewhat useful; however, it is very clear that we are at the beginning of a DOS design, not anywhere close to resolving outstanding issues or gaining market participant understanding of the DOS design. Loads, in particular, are very confused about how the 20% load factor works as well as how DOS can be used and how settlement works between DOS and DTS. It would be useful for the AESO to explicitly outline how a modernized DOS helps interruptible loads whose use of the transmission system under the AESO proposed tariff re-design is no longer economically viable. The explanations provided during the webinar were confusing. It would have been useful to have several load-only examples during the webinar. IPCAA appreciates that the AESO posted examples after the webinar; however, reviewing them live with stakeholders would be beneficial. This would be a welcome addition to the June 24th stakeholder session.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	IPCAA is supportive of the concept of modernizing DOS; however, IPCAA has concerns with regards to the actual plan to do so. This modernization proposal may work for some energy storage (ES) facilities, but it does not work for price responsive load. The AESO should set out what it is trying to achieve with this DOS proposal. Is this supposed to be a tariff solution for price responsive load? Is this supposed to be a tariff solution for ES? What does success look like for this DOS design? Optimally, DOS should help optimize wires utilization in Alberta, and contribute to lowering the wires costs for Alberta consumers. Are there metrics to determine whether DOS is successful? It would be helpful to communicate this in advance.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	The AESO is excluding high load factor loads, presumably because they are concerned that the use of DOS will simply be about tariff avoidance. Opportunity service was described as: *"Available to customers who could clearly demonstrate that their use of the transmission system would not be economically viable at the rates otherwise applicable".* The AESO's proposed tariff re-design is effectively creating a class of industrial customers whose use of the transmission system is no longer economically viable. The AESO should acknowledge that they are creating this issue via their proposed tariff design, it is not being created by industrial customers trying to avoid their transmission cost commitments. The AESO's proposed 20% load factor limit is excluding the use of opportunity service by the very consumers who are now faced with an uneconomic transmission system. IPCAA's main concern is that the 20% load factor condition effectively renders price responsive loads ineligible for DOS. IPCAA understands that the 20% level is based on historical information. Using historical behaviour as a predictor for the future, when the DOS design is changing, is not a recipe for success. This is particularly true when historical usage of DOS has been minimal. In addition, the 20% load factor is an annual condition, whereas settlement is monthly. On the ES front, ES investment is based on arbitrage, i.e., the price it can charge at versus the price it can sell at. This is good for the market and for consumers. Has the AESO modelled how this DOS rate would work for ES and how the AESO's proposed dispatch to gain the DOS rate would provide the flexibility ES needs? How does this serve consumers and optimize the delivered price of electricity? Since the AESO is looking to optimize utilization of the existing transmission infrastructure, why would the AESO not study available transmission capacity and publish it? We need more load on the system. This is a good opportunity to acquire more load. The AESO's preferred DTS rate design is uneconomic for many of the sites currently targeted for mitigation. Can the AESO provide more information on how this DOS rate will be modified for these sites? Will the 20% load factor requirement be lifted? Also, the must bid requirement is overly burdensome for consumers. Have any alternative options been considered?

4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	Alberta has a transmission system that is over-built. In its Long-term Outlook (LTO) of 2014, the AESO forecasted an AIL demand of 15,033 MW in 2021. In 2019, the AESO forecasted an AIL demand of 12,414 MW in 2021. Historical AIL Peak demand to date is 11,729 MW. There is over 3,000 MW of difference between forecast and actual which could be used to accommodate DOS. If we assume the current Alberta transmission system is designed to accommodate at least 17,000 MW of AIL (AESO's 2014 LTO forecast of 2027 AIL), there is at least 5,000 MW of difference available - a substantial portion of which can be used for DOS. The AESO needs to consider how to both retain existing load and attract new load investment to Alberta, without the need for additional large transmission build. Proper implementation of DOS can be a method to achieve both retention and expansion of load. In addition, IPCAA is concerned with how this proposed rate will translate from the AESO tariff level through to the distribution tariffs. If it is not a direct translation, we will be sending different price signals to ES facilities, in particular, connected at different voltage levels. This will create an unlevel playing field and possibly perverse outcomes. Does the AESO have a plan on how to resolve this?

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	Settlement between DTS and DOS is confusing. The dispatch tolerance introduces another level of complexity. Please see comments above re: examples at the June 24th session.
6.	Additional comments	IPCAA is concerned that the AESO has not studied the stress conditions with and without the price responsive load. In the absence of the study both with and without the PRL at times of system stress, how can the value of the CP charge be adequately determined? What is the AESO's rationale of charging any load a loss factor? In the Alberta design, losses are paid by generation.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Robert Stewart
Comments From:	RMP Energy Storage Inc.			**Phone:**	587-920-4833
Date:	[2021/05/29]			**Email**:	Robert.stewart@rockymountainpower.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	It was unclear what the AESO was doing for load customers vs. energy storage participation. Load and energy storage are different as the business of energy storage is to provide the electricity back onto the grid at a later date and generates all revenue from energy market participation.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	We are supportive of discussions around removing tariff barriers for energy storage participation in the energy market. The DOS modernization as proposed does address a key issue with the current DOS rate namely the term changing from one year to indefinite but adds additional complexity, uncertain and cost to the DOS user. Therefore, significant modifications to the AESO's proposed DOS modernization would be required for us to it.. The modernization did not state explicitly that energy storage would be viewed as an acceptable business case for the DOS rate. This should be clearly stated to remove uncertainty for all market participants. The additions that the AESO has proposed including adding a load factor limit and an energy market participation requirement lack supporting information. The load factor limit appears arbitrary and should not be applied as the DOS rate already allows for interruption when the system is stressed. Unwarranted DOS applications should be screened using the business case. The exact load factor recommended does not clearly align with the system constraints outlined nor the available transmission in the future. Finally, the modification to having DOS customers participate in the energy merit order has implications beyond the tariff in the energy market. We note that current DOS customers are not required to bid a price for determining curtailment. Curtailment is related to system constraints only. Why the change? While we are open to discussing this, particularly for energy storage participation, it should be under a curtailable opportunity rate under a similar tariff to generation as the assets system impact, dispatch performance and obligations are the same as generation.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	The changes in billing functionalization percentages means the DOS rate is expected to increase significantly. Our understanding on the justification for shifting transmission costs into the energy functionalization in the DTS tariff is based on allocating a portion of the transmission cost to the flow of in-merit energy. This cost is incurred from a transmission requirement to alleviate a transmission constraint caused by in-merit energy flow. We note that the system planning used to determine transmission constraints does not include DOS customers. We also note that DOS customers do not cause a system constraint, either demand or energy flow related, as they would be curtailed prior to a constraint occurring. Therefore, allocation of these transmission costs for in-merit energy flow are not justified for DOS customers. This suggests that the DOS customer should pay for AS, losses, administration as it is not adding any other costs to the system. This tariff should be similar to STS + AS + Losses. The AESO should consider changing the DOS recall to 5 minutes to align with system marginal price intervals. This would allow for greater flexibility for the operators and energy storage asset participation.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	If a non-firm load has a must offer must comply within the energy market and is curtailable when transmission is constrained, then it is providing the same service as a generator in ensuring the lowest cost energy to firm load customers. This is particularly important to consider with increasing levels of intermittent generation. For example, if demand with firm and non-firm load energized intersects the merit order at $90/MWh and this non-firm load bid $30/MWh into the merit order, then dispatching this load off reduces the price towards $30/MWh for all other customers. This is the same as a generator of the same size bidding in $30/MWh. Consequentially, this non-firm load that is being treated the same as a generator and providing the same service to load customers should pay for the same transmission service as a generator (plus losses and appropriate AS). If this non-firm load is charging an energy storage asset then there are additional consumer benefits from increased competition when there are no additional non-firm loads to dispatch off.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	
6.	Additional comments	If there is no room for accommodating the modifications to the DOS rate as per items above we would recommend an energy storage rate based on Administration costs + losses + AS which should be equivalent to STS + AS + Losses be submitted in this tariff application for suitability to be determined by the AUC.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Paula McGarrigle
Comments From:	Solas Energy Consulting			**Phone:**	403-875-4593
Date:	2021/05/31			**Email**:	Pmcgarrigle@solasenergyconsulting.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 31, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments

1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	On May 20, 2021, the DOS 101 discussion was valuable in ensuring everyone had the necessary background information and context. There were a number of inconsistencies that created confusion. At the start of the presentation, AESO members mentioned that a motiviation for modernizating the DOS was to expand eligibility, "including energy storage". The purpose of including energy storage was not clearly stated. However, during the modernization discussion, AESO acknowledged that: • it was made clear in the market participation engagement that energy storage has difficulty in bidding into the Alberta market, and • The load factor was assessed based on historical use and no modeling was done for the different energy storage technologies and how their charging/discharging characteristics (short versus long duration storage) might be affected by the 20% limit. • DOS should only be used as an opportunity service so any load (i.e energy storage) should have a base DTS. • The AESO has historically confirmed that the current DTS/STS costs create a barrier for investors of energy storage and deployment of energy storage. The comments noted above, illustrate the inconsistences in what AESO is saying is the motivation for the DOS modernization and where the proposed modernization has landed. The AESO has also confirmed that they have not completed any cases for economic evaluation of Energy Storage to determine if the new DOS proposed removes the identified barriers. How does the proposed DOS reduce the barriers identified by the AESO? Could AESO complete economic evaluation to determine if the proposed DOS for energy storage will alleviate the problem for Energy Storage identified by the AESO? The AESO appears to be focused on updating DOS rather than addressing the barriers for Energy Storage. AESO tried to provide examples of how the new DOS modernization would work related to bidding into the market, these examples created more confusion so a follow up on the bidding process for load and how this compares/differs from generation offers is needed. Further guidance on the business case assessment is also needed as this was explained as being quite subjective. Also it is concerning that the Energy Storage

		owner would be required to provide the AESO with commercially sensitive information. In no other case is commercial strategy required to be provided to the AESO for their adjudication.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	No, as illustrated above, there is inconsistencies in what AESO is saying is the motivation for the DOS modernization and the proposed modernization. It is not clear if the proposed DOS modernization solves the issue it was intended to.
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	Yes, modelling of charging/discharging behaviors of different energy storage technologies for short and long duration should be completed to help inform the load factor percent and the economics of Energy Storage. If DOS is still intended to be only an opportunity service and not a solution to the current economic challenges that energy storage faces, then additional work on how energy storage can participate in the market is needed.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	As acknowledged by AESO, the DOS modernization only supports the connection of energy storage on the transmission system, so more work on the impact this modernization will have on distributed connected energy storage is needed. Energy storage can provide a multitude of benefits to Alberta, including supporting the integration of greater amounts of renewable energy into the electric grid, deferring the need for new fossil-fueled power plants and transmission and distribution infrastructure, and reducing dependence on fossil fuel generation to meet peak loads. The AESO's role is to lower barriers and and enhance the ability of transmission grid-connected energy storage in the Alberta market given the barriers AESO has identified. The AESO's role is to provide a less restrictive market for energy storage participation. The AESO needs to provide a clear path for energy storage participation. For regulated assets, the AESO should ensure greater certainty of cost recovery for investments in energy storage technologies by developing a valuation method to help monetize the benefits provided by energy storage.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	1. What is the AESO trying to achieve by modifying DOS? 2. How does the proposed DOS reduce the energy storage barriers identified by the AESO? 3. What is the proposed DOS design based on? How does it compare with other jurisdictions? 4. How competitive is the overall DTS/DOS/STS rate compared with other jurisdictions for Energy Storage? 5. How does the process of dispatching charge/discharge compare with other jurisdictions for Energy Storage? 6. Why does the AESO require commercially sensitive information? Can access to DOS be provided without this information? 7. How does DOS rate fit with Energy Storage used for transmission and distribution deferral? 8. Can Energy Storage be seen by the AESO as a supercapacitor? (i.e. equipment used in a substation?) 9. Why is load now part of the market requiring bidding? 10. Does the AESO see energy storage moving to distribution and behind the meter transmission connection as a result of this proposed DOS approach? What will the impact to overall DTS revenues be as a result? 11. Could AESO complete economic evaluation to determine if the proposed DOS will alleviate the problem for Energy Storage identified by the AESO?
6.	Additional comments	Energy Storage is not generation and is not load. The current approach is shoehorning Energy Storage into a rate structure that is not suited for it. A new and fresh approach is required. The AESO has indicated that Alberta Energy needs to direct the AESO to create a new approach and the AESO will not create a new approach until this direction is given. Given that changes to tariffs and regulation require multiple stakeholder engagement and consultation, it is recommended that this is done specifically for Energy Storage rather than in a unsystematic approach where changes to regulations are limited to legacy structures.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021 through May 31, 2021	**Contact:**	Horst Klinkenborg
Comments From:	Suncor Energy Marketing Inc	**Phone:**	(403) 819-7125
Date:	2021/05/31	**Email**:	horst.klinkenborg@suncor.com

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Suncor does not believe that the session was particularly valuable because in hindsight, participants and the AESO had different objectives and expectations for the session. See Q&A 6 for further details.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	Suncor is not supportive of the fundamental premise of the current DOS. While the AESO's proposed modernization recommendation would likely improve DOS, it does not address the fundamental concern with the current DOS. See Q&A 6 for further details.
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	Suncor believe that the fundamental premise of DOS should be revised. See Q&A 6 for further details.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	Suncor believe that the fundamental premise of DOS should be revised. See Q&A 6 for further details.
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	In hindsight, a lot of confusion in Session 5B arose from a mismatch in expectations and objectives between the AESO and participants. Suncor understands the AESO's proposal, but believes that the proposal does not address the concerns of market participants. See Q&A 6 for further details.

	Questions	Stakeholder Comments
6.	Additional comments	The ISO is the sole provider of system access service (SAS) on the transmission system, and must provide SAS in a manner that gives all electricity market participants wishing to exchange electric energy and ancillary services a reasonable opportunity to do so. Further, the ISO must develop a tariff setting out the rates for each class of SAS, and the terms and conditions that apply to each class of SAS. The AESO currently provides system access service (SAS) by dividing customers into various groups, with each customer falling exactly into one group. For each customer group as defined by the AESO, the AESO offers exactly one SAS class. Customers within each class have the choice to accept that level of service and the associated costs or to not receive SAS at all. For example, if a customer wants to import power into Alberta, the customer has to take IOS, if a customer wants to supply power from a generating unit, the customer has to take STS; in either case, the customer's only choice is to take it or leave it. At first glance it might look like demand customers fare slightly better by having a choice between DTS and DOS, however, there is actually no choice. A customer either can afford DTS or not and this is what drives the outcome, not the customer's choice. If the customer can afford DTS, the customer must take DTS, and if a customer can't afford DTS, the customer inherently can't take DTS but *may* qualify for DOS. Not only does DOS not provide an additional rate choice, fundamentally it is an inappropriately delineated customer class. The AESO should not be concerned with a customer's economics. That is outside of the AESO's mandate and the AESO is not qualified to do so. This has been previously brought up in the Mothball Outage Reporting Rule consultation – a customer's economics are solely that customer's concern. The customer knows its assets, knows the industries they are involved in and make their decisions accordingly. At no point is it appropriate for the AESO to request and for a customer to have to provide any kind of information on the economics of the customer's operation. In short, the current DOS customer class should not exist. This gets to the heart of the issue: customers want the AESO to provide them with actual options. They are not interested in paying the price for a service level they do not want. Instead they want a service level that better reflects their needs and that they believe could be provided at a lower cost. In the current discussion there are various customer groups (notably price responsive loads, storage operators and customers with self-supply) asking for additional options. (In the past, some suppliers also made the case for additional options.) These groups have a broad range of flexibility and quite diverse needs with regard to their system access service. What they have in common, is the belief that their needs can be met at a lower cost and that such options should be pursued in order for them to then be able to also pay a commensurate lower price. Whether a single option could be sufficiently flexible to satisfy all these customers isn't clear yet. However, at least a single actual option is what customers expected to discuss in Session 5B. In summary, the AESO needs to abandon the current premise of DOS as a class of SAS available only to customers that "pass" an utterly inappropriate economic test and then the AESO needs to develop at least one SAS option for demand customers that reflects a lower level of service, therefore incurs less costs, and accordingly has a lower associated rate.

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Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Mark Thompson
Comments From:	TC Energy Corporation (TCE)			**Phone:**	403-589-7193
Date:	2021/05/31			**Email**:	markj_thompson@tcenergy.com

Instructions:

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The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	TCE appreciates all opportunities for stakeholder consultation. The bid examples published after the stakeholder session on May 26, 2021 were helpful. Ideally these examples would have been provided before the session, which would have allowed for a discussion to allow stakeholders to ensure the examples were understood. Further bid examples, particularly with respect to hybrid battery facilities that may choose to charge from the grid, would be helpful.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	TCE continues to support the application of an opportunity service rate for charging energy storage facilities. The AESO's recommended DOS modernization rate comes fairly close to meeting this objective. More specifically, there are certain elements of the AESO's DOS modernization recommendation that TCE supports and others for which we have concerns. TCE supports the removal of the annual term for DOS as it would have created a barrier to entry for energy storage. TCE also supports the provision that an energy storage facility operating under Rate DOS would not be excluded from providing ancillary services. In this regard, we request that the AESO clarify whether the DOS rate would be charged during the time when an energy storage facility is dispatched to provide ancillary services.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	<u>DOS Eligibility – Business Case Assessment</u> TCE is concerned that the AESO is proposing to administer a business case assessment for all Rate DOS applicants. We expect this would include all energy storage facilities. While we understand and agree with the AESO's objective to find an appropriate balance to enable DOS while ensuring that Rate DOS does not cannibalize Rate DTS, we expect the business case justifying Rate DOS for all energy storage facilities to be virtually the same. The effect will create unnecessary red tape and a barrier to entry. The AESO's proposal is subjective and lacks transparency, which could lead to inconsistent and discriminatory outcomes. For these reasons, TCE recommends that Rate DOS acknowledge that the business case justifying the use of Rate DOS has been met for energy storage facilities. <u>Load Factor</u> The AESO has proposed that Rate DOS incorporate a maximum annual load factor of 20 per cent to replace the current temporary and short-term use requirements. Energy consumed over the 20 per cent maximum would be charged at the DOS Term rate. The AESO arrived at the 20 per cent threshold based on historical load assessments of Rate DOS customers. TCE recognizes the concern that Rate DOS may cannibalize Rate DTS revenues and that high load factors may be an indicator for inappropriate use of Rate DOS. TCE requests that the AESO clarify why this threshold is needed in addition to the business case assessment. To the extent that the AESO concludes that this threshold is necessary, TCE recommends that the AESO not rely too heavily on the historical load assessments of Rate DOS customers when setting the threshold as it may not apply reasonably to future Rate DOS customers such as energy storage facilites. Care should be taken to ensure the load factor threshold is not too stringent such that it may restrict legitimate energy storage activities. TCE recommends that the AESO implement a more lenient load factor restriction in the range of 25 to 30 per cent. TCE anticipates that a threshold in this range would still satisfy the original need for the threshold. <u>Dispatchable DOS / DOS Transaction Request / Take-or-Pay</u>

		The AESO recommends that Rate DOS require full-range participation in the energy market and that this will replace the current transaction request requirement and the take-or-pay provision. For some parties, such as those that already actively participate in the market, this tradeoff may be worthwhile. For others, including current Rate DOS ratepayers, this tradeoff may preclude their ability to utilize Rate DOS. For this reason, TCE recommends that the AESO provide dispatchable DOS as an option. This would also be consistent with the AESO's prior recommendation that full-range participation be optional. <u>Minimum DTS Capacity</u> During the stakeholder session, the AESO stated it would require a Rate DOS ratepayer to contract for a Rate DTS capacity that was in excess of the facilities station load to ensure that the facility could charge in the event its transmission access was recalled. TCE strongly encourages the AESO to remove this requirement for several reasons. First, this requirement is inconsistent with the business case assessment that has already demonstrated that Rate DTS does not work for this facility. Second, the level of Rate DTS service is a business decision that should be at the discretion of the ratepayer. If the transmission access for the customer is insufficient, it should be up to the customer to determine whether it needs more Rate DTS capacity. Third, this requirement is discriminatory. No other Rate STS customer is required to have firm transmission service for its fuel delivery, nor should it.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	Rate Export Opportunity Service (Rate XOS) is another opportunity service that warrants consideration for energy storage facilities. In some ways the charging of energy storage facilities is more similar to exports than the current loads under Rate DOS. This would include the timing of the load. Like exports, the charging of an energy storage facility is expected to occur when the system is not under stress. The same cannot be said for the current DOS load. TCE requests that the AESO explain why Rate XOS is not being considered as an alternative for energy storage facilities. TCE further requests that the AESO publish what Rate XOS would be under its preferred bulk and regional rate design. This is needed by stakeholders not only for comparison purposes with Rate DOS, but also for stakeholders that are Rate XOS ratepayers.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	At slide 54 of the presentation, the AESO stated that it would not be prioritizing the publication of the location and availability of transmission capacity for Dos as part of the DOS modernization. TCE recognizes that the AESO may not have the time to include this information within the timeframe permitted for DOS modernization. Nevertheless, the publication of this information could improve the efficiency of the transmission system and significantly reduce future costs. Would the AESO agree to include this in future consultations?
6.	Additional comments	TCE has no additional comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 28, 2021	**Contact:**	Luis Pando
Comments From:	TransAlta Corporation			**Phone:**	403-267-3627
Date:	2021/05/28			**Email**:	Luis_Pando@transalta.com

Instructions:

1. Please fill out the section above as indicated.
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4. Email your completed comment matrix to tariffdesign@aeso.ca by **May 28, 2021**.

The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	**A better (more comprehensive) set of examples would be helpful and more information is required to fully understand the AESO's proposal.** TransAlta considers the session was valuable, particularly the discussion of the history of the current DOS process and requirements. However, some of the examples used during the presentation were very simplistic and it was evident that more analysis is required.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	**TransAlta is supportive of DOS modernization but has concerns with some elements of the recommendation.** TransAlta considers the modernized framework that incorporates interruptibility is an important advancement in the tariff, particularly the treatment of energy storage technologies. However, we need to understand the details of the implementation of this proposal before we can fully support it.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	**The business case requirement for DOS is not necessary and should be removed.** TransAlta considers that the condition of interruptibility (and this risk) is enough for the DOS applicant to make the decision to choose between DOS versus DTS. We do not agree that the AESO should have a role in reviewing this business case under a modernized design and the AESO should endeavor to remove this unnecessary requirement under its existing, administratively burdensome, process. **TransAlta is concerned that the penalty for exceeding DTS and DOS contract capacity is introducing a ratchet of the DOS rate.** It seems the AESO has designed two penalties as the DOS customer that consumes above the rate is curtailable/interruptible, and then also incurs the same cost as a DTS customer. Charging the customer DTS and making the customer curtailable would make this rate design discriminatory. **The AESO should providing details about its rationale and calculation of the maximum load factor.** It is unclear how this historical assessment of low usage of DOS is relevant to the conclusion that a 20% maximum load factor should apply. The historical data does not reflect the current market conditions or broader application of DOS under its modernized design. We are concerned that there have not been a lot of historical users of DOS and, consequently, the data set is not representative. As such, we struggle with historical data being useful or reliable enough to determine a maximum load factor. For example, we do not think that a 20% maximum load level is indicative of the load factor for energy storage. Moreover, we question how using an maximum load factor calculated annually can be applied on DOS settlements which are calculated on a monthly basis. We simply do not have enough information to have any confidence in the AESO's proposed maximum load factor or fully understand how it will be applied.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	While we see potential benefits behind a dispatchable DOS and the idea of moving the operation of DOS from the tariff to the energy market rules, the recommendation adds extra requirements regarding bid submissions.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	The AESO stated that historically very few customers on DOS, which raises questions about the robustness of the dataset of DOS customers historically and how big is that sample size. In addition, TransAlta questions the relevance of the historical DOS load in a period of time when no energy storage providers were present. The AESO is recommending that a participant can only get the DOS rate if they bid. Clarity is required on the must bid requirement and whether it applies to all circumstances or only when the intent is to use DOS. Clarity is also required about the ability to restate the bid within T-2. TransAlta also questions why the AESO is concerned about a load customer dispatch compliance and why is it an issue if the customer doesn't consume their full DOS.
6.	Additional comments	TransAlta considers that more discussion is needed about DOS participation on the energy market, with better examples that assess the impact on different types of load, including treatment of different energy storage configurations.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Kipp Horton
Comments From:	Turning Point Generation			**Phone:**	(403) 233-2259
Date:	2021/05/31			**Email**:	Kipp.horton@windriver.ca

Instructions:

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2. Please respond to the questions below and provide your specific comments.
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The AESO is seeking comments from Stakeholders on its DOS modernization recommendation. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	Turning Point Generation (TPG) appreciates the continued engagement opportunity provided by the AESO on this matter. We continue to believe this is a valuable process for all stakeholders.
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	TPG has been supportive of AESO's development to date of an opportunity-type service for energy storage resources. However, based upon the details provided in the latest Engagement Session 5B (DOS), TPG is not supportive of the AESO's current DOS modernization recommendation. The two most problematic issues with the recommendation from an energy storage perspective are a) the Annual Maximum Load Factor provision, and b) the Business Case eligibility test. In both cases, the AESO has not provided enough analysis to warrant their application and therefore these items appear to be arbitrary and subjective in nature.
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	The AESO should exclude the two concepts noted above, being a) the Annual Maximum Load Factor provision, and b) the Business Case eligibility test. TPG believes that these concepts combine arbitrary and subjective aspects which will result in added uncertainty. TPG suspects that this added uncertainty will render the DOS modernization impractical and therefore limit energy storage market participants use of this rate class. In TPG's view, these proposals do not support a "red tape reduction" strategy nor due they adhere to fundamental FEOC principles.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	Through the DOS modernization, the AESO is proposing that energy storage resources be included as full-range participation in the energy merit order. The AESO has previously engaged on the question of full-range participation with the energy storage stakeholders outside of this current Bulk & Regional Tariff engagement. There are many additional considerations with respect to including energy storage in the energy merit order that are beyond the Bulk & Regional tariff design. Inclusion in the energy merit order requires a review and assessment of Alberta electricity market design to determine how storage participation may influence market outcomes and objectives.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	None at this time.
6.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021 through May 28, 2021	**Contact:**	Megan Gill
Comments From:	The Office of the Utilities Consumer Advocate	**Phone:**	
Date:	2021/05/28	**Email**:	

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	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was a valuable review of the original intent and purpose of DOS and considerations of the pros and cons of any changes to the structure and conditions of access to this opportunity service.

2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	While the UCA is generally supportive of the intent of the proposed changes to DOS and the cost benefits it could theoretically yield to residential, farm, and small business consumers, we remain concerned about the potential for revenue loss and future DTS rate increases. This DOS was initially designed to address the following key objectives: 1. To maintain a clear *distinction* between the *regulated* tariff for using the "wire' system based on *cost recovery*, and the separate price-offer based *market* arrangements for energy and ancillary services.This translates into paying for the use of a pre-agreed amount of wire capacity regardless of load factor or the economics of market based energy consumption or supply of other services. 2.To provide reliable safeguards against the cannibalization of DTS revenues by attracting *only* incremental (or avoided decremental) use that would not otherwise have occurred in the absence of DOS. Limited terms are an important part of these safeguards. 3.Comparison with extra-provincial exports and import procedures is not relevant as inter-provincial tie-line transactons are *inherently* market based opportunity transactions where DTS would never have been applicable in the first place. In UCA's view, any changes to DOS must be carefully considered so that the door to revenue loss is not opened any wider than necessary. In our opinion the modernization reccomendations result in an uneccessarily complex rate that fails to meet the crucial objectives of an opportunity service and obscures the potential for revenue losses. The modernization would increase the risk of revenue loss as: 1.Linking DOS to offers in the energy markets and achieved load factors bases the rate on energy market dynamics instead of regulated transmission costs and Bonbright pricing principles. This change introduces unnecessary complexity and obscures the clarity of DOS purpose, increasing the risks of revenue losses. 2.The proposed energy market linkage and the removal of limited terms weakens the protections built into the existing DOS to lower the risks of revenue losses through cannibalization of DTS and opens the door to future increases in DTS. 3.Comparisons with import and export trading arrangements on interconnectors, and the provision of ancillary services used to justify the linkage to the energy or ancillary service markets are invalid and confuse the purpose of DOS and the very different purpose and basis of tie-lines and import/export transactions.

		The UCA is supportive of the intent behind the combination of qualitative and quantitative measures to evaluate DOS eligibility while avoiding DTS cannibalization, which is hoped to be achieved through increased oversight that will come from annual technical and business case assessments.
3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	If the intent of DOS modernization is to encourage energy storage developments we would recommend the introduction of a separate rate or arrangement. That is specific to new energy storage installations only. If the use of DOS is limited to recognized energy storage developments the potential to cannibalize DTS revenues could be limited. It will be increasingly important to have sufficient AESO oversight and scrutiny of DOS eligibility requirements to ensure the opportunity rate is being used as intended.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	Did the AESO consider restricting the use of DOS to specifc new energy storage installations? How will the AESO ensure transparency of DOS utilization and potential impacts on revenue loss? What metrics will the AESO use to determine if the changes to DOS eligibility needs to be reassessed?
6.	Additional comments	NA

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Stakeholder Comment Matrix – May 13, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS)

Period of Comment:	May 13, 2021	through	May 31, 2021	**Contact:**	Colette Chekerda
Comments From:	West Fraser Mills Ltd.			**Phone:**	780-920-9399
Date:	[2021/05/31]			**Email**:	Colette Chekerda

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	Questions	Stakeholder Comments
1.	Please comment on Session 5B hosted on May 20, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful?	The session was valuable in that DOS required it's own session, however clearer examples and description of how the DOS is expected to work would have been helpful. **The consultation and feedback timelines are very tight for this process. We do not believe that we have been given adequate time to review and respond to the consulation and the materials that have been provided.** **West Fraser (WF) is a forestry company, and does not employ tariff design professionals. As such, we must defer at our own expense to subject matter experts in this process. Loads pay for all of the transmission in Alberta, yet do not qualify for cost recovery as part of tariff consultations and proceedings. WF is both exposed to the cost of the tariff re-design and the cost to defend our company against this cost increase. This process is not fair, efficient or economic in our opinion.**
2.	Are you supportive of the AESO's demand opportunity service (DOS) modernization recommendation? Why or why not?	WF supports the initiative of moderninzing DOS, however the AESO proposal for DOS apears unnecessarily complicated. The dispatch should be a "down to" DTS contract level – similar to what the capacity market envisioned for load resources. The basis for the 20% load factor appears arbitrary and restricts usage by highly impacted loads. To mitigate increasing costs of rate DTS, DOS volumes should be based on economic necessity. If the participant meets the eligibility criteria for DOS, then it would be in the best interest of other rate payers that the volume be maximized to provide incremental revenues. WF sees the DOS modernization in it's current form as not being a good fit for the load type that is most affected by the tariff modernization. Price responsive loads must respond to price signals to mitigate costs to remain competitive. If DOS volumes are combined with DTS volumes for price responsive loads, then the price signal relating to coincident metered demand is affected.

3.	Are there considerations that the AESO should include, exclude and/or modify in its DOS modernization recommendation? Please specify and include your rationale.	WF requires the following modifications to support the DOS tariff proposal: *1. Removal of the maximum load factor requirement* If the opportunity meets the eligibility criteria, and would be foregone revenue if the DOS is not granted, then it is in the best interest of ratepayers to maximize the use of DOS. *2. Eligibilty criteria should include a. a credible by-pass opportunity and b. should be extended to price responsive load.* First: If a load can demonstrate they would exit the grid in the absence of DOS, then DOS should be granted in this circumstance. This would keep more load on the grid, and delay grid defections, hopefully to the point where CTI projects have been depreciated and DTS costs become more attractive than a bypass option. Once a load makes the decision to defect from the grid, they are not coming back and their future revenue contribution is gone. Most loads do not want to be generators and are only doing so to remain competitive in Alberta. It appears as though loads are being held hostage to an overbuilt transmission system (self-supply and export restrictions, adjusted metering practice that would move existing net metered sites to gross metered sites with a SASR change, the proposed DTS tariff), these restricitons will only lead energy intensive loads to more extreme measures to remain competitive. This includes moving production to other more attractive juristictions or completely defecting from the grid. This result will be detrimental to Alberta ratepayers, the Alberta economy, jobs and future investment in the province. Second: Loads that demonstrate consistent CPD and energy market response should have that portion of their load eligible for DOS. This would result in several key benefits to all ratepayers. • Load retention and revenue enhancement: Energy intensive and trade exposed loads respond to price signals in order to remain competitive in Alberta. The proposed DTS tariff renders these loads uncompetitive. The mitigation solution needs to be a permanent rate option. An interruptible tariff is preferrable, however DOS could serve as a proxy with changes. Having qualified price responsive load granted DOS will keep these loads on the grid and continuing to contribute to the transmission revenue requirement. • Energy market stability: WF's price responsivle loads are aggressively responding to coincident peaks. This response is not confined to one 15

		minute interval, but happens many hours each month. This affects facility performance, energy efficiency and output but improves stability of the grid. Since the Alberta system peaks in the winter and summer, having flexible loads respond in the shoulder months reduces WFs productivity without a commensurate benefit in the transmission system. • Productivity improvement: Having price responsive loads operate under a DOS tariff instead of DTS will enhance productivity and economic output of WFs flexible loads. This may increase the revenue contributed compared to the current DTS tariff while keeping WF's facilties viable in Alberta. 3. Ensure that PODs are maintained despite having DOS loads. Consider a modification to DOS 7 minute where POD charges are separated out and billed according to the import requirement at the site (DTS + DOS MW). In exchange for this consideration, WF's operations would have assurance that our substations continue to be maintained and repaired when required. Further, a reasonable expectation of period of DOS availability (i.e. 5 year notice to exit or return to DTS). This will allow WF's high load factor facilities to continue to plan their business in Alberta with a reasonable period to pivot to on-site generation or move production out of province when the system no longer has opportunity capacity. 4. Allow a standing DOS bid in the energy market for 7 min DOS with a down to DTS contract level requirement under transmission constraints or EEA events. Sites paying for firm DTS service should not have to remove a block of energy to below this level. Energy market rules would need to be developed such that compliance is not an issue if the site load level was at or below the DTS contract level.
4.	Do you have any additional implementation considerations for the DOS modernization the AESO should consider?	The AESO DX-TX meeting of May 26, 2021 indicated that the AESO is intending on publishing transmission and substation capability maps to assist generators in deciding where to connect. This same work could be used for DOS customers to understand the capability in their area as well as a future outlook.

	Questions	Stakeholder Comments
5.	Do you have additional clarifying questions that need to be answered to support your understanding?	No further questions
6.	Additional comments	DOS could provide an opportunity for high load factor flexible loads to continue to remain competitive in Alberta, even with the very high cost of delivered power. The forestry industry plans to operate it's facilities for 40 – 80 years, so a DOS or interruptible rate is required with enough certainty to allow WF to plan for the future, mitigate delivered power costs and continue paying for Alberta's overbuilt transmission system is needed.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS) hosted on May 20, 2021

I. Purpose and objectives of the session

The purpose of this session is to engage stakeholders in a discussion of the AESO's demand opportunity service (DOS) modernization recommendation to allow expanded eligibility (e.g., energy storage).

The session objectives include:

- Present additional background on the AESO's demand opportunity service – what it is, the service it provides, and how it operates today
- Share our learnings on DOS modernization stakeholder feedback
- Present and discuss the AESO's DOS modernization recommendation for the purpose of seeking takeholder feedback on the recommendation

II. Session agenda

Time	Agenda Item	Presenter
8:00 – 8:15	Welcome, introduction, purpose, and session objectives including extension requestion on engagement and filing schedule	AESO / Stack'd
8:15 – 9:00	DOS 101 – describes how the current DOS rate works today • Origins of DOS • How the current DOS rate is derived • How DOS works ○ How to apply for it, use it, curtail it, how is it charged and what happens if you misuse it • Q&A	AESO
9:00 – 9:20	Recap of AESO conclusions on non-firm rates • Q&A	AESO
9:20 – 9:35	Break	
9:35 – 9:45	Key highlights of AESO's DOS modernization recommendation • Opportunity rate design principles • Proposed key changes to DOS	AESO
9:45 – 10:05	What we heard • DOS rate under preferred rate design • Fast recall rate • Annual term for DOS • DOS take-or-pay requirement • Provision of ancillary services as a DOS customer • Availability of capacity	AESO

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Time	Agenda Item	Presenter
10:05 – 11:30	AESO's DOS modernization recommendation • DOS Eligibility • DOS Connections • DOS Transactions • Suspension of DOS • DOS Rates Streamlined	AESO
11:30 – 12:00	Break	
12:00 – 12:50	Q&A Period • What we heard • AESO's DOS modernization recommendation	AESO
12:50 – 1:00	Session close-out and next steps	AESO / Stack'd

III. Attendees

Company
Alberta Direct Connect Consumers Association ("ADC")
Alberta Electric System Operator ("AESO")
Alberta Energy
Alberta Newsprint Company ("ANC")
Alberta Utilities Commission ("AUC")
AltaLink Management Ltd.
AltaSteel
Arcus Power Corporation
ASCENT Energy Partners Ltd.
ATCO Electric Ltd.
Best Consulting Solutions Inc.
BluEarth Renewables Inc.
Boost Energy Ventures
Brubaker & Associates, Inc., on behalf of ADC
Canadian Renewable Energy Association ("CanREA")
Capital Power
Chymko Consulting, on behalf of Cities of Lethbridge and Red Deer
Consumers Coalition of Alberta ("CCA")
Cenovus Energy
Chapman Ventures Inc.

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Company
CNRL
Customized Energy Solutions
DePal Consulting Limited
Enbridge Pipelines Inc.
Enel NA
Energy Storage Canada
ENMAX Corporation
EnPowered Inc.
EPCOR Distribution & Transmission Inc.
EQUS
ERCO Worldwide
FortisAlberta Inc.
Heartland Generation Ltd.
Imperial Oil
Industrial Power Consumers Association of Alberta (“IPCAA”)
Lionstooth Energy Inc.
Mercer Peace River Pulp
Millar Western Forest Products
NextEra Insights Inc.
Northern Sunrise County
NRGCS
Power Advisory LLC
RMP Energy Storage
Rodan Energy Solutions
Solas Energy Consulting Inc.
Suncor Energy Inc.
TC Energy
The Office of the Utilities Consumer Advocate (“UCA”)
TransAlta Corporation
Turning Point Generation
URICA Asset Optimization
VIDYA Knowledge Systems, on behalf of Canada West Ski Areas Association (“CWSAA”)
West Fraser

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Company
Weyerhaeuser
Stack'd Consulting, Inc.
Attendees by phone
14034636639
14038284900
15878894627

IV. Overall outcomes from the day

The main objective of the session was for the AESO to present its recommendations for DOS modernization. Participants engaged in discussion and overall, stakeholders agreed that more clarity was needed to achieve a better understanding of the modernized DOS.

V. Session highlights

Captured below are the highlights of the questions and discussion on a topic-by-topic basis. For a detailed review of the session, please refer to the session recording, posted at www.aeso.ca.

Topic 1: DOS 101 – how the current DOS rate works today

i. Stakeholder Commentary

- Clarifying comments:
  - *Solas Energy:* Does the AESO use economic thresholds for any other connection load or generation?
  - *ERCO:* Could you provide the timing of the AESO's review of the DOS application? Days? Weeks?
  - *AltaSteel:* Does the AESO have any historic numbers of MW applied for and granted in the DOS?
  - *Best Consulting:* On Slide 27 (Current DOS usage request process), how are there only two reasons for denial listed when there is supposed to be an economic case?
  - *CanREA:* Are there other services where a lack of compliance can result in loss of access to the service?
  - *TransAlta:* If the AESO disqualifies a DOS customer as a consequence of an audit, is there a dispute resolution mechanism in place?

ii. AESO Clarification

- Response to clarifying comments:
  - DOS is the only rate that requires economic thresholds.

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- Regarding application review, the AESO takes 30 days from receipt of the application to approval.
- Regarding the historic numbers of MW of applied for DOS, these numbers can be found on Slide 90 (Historical DOS statistics) of the presentation.
- Regarding Slide 27, this slide is not about eligibility, it is about transaction requests.
- Regarding lack of compliance within other services, there are provisions within the ISO tariff that allow the AESO to terminate Demand Transmission Service (DTS).
- The AESO has a process for dispute resolution set out in the ISO rules.

Topic 2: Recap of AESO conclusions on non-firm rates

i. Stakeholder commentary

- Clarifying Questions:
  - *ADC:* Has the AESO studied the stress conditions with and without the response of the price responsive load?
  - *IPCAA:* Is the AESO forecasting load on the system or is the new issue forecasting generation on the system? In 2014 the AESO was forecasting for 2025, 16,318 MW of Alberta Internal Load (AIL) on the system, in 2019 it was forecasting 12,803 MW of AIL on the System, a decrease of over 3500 MW of AIL.
  - *Weyerhaeuser:* Can the AESO provide their information for load forecasting at an individual point-of-delivery (POD)?
  - *Alberta Newsprint:* After listening to the AESO, there's a stronger case for an interruptible rate. What I'm hearing is that the AESO did not build the system for the average load during stress conditions. Then, the argument is that some loads should not be paying the average transmission charges because the AESO did not build the system for the average load.
  - *Solas Energy:* Does the extreme conditions include 24x7 solar production at max. capacity and wind at max. from all facilities on an 8760 basis?
  - *ADC:* It seems like the AESO is aligned with the concept of coincident peak (CP); the concern is then the value. In the absence the study of the system with and without price responsive load at times of system stress, how can the value of the CP charge be adequately determined? There is some real value that happens in real time with the behaviour of particular loads. What would happen without these price responsive loads behaving as they do today?
  - *Suncor:* The AESO takes into account the diversity of load and does not stack DTS capacities, which implies that some customers add to the transmission system stress more than others independent of their contract capacity or total energy consumption. Coincidence/correlation among customers is clearly a system planning driver and should therefore be a cost driver and be appropriately reflected in rates.

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ii. AESO clarification

- Response to clarifying questions:
  - The AESO continues to forecast both load and generation. Looking forward, we are not going to be seeing load growing as much. The reinforcements to serve load are very small regional developments.
  - One aspect of DOS is that there is mirror-type behaviour and capability on the system – customers will want to use that capability at peak.
  - Regarding POD level forecasting, the AESO provides some high-level details of POD level forecasting when we release the long-term outlook. However, at the level of individual PODs, there is some commercially sensitive information – that is why the AESO has not historically released POD information.
  - The AESO creates study conditions for a range of planning activities to drive longer term plans. The AESO sees interruptible rates as being locationally driven. If an interruptible rate was provided in a specific region, it would be locationally specific where providing the rate would relieve the constraint. The specificity of an interruptible rate does not align with the postage stamp constraints that the AESO is trying to operate within.
  - In creating study conditions, the likely output of solar and wind are included. We have to identify what the right combination for solar and wind snapshot conditions are.
  - Under the current embedded cost allocation method and the one the AESO is recommending, there are a set of costs that have been deemed prudent to recover. It is a construct that is looking to align cost recovery with billing determinants and rates that get as close as possible to cost causation principles.

Topic 3: Key highlights of AESO's DOS modernization recommendation

i. Stakeholder commentary

- Clarifying comments:
  - *CanREA:* On Slide 16 (The origins of DOS circa 2001), can the AESO explain using "Cost Causation" to determine the rate when the original principle was that the rate should be based on value not costs?
  - *Power Advisory:* On Slide 51 (Annual term for DOS) – any customer using DOS rate would have to have a must bid requirement. But your proposal for market participation said you could choose either to bid or not.
  - *ADC:* I would like to understand the second last bullet on Slide 51. If your load is 29 MW, would your load not be compliant?

ii. AESO clarification

- Response to clarifying comments:
  - Regarding Slide 16, this slide references that DOS is supportive of cost causation principles. DOS does not cause costs and therefore having a rate that is based on value, aligns with cost causation principles.

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- Regarding Slide 51, the AESO's proposal for energy storage market participation said customers could choose either to bid or not. But we believe the best way to modernize the transaction portion of DOS is to have DOS moved into real time operations.
- Regarding the second last bullet on Slide 51, what the AESO was trying to highlight here is that if your load was at 20 MW, the settlement of DOS relies on metered volume. So, if your metered volume never got up to your DTS contract capacity, that energy would still be charged under DTS. When responding to a bid, the dispatch instruction is based on where your load is currently at and where you were dispatched from a compliance perspective.

Topic 4: AESO's DOS modernization recommendation

i. Stakeholder commentary

- Some participants were concerned with the AESO's use of historical data:
  - *Capital Power:* Has the AESO looked at different energy storage configurations? There's a bit of concern with always using historical behaviour to predict what future behaviour will look like.
  - *ADC:* Given the lack of historical use of DOS, how is the historical assessment of usage relevant?
  - *TransAlta:* What relevance does historical DOS load have if there weren't any energy storage providers under DOS in this historical period?
- Some participants were concerned with the perceived penalization within the AESO's modernized DOS recommendation:
  - *TransAlta:* It seems like the AESO has designed two penalties – the DOS customer that consumes above the rate is curtailable/interruptible and then also incurs the same cost as a DTS customer. If you charge the customer DTS, why would they be curtailable today (isn't this rate design discriminatory)?
  - *TransAlta:* Why is the AESO concerned about load customer dispatch compliance (why is it an issue if the customer doesn't consume their full DOS)? I'm not understanding the penalty on the customer's ability to get DOS in the future if they have already been ratcheted in the past.
  - *ADC:* With respect to meeting the dispatch requirements, this is problematic because if you're paying for DTS service for 20 MWs, you are offered 10 MWs and only use 5 MW, why would you have to dispatch below your DTS capacity? You shouldn't be required to interrupt below your firm level.
  - *ASCENT Energy:* Regarding the energy market versus DOS tariff charge – is it fair to say that one can only get the DOS rate (and avoid a DTS ratchet) if they bid (rather than give notice)? In the current DOS tariff, you have to give notice that you're planning to access your DOS – that's being replaced by the bidding process. If you fail to bid, you'll just run over your DTS limit, set a new ratchet and your bill will be bigger?
- Clarifying comments:

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- *TC Energy:* On the business case piece, what I worry about is the subjectivity associated with it. Two parties might submit business cases that are similar and one might end up being eligible for DOS and the other might not be. How does the AESO plan to address that?
- *TC Energy:* If a new revenue stream becomes available for a facility that bumps you above 20 per cent, they might now get pushed off DOS to DTS, which means you'll have to forego the new revenue stream. Can the AESO bump it up to 25 per cent to allow for more flexibility?
- *Best Consulting:* What would your bid be at various points on the graph on Slide 63 (DOS maximum load factor – Example)?
- *Capital Power:* Given the 20 per cent load factor is an annual measure, and settlement is monthly. How will this be performed? Will the AESO have to retroactively adjust its billings if load exceeds the 20 per cent?
- *Solas Energy:* Would you expect energy storage to use Supply Transmission Service (STS) and DOS or would DOS be used for charging and discharging?
- *Capital Power:* At what stage in the AESO's connection process would it assess a DOS request?
- *CCA:* Given that DOS capacity is not planned, what is the mechanism for recall in the event of transmission stress situations? I note that energy market dispatchability is purely an energy market issue and not a transmission one.
- *Solas Energy:* What is the AESO trying to achieve with DOS? What's the design based on (i.e., other jurisdictions)? Why do you need the application with commercially sensitive information? Are you bidding in the rate of change of charge or are you bidding in the absolute?
- *Chapman Ventures:* If there was a limitation on the system that wasn't just related to having firm capacity, there would be instance where STS wouldn't be available as well. All things equal, would that be a decision left to the project proponent?
- *ATCO:* Looking for clarification on the maximum annual DOS limit of 20 per cent. For a load contracted at 10 MW DTS, is the maximum annual 20 per cent load factor calculated as: (a) 10 MW x 20% x 8760 = 17,520 MWh or (b) 10 MW x 80% x 8760 x 0.2 = 14,016 MWh? Is the annual DOS limit applied monthly as the above number divided by 12?
- *Alberta Newsprint:* We're making it very cumbersome on the load – we'll end up with a similar issue that we have now that not a lot of people will take to DOS.
- *ADC:* The DOS tariff was presented as a potential opportunity for the most impacted customers. But now that the AESO has introduced the 20 per cent load requirement, it would put DOS out of eligibility for those customers. Where did the 20 per cent come from?
- *ADC:* Would there be any possibility just for the DOS to be a standard bid in the energy market? Could you just not have the 10 MW bid in and when you use it you use it?
- *Best Consulting:* As DOS is an opportunity service and transmission won't be built for it, what would you do if a firm load showed up and wanted to use the capacity and are willing to pay DTS for it?

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- *Lionstooth Energy:* From a quick scan of the AESO's project list, there are about 14 storage projects in the queue. Over half (~eight) of these appear to be connecting via the Distribution system. Has the AESO had discussions with distribution facility owners (DFOs) for how DOS concepts would flow through to the DFO tariffs? Is there a concern that there will continue to be different tariff signals sent between ISO and DFO tariffs?
- *DePal Consulting:* It sounds like a storage proponent might want to have a certain level of DTS because that protects them. If that's the case, that's really up to the project proponent on how much risk they want to take?
- *Suncor:* Concerned about a subgroup of industry discussing rate alternatives, as rates classes should principally be open to everyone. Further, if there is financial mitigation, it will have to be financed by other ratepayers, so those ratepayers should be allowed to be at the table. Asked the AESO to consider opening up for participation outside of the targeted mitigation customers?

ii. AESO clarification

- Response to comments regarding the perceived penalization for DOS users:
  - The AESO is not going to force customers to consume their dispatch level.
  - If a customer doesn't bid and runs over their DTS, then their bill would be bigger.
  - Regarding the perception of "double penalties", when a customer is dispatched to provide the DOS and if they exceeded their 20 per cent, there would be no impact to their contract capacity for DTS, but the AESO would charge that portion to the DTS rate. If the customer is consuming above the DTS contract capacity outside of the DOS, that is a different assessment covered by other provisions in the ISO tariff.
- Response to clarifying comments:
  - The business case was always there for DOS. The AESO understands it is a qualitative assessment with some subjectivity. The current DOS heavily relied on the business case. We think that by adding the load factor, goes a long way to assessing the overall application and there's less emphasis based on the business case.
  - DOS is not a rate for only energy storage.
  - For energy storage there are a wide range of energy storage implementations and the AESO would have to consider these in the assessment of the business case.
  - The current bidding rules would allow you to submit the bid whenever you choose to bid. If you weren't above your DTS line and you submitted a bid, you would still have to respond to the dispatch even though it's not technically your DOS load. Settlement and dispatch aren't closely coupled because it allows customers to control both load and bid.
  - Regarding time periods, the load factor was to be an annual load factor and the settlement done on a monthly basis. There would be an adjustment made to the monthly bill to calculate that on a go forward basis.
  - The expectation is that you have to demonstrate you can operate the asset without DOS energy, under DTS. If you didn't have DOS energy, how would you ever charge your asset.

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- DOS is using capacity that is deemed excess, that capacity is recallable. You could not operate a site without at least some capability to charge and we think there's a minimum that should be chargeable by DTS if DOS was unavailable.
- The minimum charge to DTS is part of our assessment to determine whether you're relying on DOS completely.

- Regarding transmission stress situations, even for energy market assets, there is the possibility for constraint and the AESO has the ability to constrain down assets. We would apply the same tools to DOS loads if a local constraint were to happen.
- There's a distinction between dispatching and settlement. The way dispatching works today is on a merit order. The controller is looking for a delta change between the time you were dispatched and the time when they expect you to change your load. That load may or may not be DOS load.
- Regarding the targeted mitigation engagement, the AESO will be asking what parts of this proposal work and don't work for mitigation.
- The 20 per cent load requirement is included in the proposal here so we can find the right balance between DOS and DTS in order to avoid DTS cannibalization.
- Regarding the how DOS concepts would flow through to the DFO tariffs, the AESO hasn't completely thought through all of that, but depending on the right metering and ability to respond by the energy storage distribution connected, don't see major issues right away. There is more work to be done by the AESO on this.

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Notice

To: AESO Stakeholders

Date: Wednesday, May 12, 2021

Subject: **AESO Request for Extension of Filing Date for Bulk & Regional Tariff Application**

On May 12, 2021, the AESO filed a submission with the Alberta Utilities Commission ("Commission") requesting an extension of the filing date for the Bulk and Regional Tariff Application from June 30, 2021, as follows:

> The AESO must file its Application by October 15, 2021, or within eight weeks of the AESO's last stakeholder session, whichever is later.

An extension would permit the AESO to better address recent stakeholder feedback on the AESO's currently preferred tariff design through additional engagement with stakeholders on discrete areas of concern, such as the proposed energy charge, incentives for self-supply and the modernization of Demand Opportunity Service ("DOS"), and to provide a response to some of the issues raised by the Commission staff questions. Taking this time to share additional information and engage in additional dialogue will build mutual understanding of the AESO's preferred design and stakeholder concerns, and should narrow issues within the Application and associated proceeding. A broader shared understanding of the AESO's preferred design and the problems and challenges it addresses will help both the AESO and stakeholders to participate in a more focused and efficient way in the upcoming proceeding. An extension to the June 30 deadline will also allow the AESO to continue to work with the most impacted stakeholders toward a mutually agreeable mitigation solution.

Please direct any questions to tariffdesign@aeso.ca.

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Agenda

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Session purpose and objectives

The purpose of this session is to engage stakeholders in a discussion of Session 5 stakeholder feedback or follow-up and key questions raised by the Alberta Utilities Commission (AUC) staff, and to provide additional clarity and build mutual understanding of the AESO's preferred rate design and stakeholder concerns. The session objectives include:

- Share our learnings on Session 5 stakeholder feedback or follow-up
- Present and seek stakeholder input on additional information on preferred rate design, including analysis of the potential response to the incentives provided in the rate design
- Present responses to key questions raised by AUC staff
- Seek to understand outstanding stakeholder concerns

Date: **Thursday, June 3, 2021**

Time: **8:00 a.m. – 1:00 p.m.**

Location: **Zoom Webinar**

Facilitator: **Stack'd**

Time	Agenda Item	Presenter
8:00 – 8:15	Welcome, introduction, purpose and session objectives • Application filing extension request	AESO / Stack'd
8:15 – 8:45	Recap of preferred rate design and summary of stakeholder feedback received	AESO
8:45 – 9:15	Appropriateness of the flat energy charge • Time of use and dynamic pricing • On-peak versus off-peak charges • Mix/max load factor energy charges • Q&A	AESO / NERA
915 – 10:15	Cost recovery through avoidable charges and efficiency • Avoidable and non-avoidable charges • Efficiency • Q&A	AESO / NERA
10:15 – 10:45	Break	
10:45 – 11:45	Analysis of self-supply in response to the preferred rate design • Self-supply analysis • Q&A	AESO / NERA
11:45 – 12:45	Analysis of the short-term impact of the preferred rate design on the energy market • Energy charge • Coincident peak charge • Q&A	AESO
12:45 – 12:55	Session close-out and next steps	AESO

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Notice

To: AESO Stakeholders

Date: Tuesday, May 25, 2021

Subject: **NERA Economic Consulting Report on Estimated Customer Response to Preferred Rate Design**

Further to the AESO's presentation of its Preferred Bulk and Regional Tariff Rate Design at its March 25, 2021 Stakeholder Session 5, the AESO received stakeholder feedback and certain questions from the Alberta Utilities Commission ("AUC") staff with respect to self-supply response to the Preferred Bulk and Regional Tariff Rate Design. In response to this feedback and the AUC questions, the AESO has posted a report prepared by NERA Economic Consulting entitled: Estimating Customer Response to Our Recommended Bulk and Regional Tariff Design (the "Customer Response Report"). The Customer Response Report will be discussed as part of the AESO's upcoming Bulk and Regional Tariff Design Stakeholder Session 6A on June 3, 2021, where stakeholders will have the opportunity to provide feedback on the report during that session and afterwards. The AESO is providing the Customer Response Report in advance of Stakeholder Session 6A to provide stakeholders additional time to review the document in advance of providing Session 6A materials on May 27, 2021. This is consistent with the AESO's Transparent and Timely Stakeholder Engagement Principle to assist stakeholders in understanding and evaluating the AESO's Preferred Bulk and Regional Tariff Rate Design.

Please direct any questions to tariffdesign@aeso.ca.

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NERA
ECONOMIC CONSULTING

Estimating Customer Response to Our Recommended Bulk and Regional Tariff Design

Prepared for the AESO

25 May 2021

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1. Executive Summary

1. NERA Economic Consulting ("NERA") has been asked to estimate the likely customer response and potential changes in self-supply outcomes by load arising from the Bulk and Regional tariff design that we recommended to the Alberta Electric System Operation ("AESO"), as described at the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5. In this report, we describe our analysis of the anticipated customer response to the change in transmission tariff.

1.1. Our recommended tariff should encourage more efficient self-supply decisions by customers

2. Customers can reduce their costs of electricity by choosing to self-supply and generate power at their own premises instead of purchasing power from the grid. A customer's decision to self-supply balances the benefit associated with not consuming power from the grid with the additional costs that the customer incurs to self-supply power. A customer's choice to self-supply may be efficient and lower the total costs of electricity provision if the avoided system costs of serving that customers' self-supplied load from the grid exceeded the costs incurred by the customer to self-supply over the long-run.

3. However, customers cannot know the costs that their demand imposes on the grid. They rely on regulated transmission and distribution tariffs and wholesale market prices to signal, to the extent possible, the costs incurred to supply them. Therefore, transmission charges which are cost-reflective will tend to encourage overall efficient self-supply decisions by customers.

1.2. Marginal cost approaches to transmission tariff design may not promote efficient self-supply decisions without locational pricing

4. In theory, a marginal cost approach to transmission tariff design should send an efficient price signal, that reflects the costs imposed by incremental changes in demand on the system, through a charge which varies with customers' consumption behaviour. The remaining costs should be recovered in a way that avoids distorting the consumption decisions that customers take in response to the marginal cost component of the tariff.

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5. Changes in customers' demands have different impacts on transmission system costs, depending on where they are located. The AESO provides transmission capacity to move electricity from areas where the supply of in-merit energy exceeds demand, to areas where demand exceeds supply. Therefore, increasing demand in areas of surplus in-merit energy may reduce transmission costs (implying a negative marginal cost), while higher demand increases transmission costs in areas where demand exceeds supply (implying a positive marginal cost).

6. In developing our recommended Bulk and Regional tariff methodology, we have been asked to assume that rates do not differ based upon the location of load on the transmission system. In the absence of the ability to differentiate the marginal cost component of the tariff by location, a tariff that reflects the marginal cost of transmission would be unable to account for the fact that the marginal cost of accommodating demand in some areas is likely to be positive, while the marginal cost of accommodating demand in other areas may be zero or even negative.

7. Therefore, a marginal cost-based tariff that applies in all areas cannot reflect these differences and therefore cannot send efficient signals regarding the marginal transmission costs associated with accommodating changes in demand in Alberta.

1.3. An embedded cost approach encourages efficient, long-run self-supply decisions

8. By contrast, an embedded cost methodology seeks to signal to customers the long-run costs of providing transmission, in a way that identifies which costs have been incurred historically to accommodate (or have been caused by) particular patterns of usage, particular customers and/or particular services. By ensuring that the structure of tariffs (the balance between fixed, demand-related, and energy-related tariffs), reflects the cost structure of the transmission grid, the tariff can encourage efficiency in users' self-supply decisions.

9. In the AESO's case, it is currently charging for the majority of transmisison costs through a 12CP charge, to an extent that is not justified on grounds of cost causation as explained in the Stakeholder Session 5 presentation. The current tariff is therefore promoting inefficient self-supply decisions aiming to avoid 12CP charges. By

contrast, our recommended tariff better reflects the dual purposes of transmission in Alberta: to meet peak demand and accommodate the flow of in-merit energy.

10. However, even if the tariff is designed to reflect the cost structure of the transmission system, and therefore promote efficient decisions to use the grid or self-supply in the long-term, there remains a possibility that a tariff set to recover historical costs will cause customers to inefficiently self-supply in cases where those customers make lower contributions to historical costs. We therefore estimate customer response to our recommended tariff using a modelling procedure.

1.4. We estimate that customer response to our recommended tariff is likely to be extremely limited

11. In order to better assess how customers may respond to our recommended transmission tariff, we model the optimal self-supply decisions for industrial sites in Alberta. Our approach follows three steps:

    A. Step 1: We construct a model that estimates the optimal self-supply decisions for industrial sites across Alberta, based on a simple comparison of the costs of purchasing power from the grid and self-generation costs.

    B. Step 2: However, this optimisation model overstates the actual self-supply for customers because we do not model other costs associated with self-supply such as costs and risks associated with business complexity or financing. To estimate how customers' actual self-supply decisions will be affected by a change in the transmission tariff, we estimate a regression equation to capture how likely customers are to self-supply, given the economic incentive to self-supply identified in Step 1.

    C. Step 3: We then use our regression to predict customers' response to the change in incentive to self-supply under our recommended tariff.

12. We estimate that self-supply could increase under our recommended tariff by up to 2,801 GWh which is equivalent to a shift in costs from self-supplying customers to other customers of approximately 1.90 per cent of the total revenue requirement for bulk and regional costs in 2019. Our estimate of customer response is a total effect

that includes any dynamic responses[1] by customers to self-supply decisions of other customers.

13. Our estimate of customers' response is conservative because it ignores the potential for customers to increase purchases of power from the grid in response to lower 12CP charges in our recommended tariff relative to the current tariff.

14. Hence, we predict an extremely limited increase in self-supply by industrial customers under our recommended tariff, and any change in customers' self-supply decisions that does arise will tend to result in more efficient patterns of electricity usage than under the current methodology.

1.5. The economic case for self-supply is likely to significantly worsen in the next decade due to rising gas and carbon prices

15. While the impact of our recommended tariff on self-supply is likely to be limited given the current costs of self-supply, the economic case for self-supply in Alberta is likely to worsen in the next decade, even under a low energy consumption growth scenario. Both carbon and gas prices are forecast to rise over the next decade. For instance, we understand that the Federal Government has announced that, under its carbon tax regime, taxes will increase from $30 per tCO2 to $170 per tCO2 in 2030.

16. The impact of future growth in gas and carbon prices on incentives to self-supply depends on how the costs of self-supply change relative to the pool price. Higher carbon and gas prices will increase the pool price for power, as generators incur higher costs to produce power, thereby increasing the cost savings associated with self-supply. On the other hand, rising gas prices and carbon prices will also result in higher costs of self-supply using gas-based generation, decreasing the cost savings associated with self-supply relative to purchasing power from the grid.

17. Gas-based generation options available for self-supply are generally smaller and therefore less efficient (requiring more gas to produce one unit of electricity) than grid-level generation plants. Consequently, the costs of self-supplying power will

[1] By the term "dynamic response", we refer to our modelling procedure accounting for some customers' decisions to self-supply pushing up tariffs for other customers, leading them to self-supply too. Our reported results consider these knock-on effects of the initial change in the tariff to our recommended design.

increase more than the pool price in response to higher carbon and gas prices, because self-suppliers require more gas (and release more emissions) to generate one unit of electricity.

18. We estimate that rising carbon and gas costs will make self-supply technologies more expensive over time, when compared to the cost of purchasing power from the grid. For two representative self-supply technologies, we estimate that by 2030, the fuel and carbon costs of producing one MWh using self-supply plant will be $25.40 or $32.47 per MWh (in real 2019 terms) more expensive respectively than producing a MWh using grid technology, relative to around $10 per MWh today. Therefore, we expect that upward pressure on fuel and carbon prices is expected to further reduce the incentive to self-supply.

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2. Introduction

19. We have been asked by the Alberta Electric System Operator ("AESO") to estimate the likely customer response and potential changes in self-supply outcomes by load arising from our recommended Bulk and Regional tariff design, described at Bulk and Regional Tariff Design Stakeholder Engagement Session 5. In this report, we describe our analysis of the anticipated customer response to the change in transmission tariff.

20. Our report is structured as follows:

    A. In Section 3, we discuss the factors that may influence a customers' decision to self-supply including the costs of self-supply options and the costs of purchasing power from the grid, and determine whether such decisions are efficient:

        i. In Section 3.1, we discuss the definition of efficient and inefficient self-supply decisions.

        ii. In Section 3.2, we discuss the ability of marginal and embedded cost tariff methodologies to promote efficient self-supply decisions in the Alberta context.

        iii. In Section 3.3, we provide a short discussion of current self-supply choices made by customers in Alberta under the current tariff.

        iv. In Section 3.4, we analyse the impact of our recommended tariff on the decision to self-supply. We provide the results of our modelling procedure developed to examine how changes in the AESO's tariff affect self-supply decisions by industrial customers. Overall, we find that any reduction in energy demand from the transmission system resulting from changing to our recommended tariff design is likely to be extremely limited, based on the current costs of self-supply.

        v. In Section 3.5, we examine how incentives to self-supply are likely to change in the future due to forecast changes in the economics of self-supply. We find that the economics of self-supply are set to worsen in the future, even under a low consumption growth scenario, because self-supply technologies are

impacted by rising carbon prices to a greater extent than grid level technologies.

B. In Section 4, we summarise our findings.

C. In Appendix A, we provide a detailed description of our modelling procedure used to estimate customer response, as reported in Section 3.4.

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3. Customer Response to the Tariff

3.1. The Decision to Self-Supply

3.1.1. A customers' decision to self-supply

21. Customers can reduce their costs of electricity by choosing to self-supply and generate power at their own premises instead of purchasing power from the grid. A customer's decision to self-supply balances the benefit associated with not consuming power from the grid with the additional costs that the customer incurs to self-supply power.

22. Customers that choose to self-supply incur costs to do so. The costs of self-supply may include:

    A. The upfront **capital costs** associated with building or procuring a generator to use for self-supply, which would usually be depreciated and financed over the useful life of the generator;

    B. The **fixed annual operating and maintenance (O&M) costs** of generating power using the installed generator;

    C. The **variable costs** associated with generating power which may include the variable O&M costs of the generator, the costs of fuel for the generator, and the carbon costs associated with using fossil fuel generation; and

    D. **Other costs** associated with self-supply such as the costs of land for the generator, personnel, administrative costs, and costs associated with any additional complexity and risk to business operations relative to purchasing power from the grid.

23. The costs of self-supply may also be offset if an industrial customer uses a bi-product from generating its own power in its industrial processes. For instance, industrial customers that self-supply power using cogeneration technology may also benefit from using heat and/or steam in industrial processes.

24. A customer that chooses to self-supply also avoids the costs of purchasing that self-supplied power from the grid. A customer that chooses to consume power from the grid incurs multiple costs, that primarily consist of:[2]

    A. **Energy costs** associated with purchasing energy from the pool;

    B. **Transmission charges** as defined by the ISO tariff for use of the transmission system;

    C. **Distribution charges**, paid by distribution connected customers, for the use of the distribution system;

    D. **Local access fees** which are fees charged by municipal districts to customers in those service areas; and

    E. **Administrative charges**, for customers which purchase energy through an electricity retailer, associated with the billing and administration of the customer's account by the retailer.

25. The costs that customers avoid from self-supplying and incur from purchasing power from the grid depend on how and when they use electricity:

    A. Depending on their connection to the system, customers may not have to pay all of the above charges when consuming electricity from the grid.

        i. A transmission connected, industrial customer purchasing power from the grid would incur energy costs and transmission charges.

        ii. An industrial customer purchasing power from the grid but connected to a distribution system might incur energy costs, transmission charges, and distribution charges.

    B. Customers pay different amounts in energy, transmission, and distribution charges depending on when they purchase electricity from the grid. For instance, customers consuming at peak times will likely pay higher energy costs because the pool price tends to be higher and may also pay more in transmission charges if they consume during times of coincident peak. Other charges, such as a flat

[2] AESO (31 May 2020), Delivered Cost of Electricity Report, p. 15.

rate energy charge would be incurred irrespective of when customers consume from the grid.

C. Charges levied per customer do not vary depending on how much or when the customer consumes energy from the grid. Such charges are difficult to avoid through self-supply decisions, unless customers disconnect from the grid entirely.

D. Charges levied on billing capacity do not vary with customers' energy consumption across all hours, but do vary with customers' contracted capacity or peak energy consumption across the year. However, customers choosing to self-supply may reduce their contracted capacity as having generation on-site may reduce their reliance on the grid for peak requirements.

26. Therefore, customers incur different costs to self-supply and avoid different costs associated with purchasing power from the grid, depending on how and when they choose to self-supply.

27. A customer's decision to self-supply is not a binary decision. There are multiple different ways that a customer could self-supply that each result in a different net consumption profile from the grid. We distinguish four approaches and technologies that could be used to self-supply:

A. **Intermittent generation:** Customers could install intermittent generators to self-supply such as rooftop solar photovoltaic (PV) generators. The profile of such generation is not controllable by the customer and therefore the customer would still need to connect to the grid or install other forms of on-site generation that could run when the intermittent resource is not available. The customer would avoid paying some costs when it was generating, such as energy charges in the transmission tariff and the pool price. However, it would tend not to avoid peak charges, except to the extent that the generator happens by chance to be producing at peak time.

B. **Peaking generation:** Customers could install peaking generators characterized by low capital costs but high variable costs of generation. Customers can choose when to run peaking generation and would likely use it to reduce their consumption during peak periods, when they can avoid network charges linked to

coincident peak load, energy charges, and energy costs associated with higher pool prices. However, peaking generators will be less economic to run in off-peak periods meaning customers would likely remain connected to the grid and consume power from the grid during those times.

C. **Baseload generation:** Customers could install baseload generators, characterized by higher capital costs but lower variable costs of generation relative to peaking generators. Baseload generators will be economic in more hours than peaking generators, and could be used to self-supply in all hours throughout the year. However, customers deploying baseload technologies for self-supply would still need to be connected to the grid as they would be reliant on the grid for back-up in cases where their generator suffers a forced outage. Customers with baseload generation would avoid most energy costs and charges, apart from the occasions where it relied on the grid for back-up, and peak charges, unless it needed to use the grid for back-up during a peak period. However, customers would remain liable for any per customer, per connection, or contract capacity charges as they would remain connected to the grid. As we discuss above, customers may also utilise baseload generation to produce bi-products for use in industrial processes.

D. **Disconnection or grid defection:** Lastly, customers could completely disconnect from the grid, and rely entirely on their own power generation capacity. Customers that disconnect from the grid would avoid all energy costs, transmission charges, and distribution charges. However, they may incur higher costs to self-supply, as they would need to have technology in place to operate in an "islanded" mode of operation, without the ability to draw on the grid for support.

28. Customers can also avoid taking power from the grid at certain times to avoid charges, but without investing to self-supply. Management of load, by reducing or eliminating power consumption, can be used to avoid coincident peak charges which are levied on consumption during small time intervals throughout the year, or the purchase of energy at relatively high pool prices. However, customers would need to be able to predict when such time intervals occur. In management of their load at any

moment in time, customers face a trade-off between the opportunity cost of using power and the savings associated with avoiding the charges levied.

29. Customers may also invest in energy storage options to complement self-supply technologies or to help them manage their load and avoid periods of time associated with relatively higher costs of purchasing power from the grid.

30. Customers' decisions on how and whether to self-supply depend on their individual circumstances, namely how and when they consume power from the grid. A customer considering whether to self-supply could choose a combination of the approaches to self-supply (listed in Paragraph 27 above) to best meet its energy requirements.

31. In making self-supply decisions, a customer's load size is also an important determinant of the self-supply options available to it. The upfront capital costs of some self-supply options, e.g. baseload generators, often make them uneconomic for customers with smaller loads. Customers with smaller loads may be limited to smaller back-up/peaking plant, intermittent generation options, and load management. On the other hand, larger industrial and commercial customers are more likely to be able to pursue a wider range of self-supply options, including peaking and baseload generation or disconnection from the grid.

32. Customers are also constrained in their decisions to self-supply by other factors. Space and land availability may constrain the use of some self-supply options, such as the use of solar PV for larger industrial loads. Local emissions limits may also restrict the self-supply options available to customers. Lastly, industrials may face capital constraints in funding the upfront capital costs of self-supply options.

33. From the customers' perspective, optimal decisions to self-supply balance the costs incurred to generate their own power with the avoided costs of purchasing power from the grid. We would expect customers to take a holistic decision of whether to self-supply based on all the benefits and avoided costs of purchasing power from the grid (i.e. not just the transmission tariff).

    A. If the customer incurs fewer costs to self-supply than it would to purchase power from the grid (accounting for any associated benefits of self-supply, such as heat supply), then the customer would optimally choose to self-supply.

B. If the customer incurs more costs to self-supply than it would to purchase power from the grid (even after accounting for associated benefits of self-supply), then the customer would optimally choose not to self-supply.

34. Given that self-generation decisions typically involve investment in long-lived generation assets, we would expect a customer's decision on whether to self-supply to consider a forward-looking assessment of the costs of self-supply relative to the avoided costs of consuming from the grid.

3.1.2. Efficient and inefficient self-supply decisions

35. Economics defines a concept named "productive efficiency".[3] A market is productively efficient when it meets the demand from customers at lowest possible cost. The power market would achieve productive efficiency if customers' loads are met at lowest possible system costs, irrespective of which parties incur those costs.

36. It is not necessarily inefficient for the system if customers choose to self-supply. In fact, a customer's choice to self-supply may be efficient and lower the total costs of electricity provision:

A. A customer choosing to self-supply would improve productive efficiency if the avoided system costs of serving that customers' self-supplied load from the grid exceeded the costs incurred by the customer to self-supply over the long-run (net of any other costs and benefits from doing so, such as the value of heat); whereas

B. A customer choosing to self-supply would reduce productive efficiency if the avoided system costs of serving that customers' self-supplied load from the grid are less than the customer's incurred costs to self-supply over the long-run (net of any other costs and benefits from doing so, such as the value of heat).

37. Customers cannot know the costs that their load imposes on the grid. They rely on regulated transmission and distribution tariffs and wholesale market prices to signal, to the extent possible, the costs incurred to supply them. Therefore, transmission

[3] See for instance, Michael. J. Farrell (1957), The Measurement of Productive Efficiency, Vol. 120, No. 3, p. 253-290.

charges which are cost-reflective will tend to encourage overall efficient self-supply decisions by customers.

38. Following a change in the transmission tariff, customers may make different, and *more efficient*, self-supply decisions in response to a transmission tariff that itself better reflects the costs of transmission incurred to serve that customer's load. For instance, compared to the current tariff, our recommended tariff reduces costs recovered through a charge on 12CP in order to better meet principles of cost causation. Consequently, customers are more incentivised to consume power from the grid during times of coincident peak, thereby reducing inefficient self-supply decisions relative to the current tariff.

39. In its Distribution System Inquiry, the Alberta Utilities Commission (AUC) distinguishes customers' decisions to self-supply by whether they constitute "economic" or "uneconomic bypass" from the grid.[4] The AUC defines uneconomic bypass:[5]

> *"uneconomic bypass describes a situation where a customer's bypass decision (i.e., supplying its needs through other means) shifts fixed cost recovery, whether in whole or in part, to other customers. This occurs when a customer's decision to self-supply electricity does not change (or even increases) system costs, but results in that customer paying a smaller share of the fixed costs. This unrecovered fixed cost must then be collected from other customers"*

40. The AUC defines "economic bypass":[6]

> *"In contrast, economic bypass occurs when a customer supplying its needs through other means results in reduced costs for other customers. This happens when a customer's decision to self-supply electricity lowers system costs; so it is not only the self-supplying customer who is paying less for the system costs, but the costs for other customers are also reduced"*

4 AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 97 and 98.

5 AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 97.

6 AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 98.

41. As we discuss above, our recommended tariff seeks to more accurately signal the long-run costs of providing transmission in Alberta. Self-supply decisions in response to cost reflective tariffs promote efficiency in the overall supply of electricity, and will tend to reduce the costs faced by the customers who purchase energy from the grid. Changes to customers' self-supply decisions in response to our recommended tariff should therefore tend to be more efficient than under the current tariff, resulting in incentives that will encourage what the AUC terms economic bypass (and discourage uneconomic bypass) in the long-run than the current tariff design.

42. However, even though our recommended tariff seeks to better reflect the cost structure of the transmission system than the existing tariff in order to promote efficient decision-making on customers' usage of the grid or self-supply decisions, there remains a risk of inefficient self-supply decisions. Specifically, any tariff has to recover the current operating and historically incurred capital costs of the transmission system in Alberta. If the costs incurred historically are higher than the costs that would be associated with the costs of meeting customers' demands for electricity in the future, then there is a risk that any tariff set to recover historical costs will cause customers to self-supply.

43. In other words, customers that respond to the price signals sent by the recommended tariff design might make lower contributions to historical costs, thereby shifting recovery of those costs to other customers. As explained below, marginal cost pricing provides a potential solution to this challenge that has been discussed in the context of distribution tariff reform in Alberta.

3.2. Marginal Cost Tariffs as a Possible Means of Promoting Efficient Self-Supply Decisions

3.2.1. Theory suggests marginal cost tariffs promote efficient self-supply decisions

44. Economic theory, and the practical application of rate design in North America and elsewhere, sometimes uses a "marginal cost approach" as a potential solution to this problem of historical costs exceeding the forward-looking costs associated with future changes in demand for electricity. The marginal cost approach sets tariffs based on an

estimate of how a change in demand from a customer will affect the future costs of the utility.[7]

45. A theoretical advantage of a marginal cost approach is the ability to send an efficient price signal that reflects the costs imposed by incremental changes in demand on the system. This price signal should be sent through a charge which is "avoidable" or varies with customers' consumption behaviour. In theory, these prices promote efficiency by allowing customers to trade-off the benefits they derive from consuming electricity drawn from the transmission system, which may include the value derived from consumption or the costs of alternative self-generation options, against the transmission costs their consumption creates (as well as other costs such as the wholesale market price).

46. The concept of marginal cost-based pricing is discussed in the context of distribution network rate design in the AUC's Distribution System Inquiry:[8]

> *"distribution rates should contain a variable component to provide a forward-looking price signal to customers to manage their use of distribution system services that will affect the future costs of the network. This forward-looking component is based on variable charges (volumetric charges or avoidable demand, such as CP charges)"*

47. However, setting prices equal to an estimate of marginal cost will not usually (except by coincidence) generate enough revenue to recover the revenue requirement.[9] The difference between the revenue earned under marginal cost prices and the revenue requirement is often called the "residual" costs.

48. Consequently, in order to recover the revenue requirement efficiently, the marginal cost methodology prescribes that the residual should be recovered in a way that avoids distorting the consumption decisions that customers would take in response to the

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7 National Association of Regulatory Utility Commissioners (NARUC), Electric Utility Cost Allocation Manual, January 1992, pp. 12-14.

8 AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 311.

9 NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 147.

efficient price signals conveyed by marginal cost component of the tariff alone. As explained in the AUC's Distribution System Inquiry:[10]

"Whenever an attempt is made to recover embedded or sunk costs (also referred to as "residual costs" in the quote above) through charges that customers can avoid (such as volumetric charges or CP demand charges), improper incentives (i.e., incentives contrary to the public interest in the least cost provisioning of electricity) arise to invest in self-supply, resulting in (i) under-recovery of fixed system costs; (ii) cost shifting to other customers; and (iii) uneconomic bypass"

49. In light of the above, methods to recover residual costs in a marginal cost-based tariff include:

A. Ramsey pricing, which recovers residual costs based on the relative elasticities of demand for different classes of customers.[11] Those classes with the highest price sensitivity will be charged the price closest to marginal cost (hence recovering less residual cost) while those that are least likely to respond to price will be charged the price that deviates the most from marginal costs (reflecting more residual costs).[12]

B. However, recognising that it can be challenging to identify the price elasticity of demand for all customers, the tariff could recover residual costs based on a charge levied on a billing determinant which is least likely to distort customer behaviour (and the price signal sent by the marginal cost component of the charge).[13]

C. Another method to recoup residual costs is to apply a proportional mark-up to the marginal-cost component of the charge.[14] While this approach is simple to administer, and can result in a similar outcome to Ramsey pricing if customer classes that impose the highest marginal costs also have the least price elastic

[10] AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 310.

[11] The elasticity of demand describes the extent to which customers can and are willing to change their behavior to avoid the charge. A higher elasticity of demand refers to a customer that is more willing to change their behavior to avoid the charge.

[12] NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 155-160.

[13] NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 162.

[14] NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 160-162.

demand, this methodology distorts the marginal cost price signal, and so undermines the efficiency properties of marginal cost pricing.

50. The choice of methodology to recover residual costs should also consider the equity of the tariff design.[15] For instance, levying a fixed charge per customer may disproportionately impact smaller customers relative to larger ones.

3.2.2. Challenges of applying a marginal cost approach to set the AESO's tariff

51. While the marginal cost approach is theoretically appealing as a means of encouraging efficient self-supply decisions, the current legislative framework in Alberta significantly limits the potential benefits of using a marginal cost approach in the AESO's tariff.

52. The efficiency of a marginal cost approach to set a regulated utility tariff that will apply to a wide set of customers (e.g. across a whole "class" of ratepayers) relies on the assumption that all such customers' consumption decisions would have a similar impact on the utility's costs. For instance, in a distribution system, it is reasonable to assume that changes in customers' consumption decisions (or growth in the number of customers) will have a similar effect on the distribution utility's costs because the majority of residential electricity customers have similar sized connections and are served with similar types of infrastructure.

53. In a transmission system, by contrast, it is not safe to assume that changes in all customers' demands have the same impact on the transmission system's costs:

A. New demand connecting to the system in a location that is close to new generation may help the AESO to avoid the need to reinforce the transmission system to evacuate power from the new generation facility. As such, the marginal cost of accommodating this particular change in demand would be negative.

B. On the other hand, additional energy consumption in locations near generators due for retirement, or in locations where demand is already high relative to the

[15] NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 164-165.

generation located nearby, may increase transmission costs. The marginal cost of accommodating such changes in demand would be positive.

54. In practice, the investments that the AESO identifies in the 2020 Long Term Plan (LTP) suggest that changes in customers' consumption decisions (e.g. demand, energy) in different locations of the network could be associated with different amounts of avoidable costs. For instance, while the AESO is currently only planning a single investment in the Northeast planning region to support voltage, it is planning multiple new single-circuit lines to alleviate *load* thermal constraints in the Northwest, two new bulk line circuits in the Central planning region to alleviate *generation* thermal constraints, and a new regional line in the Calgary planning region to alleviate *load* thermal and voltage constraints. Hence, changes in customers' consumption decisions in Calgary are unlikely to drive the same change in transmission costs associated with the identified investments in the Northwest as changes in customers' consumption decisions in the Northwest.

55. In developing our recommended Bulk and Regional tariff methodology, we have been asked to assume that rates cannot differ based upon the location of load on the transmission system. In absence of the ability to differentiate the marginal cost component of the tariff by location, a tariff that reflects the marginal cost of transmission would be unable to account for the fact that the marginal cost of accommodating demand in some areas is likely to be positive, while the marginal cost of accommodating in other areas may be zero or even negative.

56. Therefore, the marginal cost component of the tariff would inevitably differ from the marginal cost of transmission investment associated with accommodating an additional unit of demand at that particular location of the network. As such, a tariff set using a marginal cost approach would not necessarily lead to an efficient outcome.

57. To take a practical example, the electricity transmission pricing methodology in Great Britain sets tariffs that seek to approximate the long-run marginal cost of transmission, such that transmission users receive a forward-looking signal regarding the costs they impose on the grid. However, the primary purpose of these forward-looking signals is to send locational signals regarding the long-run investment cost

users impose on the grid in different *locations*, with charges for demand customers varying from £20.38 to £61.68 ($35.33 to $106.91) per kW per year, depending on location.[16] Customers also pay a non-locational charge per kW to cover residual costs.

58. Hence, even if marginal cost-based distribution tariffs may have the potential to encourage the efficient use of distribution systems in Alberta, the legislative framework in Alberta limits the potential benefits of a marginal cost methodology to set *transmission* tariffs. The relative importance of locational signals at the transmission system level compared to the distribution system level is recognised in the Distribution System Inquiry:[17]

> *"experts indicated that while there may be merits of locational pricing on the transmission system, there probably is much less value in locational pricing on the distribution systems, at this time"*

59. Whilst we assess that the use of a marginal cost-based approach for transmission pricing in Alberta is principally limited by the inability to vary the marginal cost component of the tariff by location, using such a methodology to set transmission tariffs would also entail challenges associated with the recovery of the remaining residual costs:

    A. The large increase in transmission investment seen since 2014 has not been accompanied by significant growth in coincident peak demand.[18] Over this historical period, load growth has also been relatively low. Consequently, we would expect a tariff based on a marginal cost approach to have a small marginal cost component and large residual cost component. Large residual cost components of the tariff create challenges for the recovery of those costs, whilst

[16] Half-hourly demand tariff reported for zones in Northern Scotland and South Western in Transmission Network Use of System Tariffs in 2021-22. See: National Grid (January 2021), Final TNUoS Tariffs 2021-22, Table 9. Currency converted using current exchange rate of GBP 1: 1.73 CAD.

[17] AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 317.

[18] AESO (10 December 2020), Bulk and Regional Tariff Design Stakeholder Engagement 4, Slides 47-48, available at https://www.aeso.ca/assets/Uploads/Presentation-Session-5.pdf.

preserving the efficient price signal sent by the marginal cost component of the tariff.

60. As we explain above, under a Ramsey pricing approach, residual costs could be recovered from customers in proportion to their estimated price elasticities of demand (higher charges levied on customers with lower price elasticities of demand). However, estimating the price elasticity of demand for different customer groups is difficult in practice. Moreover, it involves levying costs on customer classes based on their willingness and/or ability to respond to charges. This approach would not seek to follow principles of cost causation but instead target the minimal customer response to the residual component of the tariff. The approach may also raise equity concerns.

61. Hence, a more practical implementation might be to levy the residual costs on billing determinants that are less likely to produce a response from the customer. For instance, the Distribution System Inquiry states that residual costs should be recovered from billing determinants that are non-avoidable, or difficult to avoid, such as fixed monthly charges or "non-bypassable demand charges" such as non-coincidental peak demand or contract capacity charges.[19]

62. However, unlike distribution systems, a relatively small number of customers are connected to the transmission system, and they vary materially in terms of their size usage of the system. For instance, transmission customers comprise small and large industrials, some of which make very little use of the grid except as a back-up to on-site generation, as well as distribution systems. Therefore, levying a fixed fee per customer or connection point to recover transmission residual costs would not follow principles of cost causation, and is likely to lead to inequitable charges as small customers would make the same financial contribution to residual costs as much larger customers.

63. In addition, it is not clear whether any billing determinant would be truly "non-avoidable" for many transmission customers. As explained above, large industrial customers that connect directly to the transmission system can choose to reduce their coincident or non-coincident demand by self-generating, or disconnecting from the

[19] AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 309.

grid and self-supplying the entirety of their energy needs. High transmission charges could also make it uneconomic to operate within Alberta. Hence, even a fixed charge per customer per month may be avoidable for a large industrial customer connected to the transmission grid.

64. As noted above, as an alternative to recovering residual costs from the customers with least price elastic demand or the billing determinants that are least avoidable, an alternative approach would be to use proportional mark-ups to uplift marginal cost-based tariffs. In this case, it is likely that proportional mark-ups would need to be large given the relative size of residual costs relative to marginal costs. Therefore, proportional mark-ups will likely significantly distort any price signal sent by the marginal cost component of the charge.

65. However, as noted above, the limitations associated with efficient recovery of residual costs are secondary to the limitations associated with the inability of the transmission tariff to accurately reflect marginal cost unless it has locational differentiation.

3.2.3. The lack of locational pricing would restrict or negate the efficiency benefits from the AESO introducing a marginal cost methodology

66. Economic theory shows that marginal cost prices may send more efficient signals to consumers of the impact of changes in load on the costs of transmission. However, these theoretical benefits of a marginal cost approach cannot be realised in the AESO's context, if rates of the transmission tariff do not differ based upon the location of load on the transmission system.

67. In simple terms, the AESO provides transmission capacity to move electricity from areas where the supply of in-merit energy exceeds demand, to areas where demand exceeds supply. Increasing demand in areas of surplus in-merit energy may therefore reduce transmission costs (implying a negative marginal cost), while higher demand increases transmission costs in areas where demand exceeds supply (implying a positive marginal cost). A marginal cost-based tariff that applies in all areas cannot reflect these differences and therefore cannot send efficient signals regarding the marginal transmission costs associated with of accommodating changes in demand in Alberta.

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3.2.4. An embedded approach will tend to promote more efficient self-supply decisions than a marginal approach in the Albertan context

68. The AESO's current tariff methodology is an embedded cost approach. In contrast to the marginal cost approach, which aims to set a forward-looking signal regarding the additional costs that would be associated with future load growth, the embedded cost approach designs tariffs based on historical spending on capital investment and operating expenses during a specific time period.[20]

69. In this context, the embedded cost methodology seeks to signal to customers the long-run costs of providing transmission, in a way that identifies which costs have been incurred historically to accommodate (or have been caused by) particular patterns of usage, particular customers and/or particular services. Embedded methodologies need to be designed to achieve this objective, and thereby send signals to users regarding the historical costs associated with their usage of the transmission grid.

70. By setting charges to reflect the costs incurred historically to serve particular customers or types of grid usage, the embedded methodology can send signals through tariffs that reflect such patterns of cost causation. By ensuring that the structure of tariffs (the balance between fixed, demand-related, and energy-related tariffs), reflects the cost structure of the transmission grid, the tariff can encourage efficiency in users' self-supply decisions.

71. The embedded cost approach is commonly criticized for sending less efficient price signals to consumers, because prices may not reflect the cost of consuming the next unit of electricity. Instead, prices reflect the historical, average cost of service, so consumption decisions made in response to the tariff may be less efficient than if the tariff were set equal to marginal cost. However, in this particular context, i.e. electricity transmission in a jurisdiction where locational differentiation of transmission tariffs is not permitted, this common criticism of the embedded methodology would be unjustified. As we explain above, the AESO's Bulk and

[20] National Association of Regulatory Utility Commissioners (NARUC), Electric Utility Cost Allocation Manual, January 1992, pp. 12-14.

Regional tariff cannot accurately reflect the marginal cost of transmission without differing rates based upon the location of load on the transmission system.

72. Given this limitation of marginal cost-based pricing in this context, an embedded methodology provides a reasonable guide to the costs associated with particular customers' usage of the transmission system. We therefore recommend that a tariff based on an embedded cost approach is more likely to promote efficient self-supply decisions than a tariff based on marginal cost pricing principles.

73. Nonetheless, we quantify the likely effect of our recommended tariff design (as outlined in the presentation delivered at Stakeholder Session 5) on self-supply decisions by customers, as described further below.

3.3. Self-Supply in Alberta

74. As we discuss in Section 3.1.1, industrial customers tend to have a larger number of options to self-supply than residential or small commercial customers because they have larger loads. Industrial customers account for approximately 65 per cent of annual Alberta Internal Load ("AIL"). The remaining load comes from commercial customers (20 per cent), residential customers (13 per cent), and farms (3 per cent).[21]

75. Some industrial customers are already self-supplying under the current tariff. Approximately 24 per cent of annual AIL is self-supplied, or roughly 37 per cent of industrial load.[22] We understand that industrial customers choosing to self-supply include those with petrochemical facilities, pulp/paper and forestry facilities, and oil sands customers. In particular, we understand that oil sands industrial customers have invested in cogeneration self-supply options, and benefit from the production of heat for use in their production processes.[23]

76. The majority of remaining industrial customers which are not pursuing self-supply options are distribution-connected. Approximately 6 per cent of total AIL comes

[21] AESO (31 May 2020), Delivered Cost of Electricity Report, p. 9.

[22] AESO (31 May 2020), Delivered Cost of Electricity Report, p. 9.

[23] AESO (31 May 2020), Delivered Cost of Electricity Report, p. 9.

from transmission-connected industrial customers which are not currently self-supplying.

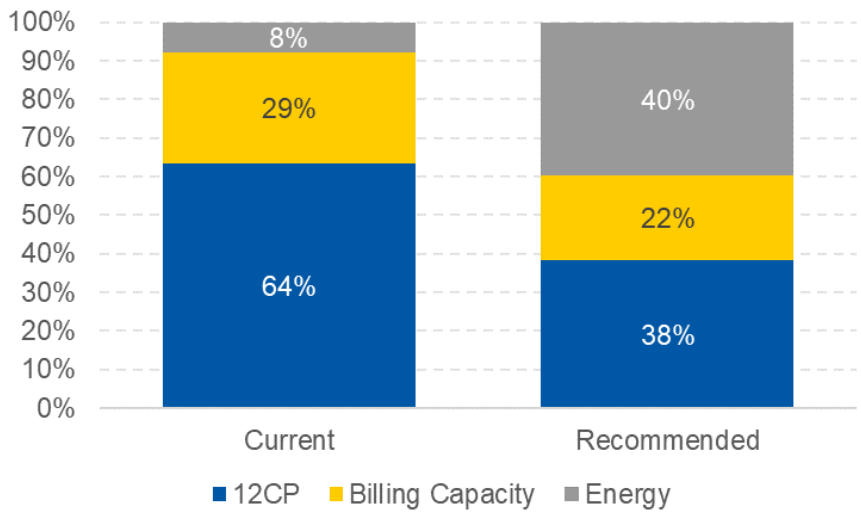
77. In addition to those industrial customers that have already invested in self-supply, other customers are responding to the current transmission tariff by reducing their load at times of 12CP.

3.4. The Recommended Tariff and Self-Supply

3.4.1. Impact of the change of tariff on customers

78. Our recommended tariff design recovers more costs from energy-based charges, and fewer costs from charges levied on billing capacity and 12CP, as illustrated in Figure 3.1 below.

Figure 3.1: Recovery of Bulk and Regional Costs Under Current and Recommended Tariff



Note: Based on 2020 data provided by the AESO. Excludes POD costs. Source: NERA analysis.

79. The change in tariff from the current methodology to our recommended methodology affects what customers pay for electricity in different ways depending on how and when they draw power from the grid.

80. In the panel chart below, we illustrate how our recommended tariff affects the amount that four illustrative customers would pay in transmission charges, assuming no other changes in their consumption behaviour.

A. In Panel A, we illustrate a baseload industrial customer. We construct its load profile from the assumptions used in the AESO's Delivered Cost of Electricity Report, and assume the customer has peak load of 6.77 megawatts (MW) with an average annual load of 4.97 MW (i.e. a load factor of 73 per cent). We assume the customer draws 6.77 MW of energy during times of coincident peak, and also has contract capacity of 6.77 MW.

B. In Panel B, we illustrate a baseload industrial customer, with similar characteristics to that in Panel A, but with average annual load of 6.77 MW (a load factor of 100 per cent).

C. In Panel C, we illustrate an industrial customer using the grid for back-up. The customer has very low average load of 0.35 MW (a load factor of 5 per cent). However, the customer may draw up to 6.77 MW of load at times when it needs to use the grid for back-up. We assume the customer does not use the grid for back-up during times of coincident peak, as defined by the 12 CP hours.

D. In Panel D, we illustrate an industrial customer with the same characteristics as the industrial customer in Panel A, but which avoids paying charges during the 12 CP hours through load management.

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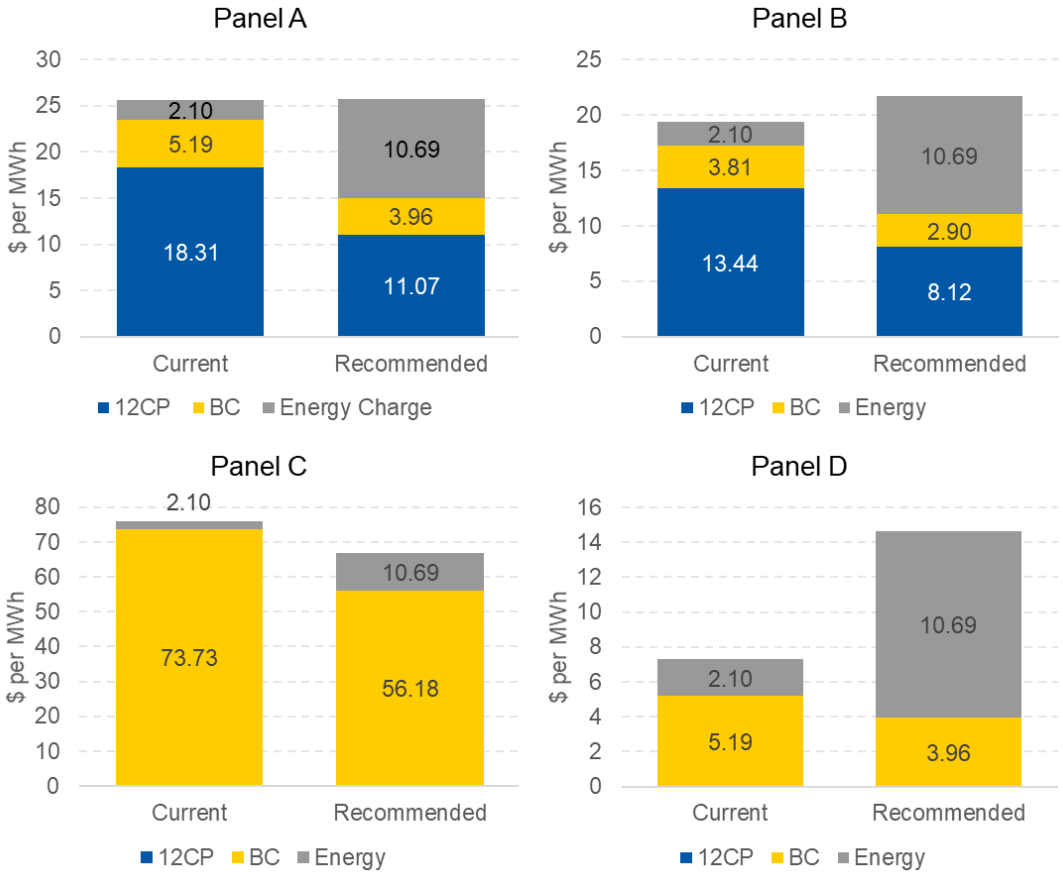
Figure 3.2: Change in Tariffs for Illustrative Industrial Customers



Note: Based on 2020 data. For simplicity, we assume a customers' consumption during coincident peak does not vary across years and therefore the movement to a five-year average 12CP charge does not impact customers charges. Excludes POD Costs. Source: NERA Illustration.

81. Implementing the classification and functionalization of costs envisaged by our recommended tariff design using data for 2020, our recommended tariff design would recover more costs from energy-based charges than the current tariff. Therefore, transmission charges for customers with high load factors and high energy consumption, such as the customer in Panel B would tend to increase under our recommended tariff. Also, customers which have previously avoided 12 CP hours, such as the customer in Panel D, could see a rise in charges under our recommended tariff, which recovers more costs from energy in all hours and fewer costs from charges levied on 12CP.

82. However, because our recommended tariff recovers fewer costs from the 12CP and contract capacity charges, customers with lower load factors that consume at these

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times, such as customers in Panel A and Panel C, tend to have lower charges under our recommended tariff.

83. Our analysis suggests that some customers' incentives to self-supply would increase, while other customers' incentives to self-supply would reduce following our recommended change in the tariff.

84. However, our analysis above assumes customers' consumption behaviour does not change in response to the change in tariff. In reality, our recommended tariff design may incentivise customers to change how and when they use the grid:

A. The reduction in the 12CP charge may reduce customers' incentive to avoid consumption at times of coincident peak, thereby increasing usage of the grid at these times;

B. The reduction in the charge on contracted demand also increases customers' incentive to hold contracted capacity to the grid to use the grid as back-up, which may reduce incentives for grid defection; and

C. The increase in the energy charge may decrease customers' incentive to take energy from the grid across the year.

85. Such changes will tend to be efficient in the long-run, because our recommended tariff is more cost reflective than the current tariff for the reasons explained above and in the Stakeholder Session 5 presentation. The more cost reflective price signal will therefore promote more efficient decisions as to whether to self-supply. However, to help the AESO and stakeholders quantify the likely impact of the change in tariff on self-supply decisions, we have performed quantitative analysis to estimate the likely impact on industrial customers' decisions to self-supply resulting from our recommended tariff.

3.4.2. Incentives to self-supply under the current and recommended tariff

86. As explained below in Section 3.4.3, we have considered in detail how the change in tariff will affect all industrial customers' self-supply incentives. However, by way of an example, consider the case of the customer in Panel B above. This customer has a 100 per cent load factor, consuming 6.77 MW in all hours of the year. We assume

this customer is directly connected to the transmission system, thereby incurring only transmission charges and the cost of energy to purchase power from the grid.

87. For the purpose of this illustration, we assume that the customer could choose to self-supply using a baseload gas generator. We adopt the costs of a aeroderivative combustion engine ("ACE") plant with cost assumptions as detailed in the AESO's Cost of New Entrant Analysis.[24] We outline the cost assumptions for this plant in more detail in Appendix A.2.4. Given the customer has a load factor of 100 per cent, we compare the cost per MWh of self-supplying all of its energy with an ACE plant of capacity 6.77 MW relative to purchasing its power from the grid. We assume the customer remains connected to the grid for back-up but does not draw any energy.

88. We illustrate the costs of self-supply relative to purchasing power under the current and our recommended tariff per MWh of consumption across a year in Figure 3.3 below. The figure uses a baseload pool price of $49.39 per MWh, based on the average pool price in 2020.[25]

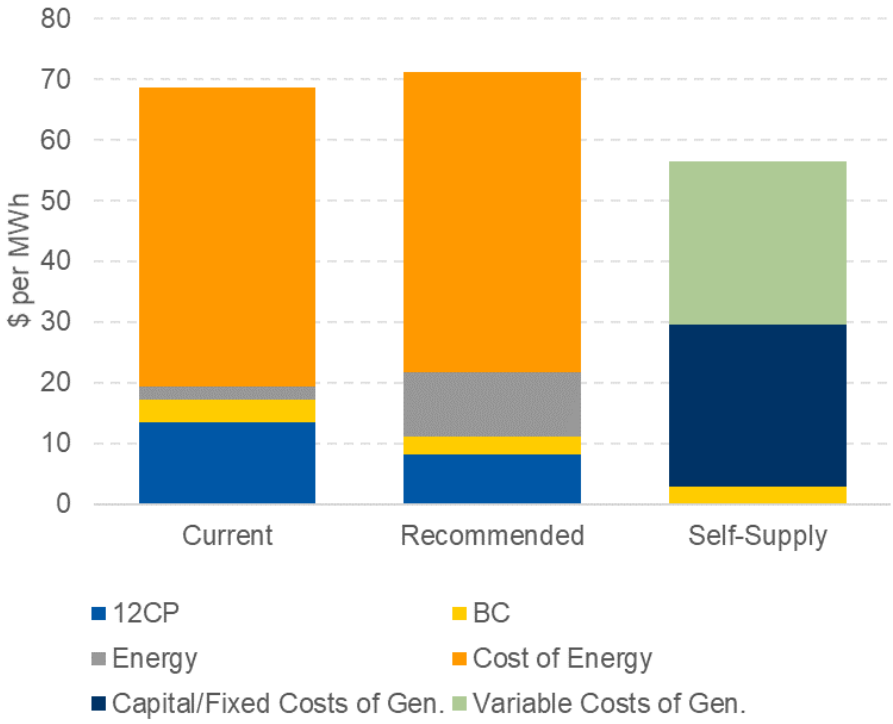
89. Our analysis suggests that the costs of self-supply across the year for the Panel B customer are below the costs of purchasing power from the grid under both the current and recommended transmission tariff designs. This finding corroborates the AESO's Delivered Cost of Electricity Report, see Figure 3.4 below.[26] The AESO identifies, using a different customer load profile and self-supply technology, that the delivered cost of electricity through self-supply (the purple, yellow, and blue bars) is lower for the illustrative, transmission-connected industrial customer than the costs of purchasing energy from the grid under the current tariff (the purple and yellow bars).

[24] Johannes P. Pfeifenberger et al. (4 September 2018), AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date.

[25] AESO data sourced from its 2020 Q4 Update – Transmission Rate Projection.

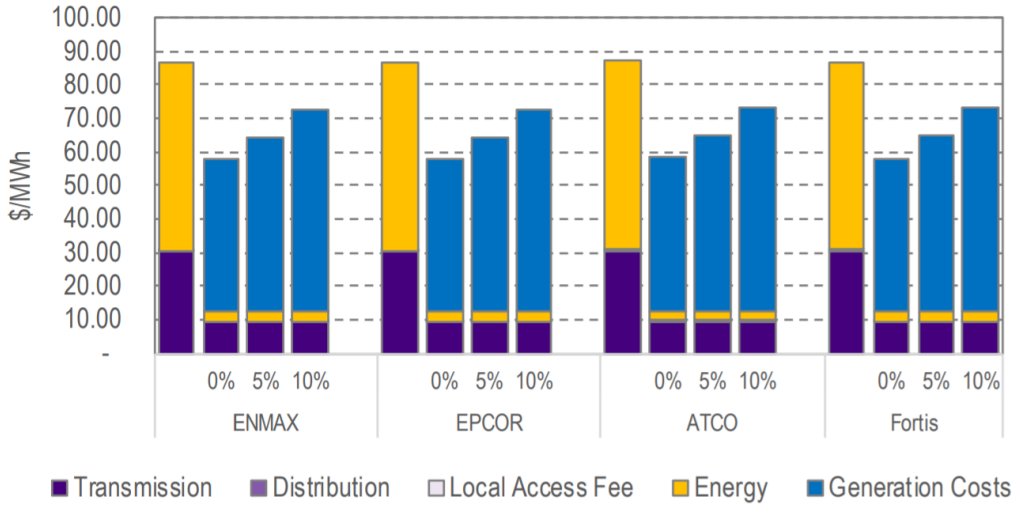
[26] AESO (31 May 2020), Delivered Cost of Electricity Report, Figure 9.5-1.

Figure 3.3: Illustrative Cost of Self-Supply Relative to Purchasing Power from the Grid Under Current and Recommended Transmission Tariff (2020 C$)



Note: 2020 gas price of C$1.92 used as reported by the AER. POD costs not included in transmission tariff. Source: NERA analysis.

Figure 3.4: AESO's Delivered Cost of Electricity for an Illustrative Industrial Customer Across Service Territories in 2019



Note: The purple and yellow bars in the left-hand column of each service area illustrate the costs of purchasing power from the grid. The three purple, yellow, and blue bars on the right-hand columns of each service area illustrate the costs of self-supplying power at different rates of return. Source: AESO (31 May 2020), Delivered Cost of Electricity Report, Figure 9.5-1.

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90. However, as we discuss in Section 3.3, only 37 per cent of industrial load is currently self-supplied, despite the suggestion from the analysis above that the economics of self-supply is favourable under the current tariff:

A. Industrial customers with different load profiles have different costs of purchasing power from the grid or self-supplying, as compared to the baseload customer used in the example above.

B. Industrials incur additional costs to self-supply beyond the capital and operating costs required to build and operate self-supply generation units. Other costs may include the costs of land (which may not be available at all close to industrial sites), costs of personnel, and the costs/risks associated with additional business complexity or administration. These costs are additional factors not captured in the above analysis which can lead to industrial customers continuing to purchase power from the grid, even if a simple cost comparison suggests it may be cheaper to self-supply.

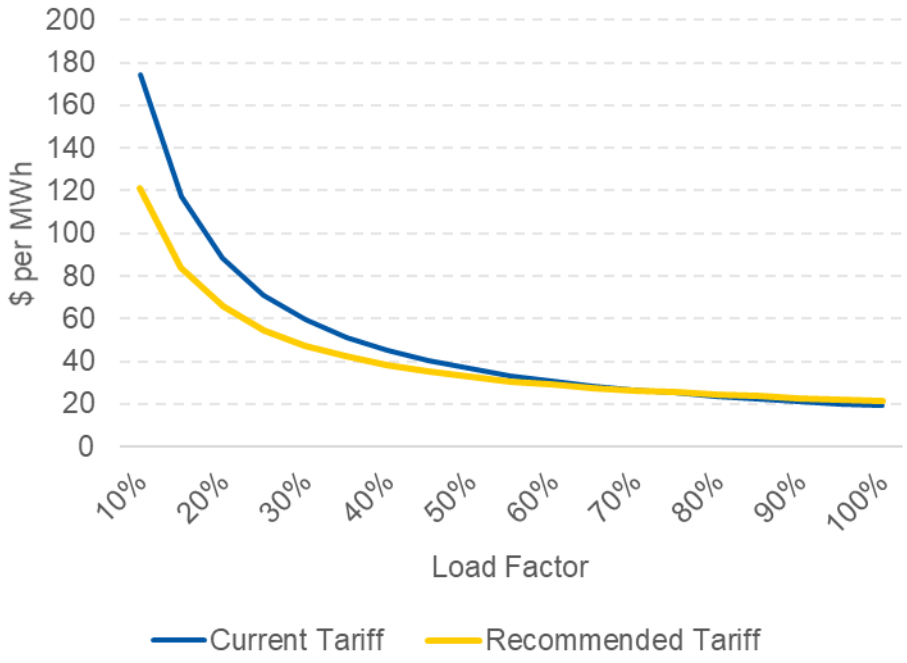
C. On the other hand, the options for customers to self-supply are more diverse than in our analysis above, as customers can choose from an array of technologies to self-supply such as baseload or peaking generation. It is reasonable to assume that customers will choose the least-cost self-supply option across technologies when considering the costs of self-supply compared to purchasing power from the grid.

91. As well as showing that self-supply appears cheaper than purchasing power from the grid, our analysis in Figure 3.3 suggests that the self-supply incentives for customers with a high load factor do not change materially following the change in tariff. Therefore, this illustrative analysis suggests that the increase in costs associated with purchasing power from the grid for a customer with a high load factor is likely to be small.

92. Moreover, for customers with lower load factors like those in Panel A and Panel C, we would expect the customers to face a lower incentive to self-supply, as the cost of purchasing power falls under our recommended tariff relative to the current tariff. In Figure 3.5 below, we illustrate transmission charges for customers with the same

characteristics as the customer in Panel B, with billing capacity and 12CP consumption of 6.77 MW, but with varying load factors. We do not illustrate the costs of purchasing energy from the grid in the Figure. Transmission charges are lower under our recommended tariff for this illustrative customer up to a load factor of between 70 to 75 per cent.

Figure 3.5: Illustrative Transmission Charges for Illustrative Customers with Varying Load Factors Under Current and Recommended Transmission Tariff (2020 C$)



Note: POD Costs Excluded. Source: NERA Illustration.

93. For customers currently avoiding 12CP, such as in Panel D, it is more difficult to determine the impact of the change in tariff on their incentive to self-supply. Whilst these customers face a lower incentive to self-supply during times of coincident peak under the recommended tariff, they face higher costs of purchasing energy from the grid during times other than coincident peak.

3.4.3. Our modelling procedure to estimate the customer response to our recommended tariff

94. In reality, customers' optimal decisions to self-supply are more complicated than the illustrative customer in Figure 3.3 above. Customers with high load factors rarely have 100 per cent load factors, which means their incentives to self-supply depend on cost savings that vary by the hours in which they are consuming power from the grid.

Moreover, because customers take different amounts of energy across hours, it may be optimal for them to install generators that allow them to self-supply all or part of their load, or a combination of types of generators to use in different hours of the year.

95. Therefore, to better assess the potential customer response to the change in tariff we conducted quantitative modelling to analyse how self-supply decisions may change for industrial sites after the introduction of our recommended tariff, which we explain in more detail in Appendix A.

96. Our modelling procedure uses hourly load data provided by the AESO for 133 industrial sites in 2018 and 2019 to assess whether and to what extent it would be economic for each site to self-supply rather than purchase power from the grid across the year, considering both wholesale prices and transmission tariffs. For each customer, we estimate the optimal amount of self-supply under both the current and our recommended tariff to examine how self-supply will change in response to our recommended tariff.

97. However, because our modelling procedure predicts the amount of self-supply based on whether it would be cheaper to self-supply or buy power from the grid, it significantly overstates the tendency for customers to deploy self-supply options. As we discuss in Section 3.1.1, this arises because we do not account for other costs customers face to self-supply that we cannot observe, such as land costs or capital constraints.

98. To address this, we introduce a statistical procedure to estimate how likely customers have been in the past to self-supply, as a function of the potential cost savings a customer could make from self-supplying, based on each customers' characteristics. We assess the performance of our statistical approach by using it to predict existing actual self-supply under the current tariff. We find our approach accurately predicts self-supply (see Appendix A.3.2).

99. We then use our statistical approach to predict actual customer responses to the change in the incentive to self-supply under our recommended tariff.

100. Our analysis focuses on the likely customer response to the increase in the energy charge under our recommended tariff relative to the current tariff. We do not consider

customer response to the decrease in 12CP charges under our recommended tariff relative to the current tariff, except through the extent to which it changes their decisions to optimally self-supply. In other words, we do not consider how decreases in the 12CP charge under our recommended tariff may increase customers' gross load during times of 12CP, and therefore our analysis is conservative with respect to self-supply by customers during times of coincident peak.

101. Overall, our approach predicts an extremely limited increase in self-supply by industrial customers under our recommended tariff. We estimate that self-supply could increase under our recommended tariff by up to 2,801 GWh which is equivalent to 4.69 per cent of the total metered energy billing determinant, used to calculate the transmission energy charge, in 2019.

102. As we explain in Appendix A, our estimate of customer response is a total effect that includes any dynamic responses by customers to self-supply decisions of other customers. This "dynamic response" accounts for the effect of higher self-supply pushing up tariffs levied on the remaining demand, which may increase further the incentives customers have to self-supply.

103. It is also equivalent to a total cost shift of C$ 29.92 million (in real 2019 terms) from self-supply customers to other customers, which is approximately 1.9 per cent of the total revenue requirement for B&R costs in 2019.

104. Therefore, whilst, in Section 3.1.2, we identified the possibility that a tariff set to recover historical costs will cause customers to self-supply, despite sending efficient price signals over the costs of providing transmission in the long run. Our modelling approach suggests that under current system conditions, any reduction in energy demand from the transmission system resulting from our recommended tariff design is likely to be extremely limited.

3.5. Future Trends in the Economics of Self-Supply

105. While the impact of our recommended tariff on self-supply is likely to be limited given the current costs of self-supply, the economic case for self-supply in Alberta is likely to worsen in the next decade.

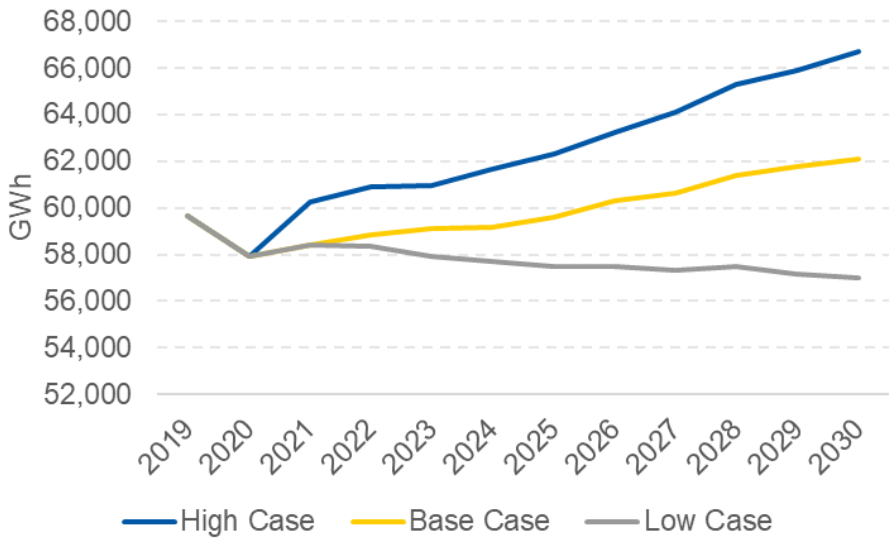
106. As we discuss in Section 3.1.1, customers' decisions to self-supply will necessarily be forward-looking because the upfront capital costs of investing in generators are offset by savings relative to purchasing power from the grid over future years (i.e. over the useful life of the generator). Therefore, not only do the current incentives to self-supply affect a customer's decision to self-supply, but also their expectations regarding future cost savings relative to purchasing power from the grid.

107. We identify two potential drivers of the future costs that customers would incur (and benefits they would obtain) by self-supplying power rather than purchasing it from the grid: future trends in transmission charges and future trends in the variable costs of self-supply.

3.5.1. Future trends in transmission charges

108. The AESO's low growth sensitivity projection of demand transmission service load in Alberta shows declining forecast energy consumption through to 2030, as shown in Figure 3.6. We focus on the low growth scenario to ensure we do not understate the potential for transmission tariffs to rise, and therefore avoid understating customers' incentive to self-supply.

Figure 3.6: AESO's Forecast of Total Energy Consumption



Source: NERA Analysis of AESO Data.[27]

[27] AESO data sourced from its 2020 Q4 Update – Transmission Rate Projection.

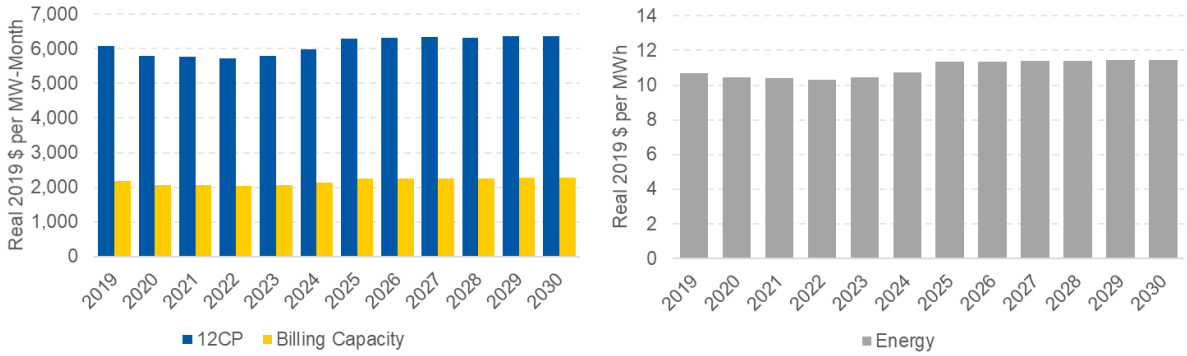
109. Reductions in demand which are coupled with the same revenue requirement can lead to a rise in transmission charges in order to ensure cost recovery. Using the low growth sensitivity forecast, the AESO's forecast revenue requirement, and the same percentage recovery of costs by billing determinant as 2020, we forecast transmission charges under our recommended tariff design.[28] Our forecast is an approximation because, amongst other reasons:

A. We assume the same revenue requirement forecast under the baseline demand projection is appropriate for the low demand forecast projection.

B. We do not account for changes in the classification of costs in our methodology in light of the changing use of the system over the forecast horizon.

110. We illustrate our forecast of transmission charges (in real 2019 C$) in Figure 3.7 below.

Figure 3.7: Forecast Transmission Charges Under Our Recommended Tariff in the AESO's Low Energy Growth Scenario



Note: Source: NERA analysis of AESO data. Inflation forecast from 2020 taken unchanged from the AESO's Rate Projection, and originally sourced from Statistics Canada Table 326-0020, Data Vector V41692327, and Conference Board of Canada Data Vector RPCPIA.

111. Our forecast suggests that transmission charges will rise slightly as energy consumption falls over the period to 2030. In absence of a reduction in other costs of purchasing power from the grid, such as the pool price which may fall with lower energy consumption, higher transmission charges will increase the costs of purchasing

[28] We also construct a low growth sensitivity forecast of coincident metered demand that forms the charging basis of the 12CP billing determinant, and billing capacity. To do so, we examine the ratio of total annual energy consumption and coincident metered demand and billing capacity in the AESO's central projection. We then apply the same ratio to forecast the coincident metered demand billing determinant and billing capacity billing determinant from the low growth forecast of energy consumption.

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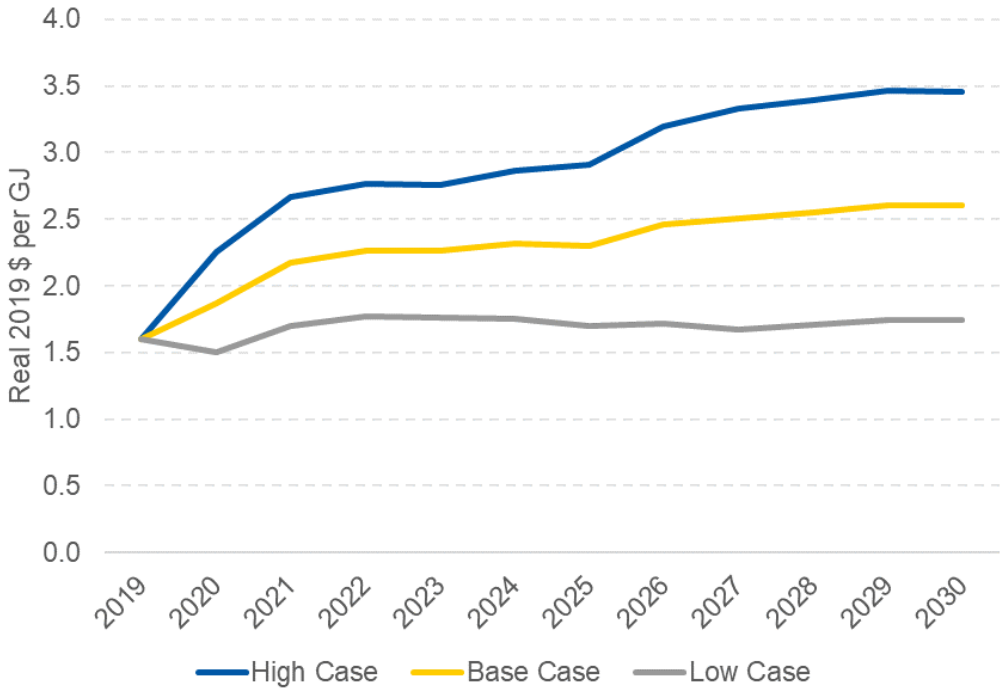
power from the grid for some customers thereby, in theory, increasing the cost savings associated with self-supply.

3.5.2. Future trends in the fuel and carbon costs of self-supply

112. However, the costs of self-supply are also likely to change over this timeframe. Higher costs of self-supply reduce the cost savings associated with self-supply relative to purchasing power from the grid. We identify two key drivers of the costs of generating power to self-supply that are particularly likely to change in the coming years: fuel costs and the carbon price.

113. We have examined the forecast annual average AECO-C natural gas price from 2019 to 2030 as published by the Alberta Energy Regulator (AER).[29] We show the forecast in Figure 3.8 below. As shown, the gas price is forecast to rise in real terms relative to 2021.

Figure 3.8: AER's Forecast AECO-C Natural Gas Price

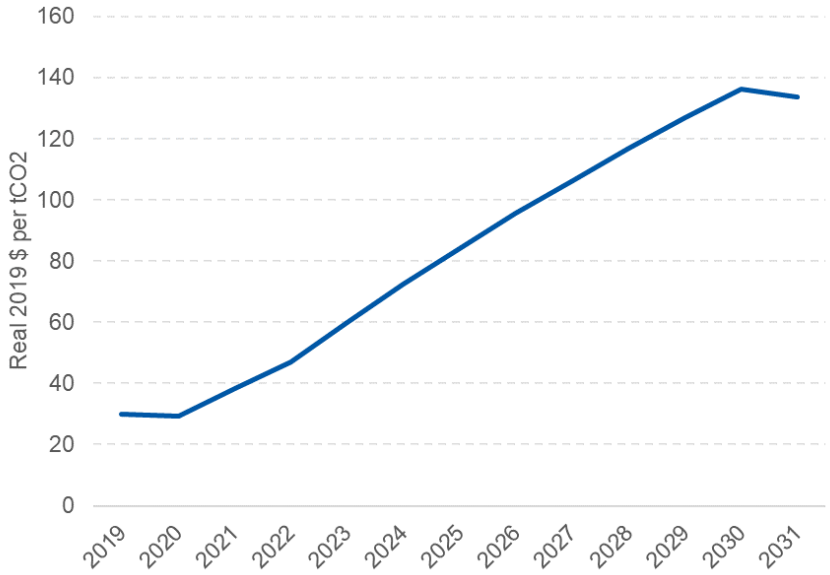


Source: NERA analysis of AER data.

[29] Alberta Energy Regulators Forecast of AECO-C gas prices updated June 2020 and accessed here: https://www.aer.ca/providing-information/data-and-reports/statistical-reports/st98/prices-and-capital-expenditure/natural-gas-prices/aeco-c-price. Last Accessed 12 May 2021.

114. We also examine forecast annual carbon prices. The Federal Government implemented a federal carbon tax through the Greenhouse Gas Pollution Pricing Act in 2018.[30] We understand that under this regime the carbon tax, which is currently $30 per tCO2, is intended to rise to $170 per tCO2 in 2030, with a $10 per tCO2 rise in 2021 and 2022, and a $15 per tCO2 rise per year starting from 2023. We illustrate this rise (in real 2019 C$) in Figure 3.9 below.

Figure 3.9: Forecast Federal Carbon Tax



Source: NERA analysis.

115. The impact of future growth in gas and carbon prices on incentives to self-supply depends on how the costs of self-supply change *relative* to the pool price. Higher carbon and gas prices will increase the wholesale price for power, as generators incur higher costs to produce power. Higher pool prices increase the costs of purchasing power from the grid, and thereby increase the cost savings associated with self-supply. On the other hand, rising gas prices and carbon prices will also result in higher costs of self-supply using gas-based generation, decreasing the cost savings associated with self-supply relative to purchasing power from the grid.

116. To the extent that gas-fired generators are the marginal source of in-merit energy in the wholesale market, the relative efficiency of grid-connected and gas generators

[30] *Greenhouse Gas Pollution Pricing Act*, SC 2018, c 12, s 186.

used to self-supply will drive whether changes in the carbon or gas price will impact the pool price more or less than the costs of self-supply. Customers installing gas generators to self-supply will likely not require, or be able to install, generators of the scale used to generate power for the grid. The smaller generators used to self-supply are likely to be less efficient than the larger generators used to generate power for the grid. Using more inefficient generators means that self-supplying customers will need to use more gas to generate energy relative to grid-serving generators, resulting in higher gas costs and carbon costs per unit of energy generated.

117. To examine this, we compare the heat rates of representative plants that customers could use to self-supply with the heat rates of representative gas plants used to generate power for the system.[31] More specifically, we compare the heat rates of a combined cycle gas plant (CCGT) that we assume would be used to generate power for the grid with the heat rates of an ACE plant and a gas-fired reciprocating internal combustion engine ("RICE") which could be used to self-supply. We detail the assumptions and sources of costs of each plant in Appendix A.2.4. We compare the heat rates in Table 3.1 below.

Table 3.1: Comparison of Heat Rates Across System and Self-Supply Plant

		CCGT	ACE	RICE
Heat Rate	GJ per MWh	6.72	9.68	10.50
Additional Heat Rate Relative to CCGT	*GJ per MWh*		*2.96*	*3.78*

Note: Heat Rates Treated as Net HHV, underlying sources do not specify. Source: NERA Analysis.

118. As the table shows, both ACE and RICE plants require more fuel relative to a CCGT to produce one MWh of electricity. We convert the additional energy requirement per MWh shown in the table to an additional gas requirement per MWh, and then an additional gas cost per MWh using the AER Low Case. We select the Low Case to ensure we do not understate the economic case for self-supply.

[31] The heat rate of a plant specifies how much gas is required to generate a unit of power. Whilst peaking, simple cycle gas plants also generate power for the system, they do so in fewer hours of the year than baseload, combined cycle gas plants which is why we consider baseload plants in our analysis.

119. Given the ACE and RICE plants require more gas to produce one MWh, self-suppliers will also incur more in carbon costs to run the plant. To calculate the additional carbon costs, we assume the ACE and RICE plants are subject to the federal carbon tax, and are also part of Alberta's Technology Innovation and Emissions Reduction ("TIER") regulation, meaning that they only pay carbon taxes on emissions above the "best in gas" standard. We assume the CCGT in our analysis has emissions that meet the best in gas standard.[32] Therefore, because we are examining the carbon costs associated with the *incremental* costs incurred by self-supply technologies relative to a best in gas CCGT, we assume all of the additional gas used by ACE or RICE technologies relative to CCGT will be subject to carbon taxes.

120. To calculate the additional carbon emissions associated with the additional gas required by self-supply technologies, we calculate the extra emissions associated with the higher gas requirement for ACE and RICE technologies relative to CCGT plants, as shown in Table 3.2 below. We then calculate the carbon costs for alternative technologies by multiplying this extra volume of emissions by the carbon price shown in Figure 3.9 above.

Table 3.2: Additional Emissions Associated with Self-Supply

	Units	System CCGT	ACE	RICE
Heat Rate (Net HHV)	GJ per MWh	6.72	9.68	10.50
Emissions Rate	t per MWh	0.338	0.486	0.527
Additional Gas Use Per MWh	GJ per MWh		2.96	3.78
Additional Emissions Per MWh	t per MWh		0.1485	0.1898

**Note: As we discuss in Appendix A.2.4, we recalculate the emissions rate for all plants using (i) tCO2/therm = 0.0053[33] (ii) Btu/therm = 100,000;[34] therm/GJ = 0.105506.[35] Source: NERA Analysis.*

[32] Whilst we recognise that the current "best in gas" standard corresponds to an emissions rate of 0.37 CO2t per MWh, we also understand that the threshold rate should fall over time. Therefore, we assume self-suppliers pay carbon taxes on all fuel use above the emissions rate of the system CCGT of 0.338 CO2t per MWh from the EIA in our analysis.

[33] EIA, Greenhouse Gases Equivalencies Calculator - Calculations and References, Last Accessed 17 May 2021, Link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[34] EIA, FAQs, Last Accessed 17 May 2021, Link: https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

[35] EIA, Energy Conversion Calculators – Natural Gas, Last Accessed 17 May 2021, Link: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

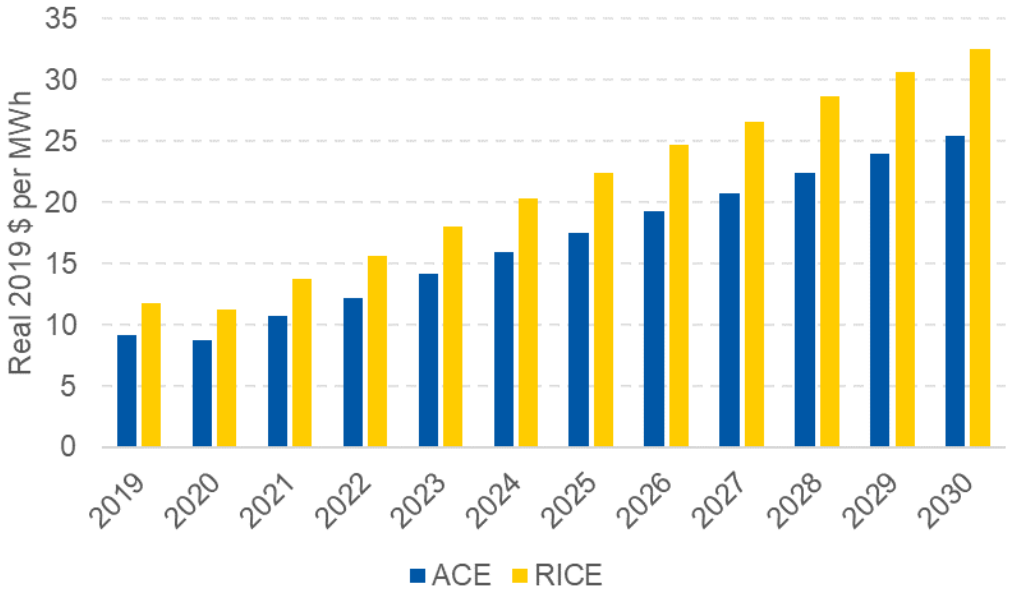
121. We illustrate the additional variable costs of self-supply using the ACE and RICE generator relative to a system CCGT in Figure 3.10 below. The figure shows the additional costs to generate one MWh using self-supply technologies rather than purchasing energy generated using a CCGT, supplied to the customer via the transmission grid.

122. The figure shows that we expect rising carbon and gas costs will make self-supply technologies more expensive over time, when compared to the cost of purchasing power from the grid:

A. By 2030, the fuel and carbon costs of producing a MWh using an ACE or RICE generator will be $25.40 or $32.47 per MWh (in real 2019 terms) more expensive, respectively, than producing that MWh using grid technology, relative to around $10 per MWh today.

B. Therefore, upward pressure on fuel and carbon prices is expected to reduce the incentive to self-supply.

Figure 3.10: Forecast Additional Fuel and Carbon Costs of Self-Supply Relative to CCGT Technology



Source: NERA analysis.

3.5.3. Future trends in the economics of self-supply

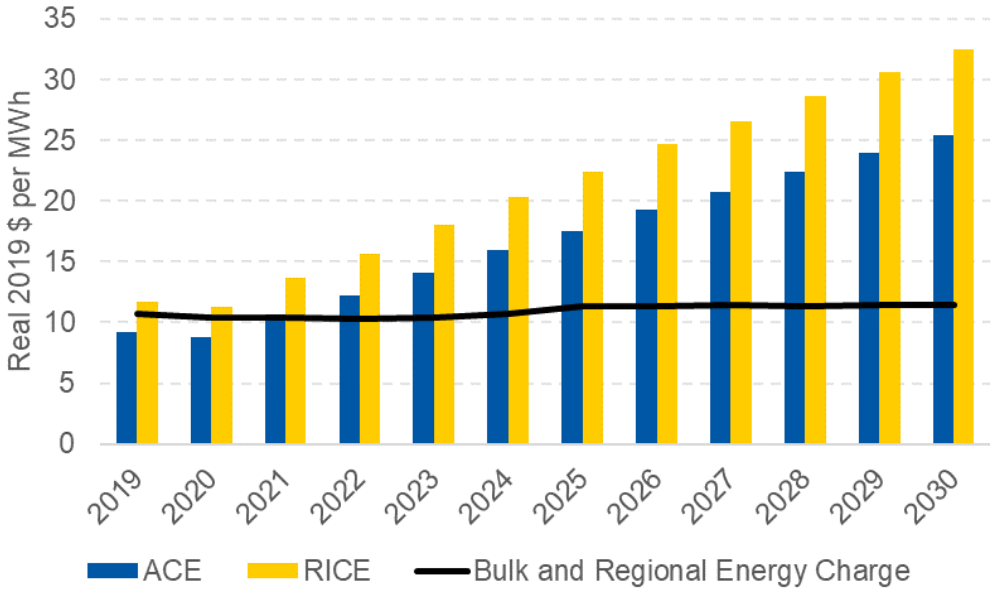
123. We illustrate in Figure 3.11 below the two drivers of future trends in the economics of self-supply:

A. Changes to the energy component of the transmission tariff under our recommended tariff structure,[36] and assuming the AESO's low demand growth scenario (see also Figure 3.7); and

B. The additional fuel and carbon costs of self-supply, driven by changes in gas and carbon prices (see also Figure 3.10).

124. The figure illustrates the additional costs incurred to self-supply one MWh using self-supply technology instead of purchasing that power from the grid (where it is generated by a CCGT), compared to the energy component of the transmission tariff.

Figure 3.11: Future Trends in the Economics of Self-Supply



Source: NERA analysis.

125. While we show above and in Appendix A that in current cost conditions, we estimate that our recommended tariff will not materially increase self-supply, the projection in Figure 3.11 shows that the economics of self-supply for industrial customers is also

[36] We focus on the energy charge of the transmission tariff because it is the component that increases in our recommended tariff relative to the current tariff.

set to worsen in the coming years due to the effects of carbon pricing. In other words, even though we estimate that our recommended change in the tariff will have a small effect on self-supply volumes, the incentives to self-supply are set to worsen materially in the coming years which means we expect an increase in energy charges will not cause significant reductions in the volume of energy supplied from the grid.

4. Summary

126. Some electricity industry participants (both in Alberta and globally) may have legitimate concerns about the risks of grid bypass and grid defection, especially in relation to transmission and distribution companies that already recover all (or the majority of) their costs from tariffs levied on energy consumption.

127. A proportionate response to these concerns is to adjust tariffs to ensure they have a cost structure that reflects the cost structure of the service in question as closely as possible, which we strive to do through our recommended tariff design.

128. Designing a tariff with the intention of minimising self-supply would be a disproportionate response. In fact, customers should be encouraged to self-supply when the costs they incur to do so are below the costs of supplying them from the grid. Self-supply decisions in response to cost reflective tariffs promote efficiency in the overall supply of electricity, and will tend to reduce the costs faced by the customers who purchase energy from the grid.

129. In the AESO's case, it is currently charging for the majority of its costs through a 12CP charge, the extent to which is not justified on grounds of cost causation as explained in the Stakeholder Session 5 presentation. The current tariff is therefore promoting *inefficient* self-supply decisions aiming to avoid 12CP charges. By contrast, our recommended tariff better reflects the dual purposes of transmission in Alberta: to meet peak demand and accommodate the flow of in-merit energy.

130. Therefore, customer response to the change in transmission tariff through different self-supply decisions will improve efficiency because the new transmission tariff is more cost reflective. However, even if a tariff is designed to reflect the cost structure of the transmission system, and therefore promote efficient decisions to use the grid or self-supply in the long-term, there remains a possibility that a tariff set to recover historical costs will cause customers to inefficiently self-supply in the short-term in cases where those customers make lower contributions to historical costs.

131. We therefore estimate customer response to our recommended tariff using a modelling procedure. We estimate that self-supply could increase under our recommended tariff by up to 2,801 GWh which is equivalent to a shift in costs from

self-supplying customers to other customers of approximately 1.90 per cent of the total revenue requirement for bulk and regional costs in 2019. Our estimate of customer response is a total effect that includes any dynamic responses by customers to self-supply decisions of other customers.

132. Our estimate of customer response ignores the potential for customers to increase purchasing of power from the grid during times of coincident peak in response to lower 12CP charges in our recommended tariff relative to the current tariff.

133. Hence, we predict an extremely limited increase in self-supply by industrial customers under our recommended tariff, and any change in customers' self-supply decisions that does arise will tend to result in more efficient patterns of electricity usage than under the current methodology.

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Appendix A. Estimating Customer Response to Our Recommended Tariff

A.1. Overview of Our Approach

134. As we discuss in Section 3.4, our analysis of customers' decisions to self-supply using illustrative consumption profiles simplifies the self-supply decision. Customers' actual self-supply decisions depend on how and when they use electricity, which for most customers vary across hours of the year (and is rarely at a 100 per cent load factor as we assume for the customer in Panel B in Figure 3.2).

135. Customers consider different self-supply technologies, and different ways of optimally self-supplying using those technologies, depending on their consumption profile. For instance, as we discuss in Paragraph 27, customers can consider peaking generators for use during hours of the year when the costs of purchasing power from the grid are highest, or baseload generators for use during a larger number of hours of the year.

136. The choice of self-supply technology depends on the individual circumstances of the customer, and balances the fixed and variable costs of operating the self-supply technology with the avoided costs of purchasing power from the grid, which vary across hours of the year with the customers' consumption profile.

137. In order to better assess how customers may respond to our recommended transmission tariff, we model the optimal self-supply decisions for industrial sites in Alberta. Our approach is formed of three steps:

    A. ***Step 1:*** We construct a model that estimates the optimal self-supply decisions for industrial sites across Alberta, based on a simple comparison of the costs of purchasing power from the grid and self-generation costs. The model allows different customers (industrial sites) to use different self-supply technologies, and operate those technologies in different ways to optimise their decision to self-supply or purchase power from the grid. By performing this optimization for each customer, we estimate the optimal amount of self-supply across Alberta under the current and our recommended tariff.

B. ***Step 2:*** However, this optimisation model overstates the actual self-supply for customers because we do not model other costs associated with self-supply such as costs and risks associated with business complexity or financing. Consequently, actual self-supply by customers will be lower than the optimal self-supply identified by the model in Step 1, or "incentive to self-supply", that we model. To estimate how customers' actual self-supply decisions will be affected by a change in the transmission tariff, we estimate a regression equation to capture how likely customers are to self-supply, given the economic incentive to self-supply identified in Step 1. This regression also controls for customers' characteristics such as size, location, and industry.

C. ***Step 3:*** We then use our regression to predict customers' response to the change in incentive to self-supply under our recommended tariff.

138. In this Appendix, we detail our modelling approach and results from each of the above steps in more detail.

A.2. Step 1: Modelling the Optimal Self-Supply Decision for Customers

139. We examine the optimal self-supply decision for customers using site-level, hourly gross load data in 2018 and 2019.[37] Of the 564 sites for which we have load data, 133 are sites with only load from industrial customers. We use the 133 industrial-only sites in our analysis.

A. We assume that there is a single industrial customer at each industrial-only site that is responsible for the entire load at that site.[38]

B. Sites which are not industrial-only, are often constituted by a mixture of industrial, residential, commercial, or other customers. We are unable to use these sites as we cannot distinguish the profile of consumption belonging to industrial customers from residential customers.

[37] By gross load, we mean total consumption of power at the site, irrespective of whether that power is sourced from the grid or through self-supply. We use net load to refer to the site's purchase of power from the grid, in other words, its gross load less any self-supply it chooses to undertake. We rely on AESO site-level load data in our analysis.

[38] Our assumption likely leads us to overstate self-supply, assuming a single industrial customer at each site means self-supply may be more economic than if the site comprised multiple, smaller customers.

140. For each industrial customer (site), we calculate both the costs of purchasing power from the grid without self-supplying and the customers' optimal self-supply decision in 2018 and 2019. To perform these calculations, we use the procedure described below.

A.2.1. We group hours of the year to reduce the computational requirements of the model

141. In order to reduce the computational requirements of the model, we group similar hours of the year together using a Price Duration Curve approach. In total we define 53 groups of hours that are similar in terms of the costs that would be incurred to purchase power from the grid.

142. We define separate groups of hours for 2018 and 2019 based on the pool price in 2018 and 2019 respectively. More specifically:

A. The first 51 groups of hours are defined by percentiles of the distribution of hourly pool prices observed during the year in question.[39]

B. The 52nd group of hours is defined to capture rare incidences of scarcity pricing in the pool, where the pool price equals the price cap of $1000 per MWh. If we did not define the 52nd group of hours in this way, the average price of the 51st group of hours would be high as it would be influenced by these rare occurrences of scarcity pricing, which would distort our estimate of the self-supply decision in the hours in the 51st bucket.

C. The last group of hours is defined to contain 12CP hours only.[40] We separate 12CP hours to allow customers' self-supply decisions to change in 12CP hours in order to avoid the 12CP charge. Our model likely overstates customer response, because we assume that all customers can perfectly predict hours of 12CP.

143. Having grouped the hours of the year in this way, we calculate the average pool price and each customers' average gross demand in each group of hours. The average pool

[39] This corresponds to prices every 2nd percentile, with an additional price group to capture prices close to zero.

[40] Whilst in reality, 12CP is defined by a fifteen-minute interval, we are restricted by the data to look at hours of 12CP. We levy the 12CP charge on customer consumption during the hour of 12CP.

price and average demand during each group of hours defines a "representative hour" that applies to all hours within this group.

144. The tables below show the Price Duration Curves used by the model to characterise the costs of purchasing electricity from the wholesale market in 2018 and 2019.

Table A.1: Price Duration Curve (2018)

Group	Number of Hours	Min Price In Group ($/MWh)	Average Pool Price	Transmission Tariff ($/MWh)	
				Current Design	*Recommended Design*
1	171	0.00	14.52	2.04	8.80
2	172	20.50	23.13	2.04	8.80
3	172	24.86	25.53	2.04	8.80
4	166	26.20	26.68	2.04	8.80
5	157	26.99	27.08	2.04	8.80
6	131	27.15	27.16	2.04	8.80
7	0	27.18		2.04	8.80
8	294	27.18	27.18	2.04	8.80
9	283	27.19	27.26	2.04	8.80
10	170	27.62	28.06	2.04	8.80
11	173	28.51	29.11	2.04	8.80
12	172	29.64	30.12	2.04	8.80
13	169	30.57	30.95	2.04	8.80
14	173	31.26	31.47	2.04	8.80
15	124	31.64	31.70	2.04	8.80
16	0	31.74		2.04	8.80
17	392	31.74	31.74	2.04	8.80
18	0	31.75		2.04	8.80
19	0	31.75		2.04	8.80
20	509	31.75	31.81	2.04	8.80
21	177	32.14	32.33	2.04	8.80
22	174	32.54	32.70	2.04	8.80
23	163	32.86	32.98	2.04	8.80
24	173	33.08	33.16	2.04	8.80
25	44	33.24	33.24	2.04	8.80
26	0	33.25		2.04	8.80
27	401	33.25	33.25	2.04	8.80
28	0	33.26		2.04	8.80
29	0	33.26		2.04	8.80
30	593	33.26	33.27	2.04	8.80
31	171	33.44	33.69	2.04	8.80
32	144	33.96	34.24	2.04	8.80
33	199	34.54	34.55	2.04	8.80
34	172	34.65	35.15	2.04	8.80
35	103	35.74	36.11	2.04	8.80
36	241	36.43	36.75	2.04	8.80
37	173	37.69	38.63	2.04	8.80
38	170	39.60	40.48	2.04	8.80
39	169	41.37	42.16	2.04	8.80
40	176	42.96	43.78	2.04	8.80
41	172	44.60	45.25	2.04	8.80
42	171	45.90	46.05	2.04	8.80
43	172	46.28	47.59	2.04	8.80
44	172	48.93	50.39	2.04	8.80
45	172	51.94	53.82	2.04	8.80
46	172	56.38	59.59	2.04	8.80
47	171	63.60	68.45	2.04	8.80
48	172	72.77	78.74	2.04	8.80
49	172	85.97	93.82	2.04	8.80
50	172	106.98	165.88	2.04	8.80
51	155	271.98	605.73	2.04	8.80
52	4	1,000	1,000	2.04	8.80
12CP	12			10,179	5,102

Note: Billing capacity charge not shown in transmission tariff. Source: NERA Analysis of AESO Data. Note: some "groups" appear to have zero hours because pool prices are only specified to 2 decimal places, so hours are allocated to a single group where two or more groups have identical prices.

Table A.2: Price Duration Curve (2019)

Group	Number of Hours	Min Price In Group ($/MWh)	Average Pool Price	Transmission Tariff ($/MWh)	
				Current Design	*Recommended Design*
1	171	0.00	18.80	2.13	10.68
2	171	23.28	24.49	2.13	10.68
3	173	25.56	26.32	2.13	10.68
4	172	27.02	27.44	2.13	10.68
5	171	27.94	28.15	2.13	10.68
6	136	28.34	28.43	2.13	10.68
7	207	28.47	28.52	2.13	10.68
8	173	28.62	28.70	2.13	10.68
9	172	28.81	28.93	2.13	10.68
10	171	29.06	29.36	2.13	10.68
11	168	29.65	29.91	2.13	10.68
12	176	30.11	30.51	2.13	10.68
13	171	30.93	31.25	2.13	10.68
14	172	31.60	31.85	2.13	10.68
15	167	32.03	32.22	2.13	10.68
16	175	32.42	32.53	2.13	10.68
17	161	32.59	32.60	2.13	10.68
18	147	32.65	32.71	2.13	10.68
19	204	32.78	32.79	2.13	10.68
20	175	32.85	32.91	2.13	10.68
21	154	32.97	33.00	2.13	10.68
22	179	33.05	33.10	2.13	10.68
23	92	33.15	33.18	2.13	10.68
24	115	33.22	33.22	2.13	10.68
25	317	33.23	33.30	2.13	10.68
26	164	33.47	33.50	2.13	10.68
27	183	33.54	33.59	2.13	10.68
28	171	33.76	33.88	2.13	10.68
29	172	34.03	34.28	2.13	10.68
30	173	34.53	34.80	2.13	10.68
31	172	34.93	35.13	2.13	10.68
32	168	35.51	35.98	2.13	10.68
33	174	36.50	36.95	2.13	10.68
34	173	37.53	38.17	2.13	10.68
35	172	38.79	39.43	2.13	10.68
36	172	40.12	40.81	2.13	10.68
37	170	41.56	42.40	2.13	10.68
38	172	43.26	44.11	2.13	10.68
39	172	44.92	45.69	2.13	10.68
40	173	46.58	47.68	2.13	10.68
41	172	48.72	49.94	2.13	10.68
42	171	51.09	52.38	2.13	10.68
43	172	53.57	54.96	2.13	10.68
44	172	56.60	58.88	2.13	10.68
45	172	61.20	64.18	2.13	10.68
46	172	67.13	70.83	2.13	10.68
47	171	74.99	79.41	2.13	10.68
48	172	84.37	88.91	2.13	10.68
49	172	93.36	110.14	2.13	10.68
50	172	143.11	226.92	2.13	10.68
51	158	346.08	642.24	2.13	10.68
52	1	1,000	1,000	2.13	10.68
12CP	12			10,526	6,075

Note: Billing capacity charge not shown in transmission tariff. Source: NERA Analysis of AESO Data. Note: some "groups" appear to have zero hours because pool prices are only specified to 2 decimal places, so hours are allocated to a single group where two or more groups have identical prices.

145. The Price Duration Curves above use historical hourly pool prices from 2018 and 2019.[41] They also use actual bulk and regional transmission charges in 2018 and 2019 to calculate transmission tariffs under the current tariff design.

146. We calculate transmission costs under our recommended tariff design using the approach described in the Stakeholder Session 5 presentation, using historical data on billing determinants, the total revenue requirement, and allocation factors calculated from hourly demand and generation data by area in each year.

147. We summarise the transmission charges that are used under our recommended tariff and the current tariff in 2018 and 2019 in Table A.3 below.

[41] Data provided by the AESO.

Table A.3: Bulk and Regional Transmission Charges Under Current and Our Recommended Tariff in 2018 and 2019

Current Tariff	2018	2019
12 CP ($ per MW-month)	10,177	10,524
BC ($ per MW-month)	2,281	2,359
Energy ($ per MWh)	2.04	2.13
Recommended Tariff	**2018**	**2019**
12 CP ($ per MW-month)	5,093	6,065
BC ($ per MW-month)	1,816	2,180
Energy ($ per MWh)	8.80	10.68

Note: Billing determinants sourced from AESO data. They may differ to those presented at the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5. Billing determinants are 96,044 (2018) and 97,698 (2019) MW-months for 12CP, 154,214 (2018) and 156,984 (2019) MW-months for billing capacity, and 61,000 (2018) and 59,678 (2019) GWh for energy consumption. Source: NERA Analysis.

A.2.2. We calculate how much each customer would pay if it did not self-supply

148. For each industrial customer, we calculate how much the customer would pay to purchase all of its gross demand from the grid under the current and recommended tariff in 2018 and 2019. We use the Price Duration Curves shown above and each customer's total gross demand (in MWh) within each group of hours.[42]

149. We summarise the costs of purchasing power from the grid across all customers under the current and recommended tariff in Figure A.1 below. The total cost that all industrial customers would have incurred to purchase their gross energy requirement from the grid would have increased slightly under our recommended tariff in 2019 relative to the current tariff, but decreased slightly in 2018.

A. The costs of purchasing power from the pool do not change between the two tariff scenarios, as we assume the pool price remains unchanged.

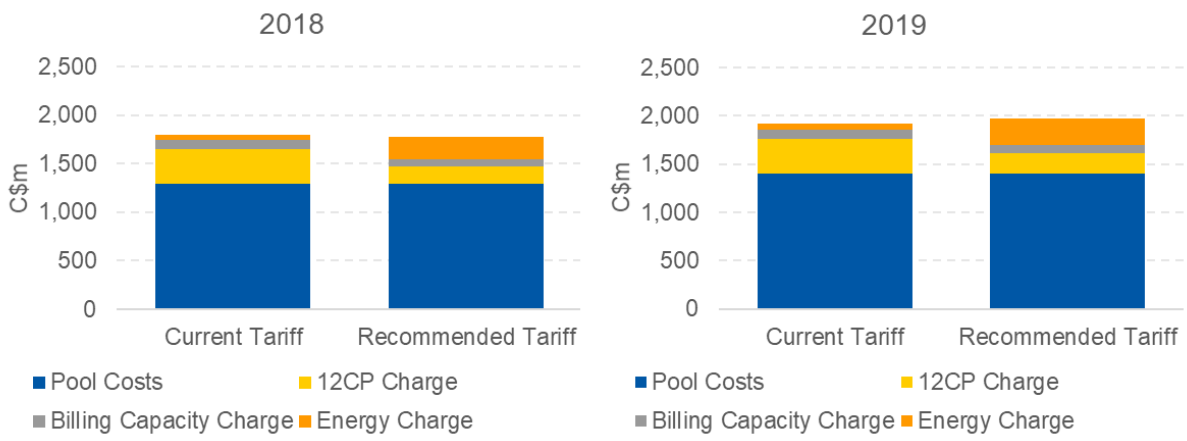
[42] Whilst our use of gross load data allows us to control for customers' existing self-supply decisions, we are unable to control for their load management decisions. In other words, a customer currently avoiding 12CP by reducing or eliminating its load during the 12CP hour, but without self-supplying, appears as if the customer has zero load in the hour. This means that we assume that the customer always chooses to avoid 12CP, if it is currently choosing to do so under the current tariff. Given our recommended tariff reduces the costs recovered by 12CP, our approach is likely to overstate the degree of 12CP avoidance under our recommended tariff.

B. The cost of 12CP charges falls under our recommended tariff, as the 12CP charge is lower under our recommended tariff design.

C. The cost of billing capacity charges falls under our recommended tariff. In our modelling, we assume customers' contract capacity is unchanged irrespective of its self-supply decision, as we assume the customer always relies on the grid for back-up.

D. The costs of paying the energy charge of the transmission tariff rise under our recommended tariff, as the energy charge is higher.

Figure A.1: Costs of Purchasing Power from the Grid Under the Current and Our Recommended Tariff



Note: POD costs not shown. Source: NERA analysis of AESO data.

A.2.3. We perform modelling to optimise the self-supply decision for each customer

150. We then perform optimisation modelling to identify the self-supply decision for each customer that would minimise its energy costs.

151. The model allows customers to choose to self-supply from two different technologies, or types of plant that we discuss in Appendix A.2.4 below. We do not constrain the capacity of plants that customers can build to be above a particular size, or the mix of the two alternative technologies. Hence, customers can build any amount (in MW terms) of either or both types of plant. This conservative assumption makes the costs of self-supply appear more attractive than they would be in reality, as generation units

typically come in standardised sizes, so each unit installed cannot be below a certain size.

152. Our model assumes that, if customers invest in plant, they incur capital costs and fixed O&M costs irrespective of how they subsequently use the plant. Having built a plant, the model optimises when the plant should be dispatched for self-supply, up to the capacity of the plant. When a customer self-supplies power from its plant:

A. It incurs variable O&M costs, fuels costs (natural gas costs), and carbon costs.[43]

B. It avoids serving its gross load from the pool, which would incur costs as per the Price Duration Curves shown above.

153. The model assumes that each customer chooses how many MW of each generation technology to build and the hours in which to run it, to minimise its total costs of meeting its gross load. The total cost function, which the model minimises using a "linear program" approach, constitutes the costs of purchasing power from the grid (pool price plus transmission costs) and the costs associated with self-supplying through investing in and running on-site plant.

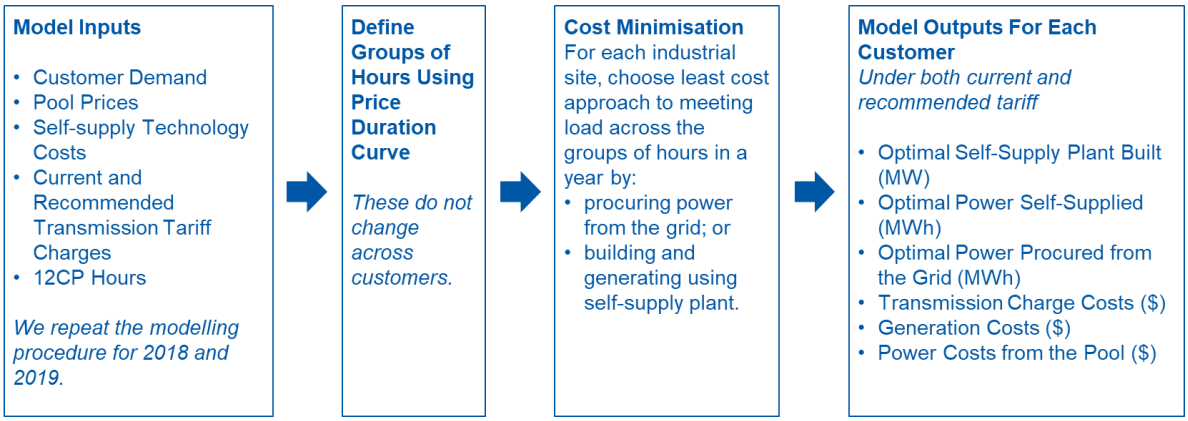
154. The model chooses how much capacity of each type of plant to build, and how much power to self-supply from each plant in each representative hour. It cannot produce more than the capacity of its plant in each representative hour, and the model is constrained to either use self-supply or power from the grid to meet the customer's gross load.[44]

155. We solve this linear programming problem for each customer (industrial site), under the current and recommended tariff, and separately for both 2018 and 2019. The solution of the problem for each customer defines its optimal self-supply under each tariff and in each year. We illustrate our modelling approach in Figure A.2 below.

[43] Throughout our analysis we source gas costs and forecasts from the Alberta Energy Regulators Forecast of AECO-C gas prices updated June 2020 and accessed here: https://www.aer.ca/providing-information/data-and-reports/statistical-reports/st98/prices-and-capital-expenditure/natural-gas-prices/aeco-c-price. Last Accessed 12 May 2021.

[44] We assume that customers cannot use self-supply technology to export power to the grid.

Figure A.2: Illustration of Our Modelling Approach



Source: NERA illustration.

A.2.4. Assumed self-supply technologies

156. We allow the model to choose between two technologies for self-supply:

A. An aeroderivative combustion engine ("ACE") fuelled by natural gas. The costs and assumptions of the ACE are derived from an AESO-commissioned study on the Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants.[45]

B. A reciprocating internal combustion engine ("RICE") fuelled by natural gas. The RICE costs and assumptions are derived from the AESO Delivered Cost of Energy Report.

157. We summarise our assumptions and sources for costs and operating conditions of each technology, the ACE and RICE, in Table A.4 and Table A.5 below respectively.

[45] Johannes P. Pfeifenberger et al. (4 September 2018), AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date.

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Table A.4: ACE Plant Cost Assumptions and Sources (2019 C$)

	Units	**ACE**	**Assumption/Source**
Initial Capex	*$/kW*	1,703	AESO Cost of New Entrant Analysis. Includes an indicative cost of land and upfront financing fees.
Heat Rate	*GJ/MWh*	9.68	AESO Cost of New Entrant Analysis.
Variable O&M	*$/MWh*	4.39	AESO Cost of New Entrant Analysis.
Fixed O&M	*$/kW-year*	48.26	AESO Cost of New Entrant Analysis.
Lifetime	*years*	20	AESO Cost of New Entrant Analysis.
Build time	*years*	2	Based on an internal combustion engine as cited by the EIA.
Emissions Intensity	*t/MWh*	0.49	NERA Calculation using (i) tCO2/therm = 0.0053[46] (ii) Btu/therm = 100,000;[47] therm/GJ = 0.105506.[48]
Rate of return	*%*	8.50%	AESO Cost of New Entrant Analysis.

Source: NERA Analysis of AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date; and Energy Information Administration (February 2021), Assumptions to the Annual Energy Outlook 2021: Electricity Market Module.

[46] EIA, Greenhouse Gases Equivalencies Calculator - Calculations and References, Last Accessed 17 May 2021, Link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[47] EIA, FAQs, Last Accessed 17 May 2021, Link: https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

[48] EIA, Energy Conversion Calculators – Natural Gas, Last Accessed 17 May 2021, Link: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

Table A.5: RICE Plant Cost Assumptions and Sources (2019 C$)

	Units	**RICE**	**Assumption/Source**
Initial Capex	*$/kW*	2,200	AESO Delivered Cost of Electricity Report 2020.
Heat Rate	*GJ/MWh*	10.50	AESO Delivered Cost of Electricity Report 2020.
Variable O&M	*$/MWh*	9.77	AESO Delivered Cost of Electricity Report 2020.
Fixed O&M	*$/kW-year*	0.00	AESO Delivered Cost of Electricity Report 2020. No fixed O&M costs mentioned in report so assumed to be zero. The risk with our assumption is that we understate the costs of self-supply technologies.
Lifetime	*years*	25	NERA assumption based on lifetime of plants cited in other sources. The AESO cites a 25-year asset life for a simple cycle gas plant in its Summary of Integrated Capacity and Energy Revenue Modelling, but a 20-year asset life for the ACE in the Cost of New Entry Analysis. In order to ensure we do not overstate the costs of self-supply, we assume a 25-year asset life.
Build time	*years*	2	Based on an internal combustion engine as cited by the EIA.
Emissions Intensity	*t/MWh*	0.53	NERA Calculation using (i) tCO2/therm = 0.0053[49] (ii) Btu/therm = 100,000;[50] therm/GJ = 0.105506.[51]
Rate of return	*%*	8.20%	NERA assumption based on rate of return cited by AESO for a simple cycle gas turbine in its Summary of Integrated Capacity and Energy Revenue Modelling.

Source: NERA Analysis of AESO (31 May 2020), Delivered Cost of Electricity Report; and Energy Information Administration (February 2021), Assumptions to the Annual Energy Outlook 2021: Electricity Market Module.

158. As can be seen in the above tables, the ACE and RICE have different cost profiles. The ACE has higher fixed costs each year than the RICE. However, the ACE has lower variable costs of generation than the RICE. We summarise the fixed and variable costs of each technology in Table A.6 below.

[49] EIA, Greenhouse Gases Equivalencies Calculator - Calculations and References, Last Accessed 17 May 2021, Link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[50] EIA, FAQs, Last Accessed 17 May 2021, Link: https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

[51] EIA, Energy Conversion Calculators – Natural Gas, Last Accessed 17 May 2021, Link: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

Table A.6: ACE and RICE Variable and Fixed Costs (2019 C$)

	ACE	RICE
Fixed Cost ($/kW/yr)	228	210
Variable Cost ($/MWh)	23.35	31.29

Source: NERA Analysis

159. Therefore, the ACE is a self-supply option similar to the baseload generation option that we outline in Paragraph 27 above. Whilst it is more expensive to build, it is more economically viable than RICE technology when run for more hours of the year, due to its lower variable costs. On the other hand, the RICE is similar to the peaking generation option that we outline in Paragraph 27 above. Whilst it is cheaper to build, it is only more economic than the ACE in fewer hours, due to its higher variable costs.

160. We considered a range of potential self-supply technologies in our analysis, drawing on both AESO studies as well as studies from the US Energy Information Administration ("EIA"). We summarise the characteristics of some of the alternative options we considered in Table A.7 below.

A. A key component of our assumption of available self-supply technologies is the size of the plant. For instance, whilst grid-scale CCGTs are more efficient than our chosen technologies, in practice, most industrial customers are unable to install a CCGT to self-supply because the minimum size of the plant is too large relative to an industrial customers' typical load.[52]

B. Therefore, we focus our analysis on plants with smaller minimum sizes for use in self-supply. In our optimization of the customers' self-supply decision, we do not constrain the minimum size of plant that the customer can build, and therefore our choice of self-supply technology should be appropriate for small-scale plant. Hence, we do not consider CCGT, Frame Combustion Turbine ("Frame CT"), and Simple Cycle Gas Turbine ("SCGT") technologies. Whilst the SCGT plant is similar in size to the ACE plant that we adopt, we consider the ACE plant to be

[52] For similar reasons, we assume that industrial customers cannot utilise intermittent technologies (combined with battery storage) because these technologies require significant land and therefore cannot be used to materially offset load. The AESO states, for industrial and large commercial customers, that "area available for PV arrays is likely insufficient to offset load" in its discussion of self-supply technologies in its Delivered Cost of Electricity Report. Source: AESO (May 2020), Delivered Cost of Electricity Report, p. 28.

more representative of the costs of installing self-supply technology, as the fixed cost estimate also includes other costs that merchant generators would incur in Alberta e.g. including an indicative cost of land.[53]

C. We considered using plant assumptions as detailed by the EIA in its Assumptions to the Annual Energy Outlook 2021.[54] More specifically, we considered utilising a distributed generation baseload gas plant ("DG Base"), and a distributed generation peaking gas plant ("DG Peak"). Both of these plants have small sizes of 2 MW and 1 MW respectively, and are therefore suitable for self-supply. The EIA also provides data for an Internal Combustion Engine ("ICE") which has a size of 21 MW which is likely more appropriate for self-supply options compared to the ACE which has a size of 93 MW.

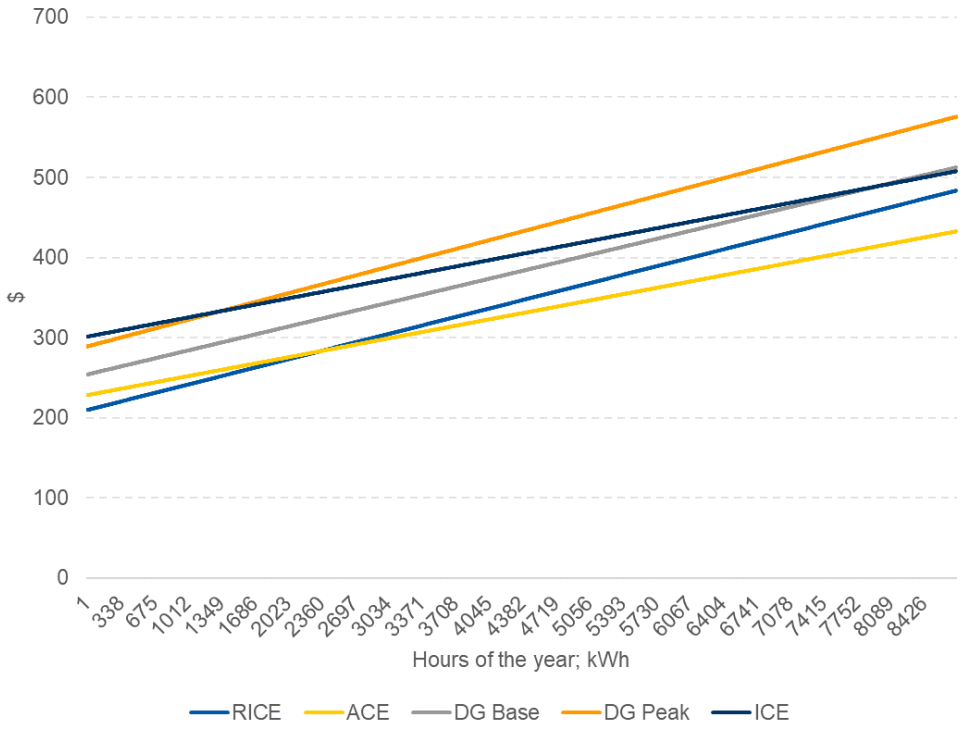
D. However, these plants are not cost competitive compared to the ACE and RICE plants. To illustrate this, we calculate a screening curve for the remaining self-supply technologies. The screening curve illustrates, for each technology, the total costs of building a 1 kW plant and then operating that plant for various hours of the year, generating 1 kWh per hour that it operates. We illustrate our screening curve in Figure A.3 below. It shows that either ACE or RICE technologies are the least cost technologies, across any amount of running hours.

53 The AESO source for the CCGT and SCGT were also cited in the context of the proposed capacity market which was not enacted. Source: AESO (January 2018), Summary of Integrated Capacity and Energy Revenue Modelling.

For land costs and other costs in the capital cost of the ACE plant, see: Johannes P. Pfeifenberger et al. (4 September 2018), AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date, Table 8.

54 Energy Information Administration (February 2021), Assumptions to the Annual Energy Outlook 2021: Electricity Market Module.

Figure A.3: Screening Curve for Self-Supply Technologies (2019 C$)



Source: NERA Analysis.

Table A.7: Self-Supply Technology Characteristics (2020 C$)

Cost	*Units*	RICE	CCGT	SCGT	ACE	Frame CT	CCGT	DG Base	DG Peak	ICE	CCGT
Initial Capex	*$/kW*	2,200	2,089	1,453	1,703	769	1,742	2,398	2,765	2,675	1,471
Heat Rate	*GJ/MWh*	10.50	7.20	10.50	9.68	10.06	6.81	9.43	10.47	8.75	6.72
Variable O&M	*$/MWh*	9.77	8.26	4.13	4.39	0.76	2.57	11.33	11.33	7.49	2.46
Fixed O&M	*$/kW-yr*		27.88	18.58	48.26	25.37	44.44	25.49	25.49	46.30	16.06
Lifetime	*years*			25	20	20	20				
Build time	*years*	2	3	2	2	2	3	3	2	2	3
Size	MW	<5	455	100	93	243	279	2	1	21	1083
Emissions intensity*	*t/MWh*	0.53	0.36	0.53	0.49	0.51	0.34	0.47	0.53	0.44	0.34
Rate of return	*%*			8.20%	8.50%	8.50%	8.50%				
Levelised Cost (incl Fixed O&M)	*$/kW/yr*	209.62	226.91	157.06	228.24	106.64	228.50	253.94	288.98	301.21	156.21
Source:		*AESO (1)*	*AESO (2)*	*AESO (2)*	*AESO (3)*	*AESO (3)*	*AESO (3)*	*EIA*	*EIA*	*EIA*	*EIA*

** Note: We recalculated all emissions intensities using the same assumptions for consistency and comparability. Our assumptions included (i) tCO2/therm = 0.0053[55] (ii) Btu/therm = 100,000;[56] therm/GJ = 0.105506.[57] Source: NERA Analysis of (1) AESO (31 May 2020), Delivered Cost of Electricity Report; (2) AESO (January 2018), Summary of Integrated Capacity and Energy Revenue Modelling; (3) Johannes P. Pfeifenberger et al. (4 September 2018), AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date, Table 8; and Energy Information Administration (February 2021), Assumptions to the Annual Energy Outlook 2021: Electricity Market Module.*

[55] EIA, Greenhouse Gases Equivalencies Calculator - Calculations and References, Last Accessed 17 May 2021, Link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[56] EIA, FAQs, Last Accessed 17 May 2021, Link: https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

[57] EIA, Energy Conversion Calculators – Natural Gas, Last Accessed 17 May 2021, Link: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

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A.2.5. Additional model assumptions

161. We also make assumptions relating to inflation, exchange rates, gas costs, and carbon costs. We detail these assumptions and our sources in Table A.8 below.

Table A.8: Overview of Model Assumptions

Assumption	Units	2018	2019	2020	Source
Exchange Rate	US$ to C$	1.2957	1.3269	1.3415	Bank of Canada, Annual Average Exchange Rates, Link: https://www.bankofcanada.ca/rates/exchange/annual-average-exchange-rates/, Last Accessed 05/05/2021.
Inflation Rate	%	1.40%	2.40%	1.84%	Inflation calculated as YoY percentage change in CPI from January each year. Source: Bank of Canada, Consumer Price Inflation, Link: https://www.bankofcanada.ca/rates/price-indexes/cpi/, Last Accessed 05/05/2021.
Gas Cost	$ per GJ	1.48	1.6	1.92	AER Forecast of AECO-C Gas. Average Annual Price, Base Case.
Carbon Cost	$ per tCO2	30	30	30	Government of Alberta (June 2018), Climate Leadership Plan 2018-2019.

Source: NERA Analysis.

A.2.6. Estimating optimal self-supply for customers

162. We run the model to estimate each customer's optimal self-supply decision using data for both 2018 and 2019 under both the current and recommended tariff designs. Our optimization model chooses the least cost combination of self-supply and purchasing of power from the grid across the year for each customer to meet its load.

163. In Table A.9 below, we outline the optimal investment in ACE and RICE plant resulting from our model of optimal self-supply decisions across customers under the current and recommended tariff. We find that most customers in our model build ACE plant, which has higher fixed costs than the RICE plant but lower variable costs. Under the recommended tariff, customers invest in more ACE plant but less RICE plant, suggesting that customers find it optimal to self-supply in more hours of the year due to the higher energy charge, thereby opting for the baseload instead of peaking technology.

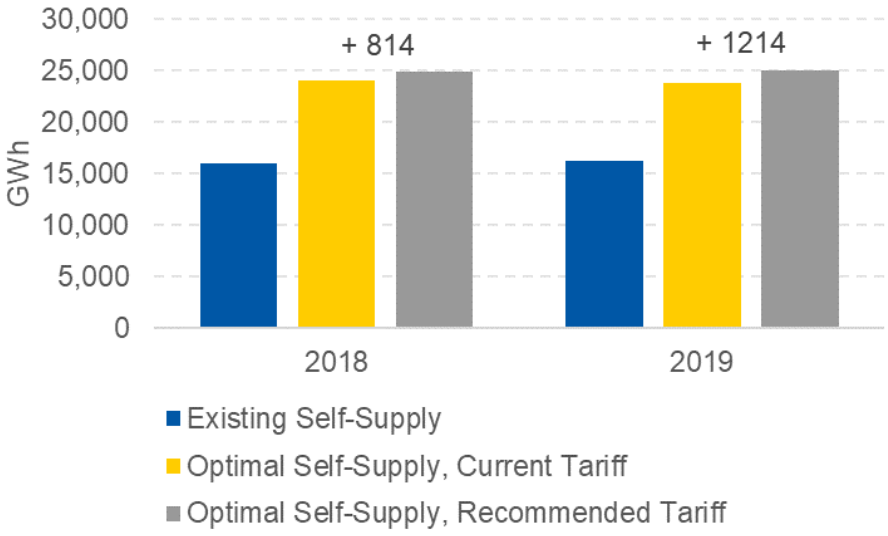
Table A.9: Modelled Optimal Self-Supply Plant Under Current and Recommended Tariff in 2018

	Capacity (MW)	ACE Capacity	RICE Capacity
Current Tariff	2,872	2,850	22
Recommended Tariff	2,893	2,887	6
Difference	21	37	-16

Source: NERA Analysis.

164. We illustrate the total change in energy self-supplied under the current and recommended tariff in Figure A.4 below. Our model suggests that optimal self-supply under the current tariff (yellow bars) is slightly lower than under our recommended tariff (grey bars). We find that moving from the current to the recommended tariff marginally increases optimal self-supply for customers in our sample by 814 GWh and 1,214 GWh in 2018 and 2019 respectively.

Figure A.4: Modelled Optimal Self-Supply Under Current and Recommended Tariff in 2018 and 2019



Source: NERA Analysis.

165. However, as can be seen in the figure, our model suggests much higher optimal self-supply under the current tariff (the yellow bars) than actually observed self-supply in 2018 and 2019 (the blue bars). Our model suggests optimal self-supply is approximately 50 and 47 per cent greater under the current tariff than actual self-

supply under the current tariff. This finding is similar to the AESO's finding in the Delivered Cost of Electricity Report, as we discuss in Section 3.4.2 above.

166. We would expect to observe this result for two key reasons:

A. Our model understates the cost of self-supply technologies. As we discuss in Appendix A.2.3, our model allows customers to build increments of capacity of self-supply technologies as we do not restrict the customer to a minimum size of plant. We also choose technologies available for self-supply that are more cost competitive than smaller plants appropriate for distributed generation but with higher operating costs.

B. Our model only considers the costs of self-supply associated with the fixed and variable costs of operating self-supply generators. In reality, customers incur other costs in their decision to self-supply, such as the costs and risks associated with business complexity and financing. Other industrial customers may not be able to self-supply due to their location in the province or lack of available land. We cannot directly observe these other costs associated with self-supply in the data available.

167. Therefore, to account for the additional costs associated with self-supply, we examine how customers' actual decisions to self-supply are linked to the incentive to self-supply identified by our optimisation modelling, as explained below.

A.3. Step 2: Estimating the Actual Self-Supply Response by Customers

168. We estimate a statistical relationship between actual self-supply decisions and the incentive to self-supply (as measured by the optimal self-supply generation amount predicted by our model in Step 1).[58]

169. We use an Ordinary Least Squares regression procedure to estimate the statistical relationship between actual self-supply and the incentive to self-supply across customers. In our regression, our dependent variable (the variable we are explaining)

[58] We could have utilized data for both 2018 and 2019 to estimate the statistical relationship. However, we only use data in 2018 so that we can test the performance of our model in predicting actual self-supply in 2019, as we discuss in Appendix A.3.2 below.

is total actual self-supply by customer across 2018 (in MWh), defined by the difference between each customer's metered gross demand and its metered net demand.

170. We use the total optimal self-supply by customer across 2018 (in MWh), taken from our model as our measure of the *incentive* to self-supply as an explanatory variable (the variable we are using to predict actual self-supply) in the regression. We illustrate our approach in Figure A.5.

Figure A.5: Illustration of Our Regression Approach

$$\text{Actual Self-Supply} = \alpha + \beta * (\text{Incentive to Self-Supply}) + \varepsilon$$

Where:

$$\text{Incentive to Self-Supply} = \text{Modelled Optimal Self-Supply}$$

α and β, are constants to be estimated, ε is an error term.

Source: NERA illustration.

171. Put simply, this procedure allows us to predict how much a customer would typically self-supply, as a function of how much an optimisation model suggests the customer should self-supply if it were making a least-cost trade-off between self-generation costs and purchasing power from the grid, as shown above.

A.3.1. We include a number of explanatory variables in our regression

172. We include a number of other explanatory variables that allow different customers to respond to the incentive to self-supply in different ways, depending on their characteristics. Formally, we use "interaction terms" in our regression which allow the statistical relationship between actual self-supply and the incentive to self-supply to change depending on customer characteristics. We include the following customer characteristics in our regression:

A. Contract Capacity: We allow the response of customers to the incentive to self-supply to change with contract capacity. As discussed in Appendix A.2, we assume each site contains a single industrial customer.

B. Industry Type: Customers' response to the incentive to self-supply might change depending on its industrial processes. We allow the response of customers to change with each customer's industry type. More specifically, we estimate different customer responses for the wood industry (pulp and paper or wood production), oilsands industry, pipeline industry, or other industry (chemical, steel, cement). We estimate a different customer response for customers with no listed industry.

C. Location in a City: We allow the response of customers to change if the customer is located in the Calgary or Edmonton planning region. Customers in more densely populated areas may have less land available for self-supply technology, reducing their responsiveness to the incentive to self-supply.

D. Industry System Designation ("ISD"): We allow the response of customers to change if the customer already has ISD status. We would expect customers with ISD status to be more responsive to the incentive to self-supply.

173. Formally, our regression is written in Table A.10 below.

Table A.10: Our Regression Approach

Type of Variable	Variable
Dependent Variable	Actual Self-Supply (MWh)
Constant	Constant
Explanatory Variable 1	Incentive to Self-Supply (MWh)
Explanatory Variable 2	Incentive to Self-Supply (MWh) x Contract Capacity (MW)
Explanatory Variable 3a	Incentive to Self-Supply (MWh) x Wood Industry (1/0 Dummy)
Explanatory Variable 3b	Incentive to Self-Supply (MWh) x Oilsands Industry (1/0 Dummy)
Explanatory Variable 3c	Incentive to Self-Supply (MWh) x Pipeline Industry (1/0 Dummy)
Explanatory Variable 3d	Incentive to Self-Supply (MWh) x Other Industry (1/0 Dummy)
Explanatory Variable 4	Incentive to Self-Supply (MWh) x Located in City (1/0 Dummy)
Explanatory Variable 5	Incentive to Self-Supply (MWh) x ISD (1/0 Dummy)
Residual	Residual Term

Note: A dummy variable takes the value of 1 if true for a customer or 0 otherwise. For instance, if a customer has an ISD then the dummy variable will equal 1, otherwise it will equal 0. Source: NERA Analysis.

A.3.2. We estimate our regression and analyse its predicative power using 2019 data

174. We estimate our regression using 2018 data and present our results in Table A.11.

Table A.11: Our Estimated Regression Using 2018 Data

Dependant Variable: MWh of Actual Self-Supply	Coefficient	p-Value
Incentive to Self-Supply *(MWh of Optimal Self-Supply as Estimated by Model)*	0.174	0.106
Interaction with ISD	0.485	0.000
Interaction with Contract Capacity	-0.001	0.000
Interaction with City	-0.301	0.185
R-Squared	0.9696	
Number of Observations	133	

Notes: Interactions with Industry Types Not Shown but Included in Model. All industry interaction explanatory variables are statistically significant with the exception of "pipeline". Incentive to self-supply is statistically significant when tested across all interaction terms. Source: NERA Analysis.

175. Our estimated regression suggests that as the incentive to self-supply increases, as measured by a 1 MWh increase in the optimal amount of self-supply identified by our model, actual self-supply by customers increases. We estimate how this relationship is affected by the characteristics of the customer:

    A. A customer with an ISD is found to be more responsive to the incentive to self-supply, increasing its actual self-supply by 0.485 MWh more than a customer without an ISD in response to a 1 MWh increase in the amount of self-supply that the optimisation model in Step 1 suggests is least cost.

    B. A customer located in the Edmonton or Calgary planning regions is found to be less responsive to the incentive to self-supply, increasing its actual self-supply by 0.301 MWh less than a customer outside these regions in response to a 1 MWh increase in the amount of self-supply that the optimisation model in Step 1 suggests is least cost.

    C. Contract capacity has a statistically significant and negative impact on the customer response to the incentive to self-supply. However, the size of this impact is very small.

176. Our regression also has a high degree of statistical fit, meaning that it explains the majority of the variation in actual self-supply across customers. Formally, the R-squared of our regression is 0.9696, meaning our regression explains 96.96 per cent of the variation in actual self-supply across customers in 2018 using the explanatory

variables. This is reassuring as it means our model has a strong predicative power to estimate actual self-supply from the amount of self-supply that the optimisation model in Step 1 suggests is least cost.

177. To further assess the predicative power of our regression, we use it to predict self-supply in 2018 and 2019 across industrial customers. We would expect our regression to perform well at predicting 2018 actual self-supply, because we estimate the regression using 2018 data. However, in this calculation we are particularly interested in the performance of our regression at predicting 2019 self-supply decisions, because this data is not used to calibrate the regression equation. We detail our results for our sample of customers in Table A.12 below.

Table A.12: Analysis of the Predicative Power of Our Regression

	2018	**2019**
Modelled Incentive to Self-Supply (GWh)	24,114	23,851
Actual Self-Supply (GWh)	16,055	16,245
Predicted Self-Supply Using Regression (GWh)	**16,624**	**16,534**
Difference Between Predicted and Actual Self-Supply (GWh)	570	289
Prediction Error Relative to Actual Self-Supply (%)	**3.55%**	**1.78%**

Source: NERA Analysis of AESO Data

178. Our regression performs well in predicting actual self-supply by customers in 2019. It predicts a volume of self-supply in 2019 within 2 per cent of the actual self-supply volume observed in that year. Therefore, we are reassured that our regression performs well at predicting actual self-supply based on data that is "out of sample", i.e. data that is not used to initially estimate the regression such as 2019 data.

179. Consequently, we are content that our regression predicts accurately the actual self-supply response by customers.

A.3.3. We considered alternative specifications of our regression

180. We considered an alternative specification of our regression which uses the cost savings associated with optimal self-supply relative to purchasing all power from the grid as a measure of the incentive to self-supply (rather than the MWh of optimal self-supply as in the "MWh Regression" above).

181. Similar to our "MWh Regression" our "Cost Regression" uses the same interaction terms to allow customers' responsiveness to the incentive to self-supply, as measured by our modelled costs savings associated with self-supply, to differ with their characteristics.

182. We estimate our "Cost Regression" using 2018 data and present our results in Table A.13.

Table A.13: Our Estimated "Cost Regression" Using 2018 Data

Dependant Variable: MWh of Actual Self-Supply	**Coefficient**	**p-Value**
Incentive to Self-Supply *(Cost Savings of Optimal Self-Supply as Estimated by Model)*	0.0093	0.103
Interaction with ISD	0.0254	0.000
Interaction with Contract Capacity	-0.0001	0.000
Interaction with City	-0.0172	0.169
R-Squared	0.9697	
Number of Observations	133	

Notes: Interactions with Industry Types Not Shown but Included in Model. All industry interactions explanatory variables are statistically significant with the exception of "pipeline". Incentive to self-supply is statistically significant when tested across all interaction terms. Source: NERA Analysis.

183. Our estimated "Cost Regression" suggests that as the incentive to self-supply increases, as measured by the cost savings associated with optimal self-supply relative to purchasing power from the grid in our model, actual self-supply by customers increases. We estimate that this relationship is also affected by the characteristics of the customer in a similar way to the "MWh Regression" as detailed in Table A.11 above.

184. Our "Cost Regression" also has a high degree of statistical fit, meaning that it explains the majority of the variation in actual self-supply across customers. The R-squared of our regression is 0.9697, meaning our regression explains 96.97 per cent of the variation in actual self-supply across customers in 2018 using the explanatory variables we include in it.

185. Similar to our test for the "MWh Regression", we further assess the predictive power of the "Cost Regression" by predicting self-supply in 2018 and 2019 across industrial

customers using our regression. We detail our results for our sample of customers in Table A.14 below.

Table A.14: Analysis of the Predicative Power of Our Regression

	2018	**2019**
Modelled Incentive to Self-Supply (GWh)	24,114	23,851
Actual Self-Supply (GWh)	16,055	16,245
Predicted Self-Supply Using Regression (GWh)	**16,605**	**19,561**
Difference Between Predicted and Actual Self-Supply (GWh)	550	3,316
Prediction Error Relative to Actual Self-Supply (%)	**3.43%**	**20.41%**

Source: NERA Analysis of AESO Data

186. Our "Cost Regression" performs better than our "MWh Regression" at predicting self-supply by customers in 2018.

187. However, our "Cost Regression" performs less well at predicting 2019 self-supply than our "MWh Regression", resulting in it predicting self-supply that is approximately 20 per cent higher than actually observed under the current tariff. We therefore use our "MWh Regression" to predict the actual self-supply response by customers to our recommended tariff in Appendix A.4 below.[59]

A.4. Step 3: Our Estimate of Self-Supply by Customers

A.4.1. Estimating the change in self-supply volumes due to the change in tariff design

188. Using our preferred specification, the "MWh Regression", we predict how self-supply by industrial customers would change under our recommended tariff design using data for 2018 and 2019. We report our results in Table A.15 below. We calculate two changes in self-supply:

A. We calculate the difference between predicted self-supply under our recommended tariff and predicted self-supply under the current tariff, where both are predicted using our modelling and regression procedure described above.

[59] We also considered logarithmic regressions to estimate the percentage increase in actual self-supply in response to a percentage increase in the incentive to self-supply. However, we could only estimate the logarithmic model on customers who are currently self-supplying (to prevent introducing non-linearity to the data) and these customers may be systematically different to the customers not self-supplying, leading to systematic bias in our estimate of self-supply.

This is shown in Row C of the table below. This calculation shows the change in self-supply predicted by our modelling procedure due to the change in the tariff design.

B. We calculate the difference between predicted self-supply under our recommended tariff and *actual* self-supply, as observed under the current tariff. This is shown in Row E of the table below. In other words, this calculation compares our modelled projection of self-supply after the change in the tariff design to the actual volume of self-supply today, i.e. under the current methodology.

Table A.15: Our Estimate of Customer Self-Supply in 2018 and 2019 Under Our Recommended Tariff

	Units: GWh	**2018**	**2019**
A	Predicted Self-Supply Under Recommended Tariff	17,249	17,401
B	Predicted Self-Supply Under Current Tariff	16,624	16,534
C = A – B	**Change in Self-Supply Under Recommended Tariff Relative to *Predicted* Self-Supply Under Current Tariff**	**625**	**867**
D	Actual Self-Supply Under Current Tariff	16,055	16,245
E = A – D	**Change in Self-Supply Under Recommended Tariff Relative to *Actual* Self-Supply Under Current Tariff**	**1,194**	**1,156**

Source: NERA Analysis.

189. We therefore predict an increase in self-supply across customers in our sample of between 625 and 1,194 GWh, depending on the approach used.

190. As we discuss in Appendix A.3.2, our regression overstates self-supply when compared against actual self-supply under the current tariff. Therefore, we control for this tendency by comparing our estimate of self-supply under the recommended tariff with *predicted* self-supply under the current tariff using our modelling procedure (Row C), rather than compare it to *actual* self-supply under the current tariff. If we do this, our model predicts an increase in self-supply across customers in our sample of 625 to 867 GWh.

191. We only model the optimal self-supply decision for industrial-only sites. Other industrial customers are located on shared sites with residential and other customers.

Therefore, to ensure we do not understate the incentive to self-supply, we scale our results to account for the industrial customers located on sites outside of our sample. More specifically, we calculate the scaling factor by examining the proportion of total industrial contract capacity constituted by our sample, and scaling by the result, as we show in Table A.16 below.

Table A.16: Calculation of the Scaling Factor for Our Modelling

A	Industrial-Only Site Contract Capacity	3,470 MW
B	Total Industrial Contract Capacity	7,186 MW
C = B / A	Scaling Factor	2.071

Source: NERA Analysis of AESO Data.

192. Scaling our results using this factor, **we estimate that self-supply will increase under our recommended tariff by 1,294 to 2,473 GWh relative to the current tariff** (not controlling for our model's tendency to overstate self-supply). This is equivalent to 2.17 to 4.14 per cent of the total metered energy billing determinant, used to calculate the transmission energy charge, in 2019.

193. Therefore, we estimate that customer response to our recommended tariff will be extremely limited.

A.4.2. We also considered whether a further customer response might arise from lower energy demand increasing the tariff

194. As customers choose to self-supply, the total metered energy billing determinant reduces. The AESO's revenue requirement does not change in the short run due to changes in demand,[60] so if customers choose to self-supply, the AESO needs to recover the same revenue requirement from a smaller billing determinant, resulting in a higher energy charge.[61] Therefore, whilst we estimate above an initial or "direct" self-supply response of between 1,294 to 2,473 GWh, we also need to account for any

[60] In the long run, as we discuss in Section 3.1.2, changes in self-supply decisions will result in changes in the AESO's costs.

[61] In practice, our recommended tariff methodology will adjust the division of costs with the changing use of the grid, as we estimate classification and allocation factors based on area level data. Therefore, decisions to self-supply will impact the classification of costs to energy. For simplicity, we maintain the same classification of costs for the purposes of this exercise.

In addition, reductions in energy consumption will also reduce the pool price and therefore the costs associated with purchasing electricity from the grid. Again for simplicity, we do not account for this factor in our analysis leading us to potentially overstate the self-supply response.

further self-supply response resulting from the direct self-supply response increasing the transmission tariff to the remaining customers.

195. We therefore recalculate our recommended tariff, with the energy charge recalculated using total metered energy *less* the direct self-supply response.[62] We use our highest estimate of the self-supply response (2,473 GWh) to recalculate the tariff. Our recalculated tariff has a higher energy charge but the same 12CP and billing capacity charge. We then estimate the change in self-supply using the same modelling procedure described above.

196. Having completed this procedure to estimate the "secondary" impact, we repeat the procedure a third time. We summarise our calculations and results in Table A.17 and Figure A.6 below.

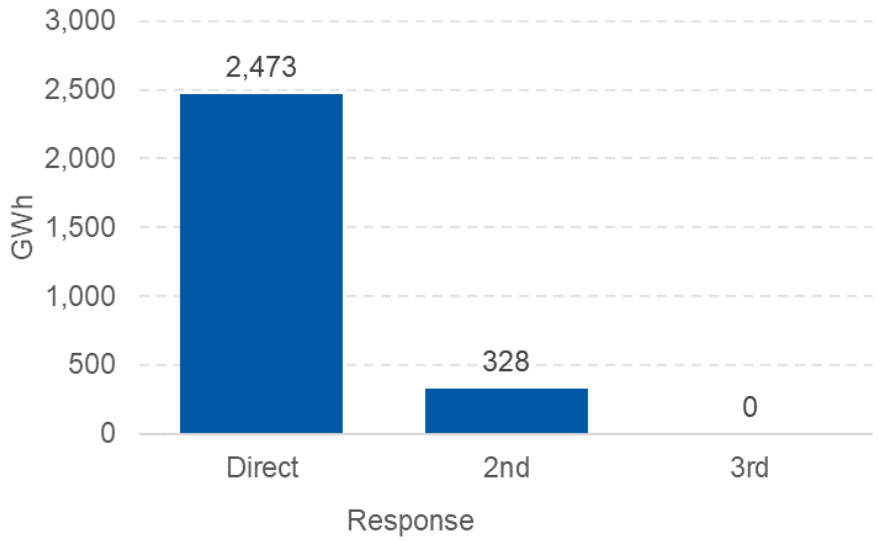
Table A.17: Our Estimate of the Dynamic Self-Supply Response to Our Recommended Tariff

	Direct	2nd	3rd
Costs Recovered from Energy Charge (C$m)	638	638	638
Energy Billing Determinant (GWh)	59,678	57,205	56,877
Energy Charge ($ per MWh)	10.68	11.14	11.21
Estimated Self-Supply Under Recommended Tariff (GWh)	**17,249**	**17,407**	**17,407**
Estimated Self-Supply Under Current Tariff (GWh)	16,055		
Additional Self-Supply Response (After Scaling, GWh)	**2,473**	**328**	**0**

*Note: * Numbers from 2018 as we take our maximum estimate of self-supply as our direct response to the tariff. Remaining numbers estimated using 2019 data. Source: NERA Analysis*

62 We use 2019 data in this modelling exercise.

Figure A.6: Our Estimate of the Dynamic Self-Supply Response to Our Recommended Tariff



Source: NERA Analysis.

197. These results show that any further increase in self-supply would be extremely limited. Even taking the top end of our estimated range, we estimate the total self-supply response will total 2,801 GWh. This is equivalent to 4.69 per cent of the total metered energy billing determinant, used to calculate the transmission energy charge, in 2019. It is also equivalent to a total cost shift of C$ 29.92 million (in real 2019 terms) from self-supply customers to other customers, which is approximately 4.69 per cent of total costs allocated to the flow of in-merit energy in 2019 and 1.90 per cent of the total revenue requirement for bulk and regional costs in 2019.

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Qualifications, assumptions and limiting conditions

NERA Economic Consulting ("NERA") has been asked to estimate the likely customer response and potential changes in self-supply outcomes by load arising from the Bulk and Regional tariff design that we recommended to the Alberta Electric System Operation ("AESO"), as described at the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5. The primary audience for this report includes AESO and interested Stakeholders.

NERA shall not have any liability to any third party in respect of this report or any actions taken or decisions made as a consequence of the results, advice or recommendations set forth herein.

This report does not represent investment advice or provide an opinion regarding the fairness of any transaction to any and all parties. This report does not represent legal advice, which can only be provided by legal counsel and for which you should seek advice of counsel. The opinions expressed herein are valid only for the purpose stated herein and as of the date hereof.

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Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

June 3, 2021

Public

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In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session and making the session recording available to the general public at www.aeso.ca. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Bulk and Regional Tariff Design engagement sessions. This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4, by telephone at 403-539-2528, or by email at privacy@aeso.ca.

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  - Click “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.
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  - If you would like to ask a question during the Q&A portion, on your phone’s dial pad, hit *9 and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone by hitting *6 and then you can ask your question. Your number will appear on the screen.

Stakeholder participation

The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:

- Listen to understand others' perspectives
- Disagree respectfully
- Balance airtime fairly
- Keep an open mind

Welcome and Introductions

Public

Session purpose and objectives

- The purpose of this session is to engage stakeholders in a discussion of Session 5 stakeholder feedback or follow-up and key questions raised by the Alberta Utilities Commission (AUC) staff, and to provide additional clarity and build mutual understanding of the AESO's preferred rate design and stakeholder concerns
- The session objectives include:
  - Share our learnings on Session 5 stakeholder feedback or follow-up
  - Present and seek stakeholder input on additional information on preferred rate design, including analysis of the potential response to the incentives provided in the rate design
  - Present responses to key questions raised by AUC staff
  - Seek to understand outstanding stakeholder concerns

Agenda

Time	Agenda Item	Presenter
8:00 – 8:15	Welcome, introduction, purpose and session objectives • Application filing extension request	AESO / Stack'd
8:15 – 8:45	Recap of preferred rate design and summary of stakeholder feedback received	AESO
8:45 – 9:15	Appropriateness of the flat energy charge • Time of use and dynamic pricing • On-peak versus off-peak charges • Mix/max load factor energy charges • Q&A	AESO / NERA
915 – 10:15	Cost recovery through avoidable charges and efficiency • Avoidable and non-avoidable charges • Efficiency • Q&A	AESO / NERA
10:15 – 10:45	Break	
10:45 – 11:45	Analysis of self-supply in response to the preferred rate design • Self-supply analysis • Q&A	AESO / NERA
11:45 – 12:45	Analysis of the short-term impact of the preferred rate design on the energy market • Energy charge • Coincident peak charge • Q&A	AESO
12:45 – 12:55	Session close-out and next steps	AESO

Registrants (as of May 27, 2021)

- Alberta Direct Connect Consumers Association (ADC)
- Alberta Energy
- Alberta Newsprint Company (ANC)
- Alberta Utilities Commission (AUC)
- AltaLink Management Ltd.
- Best Consulting Solutions Inc.
- Brubaker and Associates, Inc. on behalf of ADC
- Capital Power
- Cenovus Energy
- Chapman Ventures Inc.
- Chymko Consulting on behalf of Cities of Red Deer and Lethbridge
- City of Lethbridge
- CNRL
- Consumers Coalition of Alberta (CCA)
- Customized Energy Solutions
- DePal Consulting Limited
- Dow Chemical Canada ULC
- Enel North America
- ENMAX Corporation
- EPCOR Distribution & Transmission Inc.
- ERCO Worldwide
- FortisAlberta Inc.
- Heartland Generation Ltd.
- Imperial Oil
- Industrial Power Consumers Association of Alberta (IPCAA)
- International Paper
- ISCON
- Kalina Distributed Power
- Lionstooth Energy Inc.
- Matt Ayres Consulting
- Millar Western Forest Products
- NERA Economic Consulting
- Norton Rose Fulbright Canada LLP
- NRGCS
- Power Advisory LLC
- Solas Energy Consulting Inc.
- Suncor Energy Inc.
- TC Energy
- TransAlta Corporation
- Turning Point Generation
- Utilities Consumer Advocate (UCA)
- URICA Asset Optimization
- Wolf Midstream Inc.
- 2332823 Alberta Ltd.

Overview of Engagement Process

Public

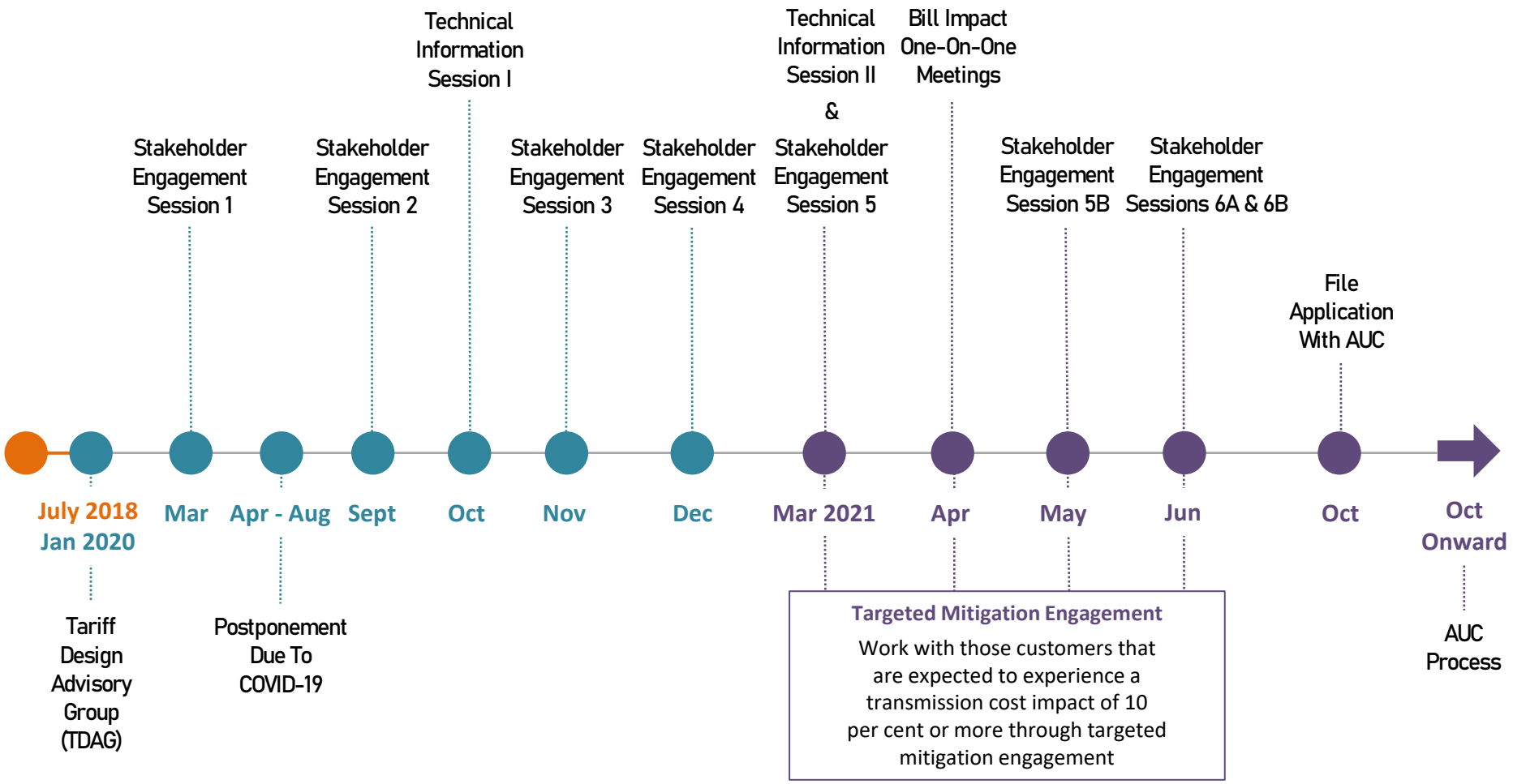
AESO Stakeholder Engagement Framework

Stakeholder engagement

The AESO's stakeholder engagement will:

- Ensure that stakeholders' needs and interests are consistently, transparently and meaningfully considered in the development of a rate design proposal for bulk and regional cost recovery;
- Provide clear objectives to be examined and evaluated in the development of a rate design proposal for bulk and regional cost recovery;
- Assist stakeholders in understanding and evaluating the AESO's preferred rate design;
- Supply stakeholders with tools that will allow them to consider and assess the impact of the AESO's preferred rate design; and
- Identify areas of alignment in order to support an efficient regulatory process.

Stakeholder engagement timeline



2018-19 2020 2021

Your participation

- Your participation to date has been very insightful to the AESO in understanding your perspectives and helping the AESO develop its preferred rate design proposal
- Your continued participation in this engagement is critical to help us prepare a well-informed application to the AUC for the benefit of Albertans
- We are looking for collaborative solutions to minimize the disruption for customers who are impacted by these changes, and your continued engagement is critical for our success
- AESO recognizes the importance of providing clarity on this initiative for all of Alberta's electricity consumers

Recap of Preferred Rate Design

Public

Cost allocation and cost causation

- Cost causation, cost responsibility, and cost reflective rates all relate to the same concept of linking the costs with cost drivers
- The costs of the transmission system are shared, and are not attributable to direct actions of specific, identifiable participants
  - Different types of transmission system use drive different types of costs
  - Cost causation is used to relate the types of use that drive costs and the costs of transmission
    - Investment in transmission results from forecasts, engineering studies, and the combined behaviours of all customers
    - Because costs are not attributable to one specific participant or behaviour, the relationship between transmission costs and cost drivers is representative

Responds to AUC staff questions 1.6 (a) and (c)

Preferred rate design aligns costs with drivers

- The preferred rate design characterizes use of the system to allocate transmission costs
  - Divides costs between demand-related cost drivers and costs driven by facilitating in-merit flow of energy
  - Divides demand costs between costs associated with coincident peak consumption and customer's own peak loads
  - Energy charge will increase; peak and billing capacity charge will decrease relative to current tariff
  - No changes to the types of charges in current tariff: billing capacity charge, energy charge, peak charge (with five-year trailing average)
- Better aligns charges with use of the system
  - Customers who wish to manage costs through peak avoidance remain able to do so, but charges are more reflective of the transmission costs associated with response

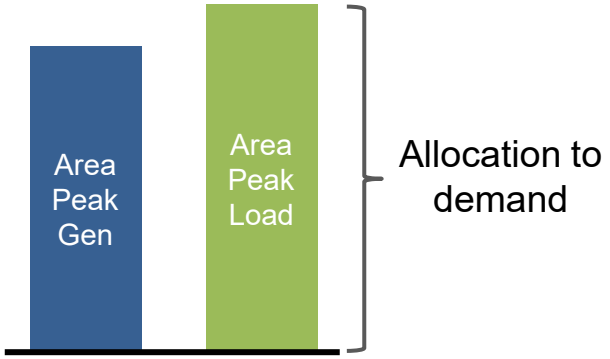
Minimum and actual system calculation

The following methodology is applied to determine the portion of costs allocated to demand and energy

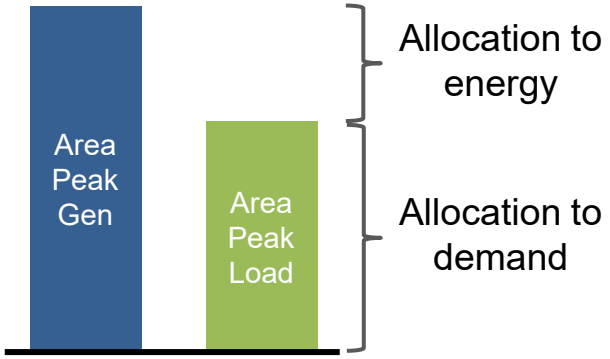
- **Minimum system**: Estimate of the transmission system required to meet peak load (demand)
- **Actual system**: Estimate of the additional transmission system required to facilitate the in-merit flow of energy
- Minimum and actual systems for Alberta are estimated as the sum of the minimum and actual systems across all planning areas
- Calculate the demand-share of costs based on the size of minimum and actual systems for Alberta

The resulting allocations for 2020 are 60 per cent demand and 40 per cent energy, and have changed minimally since 2015

Example of an area where peak gen < peak load



Example of an area where peak gen > peak load



Minimum system illustrative calculation

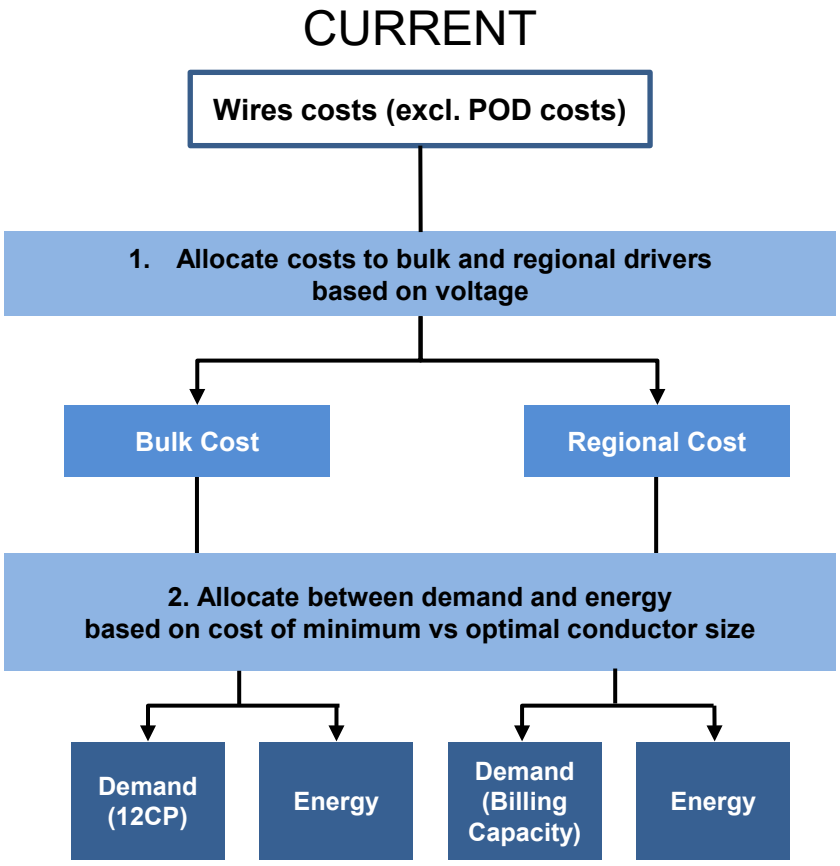
Area	Peak Load (MWh) (a)	Peak Gen (MWh) (b)	Min System (MWh) =(a)	Additional System (MWh) =(b) – (a) if (b) > (a), otherwise 0
1	100	0	100	0
2	100	100	100	0
3	100	150	100	50
4	0	100	0	100
5	20	10	20	0
Total			**320**	**150**

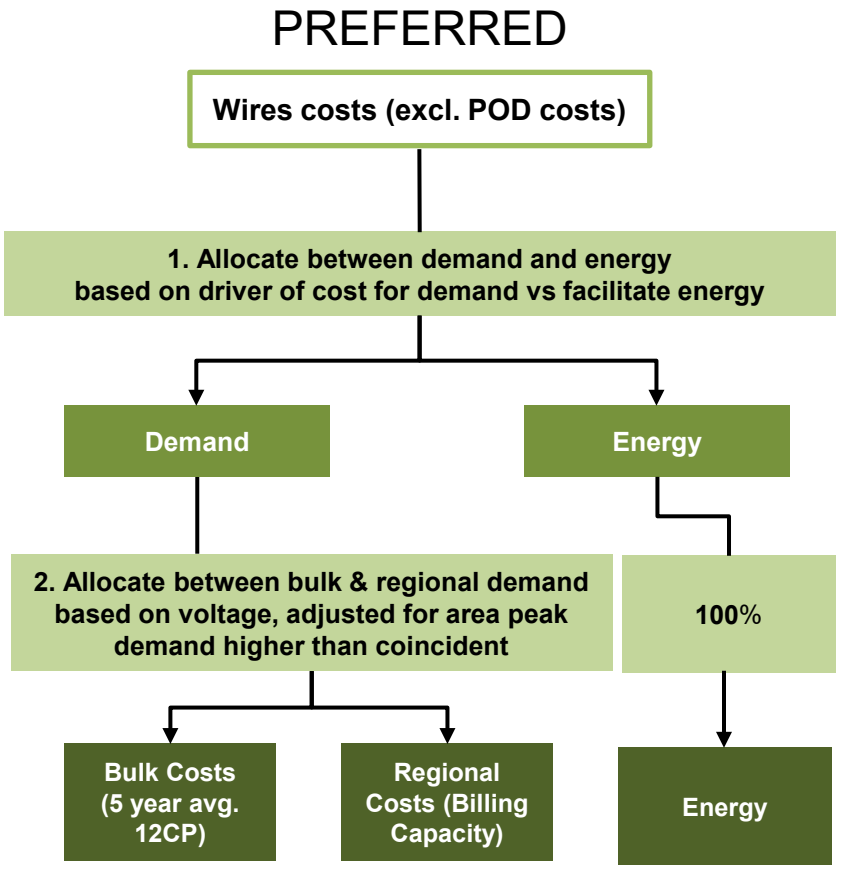
In this example the allocations across the whole province would be:

- Demand Allocation: 68% (320 / 470)
- Energy Allocation: 32% (150 / 470)

Allocations for the whole province are applied to the entirety of wires costs (excluding POD) to calculate rates that apply across the province

Current and preferred rate design





Current and preferred rate design

Type of charge	Cost Allocation (do not sum due to rounding)		Charges Estimated for 2019 test year	
	Current	Preferred	2019 Test Year	Preferred
Coincident Peak ($/MW month)	47%	29%	10,087	5,980
Energy* ($/MWh)	7%	31%	2.18	10.19
Billing Capacity ($/MW month)	22%	17%	2,668	2,055
POD (**out of scope**) ($/MW month)	24%	24%	N/A	
Total	**100%**	**100%**	**N/A**	

*Current energy charges are the sum of bulk and regional components

What We Heard from Session 5 Stakeholder Feedback

Public

Summary

- Today we want to focus on key areas of stakeholder feedback and questions we received that are important to address to provide additional clarity and build a better understanding of the preferred tariff design
- Many stakeholders expressed concerns with the preferred rate design, including:
  - Belief that charge on energy is not appropriate to recover fixed costs
    - Suggest further analysis required on: analyzing time varying charges or min/max load factor charge, self-supply risk
  - Questions about 5-year average on 12-CP charge, mitigation through rate design versus bill credits, appropriateness of DOS for mitigation, and general request for more details
- Many stakeholders referred to AUC staff questions and indicated that AESO responses may help them to better understand the preferred rate design

AUC staff questions

- On April 7, 2021, the AESO received a list of 58 questions in six categories from the AUC staff in relation to the anticipated application, on the following general topics:
  - Appropriateness of cost recovery on avoidable versus unavoidable charges
  - Historical data on transmission costs and load growth
  - Transmission cost recovery based on coincident peak, time varying energy charges or other dynamic charges
  - How we plan transmission for various types of loads (including energy storage)

Our response to stakeholder feedback

- Today we want to share information on the following topics that have been raised through AUC staff questions and stakeholder feedback
  1) Appropriateness of the flat energy charge
  2) Cost recovery through avoidable charges and efficiency
  3) Analysis of self-supply in response to the preferred rate design
  4) Analysis of the short-run impact of the preferred rate design on the energy market

1) Appropriateness of the Flat Energy Charge

Public

Concerns with proposed energy charge

- Stakeholders have commented on the following:
  - Concern that fixed costs recovered on variable charges is not aligned with cost causation and would send inefficient price signals (aligns with AUC staff questions)
  - Concern that the flat energy charge not consistent with time variation in use of transmission and would not send efficient price signals
    - Suggested improvement would be on-peak and off-peak charge
  - Concern that “penalizing” high load factor customers who use transmission efficiently not aligned with sending efficient price signals
    - Suggested improvement would be “Wright” tariff (min load factor/ max load factor) or declining block charges for energy
  - Concern about impacts on long-term response, incentives for self-supply / cost shifting (aligns with AUC staff questions)

Flat energy charge best reflects costs associated with in-merit energy

- There is no evidence for a cost reflective basis to recover costs associated with accommodating the flow of in-merit energy from a time of use energy charge
- The costs associated with accommodating the flow of in-merit energy are, by definition, not associated with changes in demand but with the use of energy
  - For example:
    - The costs of facilitating the flow of in-merit energy from wind generators are driven by times of windy conditions which may occur in any hour of the day.
    - Other flows of in-merit energy, i.e. from non-responsive baseload plant e.g. cogeneration or hydropower, may also occur in any hour of the day.

Responds to AUC staff question 5.4 and 5.5

Flat energy charge best reflects costs associated with in-merit energy

- There is no evidence for a cost reflective basis to vary the energy charge by customers' load factor
- A customer's decision to use energy in any hour means the AESO needs to accommodate the flow of in-merit energy to meet that load, irrespective of how that customer's use of energy in the hour compares to other times of the year

Responds to AUC staff question 5.4 and 5.5

Preferred rate design reflects costs and includes time of use charges

- The preferred rate design is made up of three charges, and recovers demand-related costs through time of use charges
- Given the relationship between system load and transmission load, the AESO's preferred rate design includes charges to reflect the costs of use at different times
  - A charge levied on 12-CP reflects costs incurred to meet consumption at times of coincident peak
  - A charge levied on billing capacity reflects investments required to meet specific customer demand at non-coincident peak
- The AESO's preferred rate design uses a flat energy charge to reflect the investments incurred to accommodate the flow of in-merit energy in all hours of the year under normal system operating conditions

Responds to AUC staff question 5.4 and 5.5

Questions?

Public

2) Cost Recovery Through Avoidable Charges and Efficiency

Public

Questions related to transmission cost recovery concepts

- Stakeholder feedback and AUC staff questions included several questions and comments related to:
  - Avoidable versus non-avoidable charges
  - Marginal cost approach to transmission pricing
  - Recovery of fixed costs through avoidable charges
  - Efficient and inefficient customer response
- We want to share some additional information in response to these themes and questions as they relate to some of the main aspects of the preferred rate design

Avoidable charges are relevant in a marginal approach to cost recovery

The concept of avoidable charges stems from a marginal cost approach

- A marginal cost approach to tariff design can send an efficient price signal levied on an avoidable charge, and uses a non-avoidable charge to recover the residual costs, provided the regulatory construct allows for locational pricing
- In the transmission context, a marginal cost approach to rate design should theoretically send an efficient price signal that reflects the costs imposed by incremental changes in demand on the system
  - This price signal should be sent through a charge which is “avoidable” or varies with customers’ consumption behavior

Responds to AUC staff question 1.1 to 1.3

Avoidable charges are relevant in a marginal approach to cost recovery (cont.)

The concept of avoidable charges stems from a marginal cost approach (cont.)

- The remaining costs would be recovered in a way that avoids distorting the consumption decisions that customers take in response to the efficient price signal
  - This price signal should be sent through a charge which is "non-avoidable" – or does not vary with customers' consumption behavior – to prevent distortion of their consumption decisions and to ensure total cost recovery

Responds to AUC staff question 1.1 to 1.3

The marginal cost of transmission varies by location

- Changes in customers' demands will have different impacts on transmission system costs depending on where they are located on the system
- In a distribution system, it is reasonable to assume that changes in customers' consumption decisions will have a similar effect on the distribution utility's costs, and that customers are served with similar types of infrastructure
- In a transmission system, by contrast, it is not safe to assume all customers' demands have the same impact on transmission system costs:
  - The AESO plans transmission capacity to move electricity from areas where the supply of in-merit energy exceeds demand, to areas where demand exceeds supply
  - Increasing demand in areas of surplus in-merit energy may therefore reduce transmission costs (implying a negative marginal cost); while
  - Increasing demand in areas where demand exceeds supply may increase transmission costs (implying a positive marginal cost)

Embedded cost methodology aligns costs with drivers

- In a transmission system *all charges are avoidable* (unlike in distribution system)
  - Transmission customers can and are expected to respond to transmission tariff charges
    - For example, by reducing demand at peak times, reducing overall energy use, or by reducing contract capacity (including grid defection)
    - How costs are allocated to different charges will incentivize different forms of response (or avoidance) to different degrees
- Embedded methodology aligns transmission cost drivers with transmission charges, so that response to charges occurs through the drivers that are aligned to costs
  - Variable charges that correspond to how costs have been incurred (based on how transmission system is used) align with the principle of cost causation

Recovery of fixed costs on variable charges is aligned with cost causation

- An embedded cost methodology signals to customers the long-run costs of providing transmission, reflecting whether costs were incurred historically to accommodate demand or accommodate the flow of in-merit energy
- Recovery of fixed transmission costs based on variable (or "avoidable") charges aligns with cost causation because an embedded cost methodology recovers the costs associated with the long-run drivers
  - Example: Recovering costs associated with accommodating the flow of in-merit energy through an "avoidable" energy charge reflects the long-run economic costs of energy purchased from the market

Responds to AUC question 1.5 a and d, 1.6 c and e

"Avoidance" of cost reflective tariff charges can be efficient

- Response to the preferred rate design (for example by "avoidance") will be efficient to the degree that the tariff is cost reflective
  - Preferred rate design improves on the current tariff by better signalling the long-run costs of providing transmission
    - For instance, explicitly recognizing the costs of providing transmission in order to accommodate the flow of in-merit energy
- If customers choose to "avoid" certain costs (for example by self-supply), it is not necessarily inefficient for the system
  - Efficient if the avoided system costs of serving that customers' self-supplied load from the grid exceed the costs incurred by the customer to self-supply over the long-run
  - There may be a possibility of inefficient self-supply decisions if the costs incurred historically are higher than the costs associated with meeting customers' demands for electricity in the future

Responds to AUC staff questions 3.2 and 3.3

"Avoidance" of cost reflective tariff charges can be efficient (cont.)

- The transmission tariff should encourage efficient self-supply decisions and discourage inefficient self-supply by customers by better signalling the costs associated with providing transmission
  - The Alberta market framework relies on wholesale market price and tariff to send signals of costs of taking energy to reach efficient outcomes

Responds to AUC staff questions 3.2 and 3.3

Questions?

Public

Break

Public

3) Analysis of Self-Supply in Response to the Preferred Rate Design

Public

Analysis of self-supply response

- Stakeholders have communicated a concern that the allocation of transmission costs under the AESO's preferred rate design creates additional opportunities for self-supply
- This section summarizes NERA's analysis of the maximum estimated customer response to the preferred rate design through self-supply, including:
  - Factors that influence self-supply decisions
  - Efficient and inefficient self-supply decisions
  - Estimates of self-supply response under preferred rate design
  - Consideration of future trends affecting self-supply decisions

For more details, see the NERA report posted on the AESO website at https://www.aeso.ca/assets/Uploads/AESO-customer-impact-report-05-25-2021.pdf

Summary

- Customer response to the preferred rate design through different self-supply decisions will improve efficiency because the preferred rate design is more cost reflective
  - Conservative estimate that self-supply could increase under the preferred rate design through a one-time adjustment of up to 2,801 GWh. This estimate is the total effect and includes dynamic responses by customers to self-supply decisions of other customers
  - This inclusive estimate reflects a shift in costs from self-supplying customers to other customers of a one time approximate 1.9 per cent of the 2019 bulk and regional costs
- Predicts an extremely limited increase in self-supply by industrial customers under the preferred rate design
  - Any change in customers' self-supply decisions that does arise will tend to result in more efficient patterns of electricity use than the current tariff
- Expect that the economics of self-supply will significantly worsen in the future due to increasing gas prices and carbon tax

Evaluating customer choice to self-supply

- From the customers' perspective, optimal decisions to self-supply balance the costs incurred to self-supply with the avoided costs of consuming power from the grid
  - Costs include generation costs, land costs, capital costs, etc
- Customers make a holistic decision of whether to self-supply based on all the benefits and avoided costs of procuring power from the grid (i.e., not just the transmission charges)
  - Avoided costs will depend on how customers use electricity and how charges are levied
- Given that self-generation decisions typically involve investment in long-lived generation assets, a customer's decision on whether to self-supply considers a forward-looking assessment of the costs of self-supply relative to the forward-looking avoided costs of consuming from the grid

Efficient and inefficient self-supply decisions

- It is not necessarily inefficient for the system if customers choose to self-supply
  - A customer's choice to self-supply may be efficient and lower the total overall costs of electricity supply as long as the tariff is cost reflective
    - A customer choosing to self-supply would **improve** efficiency if the avoided system costs of serving that customers' self-supplied load from the grid **exceed** the costs incurred by the customer to self-supply over the long-run
    - A customer choosing to self-supply would **reduce** efficiency if the avoided system costs of serving that customers' self-supplied load from the grid **are less than** the customer's incurred costs to self-supply over the long-run
- Customers rely on regulated transmission tariff and wholesale market prices to signal the total costs incurred to supply them with electricity

Efficiency of the response to a change in the tariff

- Customers may make different, and *more efficient*, self-supply decisions in response to a new tariff that is more reflective of the costs of transmission incurred to serve that customer's load
- The AESO's preferred rate design:
  - Reduces costs recovered through a charge on 12-CP in order to better meet principles of cost causation
  - Reduces the incentive for inefficient self-supply decisions taken based on current 12-CP transmission charges that exceed the costs associated with meeting coincident peaks in demand
- However, need to evaluate the remaining risk of inefficient self-supply decisions
  - Tariff recovers the current operating and historically incurred capital costs of the transmission system
  - If the costs incurred historically are higher than the costs associated with meeting customers' demands for electricity in the future, there is a risk that a tariff set to recover historical costs will cause customers to self-supply

Estimating future self-supply response

- The AESO's preferred rate design would change what customers pay for grid supplied electricity and their incentive to self-supply in different ways depending on how and when they draw power from the grid
  - Preferred rate design would recover more costs from energy-based charges than the current tariff
    - Transmission charges for customers with high load factors and high energy consumption would tend to increase
    - Customers who have previously avoided 12-CP hours could see a rise in charges since more costs are allocated to energy in all hours and fewer costs are allocated to 12-CP
    - Customers with lower load factors, or who consume at times of 12-CP tend to have lower charges

Changes in consumption in response to change in tariff

- Preferred rate design may lead customers to change how and when they use the grid:
  - Lower 12-CP charge may reduce customers' incentive to avoid consumption at times of coincident peak, increasing use at these times
  - Lower charge on contracted demand increases customers' incentive to hold contracted capacity (e.g., for backup), which reduces the incentive for grid defection
  - Increase in the energy charge may decrease customers' incentive to take energy from the grid across the year
- Overall response to changes is expected to vary based on customer attributes including load factor, flexibility, etc.
  - Response will tend to be more efficient (for the customer and for the system), because preferred rate design is more cost reflective than the current tariff

Estimating customer response to preferred rate design

- Analysis of how self-supply decisions may change for industrial sites after the introduction of the preferred rate design:
  - First, assess whether and to what extent it would be economic for industrial sites to self-supply rather than procure power from the grid across the year, considering both wholesale prices and transmission tariffs
  - Then, predict actual customer responses to the change in the incentive to self-supply under preferred rate design, based on statistical estimates of how likely customers have been in the past to self-supply
    - This step accounts for other costs customers face to self-supply that we cannot observe
  - Calculate new rates including reduction in billing determinants and repeat first step using new rates

Findings on self-supply response

- We predict an extremely limited increase in self-supply by industrial customers under preferred rate design, and any change in customers' self-supply decisions that does arise will tend to result in more efficient patterns of electricity use than under the current tariff
- Self-supply is estimated to increase through a one-time adjustment (including expected dynamic response) under the preferred rate design
  - **Up to** 2,801 GWh (4.7 per cent of 2019 energy billing determinant)
    - Equivalent to a total cost shift of approximately $30 million from self-supply customers to other customers (or 1.9 per cent of 2019 bulk and regional costs)
- Estimate of self-supply response is conservative
  - Assumes capacity will be installed today even though future costs of self-supply increase relative to costs from the market (future changes in carbon taxes and gas prices)

Questions?

Public

4) Analysis of the Short-Run Impact of the Preferred Rate Design on the Energy Market

Public

Introduction

- Loads can respond to tariff charges in the short-run and the long-run
  - Short-run: Loads increase or decrease their consumption using existing capability
  - Long-run: Investments in self-supply, energy efficiency, flexibility, etc.
- This analysis seeks to better understand how the **short-run** response of loads to the preferred rate design will impact the energy market
  - Address concern from stakeholders that allocation of transmission costs to energy charge will lead to distortions in the wholesale energy market
- Key findings:
  - **The changes in the preferred rate design are estimated to have a minimal impact on the energy market, and may even increase efficiency in the energy market**
    - Increase to the energy charge will lead to a small reduction in efficiency
    - Reduction in the CP charge can be expected to increase efficiency

Introduction (cont.)

- This analysis isolates the energy market and therefore does not measure the overall efficiency of the electric system
  - Improving transmission cost recovery to align with cost causation principles will lead to more efficient consumption decisions
  - Some energy market impact is inevitable, as consumers can respond to tariff charges in the long-run no matter how costs are collected
- When loads that would otherwise be consuming turn off due to tariff charges, this shows up as an inefficiency in the energy market, consisting of:
  - Lost benefit to the load
  - Lost profit to the generator

Introduction (cont.)

- This analysis estimates the change in energy market efficiency based on the following assumptions:
  - Approximate $9/MWh increase in the energy charge
  - Removal of the coincident peak (CP) charge
    - The AESO's preferred rate design does not remove the CP charge, but rather reduces it by about 40 per cent
    - Due to data limitations, the load response to this change cannot be accurately measured
      - *This will be discussed further*
- The AESO estimates the efficiency impact of these changes based on the response from price-responsive loads
  - Firm loads will not change their behaviour in the short-run and therefore will not impact efficiency in the energy market
- The model includes the years 2018 and 2019

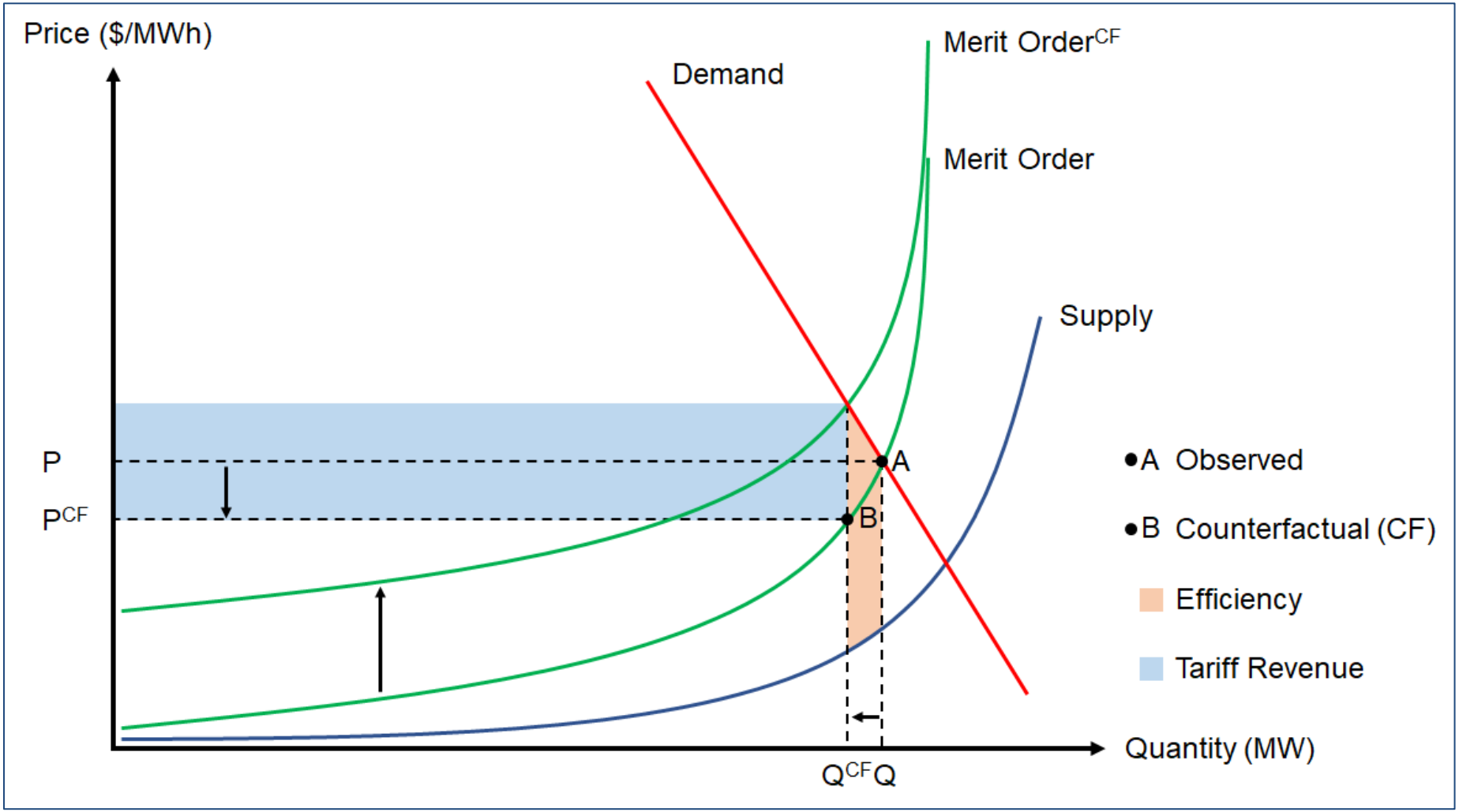
Energy Charge

Public

Method

- As a proxy for the increased energy charge, all offers to the energy market are increased by $9
  - This will increase the energy price by $9 for any given level of demand
- The response of loads to the higher energy price is estimated using historical data from eight sites identified as being price-responsive
  - In reality, loads may respond differently to tariff charges and the energy price due to hedging
- The new market equilibrium is estimated using the new, lower level of demand and the original merit order
- The efficiency loss is estimated based on the lost benefit to loads and generators on the reduced MW of demand

Illustrative example



Results

Year	Efficiency Change ($)
2018	(865,890)
2019	(1,279,615)

- A $9/MWh increase in the energy charge is estimated to create approximately $1 million in efficiency losses per year in the energy market
  - To the extent that loads are more responsive to tariff charges than to the energy price, the actual impact may be larger than this estimate

Coincident Peak Charge

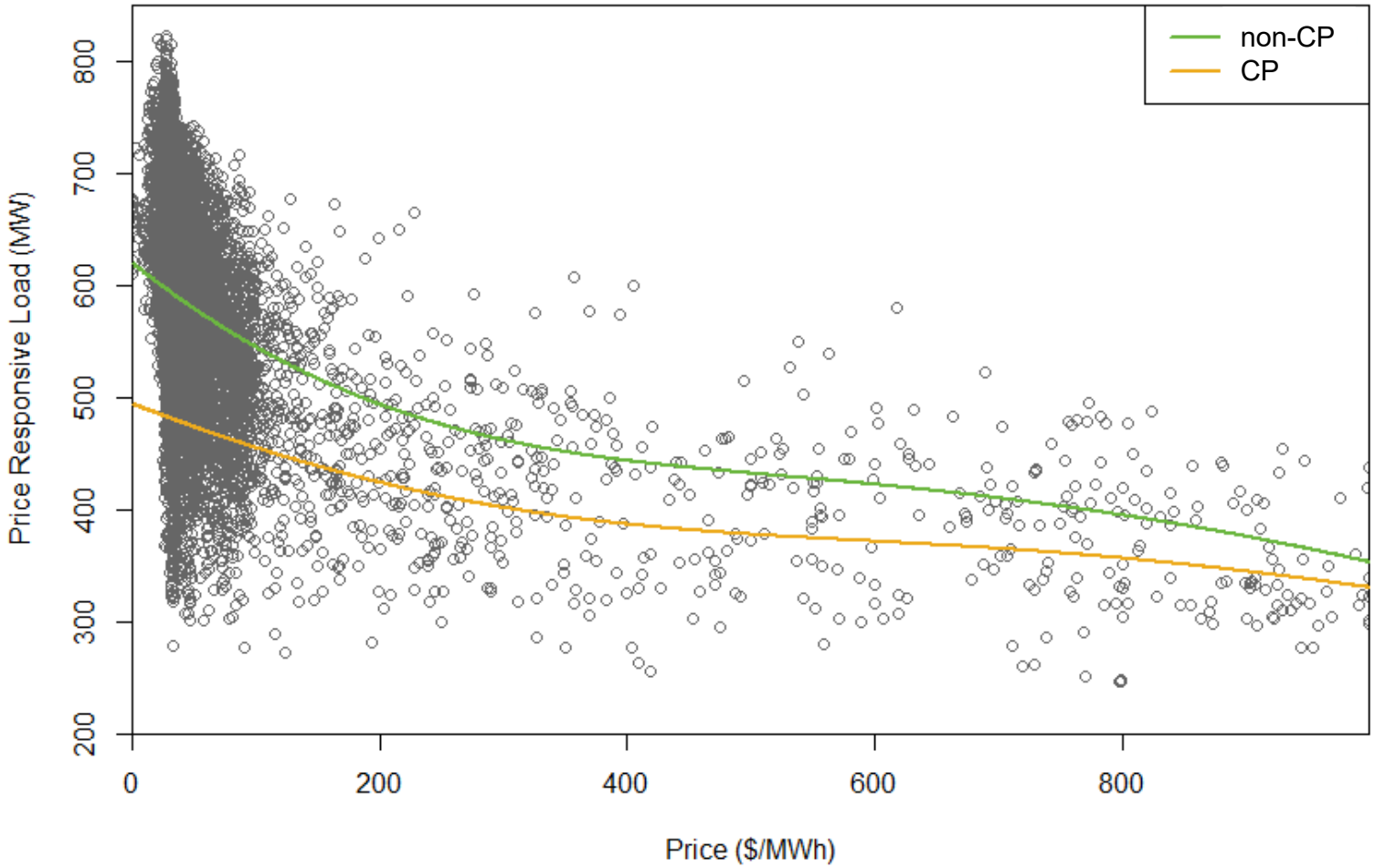
Public

Method

- Unlike the energy charge, changes to the CP charge are expected to impact the market in a small number of hours
  - Because the CP interval is uncertain until the end of the month, loads respond in multiple hours to avoid the charge
    - The day-ahead hourly demand forecast was used as an indicator of whether loads may choose to respond
    - Using a regression on load consumption data, the AESO found that 45 hours of response per month best explained the behaviour of loads
    - Twenty-eight sites were identified as responding with at least 1 MW of load on average during these 45 hours after controlling for responsiveness to price
- From these 28 sites, two demand curves were estimated using their consumption in the 45 CP-flagged hours compared to all other hours

Demand curve shift

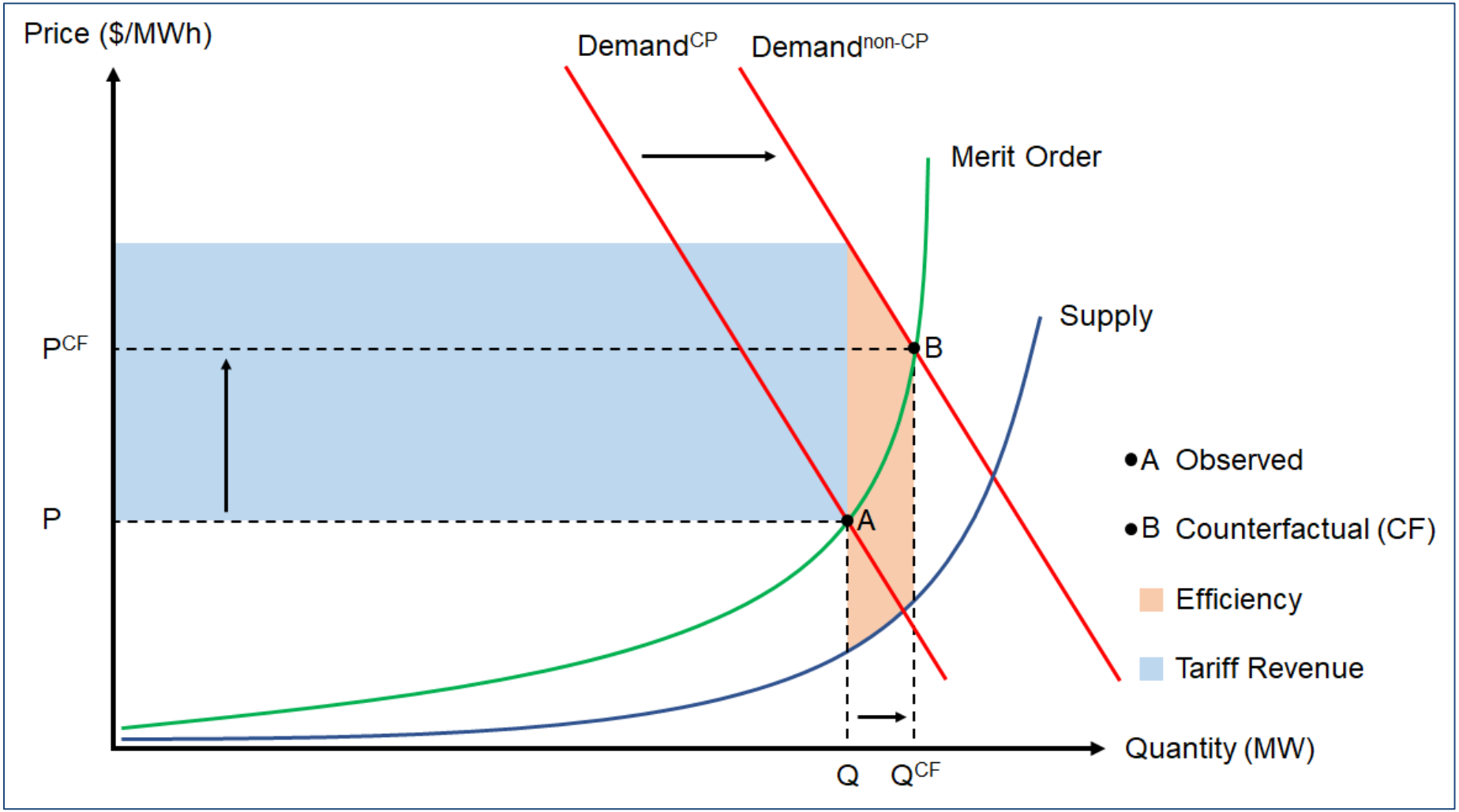
- The graph below shows the CP and non-CP demand curves, estimated using the method described in the previous slide



Method (cont.)

- The impact of removing the CP charge is determined by adjusting demand in CP-flagged hours to the level that would be expected in a non-CP hour
  - This estimates the efficiency gain from setting the charge to $0, not the level in the preferred rate design
    - The last time the CP charge was at ~$5,980/MW month as is the charge in the preferred rate design was in 2013-2015 which would not be reflective of how load responds today
- The new equilibrium is estimated using the new, higher level of demand and the merit order
- The efficiency gain is estimated using the recovered benefit to loads and generators on the MW of demand that respond to the CP charge

Illustrative example



Results

Year	Efficiency Change ($)
2018	9,548,063
2019	12,193,163

- Removing the CP charge would result in an estimated efficiency gain of ~$10 million per year in the energy market
- The impact of the preferred rate design will depend on how the response from loads changes compared to the status quo
  - Both the reduced charge and the change to a 5-year average billing determinant would reduce the incentive to respond, which would recover some lost efficiency

Findings

- The efficiency impact of the proposed energy charge is estimated to be minimal
  - Based on 2019 average system load of 7,030 MW, a $9/MWh increase in the energy charge is estimated to collect over $500 million in revenue with an efficiency loss of ~$1 million (0.002 per cent)
- The current CP charge is estimated to create inefficiencies that are an order of magnitude higher than the proposed energy charge
  - If loads consume more during coincident peak times in response to the preferred rate design, these inefficiencies would be reduced
- Even if the impact of the energy charge is not offset by the change to the CP charge, the preferred rate design will still be more efficient from the perspective of the overall system

Questions?

Public

Next Steps

Public

Engagement schedule

- **June 10, 2021 |** Stakeholder feedback due on questions set out in Stakeholder Comment Matrix Session 6A
- **June 24, 2021 |** Host stakeholder engagement session to discuss AESO's targeted mitigation discussion outcomes, Session 5B (DOS) and Session 6A stakeholder feedback, and areas of alignment
- **July 9, 2021 |** Stakeholder feedback due on questions set out in Stakeholder Comment Matrix Session 6B
- **October 2021 |** File application with AUC for public proceeding and approval

Session feedback

- We want to thank you for attending the Bulk and Regional Tariff Design Stakeholder Engagement Session 6A and we would appreciate your feedback on the session
- Launch Zoom poll
- We invite all interested stakeholders to provide their input on this session via the questions set out in the **Stakeholder Comment Matrix Session 6A on or before June 10, 2021**. The matrix will be available on May 27, 2021 on our website at www.aeso.ca
  - Path: Stakeholder Engagement > Rules, standards and tariff consultations > Tariff (filter) > Bulk and Regional Tariff Design > Session 6A | June 3, 2021

Next session

- Following Session 6A, the AESO will host Session 6B on **June 24, 2021.** Registration details will be available in early June on the AESO website at www.aeso.ca
- **Session 6B purpose**
  - The purpose of the session is to engage stakeholders in a discussion of the AESO's targeted mitigation discussion outcomes, Session 5B (DOS) and Session 6A stakeholder feedback, and areas of alignment
- **Session 6B objectives**
  - Provide an overview and seek stakeholder input on the outcomes of the targeted mitigation engagement
  - Share our learnings and seek stakeholder input on Session 5B (DOS) and Session 6A stakeholder feedback and areas of alignment
  - Present and discuss implementation considerations
  - Seek to understand outstanding stakeholder concerns

Questions?

Public

Contact the AESO

- ***Twitter:*** *@theAESO*
- ***Email:*** *tariffdesign@aeso.ca*
- ***Website:*** *www.aeso.ca*
- Subscribe to our stakeholder newsletter

Thank you

Public

Appendix – Acronyms

Public

Acronyms

- AGF = Aggregated Generating Facilities
- AIES = Alberta Interconnected Electric System
- AIL = Alberta internal Load
- ARS = Alberta Reliability Standards
- AS = Ancillary Services
- AUC = Alberta Utilities Commission
- BTF = Behind-The-Fence
- CP = Coincident Peak
- DFO = Distribution Facility Owner
- DOS = Demand Opportunity Service
- DTS = Demand Transmission Service
- EAL = ESBI Alberta Limited (Transmission Administrator prior to the formation of the AESO)
- EEA = Energy Emergency Alert
- GTA = General Tariff Application
- IOS = Import Opportunity Service
- LdF = Load Factor
- MSA = Market Surveillance Administrator
- OR = Operating Reserve
- PILON = Payment in Lieu of Notice
- POD = Point-of-Delivery
- SASR = System Access Service Request
- VER = Variable Energy Resource
- XOS = Export Opportunity Service

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Company Representative
Comments From:	Company Name			**Phone:**	Contact Phone Number
Date:	[yyyy/mm/dd]			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	
4.	How would you describe your level of support for the “allocation of costs to energy” element of the design?	
5.	How would you describe your level of support for the “flat energy charge” element of the design?	
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	
7.	Are there other elements of the design you support or have concerns with? Please be specific.	
8.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Session 6A – June 3, 2021 Comments

Stakeholder comments on Session 6A [Posted June 11, 2021]

1. Alberta Direct Consumers Association (ADC)
2. AltaLink Management Ltd.
3. Canada West Ski Areas Association (CWSAA)
4. Capital Power Corporation
5. Conoco
6. Consumers Coalition of Alberta (CCA)
7. DCG Consortium
8. Dual Use Customers (DUC)
9. EPCOR Distribution and Transmission Inc.
10. Heartland Generation Ltd.
11. Industrial Power Consumers Association of Alberta (IPCAA)
12. MATL Canada & MATL LLP (MATL)
13. Suncor Energy Inc.
14. TC Energy
15. TransAlta Corporation
16. Utilities Consumer Advocate (UCA)

Alberta Electric System Operator

Calgary Place, 2500, 330-5th Avenue SW Calgary, AB T2P 0L4

Phone: 403-539-2450 | Fax: 403-539-2949

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@theaeso

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021 through June 10, 2021	**Contact:**	Colette Chekerda
Comments From:	Alberta Direct Connect Consumers Association	**Phone:**	780-920-9399
Date:	2021/06/10	**Email**:	colette@carmal.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	The ADC did not find the session particularly valuable as the AESO continues to rely on high level power point presentations to support their proposal and has provided no transparency to any studies, data or analysis to support the preferred tariff design. The message has been "trust us" without regard for the consequences on the Alberta economy. The ADC remains unconvinced that the AESO preferred tariff design provides a fair or efficient price signal. The impact to the Alberta economy and particulary to the manufacturing sector will have consequences to long term investment and jobs.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	The study makes no mention of reasons why customers have been reluctant to self supply in the last few years. I.e. Policy uncertainty around capacity market, self – supply and export, and metering practices.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	e. not supportive The proposed tariff design is signalling a grid exit for high load factor customers. This exit could be a move to self generation or exit from the province. Further the AUC just ruled that DCG credits are to be phased out over the next 4 years, so one of the key reasons for the case for change no longer exists.
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	Not supportive
5.	How would you describe your level of support for the "flat energy charge" element of the design?	Not supportive
6.	How would you describe your level of support for the "5-year average of 12-CP" element of the design?	Not supportive – the AESO already has a 5 year notice period for changes to DTS contract capacity, the 5 year 12 CP ratchet is unnecessarily complex and will be another barrier for distribution companies to adopt tariffs that can align with the transmission tariff.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	The ADC has previously commented on the elements of the design we have concerns with. Those concerns remain unaddressed, in particular the demand energy classification. The AESO could have taken an approach where they held the CP charge at current levels and introduced a higher energy charge over time or considered alternative rates.

8.	Additional comments	The ADC requests the AESO provide their detailed analysis and data supporting the demand / energy classification to provide transparency and sufficient time for interveners to review and understand the materials. The AESO has this data available as they relied on it for the tariff proposal. There is no reason not to make this available as soon as possible. Further, the ADC wishes to highlight a commission ruling on alternative rate classes and requests the AESO reconsider it's position on examining alternate rate classes (beyond DOS) for different operational requirements for interruptible, standby, and storage customers. **Extract from EUB Decision 2007-106** Page 7&8, pdf 12&13 In a number of instances, the AESO argued[12] that it would consider it inappropriate to permit variations in rates based on operational considerations such as voltage level because operational considerations may, to an extent, reflect the location of the customer. As a result, such variations may violate subsection 30(3) of the *Electric Utilities Act* (EUA). Subsection 30(3) of the EUA provides: 30 (3) The rates set out in the tariff (a) shall not be different for owners of electric distribution systems, customers who are industrial systems or a person who has made an arrangement under section 101(2) as a result of the location of those systems or persons on the transmission system, and (b) are not unjust or unreasonable simply because they comply with clause (a). In its reply argument, the ADC submitted that the AESO's interpretation of subsection 30(3) of the EUA was too broad. The ADC submitted that this provision does not prohibit recognition in

		the AESO's tariff of engineering or physical differences that may cause increased costs but which are not specifically tied to location.[13] The Board agrees with the interpretation presented by the ADC. **In the Board's view, recognizing different operational circumstances and their cost implications does not, in itself, contravene subsection 30(3) of the EUA. That section requires only that the rates not vary as a result of the location of their systems on the transmission system (i.e. the geographic location of the POD within the province). This is consistent with the Board's finding in Decision 2001-6.[14] The Board is in no way commenting on whether the AESO may have justifiable reasons, separate and apart from subsection 30(3), for extending system access service to all customers regardless of their actual physical system facilities. This specific legislative provision simply does not prohibit variations in rates based on operational considerations.**

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021 through June 10, 2021	**Contact:**	Hao Liu / Rob Senko
Comments From:	AltaLink Management Ltd.	**Phone:**	403-710-1247 / 403-874-6762
Date:	[2021/06/10]	**Email**:	Hao.liu@altalink.ca / rob.senko@altalink.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	(i) Somewhat valuable The session allowed parties to express concerns with the newly-released Nera study on self-supply. (ii) The March 25 session was sufficient to explain the AESOs preferred rate design
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: (i) Response to incentives under the preferred rate design (e.g., assessment of self-supply response) (ii) Impact on wholesale energy market	(i) No additional questions at this time. (ii) No additional questions at this time..

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	e) Not supportive. AltaLink is still not convinced that the proposed rate design will stop the increase in bypass of transmission costs or the cost shifting that has been occurring under the AESO's existing rate structure. In fact, under the proposed AESO rate design AltaLink believes the cost bypass issue will only get worse. See AltaLink's rationale set out in the comment matrix in response to the AESO's March 25, 2021 stakeholder session. As well, AltaLink agrees with the stakeholder comments at the AESO's June 3, 2021 meeting concerning NERA's report on Customers Response to the AESO's Recommended Bulk and Regional Tariff Design. In AltaLink's opinion, this report does not truly reflect the amount of future cost bypass that will occur if the AESO's recommended design is approved by the Commission.
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	Not supportive. See above.
5.	How would you describe your level of support for the "flat energy charge" element of the design?	Not supportive. See above.
6.	How would you describe your level of support for the "5-year average of 12-CP" element of the design?	Not supportive. See above.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	See above.
8.	Additional comments	None.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Rick Cowburn
Comments From:	CWSAA / VIDYA			**Phone:**	(403) 397-8785
Date:	2021-06-10			**Email**:	rcowburn@vidya.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	Thanks, the AESO is clearly working hard to consult with stakeholders. The session was useful, and the recording was most helpful to review details of discussions.

2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	The proposal to allocate costs based on generation & load's use of the system merits deeper reflection. If the generation fuel source was available everywhere, then generation would always be located in close proximity to the load it serves. ENMAX's Shepard plant is an excellent example – virtually no transmission was required. The only requirement for transmission would be in the event of outages, or where the economics of generation technologies favoured it (e.g. the original Calgary-Edmonton transmission line in the 1930's, when "Calgary Power sold electricity to Edmonton during the summer, and EWdmonton sold surplus power to Calgary power during the low-water season." Candles to Kilowatts, p.29). Generation's energy source is the primary driver of generation location. Hydro-electric generation has to be where the dam is. Similarly, it is far cheaper to transport electricity than it is to transport thermal coal, so coal-fired power plants were located at the coal fields and transmission was built to reduce the total cost of electricity. Wind and solar resources are more widely distributed, but the same logic holds – transmission is built to enable optimal generation resource location. If local generation exceeds local load, it is because generation developers have identified an attractive local energy source. Under current legislation, generation has no material incentive to minimize the resulting transmission build, and local load is thus completely irrelevant to generators' location decisions. If transmission is required, it is there to facilitate access to attractive energy resources, which could be seen as supporting an allocation of all transmission costs to energy. The converse situation, where local load exceeds local generation, would arise where there are few attractive local energy resources. One could argue that incoming transmission capacity is needed only for that 'excess' portion of the load that is above local generation. However local generation does not trigger any bulk or regional transmission requirements, thus the level of local generation seems irrelevant to cost allocation. Are we really capturing the overall system's characteristics by taking all these local area data points and summing them up? We have a calculation – but is it physically meaningful? How could we demonstrate that it is – or is not? If this is a scientific hypothesis, it has to be possible to prove it false. (see Popper – The Logic of Scientific Discovery) There is a second factor driving transmission capacity, namely flexible generation dispatch. In the old monopoly generation world, unit dispatch could be optimized to follow a clearly defined response pattern that considered both generation and transmission economics. But in the new competitive electric market, unit dispatch follows 'deals' between parties, and as a matter of policy all possible 'deals' have to be facilitated by transmission assets. (T Reg §42) In principle, one could construct a hypothetical transmission system that is optimized based on central control of generation, and compare it to the current system. Any such hypothetical analysis would be open to endless challenge, though the principles may be sound. And then there is the reality that much of the current bulk system was created by legislative fiat, driven by neither demand nor energy. The search for cost causation hits a wall…

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Somewhat supportive of some elements. (see below)
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	Regulators and utilities have been debating demand / energy cost allocation for well over a century, and there is still no 'standard' consensus approach. The observatiions at point 2 above are intended to question the assumption that area peak generation and load can be directly linked to demand and energy allocators. While the proposed fundamentals-based approach appears generally sound, it is not clear how the proposed allocation is grounded in physical reality.
5.	How would you describe your level of support for the "flat energy charge" element of the design?	A review of NIDs will demonstrate that responding to outage contingencies and unusual generation dispatch patterns is the immediate driver of many transmission projects. Ratemaking focuses on peak loads for cost allocation because that's who pays the bills and the data is easy to come by – but transmission system stress and the need for reinforcement is not rigidly correlated with peak loads. Accordingly, non-time differentiated energy charges appear appropriate. The old equation "Fixed = Demand, Variable = Energy" has a pleasing simplicity that is unfounded in fact. The reality is more complex – for example, ratcheted demand charges seem to encourage peak demand reduction, but in practice long-term ratchets discourage peak reduction throughout the ratchet period by locking in a usage-independent bill. "We're already paying for it, we might as well use it…" The unratcheted 12-CP approach is in this regard similar to the energy charge – by more closely linking usage with billing, they encourage parties to 'get off the system' when they're not using it.

6.	How would you describe your level of support for the "5-year average of 12-CP" element of the design?	The 12-CP element of the rate design was never expected or intended to become the cost-avoidance tool it has evolved into. ("Clearly it is not possible for a customer to generally simply turn the power off and completely avoid the hour of system peak…" EUB Decision 2007-106, p.34) It should be removed from the tariff entirely, rather than fossilized for the forseeable future. And on this matter, views are entirely polarized into those who benefit from 12-CP and those who pay the resulting bills.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	It appears unlikely that there will be an agreement on rate impact mitigation. The AUC's recent DCG Decision 26090 provides a reasonable approach to major rate transition – a five year, graduated phase-in. The calculation details in this case are not trivial, since one would have to establish a 'base tariff' against which to calculate benefits, and determine the volumes to which the two tariffs would apply in order to calculate the mitigation payment; but the approach seems balanced and fair.
8.	Additional comments	Best wishes – this will be a controversial proceeding!

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Matthew Davis
Comments From:	Capital Power			**Phone:**	403.540.6087
Date:	2021/06/10			**Email**:	mdavis@capitalpower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	Capital Power appreciates the opportunity to provide comments on the June 3, 2021 stakeholder session. While the session was valuable in that it provided a forum for stakeholders to ask questions about the preferred rate design, it appeared that many questions either remained unanswered or the answers provided were not sufficient in explanation. As a result, Capital Power did not come out of the session with a materially improved understanding of the AESO's preferred rate design. Capital Power believes that further anaylsis should be undertaken to determine the portion of costs allocated to demand and energy and the overall impact of the preferred rate design on customers. However, this additional analysis will only be effective if the AESO takes into consideration the concerns and recommendations voiced by stakeholders in the June 3rd session.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas:	Capital Power remains concerned that the AESO's preferred rate design and underlying analysis fails to accurately depict customer response to the incentives that will be created by the tariff. For

	Questions	Stakeholder Comments
	i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	example, in the AESO's analysis of self-supply response there was no consideration given to cogeneration or renewables, only simple and combined cycle. The narrow generation mix focused on by the AESO is not reflective of Alberta's current or future state. At minimum, the AESO needs to expand its assessment of self-supply response to consider the impacts of the tariff for cogeneration investment. In addition, the AESO did not consider that customers in Alberta have invested in generation and technology in response to the signal that 12-CP provides and that these sunk costs combined with the AESO's preferred rate design will further incentivize self-supply and grid defection. Capital Power's question at the session regarding how the AESO's analysis on the impact to wholesale energy market efficiency would change when considering how sunk investments would alter their behaviour remains un-answered. It is highly likely that the 12-CP response would continue, and further, those that have invested in capacity on-site to avoid 12-CP periods would now be more likely to run that capacity in more hours due to the increased energy charge. The AESO's efficiency analysis does not consider these incentives in developing their conculsions,.and is incomplete in this key respect. In the AESO's findings on the response of self-supply to the AESO's preferred rate design, it was estimated that the initial response will be an increase of up to 2,801 GWh of self-supply, or equivalent to a total cost shift of approximately $30 million per year from self-supply customers to other customers. This is concerning because: 1. The AESO did not consider cogeneration or renewables in the self-supply analysis; and 2. This equates to about a 400 MW reduction in load served by the transmission system and market, which is not immaterial, particularly given current expectations for little to no load growth. Capital Power is concerned that not only did the AESO miss a significant portion of self-supply customers in their analysis, but that the AESO considers this magnitude of self-supply immaterial.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Please see Capital Power's response to AESO session 5 materials.
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	Please see Capital Power's response to AESO session 5 materials.
5.	How would you describe your level of support for the "flat energy charge" element of the design?	Please see Capital Power's response to AESO session 5 materials.
6.	How would you describe your level of support for the "5-year average of 12-CP" element of the design?	Please see Capital Power's response to AESO session 5 materials.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	Please see Capital Power's response to AESO session 5 materials.
8.	Additional comments	Capital Power does not have any additional comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Blair Wood
Comments From:	Conoco			**Phone:**	403-532-3575
Date:	2021/06/10			**Email**:	Blair.wood@conocophillips.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	The session was valuable, and the AESO offered a clear explanation of the components of its preferred rate design.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	During the session, concerns were raised about the comparative economics and incentives of the preferred rate design. Conoco shares those concerns. The NERA study states that "We find that moving from the current to the recommended tariff marginally increases optimal self-supply for customers in our sample by 814 GWh and 1,214 GWh in 2018 and 2019 respectively" (para 164). In other words, the proposed design increases the incentive to self-supply as compared to the existing tariff, according to the NERA study. Therefore, an outstanding question for the AESO is whether their preferred rate design is aligned with the original goal of decreasing the incentive to self-supply. If there are other goals, such as the potential for unquantified long run gains in economic efficiency, how has the AESO chosen to weigh those goals against each other? How are these goals balanced considering the likely short term increase in tariff costs to the remaining market participants because of the preferred rate design? It would be helpful to Conoco, all other participants, and eventually the Commission, to have access to the AESO's reasoning in response to the above questions and the underlying data/information.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Conoco is not supportive overall since it increases costs to high load factor customers which should be the customer group that the AESO would want to retain.
4.	How would you describe your level of support for the “allocation of costs to energy” element of the design?	Conoco is not supportive of allocating to energy. Transmission is built in substantial chunks, and typically built for capacity. Therefore, it is more appropriate to allocate these costs on a non-ratcheted NCP basis.
5.	How would you describe your level of support for the “flat energy charge” element of the design?	Conoco is not supportive of the flat energy charge, as it causes a distortion that is primarily of benefit to low load factor customers.
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	Conoco is still evaluating this design element.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	NA
8.	Additional comments	The AESO has not adequately supported the reasoning behind its preferred design. In particular, the AESO has not explained how its preferred design will respond to immediate concerns about the incentives to self-supply and the resulting impact on the remaining market participants.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Raj Retnanandan
Comments From:	CCA			**Phone:**	Contact Phone Number
Date:	June 10, 2021			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	i) Parties have expressed concerns over the preferred rate design in previous comment matrices and in submissions to the Commission. The explanations and rationalizations provided at this meeting served primarily to justify the AESO's preferred rate design. The AESO could establish a process to follow up on the continuing concerns of stakeholders. ii) In view of i) above, providing further clarity on the preferred rate design was not helpful from CCA's perspective.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	A number of questions and concerns were raised during the sessions on the assumptions used in the study.
	Questions	**Stakeholder Comments**
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	See below

4.	How would you describe your level of support for the “allocation of costs to energy” element of the design?	Not supportive. Classifying those area facilities costs, where peak generation exceeds peak demand, to energy, could be appropriate if the energy price signals were being provided directly to generators on a location basis; this is not permitted by legislation. However, providing energy price signals to load based on costs that arise from generation, would have the effect of discouraging energy use from the grid and encouraging self generation. This could create a viscious circle where increases in self generation and export, could be followed by further increases in the proportion of transmission costs classified as energy related, followed by further increases in the energy price. At a time when self supply on the part of load customers of all types is increasing, the value of grid connection to such customers gains greater importance, while the value of energy supplied from the grid decreases. The value of grid connection to self supply customers includes: i) balancing of supply and demand flows through exchanges with the grid; ii) ability to maximize value of exports; iii) access to back up power; iv) frequency and voltage control services received from the grid or provided to the grid and v) system stability arising from grid connection. In addition to the grid connection, the capacity that is in place to meet the demand requirements of self supply customers is also an important value consideration. In view of these value considerations (i.e. connection and capacity), CCA believes further thought ought to be given to classifying that portion of costs considered as energy related by virtue of area peak generation exceeding peak load, as demand related and recovered on the basis of customer NCP demand (non ratcheted). Use of customer NCP demand (non ratcheted) would better reflect recovery of the fixed capacity costs associated with grid connections and provide a more effective price signal to load with self generation based on the value of grid connection.

5.	How would you describe your level of support for the “flat energy charge” element of the design?	Not supportive. In CCA’s view, as the proportion of self supply customers increases over time, a significant energy charge, whether time differentiated or not, could lead to lower and lower amounts of energy being taken from the grid. Since, a large proportion of transmission costs are fixed, reducing the offtake of energy from the grid by self generation customers means, those costs would then need to be recovered from other customers. This could lead to inequities between customers with self generation and other customers.
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	In CCA’s view the 5 year average CP demand approach using a single hour in each month, for recovery of a portion of bulk system costs, neither reflects cost causation nor does it provide efficient price signals for customers to reduce consumption during any other peak hour that has a high probability of giving rise to future plant additions. However, if the CP hours were based on a group of peak period hours in each month, with a high probability of driving system additions (example: hours with 90% probability of driving system additions) that would result in better alignment between cost causation and price signals as opposed to using historical average CP hours as proposed by the AESO.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	The items discussd above reflect the major concerns that need to be addressed.

8.	Additional comments	CCA recognizes the difficult task of designing AESO tariffs when the overall AESO revenue requirement (wires and ancillary services) remains relatively high. As a result of a relatively high revenue requirement, the resulting tariffs are likely higher than the avoided cost of self supply for many customers. [AESO Delivered Cost of Electricity Report May 2020] The AESO has statutory responsibility for planning TFO wires, distribution driven transmission facilities and ancillary services. Although there have been initiatives on the part of the AESO to coordinate planning efforts with DFOs, the overall planning approach of the AESO remains rooted in the one way energy flow, siloed utility planning model with little regard to optimization of overall costs to customers. However, the industry is in transition with two way (or multiple) flows of electricity whereby distributed and other resources are increasingly able to provide value to the system and consequently help reduce system costs. In CCA's view this value is not being tapped under the AESO's current regulatory policies for system planning. In the absence of appropriate regulatory policies, harnessing the potential value that DCG, TCG, DER and Demand Response could offer for the benefit of the system remains elusive, although enabling conditions, such as cloud computing and other digital technologies are available. In order to reduce some of the cost pressures arising from an increasing AESO revenue requirement, there is merit in reviewing the AESO's planning approaches in the context of the upcoming AESO GTA Phase I proceeding in order to achieve overall optimization of wires and ancillary services costs.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021 through June 10, 2021	**Contact:**	Christine Runge (Power Advisory)
Comments From:	DCG Consortium The DCG Consortium is comprised of the following members: BluEarth Renewables Inc., Canadian Solar Solutions Inc., Elemental Energy Renewables Inc., RWE Renewables Canada Holding Inc. and Siemens Energy Canada Limited. This submission represents the consensus view of the group and is submitted on behalf of the group by Power Advisory LLC	**Phone:**	403-613-7624
		Email:	crunge@poweradvisoryllc.com
Date:	2021-06-10		

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	
5.	How would you describe your level of support for the "flat energy charge" element of the design?	

6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	The following comments were submitted by the DCG Consortium in its April 15, 2021 comment matrix in response to Session 5: **<u>The implication of a five-year average 12CP reduction on DCG Credits</u>** It is unclear if the AESO has thoroughly considered the implications of using a five-year average of 12CP in calculating DCG Credits. It is further unclear how a DFO would perform these calculations. In the consultation session, it was explained that the use of a five-year average 12CP response does not change the total savings, but does smooth them over five years, i.e., response to a 12CP hour in January will result in savings spread over the following five January bills. DCG Credits cannot ignore this fact. When a DCG generates under this five-year average approach, it will cause bill savings in that month’s bill and also four additional monthly bills over the next five years. The DCG Credits cannot continue to be calculated in their current form, which consider only the impacts to that specific month’s bill. A DCG needs to continue to be compensated for all of the savings it generates, which will occur over time under the AESO’s proposal. (Please note that this comment is based on the fact that the current DCG Credits are based on the bulk and regional tariff and noting that Decision 26090 has not yet been released. However, even in the event that DCG Credits change as the result of that decision, a grandfathering or transitional period may continue to exist and DCG Credits should not be artificially decreased over a transition period based on this five-year average calculation.) **<u>Transition to a five-year average</u>** The AESO should further consider that the transitional period to the use of a five-year average will place increased importance on the ability to avoid a 12CP charge in the first few years of the new rate design. In the first year, the January 12CP charge will be based 100% on consumption during that time period. In the second year, the January 12CP avoidance from the first year will count for 50% and the January 12CP avoidance from the second year will count for 50%. In this way, while the steady state use of a five-year average will have each month count for 20% of a charge five times (20% x 5 = 100%), the months in the first year will be weighted much higher (100% + 50% + 33% + 25% + 20% = 228%). As a result, failure to respond to a 12CP hour in the first year of this new rate design will have much more significant financial impacts than failure to respond to a 12CP hour in later years. The AESO may wish to consider a different transition mechanism under which the first year is not so strongly weighted. One such option would be to fix the value of previous years at 20% from the beginning, i.e., in year 1, year 1 is 100% but in year 2, instead of 50%/50%, year 1 can be worth 20% and year 2 can be worth 80%. This would lower the value of year 1 from 228% to 180%.

Any reduction in the first-year weight would help to lower the cost and risk of failure to avoid all net imports during a 12CP hour in the first year.

The DCG Consortium notes that these issues were not raised or responded to in Session 6A. The impact of the five-year average on DCG Credits is a significant concern to the DCG Consortium. The DCG Credits will be significantly reduced for many DCGs with the implementation of the adjusted metering practice. DCG Credits can further be expected to fall with the reduction in the 12CP rate as a result of this application. DCG Credits should not be further arbitrarily reduced by 80% due to the use of a five-year average.

While the calculation methodology of the DCG Credits is the responsibility of the DFOs, the AESO cannot ignore this important implication in the development of its application.

As per the recently released Decision 26090-D01-2021, DCG Credits will be reduced through a transitional period between January 2022 and January 2026 in accordance with the following table.

Year	First day when the multiplier will be applied	Multiplier
1	Jan 1, 2022	0.8
2	Jan 1, 2023	0.6
3	Jan 1, 2024	0.4
4	Jan 1, 2025	0.2
5	Jan 1, 2026	0

However, in addition to these reductions, most DCGs will also be subject to a future reduction in DCG Credits due to the implementation of the AESO's adjusted metering practice.

The Commission has approved both of these forms of DCG Credit reductions. The Commission has not approved a further reduction in DCG Credits as a result of the use of the 5-year average 12CP charge that would impact DCG Credits in a different way from the impact of load rates, i.e. the DCG Consortium accepts that DCG Credits may change in value as a result of the next ISO tariff rates (expected to go into effect in 2023 or 2024), but the DCG Consortium does not agree that a further reduction as a result of the use of the 5-year average 12CP charge is appropriate.

The AESO should not decrease these multipliers beyond what was approved by the Commission through the application of its 5-year average 12CP charge. This needs to be appropriately accounted for the in calculation of DCG Credits.

Assuming the ISO tariff goes into effect on Jan1, 2023, if this is not appropriately accounted for in the DCG Credit calculation, then in 2024 DCG Credits will be subject to a 0.2 multiplier (0.4 as approved by the Commission further reduced by 0.5 due to the use of the 12CP average) and further to 0.066 in 2025 (0.2 as approved by the Commission further reduced by 0.33 due to the use of the 12CP average). This would go against the multipliers approved by the Commission.

		This problem can be solved simply as long as the DFOs are accurately accounting for the impact of a DCG's generation during 12CP, noting that it will impact not only that month's invoice but also invoices for the following 4 years. This could be resolved through continuing to provide the DCG Credit associated with the 12CP reduction in the year of the action and the five years following (i.e. generation in 2024 would result in DCG Credits paid in 2024-2028) or through paying DCG Credits in that month assuming a 100% impact to the 12CP charge, rather than a partial impact in this year and a partial impact in future years. However this issue is resolved, it must be resolved. The DCG Consortium urges the AESO to consider this issue and include language in its 2021 ISO tariff filing with the Commission in October in order to provide for an understanding of how this 5-year average is designed to flow through to DCG Credits in order to provide investor certainty and clarity through this transitional period.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	
8.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Dale Hildebrand
Comments From:	Dual Use Customers			**Phone:**	403-869-6200
Date:	2021/06/10			**Email**:	dale.hildebrand@desirataenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	(i) We found the first two sections of the session to be repetitive and of limited value. The DUC would like to review the proposed cost of service study and proposed allocation of costs to energy methodology in detail once the AESO makes this information available. (ii) No.

2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	i. As discussed during the session, the DUC submits that the Estimating Customer Response to Our Recommended Bulk and Regional Tariff Design report dated 25 May 2021 does not appropriately analyze the potential threat of load defections from the AESO's proposed B&R tariff design. We submit that the significant and real threat of load defections predicated by the AESO proposed B&R tariff design will be large high load factor industrial customers and price responsive industrial loads who will experience large rate increases. We submit that the potential for customers to self-supply using simple cycle gas fired generation, as assumed in the NERA report, will be minimal. The self-supply response analysis had very limiting assumptions and ignored alternative self-supply technologies. It further ignored the fundamental question as to what level of self-supply should be incentivized via the AESO tariff. The analysis was confusing and was further hampered by the statement that the different "efficiency impacts" are not comparable to each other, and by the report not providing any conclusions, and by the AESO not clearly articulating the purpose of the analysis. The NERA report also did not address the threat of additional load defection from on-site solar. As has been seen in many jurisdictions, roof-top solar has proliferated resulting in significant utility revenue erosion. The AESO's proposed tariff will likely shift end use distribution tariffs from demand to energy charges by about $9/MWh. This will make roof top solar for commercial and institutional customers about 10% more economic, leading to decreased AESO revenues and tariff price increases. ii. Regarding the AESO's analysis on the impact on the energy market of a $9/MWh variable energy charge, this change would be dwarfed by power pool prices that can change hour to hour by 100 times as much. The AESO analysis based on the removal of the 12 CP charge was an impact of about $10 million/year. If the 12 CP charge is

		reduced by about 50%, the impact could be about $5 million per year, which is about 0.15% of the annual power pool market value. The DUC submits that the tariff impacts, based the AESO's analysis, would be minimal. What the NERA / AESO analysis missed is the impact the proposed B&R tariff changes could have on on-site generation development and the resulting impact on power pool prices.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	The DUC is undecided on its position with respect to the proposed B&R rate design. The DUC would like to review the cost of service study and the proposed allocation of costs to energy methodology in detail. The DUC is of the view that the current tariff continues to be appropriate for Alberta, in both the near and long term.
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	The DUC submits that the AESO's proposed "allocation of costs to energy" design is untested and non-industry standard.
5.	How would you describe your level of support for the "flat energy charge" element of the design?	The DUC is generally unsupportive of the AESO's "flat energy charge" design. A flat energy charge eliminates demand shifting and demand curtailment as options and only leaves self-supply as an option to manage tariff cost increases. It further skews the self-supply option towards baseload-type generation.
6.	How would you describe your level of support for the "5-year average of 12-CP" element of the design?	The DUC is unsupportive of the AESO's proposed 12 CP rachet. This rate design seems unnecessarily complex and we fail to understand how it will provide an appropriate or meaningful price signal.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	The DUC's main concern is the significant costs and disruption the AESO's proposed B&R rate design has and will continue to impose on Alberta businesses and the economy. The cost impact on price responsive and high load factor customers seems unwarranted for the minimal price reductions small distribution customers will experience.

8.	Additional comments	Please see the DUC's letter to the AUC, filed as Exhibit 25175-X0140, for the concerns the DUC has with the AESO's B&R tariff development process. The DUC re-iterates its desire and willingness to work cooperatively with the AESO to investigate tariff design options that will not have significant and material impacts on the economic wellbeing of Alberta, including a stand-by tariff for cogenerators and/or a separate rate class for price responsive and/or interruptible load customers.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021 through June 10, 2021	**Contact:**	Gerald Zurek
Comments From:	EPCOR Distribution & Transmission Inc.	**Phone:**	780-686-1186
Date:	2021/06/04	**Email**:	gzurek@epcor.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	Yes, EDTI found the session helpful. Yes, session 6A provided additional clarity.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	EDTI has no outstanding questions.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Somewhat supportive.
4.	How would you describe your level of support for the “allocation of costs to energy” element of the design?	Undecided.
5.	How would you describe your level of support for the “flat energy charge” element of the design?	Somewhat supportive.
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	Somewhat supportive.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	EDTI is concerned that the relatively large energy charge could incent more customers to choose to self-supply to avoid the energy based transmission charge. EDTI is still unsure why the AESO chose an energy charge over a monthly demand charge based on the customer’s peak demand for the month. The use of a monthly demand charge should incent customers that are able to respond to price signals to generally lower demand and increase load factor thereby making more efficient use of the transmission system.

8.	Additional comments	EDTI would like to understand whether excess generation occurs (on some systems) at the same time as the AIES monthly coincident peak and/or at times of monthly peaks on systems in the same area as the systems with excess generation. This may suggest a link between times of excess generation and system peaks.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021 through June 10, 2021	**Contact:**	Kurtis Glasier
Comments From:	Heartland Generation Ltd. ("Heartland Generation")	**Phone:**	587-228-9617
Date:	[2021/06/10]	**Email**:	Kurtis.Glasier@heartlandgeneration.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	Heartland Generation found Session 6A, hosted on June 3, 2021, to be valuable. The session provided additional clarity and a better understanding of the analysis, which supports the preferred rate design. It was particularly helpful that the AESO economists and the NERA expert presented and answered questions during the stakeholder session.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	At this time, Heartland Generation does not have any outstanding questions on the analysis presented in these two areas.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Somewhat supportive.
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	Somewhat supportive. Heartland Generation is concerned about the characterization of transmission costs being driven by generators on a regional basis. The generators at all times of operation are producing electric energy that is used to serve some portion of load in the province. A load that connects to the transmission system is given the opportunity in every hour to access the least cost electricity generated to meet load demand; the competitively offered merit order leads to allocative efficiency. The transmission system, by connecting all generation without risk of constraint/congestion (as required by the *Transmission Regulation*), is built to maximize this opportunity for load customers. Heartland Generation understands the preferred rate design accounts for this relationship in the demand vs. energy allocation; whereby, the demand allocation are the costs driven by capacity (that the system will accommodate each load's relationship to regional coincidence) and the energy allocation are driven by the opportunity for load to always be served by the cheapest form of generation at any time. Heartland Generation is curious if the billing determinants should be broadened to include regional peak measures as well. The AESO would retain the coincident peak charge to indicate a loads relationship with system demand. However, the energy charge could be shaped to reflect a loads impact on the regional peaks (e.g., peak gen). This would allow the tariff rate to reflect the fact that tariff costs are not flat in every hour but are informed by the relationship between regional loads and regional generation (see further comments below on the "flat energy charge").

5.	How would you describe your level of support for the “flat energy charge” element of the design?	Somewhat supportive. Heartland Generation suggests that the “flat energy charge” could be improved by shaping or profiling the costs to better reflect the cost of transmission in each hour. During the capacity market cost allocation discussions, a similar method of allocating generation capacity costs by ascribing different weights to different hours was used. A similar approach could be used to shape the energy charge based on the relationship between the utilization or stress of the transmission system varying throughout the day. Currently, it does not seem intuitive why the energy charge portion of the tariff would be equal during times of low utilization with abundant capacity and during times of system stress (not including the period of coincident peak). The AESO should explore the rudimentary shaping of the energy charge suggested above (e.g., using all regional peaks for all load customers), or some other method of profiling the energy charge to reflect differentiated system costs being driven in each hour. Inherently, shaping the energy charge portion of the tariff would allow a reasonable way of receiving an opportunity service tariff; a customer that utilizes the transmission system only during period of excess capacity, would receive a reduced effective tariff rate reflective of its decreased impact on transmission costs.
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	Undecided. Heartland Generation understands the “5-year average of 12-CP” to lessen rate shock in the long run, by smoothing the effect of any sudden shift in load behavior from year to year. However, it would also appear that this would lead to a rate “stickiness”, whereby a load customer that changed its behavior in year two would have the impact of that change lessened by the averaging with other years. This may require the AESO to further include exemptions or waivers when a load customer has significantly changed its behavior/operations/configuration in one year to avoid a penalization period of five-years while the “bad years” roll off. The implementation of the 5-year average can make this rate “stickiness” worse, as a bad first year will have an inflated impact on the average until year five is observed (e.g., the first year carries the inherent weight of 50%, 33%, 25%, and only reaches the normalized 20% impact in year 5 of implementation). Does the AESO expect load behavior to fluctuate year-over-year to the extent that a rate smoothing mechanic is necessary? Otherwise, it seems this mechanism would create a disincentive to load customer from making improvements year over year in reaction to the tariff. In the most extreme of cases a load customer could receive a rate for five years that is not reflective of its impact on system costs in any of those five years, and only representative of its average impact over those five years; this would result in a load customer performing to its five-year average rather than trying to lower costs and enhance savings in the future.

7.	Are there other elements of the design you support or have concerns with? Please be specific.	Heartland Generation remains concerned about the broader context of a tariff design at this time, with so many uncertain policy issues. It will likely need to be examined how the preferred tariff design will impact or be impacted by: the forthcoming *Transmission Regulation* expiry (and possible fulsome review), the outstanding policy direction and/or legislative changes regarding self-supply and export, the alignment of transmission and distribution interconnections/tariffs, and the distributed generation credits methodology. There is a massive confluence of related and impactful changes in the electricity industry, and the timing due to operational/commercial pressures from COVID-19 could not be worse.
8.	Additional comments	Heartland Generation does not have additional comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021 through June 10, 2021	**Contact:**	Vittoria Bellissimo
Comments From:	Industrial Power Consumers Association of Alberta (IPCAA)	**Phone:**	403 966 2700
Date:	2021/06/10	**Email**:	Vittoria.Bellissimo@IPCAA.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	(i) The Session was useful. It would have been helpful to present the NERA analysis before the AESO settled on their preferred rate design. (ii) There was some additional clarity.

2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	IPCAA has the following outstanding questions: • Has the AESO looked at the efficiency loss associated with a flat energy charge instead of a shaped one? • Did the AESO look at the distribution of congestion or forecasted congestion hours in all of the areas when the transmission was built? Is it flat? • How do the CTI projects fit within the explanation that NERA has provided? • Can you let us know if you will use a forecast or historical actuals for the energy/demand split? Also, will major transmission changes trigger an allocation change? Note that this question was answered during the webinar; however, the concern is that if we build a significant transmission addition and the energy/demand allocation does not change at all, how can we ensure we are basing the allocation on cost causation? • Can the AESO elaborate further on its use of gross peak load and peak generation instead of net? (slide 18). • Because of the considerable transmission overbuild, should the AESO start by determining the actual minimum system needed for current demand and generation, the costs for that minimum system and then apply this preferred rate design methodology? Then the AESO could examine an appropriate methodology for the costs of the system built for future use. • Is the longer-term plan to allocate the energy charge component of the rate design to generators via a change in the Transmission Regulation? The AESO's preferred rate design energy charge is flat; however, if charged to generators they would likely shape that charge to better reflect demand. • These charges will not translate through to distribution rates. Is the AESO taking this into consideration in its analysis? The majority of customers only see distribution tariffs.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	e) Not supportive
4.	How would you describe your level of support for the “allocation of costs to energy” element of the design?	Not supportive
5.	How would you describe your level of support for the “flat energy charge” element of the design?	Not supportive
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	Not supportive. Key concerns include: (1) understanding of this element is low; (2) initial years receive a much higher and sustained weighting, which could discourage innovative investments.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	IPCAA supports the 12 CP portion of the rate design; however, we are concerned that the level of 12 CP has been drastically reduced.

8.	Additional comments	• The AESO's and NERA's analysis uses load and price data from 2018 and 2019. With the return of the Power Purchase Arrangements (PPAs) on December 31, 2020, generator behavior and price outcomes have markedly changed in Alberta. The energy market is pricing in a substantial premium over marginal cost generation. In combination with increasing carbon prices, industrial sites have a very strong signal to self-supply. IPCAA would recommend that NERA re-estimate the amount of self-supply in response to the AESO's Preffered Rate Design using updated market information. • NERA's analysis does not account for enhanced self-supply from using heat and / or steam in industrial processes other than a reference in paragraph 23 of its report. IPCAA recommends that NERA update its analysis to include the substantial amount of industrial load that would be incented to self-supply due to its industrial processes. • Typically, reports such as the NERA Report, are released in advance and are used to inform decision making rather than to justify decisions that have already been made. Was the NERA Report commissioned and delivered ahead of the AESO's endorsement of its preferred rate design? • The AESO has provided an analysis of market efficiency losses and gains for the preferred rate design. Did the AESO conduct a range of efficiency analysis across various options? If such analysis has been done and is available, can the efficiency analysis for the various options be provided to stakeholders? • The AESO's efficiency analysis used the complete removal of the coincident peak charge (slide 56) and then determined an efficiency gain of approximately $10 M per year. Since the preferred rate design reduces the the CP charge by only ~40%, any efficiency gains should be markedly less. Can the AESO provide a more accurate analysis?

		• The AESO should provide their detailed analysis supporting the demand / energy classification. Customers are interested in understanding this analysis. In order to be both efficient and transparent, this should be done in short order.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021 through June 10, 2021	**Contact:**	Sharmen Andrew
Comments From:	MATL Canada and MATL LLP (MATL)	**Phone:**	403-818-0058
Date:	2021/06/10	**Email**:	sharmen.andrew@bhe-canada.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	The webinar and presentation were both valuable and provided additional clarity.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	MATL is seeking to understand the impact of the preferred rate design on export opportunity services (i.e., XOM/XOS) and other impacts to MATL and its customers.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Undecided
4.	How would you describe your level of support for the “allocation of costs to energy” element of the design?	Undecided
5.	How would you describe your level of support for the “flat energy charge” element of the design?	Undecided
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	Undecided
7.	Are there other elements of the design you support or have concerns with? Please be specific.	MATL has a general concern that the preferred rate design may adversely impact export charges and seeks to better understand the impacts on MATL and its customers.
8.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Horst Klinkenborg
Comments From:	Suncor Energy Inc			**Phone:**	(403) 819-7125
Date:	2021/06/10			**Email**:	horst.klinkenborg@suncor.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	(i) Suncor did not find the session particularly helpful. The analysis was lacking a clear purpose, assumptions were overly limiting, and the results were non-comparable. (ii) Suncor's understanding of the AESO's preferred rate design has not improved as a result of the session.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	i. Suncor did not find the analysis helpful. Whether there is an increase in self-supply (under certain assumptions) is not relevant. Whether the design incentivizes an appropriate level of self-supply, demand shifting and demand curtailment is relevant but wasn't analyzed. ii. Suncor did not find this part of the session helpful. The analysis was lacking a clear purpose, was confusing, and did not lead to any conclusions.

	Questions	Stakeholder Comments
1.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Suncor remains undecided with regard to the preferred rate design. So far the explanations in support of the design have been unconvincing.
2.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	While there may be some merit to allocating a higher portion of costs to energy, Suncor is not convinced of the rationale or the detemination of the proportion.
3.	How would you describe your level of support for the "flat energy charge" element of the design?	Suncor is not supportive of the "flat energy charge." A flat charge is distortive and counter to cost causation.
4.	How would you describe your level of support for the "5-year average of 12-CP" element of the design?	Suncor is not supportive of the "5-year average of 12-CP." The calculation introduces unnecessary complexity for no apparent purpose.
5.	Are there other elements of the design you support or have concerns with? Please be specific.	Suncor is still trying to understand the rationale behind the components of the AESO's preferred design as well as to why the design is supposedly an improvement over the current rate design.
6.	Additional comments	Suncor is concerned that the AESO introduced a brand new rate design shortly before the filing deadline and that industry is now limited in its ability to consult on this design. In light of this, as well as the uncertainty around self-supply and transmission policy, a tariff filing based on the existing design seems more appropriate. This would create time to receive policy clarity and allow stakeholders to fully evaluate the appropriateness of this novel design.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Mark Thompson
Comments From:	TC Energy Corp. (TCE)			**Phone:**	403-589-7193
Date:	2021/06/10			**Email**:	markj_thompson@tcenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	TCE appreciates all opportunities for stakeholder consultation.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	While TCE appreciates the AESO's initiative to estimate the self-supply response resulting from its preferred rate design, the analysis performed by NERA was inadequate and insufficient. It would have been preferrable for the analysis to have been performed by an independent third-party rather than the same party that developed the rate design being tested. Unfortunately, the analysis did not accurately reflect the self-supply technology that would most likely be developed and did not include the potential increased use of existing self-supply. Accordingly, TCE does not have much confidence in the accuracy of the analysis and the question of the self-supply response remains unanswered.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Somewhat not supportive.
4.	How would you describe your level of support for the “allocation of costs to energy” element of the design?	Somewhat not supportive.
5.	How would you describe your level of support for the “flat energy charge” element of the design?	Not supportive.
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	Not supportive.
7.	Are there other elements of the design you support or have concerns with? Please be specific.	Please refer to the comments submitted by TCE in prior stakeholder engagements.
8.	Additional comments	TCE has no further comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021	through	June 10, 2021	**Contact:**	Luis Pando
Comments From:	TransAlta Corporation			**Phone:**	(403) 267-3627
Date:	2021/06/09			**Email**:	Luis_Pando@transalta.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	***The session was valuable and provided more information behind the proposed changes but the comment deadline was too short*** TransAlta appreciates the clarity provided with NERA's report and the AESO presentation. While the session provided an opportunity to understand and test the rationale used by the AESO and NERA, the deadline set for stakeholder comments was too short, and deprived stakeholders from the opportunity to carefully consider the information and craft thoughtful responses to assist the AESO. By rushing the engagement process and not adequately answering many stakeholders' questions and the Alberta Utilities Commission's information requests which pushes these issues to be dealt with later in the tariff proceeding. We view this as an undesirable outcome. The purpose of the delay in filing date to October should be to enable a fulsome stakeholder engagement process so that the regulatory process can be as efficient as possible. We recommend the AESO follows additional process to address all outstanding issues raised during the consultation and explain the reasons behind leaving out certain topics. In addition, the session could have benefitted from more analysis of the estimated efficiency losses and gains.

2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	***The methodology used to classify transmission costs between demand and energy is vague and not fully justified*** We have concerns with the definition of minimum versus actual system as it seems arbitrary and unsubstantiated. While the "minimum system" appears to be an engineering concept the methodology does not appear to account for possible changes in load or generation in the future, nor adequately reflects the big transmission build that occurred as a consequence of policy (Critical Transmission Infrastructure) which is not based on cost causation. In addition, we are unsure whether the regional perspective is truly a fair representation of a "minimum system" at a system level. We still have several questions about this new methodology that we wish the AESO to address: • Is generation adjusted to factor in the capacity factor of the resource or all installed MW accounted for in the same manner (e.g. 1 MW of solar is the same as 1 MW of gas)? • Installed generation capacity is typically greater than demand in order to ensure resource adequacy is met (generation capacity needs to provide a reserve margin). Doesn't this methodology therefore suggest that at a system level (where generation will be greater than demand) the transmission system is always in excess of the "minimum system"? • If a region has a retirement of a generating unit such that it becomes a region that imports power, does that translate into a reduction in the energy charge and an increase in demand charges? (Wouldn't a change in flows indicate greater use of the bulk system and be directionally misaligned with the change in energy charge?) ***We agree with NERA that the transmission tariff should be cost reflective and provide price signals that encourage efficient self-supply decisions and discourage inefficient self-supply by customers*** The assumption that less self-supply will be installed in the future due to future changes in carbon tax and gas prices, and the reliance of the study on self-supply that only considered gas generation (when it is more likely a scenario of increased solar and wind and other hybrid resources) needs to be tested. We note that the legislative framework and its restrictive

		exemptions for self supply are a key reason for more limited adoption of self supply (not the tariff). We also understand that the Government may be considering changes to the legislative framework that could include unlimited self-supply and export and if the legislative framework is changed we expect that there could be significant more self-supply in the future. To address this concern, we recommend the AESO update its own delivered cost of electricity report under the preferred rate design to test if self-supply and export would still be more economic than receiving power from the grid. This will allow the AESO to demonstrate that the estimate of limited self supply is fair and reasonable assumption. ***The AESO should take the opportunity to test their assumptions about load response to the preferred rate design by surveying load customers participating in this consultation*** The AESO is assuming low self-supply investments and low grid defection, all of which is uncertain, as these assumptions are highly dependant on how load customers will respond to the tariff changes. The AESO argues the increase in the energy charge creates a negligible impact due to the alleged positive gains that result from reaction to the 40% reduction in the 12 CP charge. Given that this consultation includes many of those load customers, canvassing customers about how they will likely respond to the preferred rate design would provide useful information to test these assumptions.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	***TransAlta is undecided because it is not clear that the new allocation methodology is a fair and reasonable way to redesign the bulk and regional tariff rates*** The preferred rate design represents a significant change in cost allocation which should clearly demonstrate an improvement from the current methodology. In addition to the concerns with the concepts of a "minimum" versus "actual" system, we do not have enough information to assess whether this new categorization of costs between energy and demand is reasonable or fair and we question how it will be applied consistently when the conceptual underpinning appears so arbitrary. This deemed difference between the "minimum" versus "actual" system implies a concept that there is "excess" infrastructure. We do not find these concepts to be helpful particularly when it is applied at a regional level. A minimum system is one that allows for the efficient transmission of generation to all load customers in the system (irrespective of which region they are in). The AESO must balance supply and demand and be certain that there is enough generation and transmission capacity to meet demand at all times. We are unclear how the regional view to categorize costs between energy and demand contributes to a better allocate transmission costs.
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	***The allocation of significant costs to the energy component provides a poor signal to consumers*** TransAlta has concerns about a design that would increase the energy charge by 5 times its current level. We are concerned that such a high energy charge could drive conservation behavior when we should be providing a signal for greater use of the transmission system (i.e. during off-peak hours). We question whether so much of the bulk and regional system cost is truly caused by the amount of energy that a customer consumes.

5.	How would you describe your level of support for the “flat energy charge” element of the design?	***The concerns raised about the flat energy charge have not been addressed*** NERA argues that recovery of fixed transmission costs based on “avoidable” charges aligns with cost causation because an embedded cost methodology recovers the costs associated with the long-run drivers. We do not agree with NERA’s conclusion. NERA has not addressed any of the concerns raised about the flat energy charge including: • Concern that fixed costs recovered on variable charges is not aligned with cost causation and would send inefficient price signals. • Concern that the flat energy charge is not consistent with time variation in use of transmission and would not send efficient price signals • Concern that “penalizing” high load factor customers who use transmission efficiently not aligned with sending efficient price signals. • Concern about impacts on long-term response, incentives for self-supply and cost shifting.
6.	How would you describe your level of support for the “5-year average of 12-CP” element of the design?	***A 5-year average may address billing determinant erosion but there are other approaches that should be explored*** We understand that averaging forces customers to show a consistent and more predictable response and may better align with transmission planning. The use of a 5-year average of monthly coincident peak could address the concerns about erosion of billing determinant but it does so at the expense of rewarding customers more promptly (within the billing period) for their behavioral response. In this respect, we question whether 5-year averaging and monthly coincident peaks is the right design. If the design is already using averages, we question whether the averages should be of 12-CP or rather an average of only those periods (winter and summer) that drive transmission builds would be more appropriate. We also question why a 5-year period was selected and ask the AESO to consider shortening the period. We ask to see analysis that considers 1, 2, 3, 4 and 5 year averages to understand the merits of using different periods length and the potential impacts on the tariff design.

7.	Are there other elements of the design you support or have concerns with? Please be specific.	We are concerned about the AESO proposed classification step before the functionalization of costs. As stated above, we are not compelled by the rationale and analysis provided to date about this step to distinguish between energy and demand costs. Moreover, the results in terms of the proposed tariff design associated with this new approach are a significant departure from the existing design and send the wrong signals.
8.	Additional comments	We are concerned that the preferred rate design does not provide efficient price signals for loads to use the transmission system.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – May 27, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A

Period of Comment:	May 27, 2021 through June 10, 2021	**Contact:**	Megan Gill
Comments From:	The Office of the Utilities Consumer Advocate	**Phone:**	403.819.5383
Date:	2021/06/07	**Email**:	Megan.Gill@gov.ab.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **June 10, 2021**.

The AESO is seeking comments from Stakeholders on Session 6A. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6A hosted on June 3, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6A with additional clarity and a better understanding of the preferred rate design?	i) The session provided the UCA with somewhat of a better understanding of the cost allocation rationale behind AESO's preferred rate design. ii) While the UCA has a better understanding behind the AESO's desire to adopt a minimum system approach and increase the amount of transmission costs recovered through an avoidable energy charge, significant questions around the economics of self-supply decisions, incentives, and long term outlook remain. The NERA study does not provide convincing answers on these critical issues. iii) The questions asked at the session and in these comments are more of the nature of post-filing information requests than pre-filing clarifications of design intent.
2.	Do you have any outstanding questions with the preferred rate design following the additional information provided in the following areas: i. Response to incentives under the preferred rate design (e.g., assessment of self-supply response) ii. Impact on wholesale energy market	i) Given that the AUC has acknowledged that a number of the self-supply generating units (cogen) in Alberta serve oil and gas facilities, the UCA would like to understand why the AESO used only the less efficient ACE and RICE technologies when estimating customer response to the recommended tariff. In addition, the UCA would like to understand why the AESO decided to publish a study using an average 2020 pool price of $49.39/MWh (given that 2020 was heavily influenced by the pandemic and average daily pool price in 2021 YTD is $96.44/MWh) instead of a forecasted pool price when analyzing the current and future economics of self-supply under the existing and proposed tariff structure.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the overall preferred rate design? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	The UCA is somewhat supportive of the overall preferred rate design as it is estimated to save residential, farm, and small business consumers between 2-5% of their transmission charges. However, the UCA believes there are still some areas which the AESO should consider to improve its preferred design to deter market participants from grid defection and uneconomic bypass in the future. • The AESO should consider gross metering instead of net metering provisions mandatory for generators with industrial system designations (ISDs). • The AESO should recover significantly more costs using NCP charges and reduce the amount recovered using avoidable energy charges.
4.	How would you describe your level of support for the "allocation of costs to energy" element of the design?	While the UCA has a better understanding of the AESO's justification for increasing the cost recovered through an energy charge under the preferred rate design, it is still unclear why the billing capacity allocation was reduced from 22% to 17%. The UCA still supports the consideration of NCP demand charge cost recovery and believes the AESO should consider modifying this determinant to improve the rate design.
5.	How would you describe your level of support for the "flat energy charge" element of the design?	The UCA is supportive of the AESO's intent behind the application of cost causation principles in using a minimum system approach to identify transmission costs associated with the flow of in-merit energy. However, UCA believes a better alternative to recovering such in-merit constraint removal costs through avoidable energy charges would be to recover them thorugh an NCP demand charge instead.
6.	How would you describe your level of support for the "5-year average of 12-CP" element of the design?	
7.	Are there other elements of the design you support or have concerns with? Please be specific.	

8.	Additional comments	The comment was raised by NERA that the intent of the preferred tariff design is to yield efficient outcomes, even if those lead to the pursuit of self-supply options by customers looking to avoiding transmission costs as reflected in the tariff. So, if increasing the energy charge allocation drives more load customers to deflect from the grid and self-supply, this can be considered efficient and subsequently considered an acceptable outcome. The UCA is concerned that a tariff that further incents self-supply and grid defection will result in further cross-subsidization between rate classes, especially between those that do not have the option to self-supply and how a disproportionate amount of the transmission cost recovery burden may inadvertently be placed on consumers who cannot move off the grid. In other words, price-regulated transmission rate design in particular is at least as much about fairness of cost recovery from captive customers as it is about providing efficient price signals concerning generation choices. The balancing of Bonbright principles still apply.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Bulk and Regional Tariff Design Stakeholder Engagement Session 6A hosted on June 3, 2021

I. Purpose and objectives of the session

The purpose of this session is to engage stakeholders in a discussion of Session 5 stakeholder feedback or follow-up and key questions raised by the Alberta Utilities Commission (AUC) staff, and to provide additional clarity and build mutual understanding of the AESO's preferred rate design and stakeholder concerns. The session objectives include:

- Present preferred rate design, including energy storage treatment, to stakeholders
- Present and discuss path to achieving minimal disruption
- Present bill impact summary and assumptions
- Provide Bill Impact Tool
- Begin to discuss implementation considerations

II. Session agenda

Time	Agenda Item	Presenter
8:00 – 8:15	Welcome, introduction, purpose, and session objectives • Application filing extension requestion	AESO / Stack'd
8:15 – 8:45	Recap of preferred rate design and summary of stakeholder feedback received	AESO
8:45 – 9:15	Appropriateness of the flat energy charge • Time of use and dynamic pricing • On-peak versus off-peak charges • Min/max load factor energy charges • Q&A	AESO / NERA
9:15 – 10:15	Cost recovery through avoidable charges and efficiency • Avoidable and non-avoidable charges • Efficiency • Q&A	AESO / NERA
10:15 – 10:45	Break	
10:45 – 11:45	Analysis of self-supply in response to the preferred rate design • Self-supply analysis • Q&A	AESO / NERA

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www.aeso.ca
@theaeso

Time	Agenda Item	Presenter
11:45 – 12:45	Analysis of the short-term impact of the preferred rate design on the energy market • Energy charge • Coincident peak charge • Q&A	AESO
12:45 – 12:55	Session close-out and next steps	AESO

III. Attendees

Company
2332823 Alberta Ltd.
Alberta Direct Connect Consumers Association (“ADC”)
Alberta Electric System Operator (“AESO”)
Alberta Energy
Alberta Newsprint Company (“ANC”)
Alberta Utilities Commission (“AUC”)
AltaLink Management Ltd.
AltaSteel Inc.
ATCO Electric Ltd.
Best Consulting Solutions Inc.
BluEarth Renewables Inc.
Brubaker & Associates, Inc. on behalf of ADC
Capital Power
Cenovus Energy
Chapman Ventures Inc.
Chymko Consulting, on behalf of Cities of Red Deer and Lethbridge
Consumers Coalition of Alberta (“CCA”)
City of Lethbridge
CNRL
Customized Energy Solutions
Canada West Ski Areas Association (“CWSAA”) / VIDYA Knowledge Systems
DePal Consulting Limited
DePal Regulatory Solutions Inc.
Dow Chemical Canada ULC

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Company
Dual Use Customers
ENMAX Corporation
EPCOR Distribution & Transmission Inc.
ERCO Worldwide
FortisAlberta Inc.
Heartland Generation Ltd.
Imperial Oil
Independent Power Producers Society of Alberta (“IPPSA”)
Industrial Power Consumers Association of Alberta (“IPCAA”)
International Paper
Lionstooth Energy (“LTE”)
Matt Ayres Consulting
Millar Western Forest Products
NERA Economic Consulting
NextEra Insights Inc.
Northern Sunrise County
Norton Rose Fulbright Canada LLP
PGSC
Power Advisory LLC
Rodan Energy Solutions
Signalta Resources Limited
Solas Energy Consulting Inc.
Suncor Energy Inc.
TC Energy
The Office of the Utilities Consumer Advocate (“UCA”)
TransAlta Corporation
Turning Point Generation
Voltus Energy Canada Ltd.
Wolf Midstream
Stack’d Consulting, Inc.
Attendees by phone
14038746762

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IV. Overall outcomes from the day

The main objective of the session was for the AESO to provide additional clarity and build mutual understanding of the AESO's preferred rate design and respond to stakeholder concerns. Participants engaged in discussion and overall, some stakeholders felt that this was a valuable session that allowed them to share their perspectives and feedback, while others felt that the session did not provide the value that they were seeking.

V.Session highlights

Captured below are the highlights of the questions and discussion on a topic-by-topic basis. For a detailed review of the session, please refer to the session recording, posted at www.aeso.ca.

Topic 1: Recap of the preferred rate design

i. Stakeholder commentary

- Clarifying comments:
  - *Suncor:* On Slide 18 (Minimum system illustrative calculation), is there double counting that's occurring here if you are not counting the flows between areas? Should we first recognize that all demand must be met from somewhere and can come from any region with only what's left over to be viewed as energy related in this calculation?
  - *TransAlta:* Could you explain the rationale behind the change in the method to first allocate between demand and energy and then functionalize between bulk and regional?

ii. AESO / NERA clarification

- Response to clarifying comments:
  - On Slide 18, the assessment is not in relation to the transfer of power between areas but to the relative size of the system within each area. By using the peak demand within an area as a proxy for the size of transmission in that area, and then accounting for any additional peak generation as a proxy for the additional transmission in that area, we are developing a measure of the degree to which the system is sized to accommodate demand and the degree to which it is sized (in addition) to accommodate generation.
  - The allocation between demand and energy as a first step is based on allocating the costs of transmission between demand and energy, since those are the two drivers of investment. Then allocating the demand costs between the different drivers of demand using bulk and regional distinction.

Topic 2: Appropriateness of the flat energy charge

i. Stakeholder commentary

- Clarifying questions:
  - *EPCOR:* I don't understand why the capacity required by generation is recovered by an energy charge. It seems that all capacity requirements, whether driven by load or generation, is capacity nonetheless and should be recovered through a demand-related charge?

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- *CCA:* Why is it important to consider the generation-related portion as energy related? Could it also be considered demand related and proportionately applied to other components of DTS?
- *ADC:* The transmission system is grossly oversized, so should the first step in the calculation be to determine the actual minimum system needed for current demand and generation, the costs for that minimum system and then apply your methodology? Then examine an appropriate methodology for the costs of the system built for future use.
- *IPCAA:* Is the ISO tariff proposal really a backdoor method to a change in the Transmission Regulation (T-Reg)? If the T-Reg were changed to allocate costs evenly between load and generation, generators would charge back that transmission cost via an energy charge. The difference being the AESO's transmission energy charge is flat and generation would likely shape that transmission charge to better reflect demand.
- *IPCAA*: Did the AESO look at the distribution of congestion or forecasted congestion hours in all of these areas when the transmission was built? Is it flat?

- Some participants were concerned with the AESO's design and use of individual areas:
  - *ANC:* On Slide 18, the major criteria for the tariff design that NERA has proposed is very arbitrary. There also seems to be double counting. Did the AESO look at the regional areas rather than all of the individual areas and if they did, what are the pros and cons compared to the 46 individual areas?
  - *Heartland Generation*: On Slide 18, should the analysis not be done on net peak load and net peak generation rather than gross?
  - *Heartland Generation*: Why do the relative sizes of the regions matter?
  - *Suncor:* The problem we're running into here is the arbitrary component comes into play with the size of the different areas. The size of the region impacts the split between demand and energy allocation. We cannot ignore the bulk and regional split and at the same time use a regional delineation to determine an allocation.

ii. AESO / NERA clarification

- Response to clarifying questions:
  - Need to have a distinction between the capacity of generation versus the use of energy. Generation capacity might be related to capacity costs, but the use of transmission to flow energy is an energy related cost. It would not be aligned with cost causation to allocate energy related costs to another, different characteristic of load.
  - The ISO tariff is required to recover the prudent costs that have been already approved. What the methodology is looking to do is to characterize or create a proxy for what should be allocated to demand related charges and what should be allocated to energy related charges.
  - Regarding congestion, the AESO did think about whether congestion was an appropriate metric. The challenge with using that as a metric is that the costs we're seeking to allocate have been incurred to avoid congestion from happening. Looking at the incidents of congestion doesn't tell us very much about the rationale behind building particular pieces of transmission.
- Response to questions regarding the use of areas:
  - The purpose of the AESO's methodology isn't to look at energy availability, it's to look at what size of the transmission system is needed and exists within the province. That's why

we're looking at peak load and peak generation as a proxy to measure the extent to which the transmission system is sized in each area.

- If we were to look at a reserve margin approach, we could take peak demand and compare it to generation and the ratio between the two could tell you something. But the size of the transmission system needed to accommodate these things depends on where and when these demands take place. Don't agree that there's double counting – the methodology we've proposed is pragmatically and reasonably accurate in identifying the degree to which transmission in each part of the system is sized to accommodate demand and energy.
- The AESO's rationale for using peak load and peak generation is that the size between areas is very different. That difference might not be captured with a netting process. For a given area that's much larger than another, you might not be able to capture the proportional size difference if the inflows are similar.
- Regarding the relative sizes of the areas, the difference in size matters because the minimum system requirements differ with the size of the area.
- The definition of the areas is not arbitrary; they were *not* created solely for the purpose of this tariff. They were created to represent the distinct parts of the transmission system for use in other areas (i.e., planning).

Topic 3: Cost recovery through avoidable charges and efficiency

i. Stakeholder commentary

- Some participants challenged the AESO's understanding of cost causation and efficiency:
  - *IPCAA:* How does your flat energy argument hold given that the majority of customers only see distribution tariffs?
  - *DePal Consulting:* I disagree with the premise that somehow the AESO's proposal is efficient. In the short term, you're going to have costs from customers who move to self-supply being pushed onto other customers. It seems that the customers who choose to remain on the grid will subsidize those that choose to leave.
  - *TransAlta:* How does recovering long-run transmission costs through a variable charge comply with the intergenerational equity part of the cost causation principle?
  - *CCA:* While having location-based marginal costs is not possible in Alberta, why is it not possible to provide marginal cost signals based on the avoided system cost of an incremental demand unit? This could be based on the avoided demand cost of a self-generator or it could be based on system expansion studies.

ii. AESO clarification

- Response to questions regarding cost causation and efficiency:
  - We're trying to design a transmission tariff that's as cost reflective as possible. In order to give parties the best information we can around the cost structures, we want to ensure the tariff structure aligns as closely as possible to the cost structure of transmission.
  - It's appropriate to have the costs associated with the need for energy recovered through the variable charge on energy. Ensuring that the tariff aligns as closely as possible with cost causation principles promotes intergenerational equity.
  - Regarding efficiency, in the short term, there will be a change and adjustment to allocation in costs. But the process that we're adopting is really about how we get the

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long-term signals right. It's important to separate out the short-term efficiency change from the potential long-term efficiencies.

- Regarding the potential of marginal cost signals in Alberta, it is important to recognize that the foundation of a marginal approach is that costs vary by area. What the AESO is trying to do with the embedded approach is to come up with a representative signal that averages costs and behaviours across the province.

Topic 4: Analysis of self-supply in response to the preferred rate design

i. Stakeholder commentary

- Clarifying comments:
  - *DePal Consulting:* We started this process four years ago with the problem that the AESO identified as high grid defection. However, the preferred rate design the AESO has chosen is worse than the rate design that the AESO initially identified as a problem. Why is the AESO recommending a design that's making the problem worse?
  - *Solas Energy:* Not understanding how the AESO is connecting the carbon price and the self-supply decrease? Would have thought it would be the opposite – as carbon price increases, self-supply would be a more likely response.
  - *CCA:* Future self-supply increases are more likely through solar than gas. Could this change the AESO's conclusion on the maximum shift to self-supply?
  - *Matt Ayres Consulting:* On Slide 49 (Changes in consumption in response to change in tariff), the AESO's prediction is reduced use of the grid for energy and increased use of the grid for backup. Can the AESO explain why a 17 per cent charge on capacity recovers the costs associated with providing backup?
  - *ADC:* The resulting rate design will have an impact on the industrial companies – if this change in tariff results in a particular sector of these manufacturing companies to no longer be economic in Alberta, what would you suggest would be the outcome if you can't make money under Alberta's new tariff?
  - *Suncor:* To the extent we still need new supply on the grid, can that same technology or similar enough technology be deployed behind the fence? If so, are we sending the right incentive to do so?

    To what extent does the tariff change the usage of existing generation? Due to the transmission credit, inefficient peakers can compete with combined cycles and run baseloaded behind the fence – doesn't this counteract the carbon tax?
  - *Wolf Midstream:* Directionally the new tariff should be constrained to keep high load factor / high load customers whole (and reduce grid defection). What would tariff look like if high load factor / high load were kept whole?
- Some participants pushed back on the assumptions that the AESO made in its report:
  - *Dual Use Customers:* The customers most impacted by the tariff design are high load factor industrials who use co-generation. The report misses the mark on co-generation and solar technologies. The AESO engages customers in the design and assumptions so this report looks more like justification for the tariff rather than providing any help to customers.
  - *DePal Consulting:* The AESO used the pool price from 2018-2019 for the report, but if you look at the current price in the first five months in 2021, the pool price is significantly

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different. As a customer looking at self-supply options, we're looking for the forecast of future pool prices; the data the AESO is using is strange.

- *CCA:* The NERA study seems to take a very static view of the industry. There is a much bigger change that seems to be taking place than what the study has taken into consideration. With decreasing billing determinants on the energy side, we're going to see higher and higher energy costs leading to a death spiral. How is the AESO going to deal with that?

ii. AESO/NERA clarification

- Response to clarifying comments:
  - The issue with 12-CP is that the more people respond to it, the greater the incentive to avoid it, as it becomes more expensive. While there will be a shift when we go from the current tariff to the new tariff in the first stage of adjustment, that response becomes more limited since it does not lead to increasing incentives for additional response through self-supply.
  - Regarding carbon prices and self-supply, the effect of the carbon price increase means that gas generation technologies become less economic when compared to potentially larger and more efficient units. Therefore, the increase in carbon price will cause the cost of behind-the-meter gas generation to increase.
  - Regarding the 17 per cent charge on capacity, the costs we're allocating are the shared costs of the transmission system for different purposes that are used to different degrees by participants. We have allocated different types of behaviours on the system and that's where the percentages are derived from – the extent to which a customer is making use of the system is reflected in the charges they face.
  - Regarding highly impacted customers, the AESO is focused on targeted mitigation with these particular impacted companies. We have identified the impact on these customers and are working on a transition plan through our ongoing targeted mitigation.
  - Regarding behind the meter generation, the AESO is seeking to reflect the cost structure of transmission. The carbon tax is rising and will cause the economics of behind the meter gas generation to worsen over time. This will tend to offset some of the increase in incentive to run gas generation behind the meter.
- Response to questions regarding the report and its assumptions:
  - The AESO made its assessment by looking at a broad range of potential scenarios with self-supply and different choices that customers could face. We have tried to take a broad view and not narrow in on a specific customer group or scenario.
  - Regarding cogeneration, the AESO acknowledges that cogeneration is a generation option. However, there are a whole range of options available for customers.
  - The analysis that was done in the report is forward looking to the extent that we're anticipating the growth in carbon pricing in the future. Technology may change over time, which may enable customers to self-supply – we haven't speculated how the market will change as technology changes.

Topic 5: Analysis of the short-term impact of the preferred rate design on the energy market

i. Stakeholder commentary

- Clarifying comments:

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- *Solas Energy:* On the illustrative example, what percentage of energy reduction are you estimating due to behind-the-meter (BTM) generation?
- *IPCAA:* One million dollars of efficiency loss is roughly how many MWs are responding to that $9 increase?
- *Alberta Newsprint:* The report only talked about the negatives of self-supply, none of the positives. Have they produced a similar report, would you share that report with us?
- *Suncor:* If we switch to the new rate design, we have an overall higher pool cost. At the same time, total load is decreasing. Does it seem realistic that we have increased energy charges and unchanged transmission charges, spread over a lower total load at a time when loads are telling the AESO that the total cost of delivered energy is skyrocketing?
- *Suncor:* If the numbers are not comparable, *i.e.* if we cannot look at a net impact, why is the AESO presenting us with these numbers/this analysis?
- *Capital Power:* Worried that this analysis does not hit the mark or address some of the concerns stakeholders have. Given the fact that people have already invested in responding to CP, how does the AESO justify that there will be any efficiency change at all? How would the AESO's analysis change taking into consideration that some of the 12-CP response is from behind the meter generation and the $9/MW hour energy charge will incent that further?

ii. AESO clarification

- Response to clarifying comments:
  - Regarding the number of MWs that are responding to the $9 increase, it is approximately 4 MW on average (over all hours, which doesn't show the shape and magnitude in the response in select hours). In many hours, we would see no response and then there are other hours where there is much more response.
  - We will assess whether additional information would be helpful to better understand the preferred rate design, including the request for 12-CP response in 2013 versus 2020.
  - Regarding the overall higher pool cost, CP intervals are at least somewhat correlated with higher prices in the energy market – it's possible that a smaller increase in load during these CP intervals could have a larger impact on the pool price than the decrease in load due to energy charge in all hours. But it's also possible the impact could go the other way and we think that in the scope of the short run response, it would be expected to be a small change either way. We're not making a claim that the energy market price will change in a particular way, we're looking at what the efficiency impact.
  - We heard from several stakeholders that they were concerned with how recovering transmission costs would impact the efficiency of the energy market. We estimated that quantity of impact to be $1 million from the energy charge. We think that this energy market impact is small given that moving to a tariff with better price signals will benefit the system overall. Additionally, to the extent that customers use more energy during CP hours, that may offset the efficiency loss from the energy charge.

Public

Agenda

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Session purpose and objectives

The purpose of the session is to engage stakeholders in a discussion of the AESO's targeted mitigation discussion outcomes, Session 5B (DOS) and Session 6A stakeholder feedback, and areas of alignment. The session objectives include:

- Provide an overview and seek stakeholder input on the outcomes of the targeted mitigation engagement
- Share our learnings and seek stakeholder input on Session 5B (DOS) and Session 6A stakeholder feedback and areas of alignment
- Present and discuss implementation considerations
- Seek to understand outstanding stakeholder concerns

Date: **Thursday, June 24, 2021**

Time: **8:00 a.m. – 1:00 p.m.**

Location: **Zoom Webinar**

Facilitator: **Stack'd**

Time	Agenda Item	Presenter
8:00 – 8:15	Welcome, introduction, purpose and session objectives	AESO / Stack'd
8:15 – 9:00	Targeted mitigation engagement • Mitigation process and outcomes • Mitigation options • Mitigation next steps • Q&A	AESO
9:00 – 10:00	DOS modernization recommendation feedback and revisions (Session 5B) • Summary of learnings and feedback themes • Revisions to the DOS modernization recommendation resulting from feedback • Q&A	AESO
10:00 – 10:30	Break	
10:30 – 11:10	DOS modernization recommendation feedback and revisions (Session 5B) cont. • Summary of learnings and feedback themes • Revisions to the DOS modernization recommendation resulting from feedback • Q&A	AESO
11:10 – 11:30	What we heard – Session 6A • Summary of learnings • Q&A	AESO
11:30 – 12:00	Areas of alignment and misalignment • Summary • Q&A	AESO

Public

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@theaeso

Time	Agenda Item	Presenter
12:00 – 12:20	Break	
12:20 – 12:30	Implementation considerations • Q&A	AESO
12:30 – 1:00	Session close-out and next steps • Rate sheets written consultation • Overall engagement survey • AESO application and the AUC process • Q&A	AESO

Public

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

June 24, 2021

Public

Notice

In accordance with its mandate to operate in the public interest, the AESO will be audio recording this session and making the session recording available to the general public at www.aeso.ca. The accessibility of these discussions is important to ensure the openness and transparency of this AESO process, and to facilitate the participation of stakeholders. Participation in this session is completely voluntary and subject to the terms of this notice.

The collection of personal information by the AESO for this session will be used for the purpose of capturing stakeholder input for the Bulk and Regional Tariff Design engagement sessions. This information is collected in accordance with Section 33(c) of the *Freedom of Information and Protection of Privacy Act*. If you have any questions or concerns regarding how your information will be handled, please contact the Director, Information and Governance Services at 2500, 330 – 5th Avenue S.W., Calgary, Alberta, T2P 0L4, by telephone at 403-539-2528, or by email at privacy@aeso.ca.

Using Zoom – Asking questions

- Two ways to ask questions if you are accessing the webinar using your computer or smartphone
  - Click “Raise Hand” and the host will be notified that you would like to ask a question. The host will unmute your microphone, you in turn will need to unmute your microphone and then you can ask your question. Your name will appear on the screen, but your camera will remain turned off.
  - Click “Lower Hand” to lower it if needed.
  - You can also ask questions by tapping the “Q&A” button and typing them in. You’re able to up-vote questions that have been already asked.
- If you are accessing the webinar via conference call
  - If you would like to ask a question during the Q&A portion, on your phone’s dial pad, hit *9 and the host will see that you have raised your hand. The host will unmute your microphone, you in turn will need to unmute your microphone by hitting *6 and then you can ask your question. Your number will appear on the screen.

Stakeholder participation

The participation of everyone here is critical to the engagement process. To ensure everyone has the opportunity to participate, we ask you to:

- Listen to understand others' perspectives
- Disagree respectfully
- Balance airtime fairly
- Keep an open mind

Welcome and Introductions

Public

Session purpose and objectives

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Registrants (as of June 17, 2021)

- Alberta Direct Connect Consumers Association (ADC)
- Alberta Newsprint Company (ANC)
- AltaLink Management Ltd.
- ATCO Electric
- Best Consulting Solutions Inc.
- BluEarth Renewables
- Brubaker and Associates, Inc. on behalf of ADC
- Campus Energy
- Canadian Renewable Energy Association (CanREA)
- Capital Power Inc.
- Chapman Ventures Inc.
- City of Grande Prairie
- City of Medicine Hat
- Consumers Coalition of Alberta (CCA)
- Customized Energy Solutions
- DePal Consulting Limited
- Dow Chemical Canada ULC
- DeepZero Energy
- Enel North America
- Energy Storage Canada
- ENMAX Corporation
- EPCOR Distribution & Transmission Inc.
- FortisAlberta Inc.
- Heartland Generation Ltd.
- Imperial Oil
- Industrial Power Consumers Association of Alberta (IPCAA)
- Lionstooth Energy Inc.
- MATL Canada/MATL LLP
- Millar Western Forest Products
- Morgan Stanley
- Pembina Pipeline Corp.
- Power Advisory LLC
- Rodan Energy Solutions
- Solas Energy Consulting Inc.
- Suncor Energy Inc.
- TC Energy
- TransAlta Corporation
- Turning Point Generation
- Utilities Consumer Advocate (UCA)
- URICA Asset Optimization
- VIDYA Knowledge Systems/ CWSAA
- West Fraser Mills Ltd.
- Weyerhaeuser
- Wolf Midstream Inc.
- 2332823 Alberta Ltd.

Overview of Engagement Process

Public

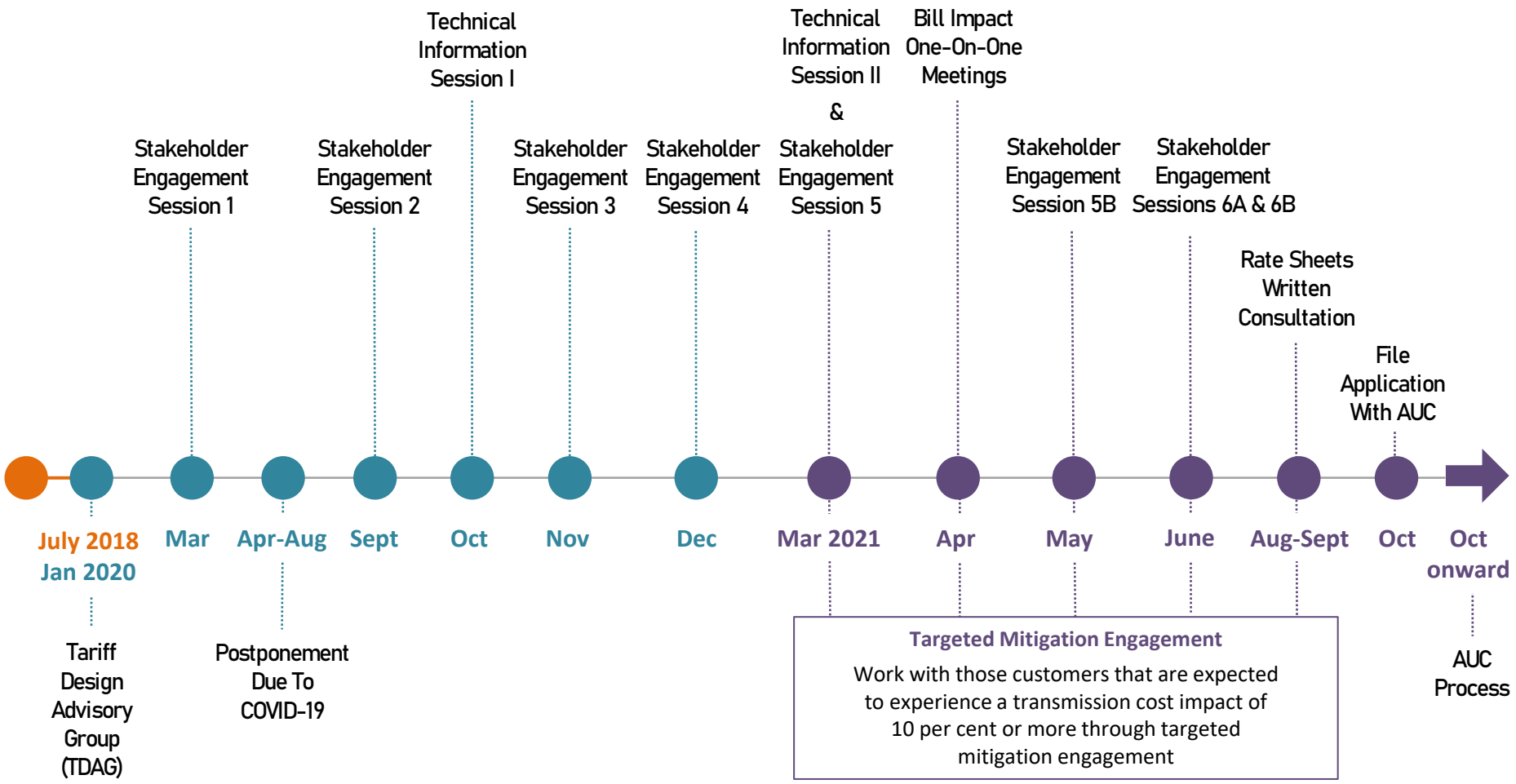
AESO Stakeholder Engagement Framework

Stakeholder engagement

The AESO's stakeholder engagement will:

- Ensure that stakeholders' needs and interests are consistently, transparently and meaningfully considered in the development of a rate design proposal for bulk and regional cost recovery;
- Provide clear objectives to be examined and evaluated in the development of a rate design proposal for bulk and regional cost recovery;
- Assist stakeholders in understanding and evaluating the AESO's preferred rate design;
- Supply stakeholders with tools that will allow them to consider and assess the impact of the AESO's preferred rate design; and
- Identify areas of alignment in order to support an efficient regulatory process.

Stakeholder engagement timeline



2018-19 2020 2021

Your participation

- Your participation to date has been very insightful to the AESO in understanding your perspectives and helping the AESO develop its preferred rate design proposal
- Your continued participation in this engagement is critical to help us prepare a well-informed application to the AUC for the benefit of Albertans
- We are looking for collaborative solutions to minimize the disruption for customers who are impacted by these changes, and your continued engagement is critical for our success
- The AESO recognizes the importance of providing clarity on this initiative for all of Alberta's electricity consumers

Targeted Mitigation Engagement Outcomes

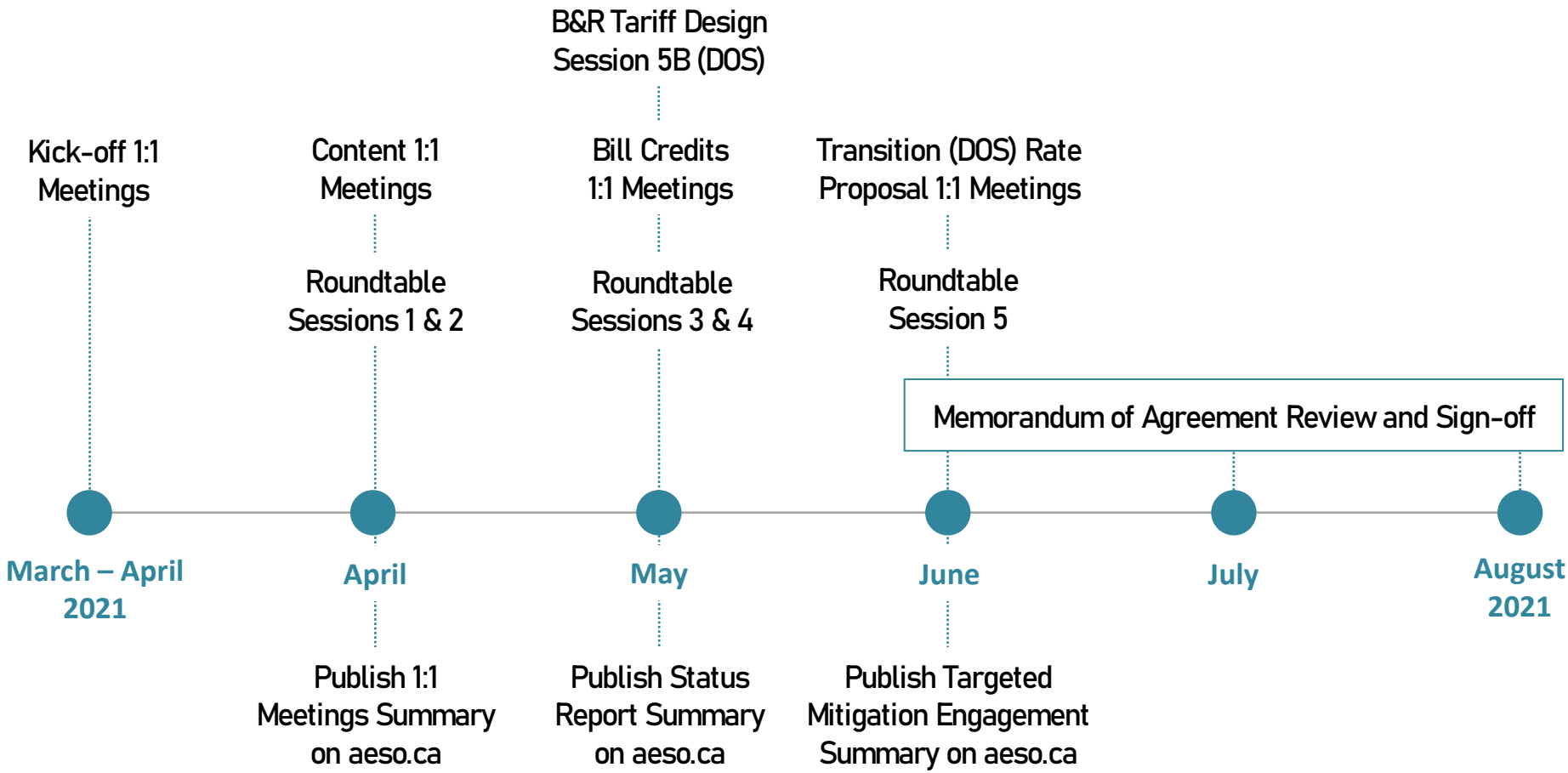
Public

AESO mitigation proposal starting principles (from B&R Session 5 March 25, 2021)

The AESO is seeking to develop a mutually acceptable mitigation proposal with the small group of impacted loads that will:

1. **Limit the rate impact for customers**: Mitigate rate impact to under 10 per cent increase to a party's transmission bill for initial stage of transition
2. **Adapt with design and rates**: Ensure options are adaptable to changes to the preferred rate design and forecasted rates
3. **Consistent application**: Mitigation options can be applied consistently across all impacted loads and not be individually defined
4. **Administrative simplicity**: Feasible to implement with current tools and systems
5. **Mutually acceptable**: Account for feedback from broad stakeholder group

Targeted mitigation engagement timeline



B&R: Bulk and Regional
DOS: Demand Opportunity Service

Mitigation outcomes

- Three alternatives explored:
  - A phasing-in of the preferred rate design and/or bill credits
  - A modernized demand opportunity service (DOS) rate
  - A non-firm interruptible rate class (i.e., a separate rate class for flexible loads that exists permanently and maintains costs for these loads where they are today and would be distinct from DOS)
- The AESO and significantly impacted stakeholders continue to hold differing views of mitigation being transitionary versus permanent treatment
- Non-firm interruptible rate class not accepted by AESO as a feasible alternative
- Engagement had led to three mitigation options:
  - Transition (DOS) Rate
  - Bill credits
  - Combination of Transition (DOS) Rate and bill credits

Memorandum of Agreement

- The AESO is developing a Memorandum of Agreement (MOA) based on the targeted mitigation engagement completed to date
  - Will continue to iterate with the impacted parties through the end of August 2021 to finalize the MOA and determine which of the impacted parties will sign the MOA
- The final MOA will be presented to the broader stakeholder group and the Alberta Utilities Commission (AUC or Commission) as part of the formal Bulk and Regional Tariff Application
  - The AESO will seek approval of this MOA from the Commission in conjunction with its preferred rate design and modernized DOS rate
  - MOA does not preclude parties from making submissions to the Commission on the merits of the preferred rate design or modernized DOS rate

Memorandum of Agreement (cont.)

- If the preferred rate design is substantially approved, the impacted parties that sign the MOA supports the use of these mitigation options
- Any party is eligible for approved mitigation options if their estimated transmission cost impact is greater than or equal to a 10 per cent increase
  - Parties that sign on to the MOA may not be eligible for mitigation if the Commission substantially approves the preferred rate design but makes minor changes that result in that party's transmission cost impact falling below the 10 per cent threshold
  - Impact will be estimated based on 2019 usage and approved rate design

Option 1: Transition (DOS) Rate

- Transition (DOS) Rate is a temporary variation of DOS
  - The 20 per cent limit to the load factor on contracted DOS load will apply if the contracted DOS level reduces the estimated transmission bill increase to below 10 per cent;
  - Otherwise, the DOS load factor can exceed 20 per cent up to levels that reduce the estimated transmission bill increase to 10 per cent (based on 2019 usage);
  - All other terms and conditions of the modernized standard DOS rate will apply
- Transition (DOS) Rate will be available for five years and comes into effect when preferred rate design becomes effective
- Upon expiry, any party operating under the Transition (DOS) Rate provisions will be required to meet the provisions of the standard DOS Rate
- Parties can make adjustments to their DOS level until end of year three; after that a DOS representation will be required

Option 2: Bill Credits

- The AESO will apply bill credits to the DTS bill for a site, in the form of an energy charge credit
- The calculation of the credit on energy charge is consistent for all sites; but the resulting credit will differ between sites based on mitigation value to reach a 10 per cent transmission bill impact

Energy charge credit percentage estimated as:

Credit on Energy Charge = ((Annual Transmission Costs [under 2019 ISO tariff rates] X 110%) – (Annual Transmission Costs [under AUC approved design])) / (Energy [2019 Site Actual Energy] X Energy Charge [under AUC approved design])

- Credit will be available for five years, starting when the approved rate design takes affect, decreasing by 20 per cent each year

Option 3: Combination

- A variation from bill credits which takes into account any reduction in transmission bill impact due to use of Transition (DOS) Rate

Energy charge credit percentage estimated as:

Credit on Energy Charge = ((Annual Transmission Costs [under 2019 ISO tariff rates] X 110%) – (Annual Transmission Costs [under AUC approved design]+ **DOS Rate**)) / (Energy [2019 Site Actual Energy] X Energy Charge [under AUC approved design])

- Credit will be available for five years, starting when the approved rate design takes affect, decreasing by 20 per cent each year

Mitigation eligibility and option selection process

- Should the preferred rate design be substantially approved the AESO will recalculate transmission bill impact estimates to identify highly impacted parties
  - Using substantially approved preferred rate design, including approved functionalization, approved demand/energy split, 2019 usage and 2019 test rates (based on 2019 billing determinants and revenue requirement)
- Highly impacted parties will be informed they are eligible for mitigation
- Highly impacted parties must inform the AESO within 45 days of their selected mitigation option, including the Transition (DOS) Rate contract amount
- If the substantially approved preferred rate design results in a significant change in the number of parties with a greater than 10 per cent transmission cost impact the MOA will become void

Mitigation implementation

- Should the preferred rate design and the MOA be approved the AESO will file an ISO tariff rider setting out the following as part of its compliance filing:
  - List of highly impacted parties (those parties that are expected to experience an increase of 10 per cent or more transmission cost impact)
  - Mitigation option selected by each impacted party
  - Transition (DOS) Rate contract levels elected by highly impacted parties that select this option, along with load factor limit if greater than 20%
  - Energy credit values for highly impacted parties that select this option

Estimated value of the mitigation options

- The transitionary bill mitigation options for the significantly impacted parties result in the following estimated mitigation value (or cost)
  - Estimates represent upper bounds for either option 1 or 2 if all parties select that specific option; costs for option 3 would fall under these upper bounds

	Estimated Billing Determinant Impact	Estimated Per Unit Impact	Estimated Total Mitigation Value (or Cost) for 5 Years
Option 1: Transition DOS (for amounts greater than 20% LF)	81 MW reduction in billing capacity	Monthly $3,509/MW of billing capacity	$17.0 million
Option 2: Bill Credits	1,970 GWh - Annual	Average Year 1 Credit of $3.30/MWh (Declining annually)	$19.5 million

- The actual mitigation value (or cost) will depend on the impacted parties' option selection and actual operations

Targeted mitigation next steps

- Drafting and finalizing MOA (June to August 2021)
- Impacted parties decide whether or not to sign, including a rationale for their decision (August 2021)
- MOA will be included as part of the AUC application (October 2021)
- Implementation of the mitigation options will be included as part of the compliance filing (post AUC decision)

Questions?

Public

DOS Modernization Recommendation Feedback & Revisions

Public

Stakeholder feedback

- Review of the stakeholder feedback on the DOS Modernization Recommendation highlighted the following themes:
  - DTS cannibalization / erosion
  - DOS Rate charges
  - Business case
  - DTS contract level
  - 20 per cent load factor
  - Bidding requirement for DOS load
  - Settlement and monitoring
  - Other items

Feedback theme: Risk of DTS erosion

- Some stakeholders expressed concern the proposal doesn't prevent DTS cannibalization
  - Concerns modernized DOS will contribute to erosion of billing determinants
  - Concerns modernized DOS will result in higher overall costs to consumers due to different self-supply dispatch decisions for load on DOS
  - Some stakeholders suggested the AESO provide energy storage with its own rate so as not to risk cannibalizing DTS
  - Define metrics for success

Proposal seeks to find the balance

- The objective of DOS is to reduce the level of average rates charged to DTS customers by applying the additional revenue earned from the use of temporarily under-utilized transmission system assets
- To meet this objective, the qualification for DOS requires ensuring that the consumption would not have occurred under Rate DTS
- To enable this:
  - Consistent and reliable application of qualification criteria is essential to the success of opportunity rates
  - Sufficient rights and remedies to deter and remedy any misuse of Rate DOS

Feedback theme: DOS Rate charges should be reviewed

- Some stakeholders stated the DOS rate design (charges) should be in scope
  - Discounted rates are a policy matter
  - No sunk costs should be recovered through DOS charges
  - DOS load bidding in market so should pay same rates as generators

Rationale for maintaining DOS rate charges despite DTS changes

- The purpose of Rate DOS is to provide the opportunity to generate additional tariff revenue to the benefit of all rate payers by enabling consumption that would be uneconomic and not otherwise occur under Rate DTS
- If Rate DOS customers only paid for short-run variable costs, then rate payers would not be better off, as the payments made by Rate DOS customers would only serve to offset the costs they directly impose
- The energy charge of the preferred rate design is representative of the historical long-run contribution of energy consumption to investment in transmission infrastructure
- To charge DOS customers less than this amount would run the risk that facilitating their consumption of energy would cause more system costs in the long-run than the revenue they contribute, leading other rate payers to be made worse off

Feedback theme: Challenges with the business case

- The original recommendation for Rate DOS required customers to provide a business case that the AESO would review regarding the economic rationale for using Rate DOS
- Range of stakeholder concerns with the qualification business case:
  - Clarity, transparency and standardization of criteria needed
  - Requirements need to be more strict
  - DOS should be an alternative to load retention rates
  - Only evaluate the business case at one point in time
  - Standardize for energy storage
  - Parties should not have to disclose economic information
  - AESO unqualified to assess

Business case: Alternative proposal

- Shift from business case to customer representation
  - Instead of providing a business case to the AESO, a customer makes a representation to the AESO that its use of Rate DOS will enable consumption that would be uneconomic and would not otherwise occur under Rate DTS
  - The representation would be standardized and included in the application form for Rate DOS. A brief description of the reasons for using DOS would be included in the application form, but it would be used for audit purposes
  - The AESO would monitor users of Rate DOS for indications that the representation they provided is untrue and that the customer requires firm service or otherwise appears willing to pay the higher Rate DTS, including, but not limited to: (1) failing to respond to dispatches or directives, (2) exceeding the contract capacity, (3) exceeding the maximum load factor limit
  - If the AESO determines a customer has misrepresented its use of Rate DOS, the AESO may charge and recover Rate DTS plus interest and any other costs or damages incurred, and may restrict future use of Rate DOS by the customer

Business case: Alternative proposal

Options	Advantages	Disadvantages
Original proposal (business case)	• Already specified within the Terms and Conditions and accepted by AUC	• Subjectivity • Administrative burden for AESO • Uncertainty for applicant
Alternative proposal (representation and no business case)	• No AESO assessment • At the time of the application, the AESO will rely upon the market participant's representation that the consumption is uneconomic under Rate DTS	• Reliance on monitoring and remedy provisions to protect rate payers against misrepresentation • Remedies, which would include claw backs, could result in significant financial liabilities for market participants if they misuse Rate DOS

Qualification: Shift from business case to customer representation

- The AESO recommends the alternative proposal and standardizing the application for Rate DOS to include a representation
  - The representation will ensure the customer understands the purpose of Rate DOS and ensures its described use of Rate DOS aligns with this purpose
  - Removes the need for customers to provide a detailed business case and for the AESO to review such detailed business case as part of the application process; however, customers will have to perform their own due diligence to ensure they can make the representation
  - The terms and conditions for Rate DOS would include sufficient remedies to deter and remedy misuse of Rate DOS

Qualification checks

- To validate there are no issues with use of DOS at point of qualification the following will be confirmed:
  - **All DOS customers**
    - Application form is complete and signed
    - Technical assessment to ensure DTS + DOS contract capacity use does not exceed connection capability, or cause transient stability or voltage control problems
    - Are capable of consuming up to the DTS + DOS contract capacities
    - Demonstrate the ability to recall DOS energy
  - **Storage**
    - STS contract capacity $\gtrsim$ DTS + DOS contract capacity

Feedback theme: DTS contract level should be determined by the customer

- Stakeholders suggested:
  - The DTS requirement should be determined by the customer
  - The AESO should clarify its intent around requiring energy storage assets to also have a DTS contract, when one of the reasons for being granted a DOS contract is that operating under DTS is unfeasible for the project

DTS contract level will be determined by the customer

- The DOS rate will not specify a minimum DTS level for DOS load; however, Rate DOS requires Rate DTS service as an applicability provision
  - Having Rate DTS service ensures that the AESO can appropriately apply other ISO tariff terms and conditions
  - The AESO is not proposing to change this requirement to have a DTS contract
  - A non-zero DTS contract will be required for DOS
- The customer will determine the appropriate contract capacities and assume the risks of such contract levels
  - Recall risk: Increases as more customers use DOS or DTS in area
  - Request to switch to DTS: Requires standard SASR timelines
  - Ancillary service qualification risk: Can the service still be provided in the event of DOS recall?

Feedback theme: Twenty per cent maximum load factor too limiting or ineffective

- The AESO received mixed feedback on maximum load factor of 20 per cent:
  - Load factor limits revenue maximization
  - Historical use not representative
  - Not high enough for certain storage options or high load factor loads
  - AESO should study further for storage charge and discharge
  - Load factor limit should eliminate the need for a business case
  - Ineffective replacement for ‘short-term and temporary’ and does not limit DOS applications

Maintaining the twenty per cent maximum load factor in DOS recommendation

- The driver behind the 20 per cent load factor is a replacement for short-term and temporary use of available transmission capacity
  - The measure is not designed to meet specific customers needs and should not consider technology or load type
  - The 20 per cent load factor is the replacement for subjective assessment of short-term or temporary use; the higher the load factor the less it represents short-term or temporary use
  - While a low load factor may reduce the opportunity for revenue maximization, it also guards against Rate DTS cannibalization
- The AESO will maintain the 20 per cent maximum load factor as a technology agnostic quantitative requirement to reduce subjective qualification for Rate DOS while also deterring DTS Rate cannibalization

Feedback theme: Bidding requirement for DOS load unclear or complex

- Stakeholder concerns with bidding DOS loads:
  - Should be a standing bid with “down-to” DTS requirements
  - Requiring bidding negates the half-range option for storage
  - Bidding requires more examples, more consultation, more understanding of associated costs
  - Concerns with linking DOS (transmission rate) to energy market outcomes
  - Allow parties to chose between bidding or transaction request

Simplified approach to bidding

- The AESO understands the concerns related to bidding complexity and recommends DOS customers consider a simplified bidding approach:
  - Standing bid at $999.99/MWh equal to DOS contract capacity
    - Dispatch on indicates participant may consume as much DOS as was dispatched
    - Dispatch / directed off indicates participant cannot consume the volume of DOS energy dispatched off
    - More sophisticated bidding strategies are available to participant if desired
  - A second block at $0.00/MWh can be used to allow participant to manage their load factor
    - When energy is moved from $999.99/MWh to $0/MWh, participant will be dispatched off and would stop using DOS energy
    - When energy is moved from $0/MWh to $999.99/MWh, participant will be dispatched on and may start using DOS energy

Simplified approach to bidding (cont.)

- Dispatch on does not require the participant to use DOS capacity, the bid dispatch permits the use of DOS capacity
- Dispatch off prohibits the use of all or portion of DOS capacity
- Simplified approach applies to traditional loads and storage
- DOS less than 5 MW will not qualify until such time that ISO rules permit lower bid volumes
  - Market submissions under 5 MW planned for implementation prior to 2024
- For more information, please refer to the Demand Opportunity Service (DOS) Bid Examples document located on the AESO website

https://www.aeso.ca/assets/Uploads/Session-5B-DOS-Bid-Examples-FINAL.pdf

Feedback theme: Clarifications for settlement

- Stakeholder concerns with settlement:
  - AESO should clarify how monthly settlement works with an annual max load factor
  - POD charges should be separated out (so loads can have confidence their POD is maintained with a low DTS level)
  - Remove loss charge as unclear why DOS load pays losses

Monthly settlement of annual load factor updated

- DOS customer is allocated a 12-month load factor balance equal to the DOS contract capacity x hours in 12-month period x 20%
- Each month settled against the remaining 20 per cent load factor balance
  - Settlement maintains the load factor energy balance
  - Exceeding the DOS load factor level of 20% over the year will result in charges at the ~~DOS~~ DTS surcharge rate
- Impact of exceeding DTS + DOS contracted MW levels
  - Metered energy above the DTS + DOS contracted MW levels will be charged as Rate DTS (aligned with current Rate DOS) and therefore will not contribute the 20 per cent load factor
  - May result in a DTS contract adjustment to reflect usage

Monthly settlement of DOS considering annual maximum load factor illustrative example updated

- Customer allocated DOS energy to use over 12 months (ex. 17,520 MWh)
- The DOS load factor energy balance declines as DOS energy is used
- Once DOS load factor energy balance drops to zero any DOS energy consumed would be charged at the DTS surcharge rate
- Load factor energy balance reset after 12 months

Line Item	Description	Jan	Feb	Mar	Apr	May
DOS Contract capacity (MW)		10	10	10	10	10
DOS Energy used (MWh)	Energy above DTS contract capacity	1455	1200	2000	7440	7440
Load factor energy balance at month end (MWh)	8760 h *10 MW * 20% = 17520 MWh allowed	16065	14865	12865	5425	-2015
DOS charges ($15/MWh)	DOS Energy Used x $15/MWh	-$21,825.00	-$18,000.00	-$30,000.00	-$111,600.00	~~-$22,785.00~~ -$81, 375.00
DTS surcharge ($110/MWh)	The energy charged at the DTS surcharge rate	$0.00	$0.00	$0.00	$0.00	-$221,650.00
Total charges ($)	DOS charges plus DTS surcharge or credit	-$21,825.00	-$18,000.00	-$30,000.00	-$111,600.00	~~-$244,435.00~~ -$303,025.00

Losses settlement under rate DOS updated

- An underlying principle of an opportunity service is that all costs caused in provision of the service are paid by the consumer of the service
- The use of DOS capacity causes losses on the system that would not otherwise occur, and therefore Rate DOS should include a losses charge
- Without it, generators are subsidizing the use of DOS since generators will pay the cost of losses
- Note: the losses charge can be minimized by consuming DOS energy when energy prices are low, because the ~~DOS~~ losses charge is a percentage of pool price

POD charges with Rate DOS

- Rate DTS POD charges are based on one definition of billing capacity, relied on for both regional and POD charges
- Currently the ISO tariff has no requirement for the installed capacity of interconnection facilities to align with Rate DTS contract levels
- Upcoming comprehensive Customer Contribution Policy review will look at a number of issues including interconnection facilities cost, AESO investment, standard facilities, installed versus contract capacity and customer contributions

DOS monitoring

- Regular monitoring:
  - As mentioned earlier, the AESO would monitor users of Rate DOS using certain criteria which may indicate that the representation they provided is untrue and that the customer requires firm service or otherwise appears willing to pay the higher Rate DTS, including, but not limited to: (1) failing to respond to dispatches, (2) exceeding the contract capacity, (3) exceeding the load factor
  - The existence of these criteria would automatically give rise to a presumption that the customer has misrepresented its use of Rate DOS; however, there would be an opportunity for the customer to explain or provide additional information to rebut the presumption
  - The AESO would ultimately make the final determination

DOS monitoring (cont.)

- If the AESO finds the market participant has mispresented its use of Rate DOS, the AESO may:
  - Charge and recover Rate DTS plus interest over the historical period (potentially the entire period the Rate DOS applied) and any other costs or damages incurred
  - Restrict future use of Rate DOS by the customer
- Market dispatch violations will be referred to Market Surveillance Administrator (MSA)

Other Items

Public

Allowing DOS for unplanned outages or derates

- Some stakeholders suggested that DOS be available for use for self-supply generator outages and derates, as few cogenerators currently utilize Rate DOS for planned outages due to the rate's inflexibility and there may be opportunities for increased transmission tariff revenue that is currently foregone
- DOS should not be considered a stand-by rate
- Given the modernization of Term type DOS, with the removal of the transaction request and having DOS loads bid into the market, the AESO could allow the use of Term type DOS for self-supply generator derates and unplanned outages provided the customer has controls in place to allow for DOS recall
- This will maximize transmission tariff revenue by allowing sites that have not contracted DTS for stand by to use the grid rather than curtail load

Separating the filing of Rate DOS from the Rate DTS

- Some stakeholders suggested that Rate DOS be a separate application
- In the interest of regulatory efficiency by having one application and one proceeding, the AESO does not plan to file a separate application for Rate DOS at this time

DOS availability and Connection Process

- Stakeholders requested the AESO to provide more information, including:
  - More details on SASR process for DOS (stages AESO will assess DOS qualification, connection study)
  - Capability maps of DOS availability
  - Notice (five years) to DOS customers of future constraints to their DOS
- The AESO will provide further details on the DOS application and contracting in the SASR process prior to the modernized DOS rate taking effect
- The AESO will not be prioritizing the development of a DOS capability map as part of DOS modernization

Recap of DOS Modernization Recommendation

- **Rate**
  - $/MWh conversion of DTS energy component
  - No expiry
  - Two types: Dispatchable and Term DOS
- **Qualification**
  - Standardized application process
    - Representation of DOS usage
  - Technical assessment of requested contract capacity
- **DOS usage and recall**
  - Managed through bids and merit order operation
- **Settlement**
  - Energy > DTS levels settled at DOS rate unless greater than 20 per cent
- **Audit**
  - Annual audit of representation and load factor

Questions?

Public

What We Heard from Session 6A Stakeholder Feedback

Public

Summary

- Primary comments from stakeholders in relation to AESO's preferred rate design were as follows:
  - Continued concern regarding allocation of costs to energy and demand using minimum system approach
  - Continued concern regarding recovery of energy related costs through flat energy charge
  - Continued questions on need for five-year average of 12-CP
  - Questions related to rate XOS and impact on exports

Comments with preferred rate design: Energy allocation

- Continued concerns with minimum system approach to allocate between demand and energy
  - Concern that methodology is not accounting for flows between areas appropriately
  - Questions regarding use of peak, net versus gross, or energy versus capacity
  - Concern that planning areas are arbitrarily defined
  - Concern about the allocation to demand and energy as a first step

Comments with preferred rate design: Flat energy charge

- Concerns with flat energy charge remain:
  - Concern that flat energy charge not consistent with time variation in use of transmission
  - Concern about impacts on long term response, incentives for self-supply / cost shifting
  - Concerns around cost for high load factor customers

Comments on five-year average 12-CP

- Questions about appropriate time horizon for calculation of 12-CP average (e.g.. One to five years)
- Concern about impact on DCG credits as a result of phasing in of five-year average
  - DFO calculation of DCG credits will need to recognize the transition of DCG credits

Comments on self-supply analysis

- Comments from stakeholders that:
  - Analysis should have included additional types of resources such as cogeneration/renewables/battery as a self-supply technology
  - Analysis needs to consider that one of the limitations on customers adopting self-supply is policy and tariff uncertainty
  - Analysis should be based on more recent average pool price
  - Analysis should consider impact of self-supply on pool prices
  - Assumption about carbon price limiting impact on self-supply needs to be tested
  - AESO should update delivered cost of energy report

Acknowledgement of feedback

- Your feedback has helped us understand your perspectives and where there are differences in views between stakeholders
- We will continue to consider your feedback in developing the application, including the process steps and issues list

Questions?

Public

Break

Public

Areas of Alignment

Public

Identifying areas of alignment and misalignment

- Areas of alignment and misalignment from our engagement process will be used to inform the AESO's application, including list of issues for adjudication by the Commission to improve regulatory efficiency
- Seeking your feedback on whether we have appropriately captured the areas of alignment and misalignment

Areas of alignment – rate design

- Tariff provides price signals that impact how customers respond
  - All transmission charges are avoidable to varying degrees by transmission customers
  - Degree of response, including self-supply, is important to understand the impact of the tariff
- Transmission charges should reflect the costs of providing transmission service
  - Transmission charges based on cost causation will lead to efficient outcomes

Areas of misalignment – rate design

- Timing and need for change
  - Await regulatory certainty and economic recovery versus now is the time for change
- Allocation of costs between demand and energy
  - Some concern about allocation between demand and energy as a first step in preferred rate design
  - Different views on minimum system approach to allocate between demand and energy
- Opportunities and incentives for response to tariff charges
  - Total impact and potential self-supply response is not the primary driver for tariff design, understanding of incremental impact relative to today

Areas of misalignment – rate design (con't)

- Difference of views on choice of appropriate billing determinants
  - Appropriateness of 12-CP: value response provides versus the costs response shifts to other customers
  - 5-year average 12-CP: questionable value and implementation consequences for sites versus better aligning billing determinant with cost drivers
  - Flat versus time of use or other shaped energy charge: reflecting the time variation in the use of the system vs the fact that the system supports the use of energy at all times
  - Un-ratcheted NCP: Fixed costs should be recovered on fixed charges versus cost recovery should primarily relate to the different ways the system is used

Areas of alignment & misalignment – Mitigation

Alignment:

- It is not in anyone's interest to reduce the number of ratepayers

Misalignment:

- Mitigation should be temporary to transition ratepayers to face new cost reflective rates vs mitigation should be permanent
- Varied views on how eligibility for mitigation should be determined: a percentage cost increase threshold, a total dollar impact threshold, phased-in rate changes, based on an economic impact assessment

Areas of alignment & misalignment – Energy Storage Treatment

Alignment:

- Energy storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter
- Energy storage can participate in Alberta's electricity use cases by providing energy price arbitrage, operating reserves, Non-wires solutions for transmission deferral
- Energy Storage should be treated in a FEOC manner

Misalignment:

- Treatment of energy storage when charging is like other consumers
- Feasibility of interruptible rates for storage and other grid users
- Applicability of DOS for energy storage is an improvement

Note: Areas of alignment and misalignment on DOS modernization will be identified following review of the July 9th feedback

Questions?

Public

Implementation Considerations

Public

Implementation considerations

- Contract capacity amendment period:
  - AESO will apply to the Commission to allow parties to adjust their contract capacity with the implementation of the new rates should they wish to do so
  - AESO will propose that any contract capacity amendments made during the rate implementation period will not be subject to the adjusted metering practice (AMP) requirements for contract capacity changes
    - the implementation of the AMP at such sites would align with the timing as approved by the Commission in the upcoming AMP Implementation proceeding
  - Payment-in-lieu of notice (PILON) would not apply to Rate DTS contract capacity amendments within the contract capacity amendment period
- DOS settlement reporting:
  - The AESO will develop settlement reporting to allow customers to track the use of DOS energy against the annual maximum load factor
- Minimum participation level for DOS will be reduced to 1 MW once the ISO rules are updated to enable assets under 5 MW to participate in the energy market
  - Change anticipated to occur as part of the Energy Storage ISO Rule Amendments

Questions?

Public

Next Steps

Public

Engagement schedule

- **July 9, 2021 |** Stakeholder feedback due on questions set out in Stakeholder Comment Matrix Session 6B
- **Late August/September 2021 |** The AESO will publish draft rate sheets for stakeholder review and written feedback
- **September 2021 |** The AESO will launch a survey to seek stakeholder input on the overall Bulk and Regional Tariff Design engagement process
- **October 2021 |** File application with AUC for public proceeding and approval

Session feedback

- We want to thank you for attending the Bulk and Regional Tariff Design Stakeholder Engagement Session 6B and we would appreciate your feedback on the session
- Launch Zoom poll
- We invite all interested stakeholders to provide their input on this session via the questions set out in the **Stakeholder Comment Matrix Session 6B on or before July 9, 2021**. The matrix will be available on June 17, 2021, on our website at www.aeso.ca
  - Path: Stakeholder Engagement > Rules, standards and tariff consultations > Tariff (filter) > Bulk and Regional Tariff Design > Session 6B | June 24, 2021

Rate sheets written consultation

- In late August/September 2021, the AESO intends to publish draft rate sheets for stakeholder review and written feedback
- **Purpose**
  - The purpose of the written consultation is to seek stakeholder input on the clarity and effectiveness of the draft rate sheets
- At that time, we invite all interested stakeholders to provide their input on the draft rate sheets via the questions set out in the Stakeholder Comment Matrix Rate Sheets.
- The draft rate sheets and associated comment matrix will be available late August/September and notice will be provided in our Stakeholder Newsletter and our website at www.aeso.ca
  - Path: Stakeholder Engagement > Rules, standards and tariff consultations > Tariff (filter) > Bulk and Regional Tariff Design

Overall engagement survey

- In September 2021, the AESO will launch a survey to seek stakeholder input on the overall Bulk and Regional Tariff Design engagement process. The survey will be available on our website at www.aeso.ca
- **Purpose**
  - The purpose of the survey is to seek stakeholder input on the overall engagement process for the Bulk and Regional Tariff Design engagement to guide us as we continuously work to improve how we engage stakeholders to ensure our approach allows stakeholders' needs and interests to be consistently, transparently and meaningfully considered
- At that time, we invite all interested stakeholders to share their perspectives on this overall engagement
  - Path: Stakeholder Engagement > Rules, standards and tariff consultations > Tariff (filter) > Bulk and Regional Tariff Design

AESO application and the AUC process

- The AESO will file an application with the AUC putting forward its preferred rate design on or before October 15, 2021
- The AUC will initiate a public proceeding following the filing of the AESO's application
- The AUC proceeding is a public process where registered participants are able to voice their concerns, objections or support and have them considered and understood before a decision is reached
- The AUC will decide whether or not to approve the AESO's preferred rate design based on what is fair, responsible and in the public interest
  - The outcomes of the targeted mitigation engagement will be tested by the AUC, who will make a decision on the overall rate design and any agreements on mitigation that are reached through the targeted mitigation engagement process
- Given the steps in the regulatory process, we anticipate the **earliest the new rate design would come into effect is 2024**

Questions?

Public

Contact the AESO

- ***Twitter:*** *@theAESO*
- ***Email:*** *tariffdesign@aeso.ca*
- ***Website:*** *www.aeso.ca*
- Subscribe to our stakeholder newsletter

Thank you

Public

Appendix – DOS additional content

Public

Term Type DOS

- Condition for term type DOS - for scheduled maintenance of a generating unit where the market participant has planned maintenance of an on-site generating unit that normally supplies electric energy to an industrial process on the same premises; and would reduce the load of its industrial process in these circumstances rather than pay the cost of receiving additional electric energy under Rate DTS
- This DOS rate type continues to represent the full DTS charge in $/MWh and is intended to allow short-term usage at less than the full cost (including ratchet) of Rate DTS but would be significantly more costly than Rate DTS for long-term or more frequent usage.

Monthly settlement of DOS considering annual maximum load factor alternative example

- January and February has unused DOS energy under the maximum load factor and that DOS energy carries over into March (33 + 192 = 225 MW)
- In March, customer exceeds the monthly allowable DOS energy plus the carry-over DOS energy by 287 MWh (512 minus 225). That volume is settled at DTS surcharge rate
- In April, the customer uses no DOS energy and is credited back the DTS surcharge amount, and the unused energy balance becomes 1440 – 287 = 1153 MWh for use in May

	Description	Jan	Feb	Mar	Apr	May
DOS Contract capacity (MW)		10	10	10	10	10
Monthly Allowable DOS Energy (MWh)	hours in month x contract capacity x 0.2	1488	1392	1488	1440	1488
DOS Energy used (MWh)	energy above DTS contract capacity	1455	1200	2000	0	1494
Monthly Energy below (above) Monthly Allowable DOS Energy	Negative – monthly use exceeded monthly allowable; Positive – monthly use was below monthly allowable	33	192	-512	1440	-6
DOS charges ($15/MWh)	Min(DOS Energy Used, Monthly allowable) x $15/MWh	-$21,825.00	-$18,000.00	-$22,320.00	$0.00	-$22,410.00
Monthly DTS surcharge energy used (or credited) (MWh)	The energy applied at the DTS surcharge rate	0	0	287	-287	0
DTS surcharge or credit ($110/MWh)	Monthly DOS surcharge or refund	$0.00	$0.00	-$31,570.00	$31,570.00	$0.00
Total charges or credit ($)	DOS charges plus DTS surcharge or credit	-$21,825.00	-$18,000.00	-$53,890.00	$31,570.00	-$22,410.00

Appendix – Acronyms

Public

Acronyms

- AGF = Aggregated Generating Facilities
- AIES = Alberta Interconnected Electric System
- AIL = Alberta internal Load
- ARS = Alberta Reliability Standards
- AS = Ancillary Services
- AUC = Alberta Utilities Commission
- BTF = Behind-The-Fence
- CP = Coincident Peak
- DFO = Distribution Facility Owner
- DOS = Demand Opportunity Service
- DTS = Demand Transmission Service
- EAL = ESBI Alberta Limited (Transmission Administrator prior to the formation of the AESO)
- EEA = Energy Emergency Alert
- GTA = General Tariff Application
- IOS = Import Opportunity Service
- LdF = Load Factor
- MSA = Market Surveillance Administrator
- OR = Operating Reserve
- PILON = Payment in Lieu of Notice
- POD = Point-of-Delivery
- SASR = System Access Service Request
- VER = Variable Energy Resource
- XOS = Export Opportunity Service

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Company Representative
Comments From:	Company Name			**Phone:**	Contact Phone Number
Date:	[yyyy/mm/dd]			**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	
7.	Do you have any further implementation considerations the AESO should consider?	
8.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Session 6B – June 24, 2021 Comments

Stakeholder comments on Session 6B [Posted July 14, 2021]

1. Alberta Direct Consumers Association (ADC)
2. AltaLink Management Ltd.
3. Canada West Ski Areas Association (CWSAA)
4. Canadian Renewable Energy Association (CanREA)
5. Capital Power Corporation
6. ConocoPhillips Canada
7. Consumers Coalition of Alberta (CCA)
8. DCG Consortium
9. Energy Storage Canada (ESC)
10. ENMAX Corporation
11. EPCOR Distribution and Transmission Inc. (EDTI)
12. Greengate Power Corporation
13. Heartland Generation Ltd.
14. Industrial Power Consumers Association of Alberta (IPCAA)
15. MATL Canada & MATL LLP (MATL)
16. Suncor Energy Inc.
17. TransAlta Corporation
18. TransCanada Energy Corp. (TCE)
19. Turning Point Generation (TPG)
20. Utilities Consumer Advocate (UCA)
21. West Fraser Mills Ltd.

Public

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Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Colette Chekerda
Comments From:	Alberta Direct Connect Consumer Association	**Phone:**	780-920-9399
Date:	2021-07-09	**Email**:	colette@carmal.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	The ADC did not find the session valuable. The AESO should have spent time providing the detailed cost of service study and supporting in depth analysis on the tariff proposal. Support for the 2014 tariff application had a comprehensive cost of service study with supporting cost tables prepared by London Economics. The study included different options for cost recovery and rationale supporting the recommendations. The AESO has provided nothing by way of comprehensive material to support the preferred rate design or the modernized DOS recommendation. Further the mitigation options are not workable for energy intensive trade exposed companies that wish to remain competitive in Alberta for the long term.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	The AESO has clearly set it's mind to their preferred tariff proposal and seem unwilling to examine any areas of misalignment with a goal of achieving a collaborative approach that can both recover costs in a fair manner while at the same time not force high load factor and price responsive customers to exit the grid.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	The ADC could support in principle a modernized DOS, but does not support the AESO recommendation.
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	The main concern about the moderninzed DOS recommendation is that it provides no long term assurance that a customer can receive power at their site, even where those customers have been on the system for decades. A company cannot invest capital in a manufacturing facility where they have no certainty of long term supply. Price responsive loads can interrupt for several hundred hours per year, but ultimately without some level of power supply they cannot make their product. Further the 20% load factor number essentially makes this product not work for any manufacturuing facility unless they have on site generation. There needs to be a different option – somewhere in between the DOS proposal and the firm DTS service where energy intensive and trade exposed industry can receive reliable, but interruptible power from the transmission system.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	No.

6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	The ADC in not supportive of the targeted mitigation outcomes. The AESO options for mitigation are only run to failure options. The choices put forward to the impacted parties are do you want to exit the grid in year 1 or have 5 years to plan your exit. This outcome does not serve the impacted parties or the public interest.
7.	Do you have any further implementation considerations the AESO should consider?	The AESO consultation process on the tariff design has been extremely dissapointing for ADC members. ADC has contributed significant time and effort in working with the AESO since 2018. To get to a point where our members options to stay viable in Alberta are to pursue on-site generation or exit the province is in our view a failure of the AESO process.
8.	Additional comments	Alberta has significant and material issues to tackle in our electricity system. Addressing carbon policy, integration of renewables, volatility and reliability are all significant challenges that need urgent attention. Implementing this rate change at this time, where it will clearly need to change again as an outcome of a needed policy update, is unnecessarily disruptive with the added negative impact of freezing industry investment in Alberta. The AESO should approach Government to say a pause is necessary while these other matters are addressed.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Hao Liu / Rob Senko
Comments From:	AltaLink Management Ltd.			**Phone:**	403-710-1247 / 403-874-6762
Date:	2021/07/09			**Email**:	Hao.liu@altalink.ca / rob.senko@altalink.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	The session held on June 24, 2021 was of assistance in that the AESO provided their implementation considerations.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	AltaLink disagrees that there is stakeholder alignment regarding "Transmission charges should reflect the costs of providing transmission services" (slide 71). Transmission charges should reflect both the costs and benefits of providing transmission service. As this was the last stakeholder session for the AESO's rate design process it would have been useful for the AESO to summarize all topics that have been raised throughout the stakeholder engagement process not just was captured in the Session 6B presentation.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	c) Undecided
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	Nothing more than what AltaLink provided in the May 28, 2021 comment matrix.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	No.
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	c) Undecided
7.	Do you have any further implementation considerations the AESO should consider?	Not at this time.
8.	Additional comments	None.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Rick Cowburn
Comments From:	CWSAA – Vidya Knowledge Systems	**Phone:**	(403) 397-8785
Date:	2021-07-09	**Email**:	rcowburn@vidya.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	Thanks to the AESO for its ongoing pursuit of stakeholder understanding and alignment. As least the parties should be relatively clear as to what the AESO is proposing -- subject to concerns identified below.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Not supportive. The industry has been down this path before (in the 1980's), providing discounted rates in a time of surplus, which only shifts costs and saves nothing. The bulk system has been built, and generation (not load) is forecast to drive future expansions. Without clear and rigorous admission criteria, the DOS rate will be flooded by applicants whose risk of physical interruption may well be minimal. The proposed solution is a customer representation that "use of Rate DOS will enable consumption that would be uneconomic and would not otherwise occur under Rate DTS." No business case or other standard documentation is proposed, leaving DOS users uncertain as to the case they would have to meet in the event of an AESO audit. A customer 'thrown off' DOS would have every reason to litigate the AESO's decision, which would be difficult indeed if there was no clear, quantitative definition of 'uneconomic consuption'. Alternatively, the AESO could avoid the issue by never making a finding re: 'uneconomic consumption'. No one outside of the AESO will know whether the business case was solid, liquid or gas. Problem solved… No doubt the AESO would try to do the right thing, as it does; but this sloppy approach is just setting the AESO up for failure, and creating yet another program that, like 12CP, will predictably grow to become a massive, locked-in subsidy that cannot be removed without severly disrupting the businesses that will have come to depend on it. Can we not learn from past mistakes?
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	This is not "tariff modernization" – this is essentially a "Non-firm interruptible rate class not accepted by AESO as a feasible alternative." Using this a part of a mitigation plan would add enormous complexity to an already difficult situation.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	Unfortunately not. Opening up DOS in a system surplus situation is a bad idea for customers unable to play the game, and would lock in yet another unjustifiable subsidy that will be painful to remove when its folly grows too obvious.

6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Supportive of a clearly defined, limited time bill credit approach, subject to implementation clarifications (see below). The AESO proposed the following formula (slide 6B-22) Credit on Energy Charge = ((Annual Transmission Costs [under 2019 ISO tariff rates] X 110%) – . (Annual Transmission Costs [under AUC approved design])) / . (Energy [2019 Site Actual Energy] X . Energy Charge [under AUC approved design]) The Credit is expressed as $ / MWh (see slide 6B-26 “Average Year 1 Credit of $3.30/MWh (Declining annually)”) A. OBSERVATIONS re: CREDIT FORMULA The basic equation is clear: [i] Reprice current period consumption under the 2019 tariff, multiply result X 110% [ii] Calculate current period transmission costs under AUC approved design [iii] Dollar Credit = ([i] – [ii]) (declining annually) The calculation is presumably done after the fact, based on actual electricity use in the period. It is not clear why it is necessary to convert this into a $ / MWh rate, particularly considering that this rate will be different for each mitigated site. If the purpose is to avoid the appearance of a subsidy, a legal opinion would be essential; it is hard to believe that such a superficial subterfuge would actually be legally effective. The purpose of the “Energy Charge [under AUC approved design” is unclear. The units of the result, the ‘Credit on Energy Charge’, are $ / MWh, so one would expect a numerator in units of $, and a denominator in units of MWh. A denominator of Energy (MWh) times Energy Charge ($/MWh) would have units of . $ X (MWh/MWh) = $, which makes no sense.

		B. USE OF 2019 ISO TARIFF FOR MITIGATION CALCULATIONS: The ISO tariff will likely increase by some amount every year. Calculating mitigation based on the 2019 tariff would materially increase the mitigation amounts paid and eliminate rate volatility. Assessing the magnitude of this additional mitigation amount would be important in assessing the fairness of the calculation. While it maybe reasonable to shield certain PODs from tariff structure changes, changes in tariff levels should equally impact all parties (as flowed through the standard tariff). A reasonable alternative would be to annually recalculate a 'reference tariff' to be used in this calculation, updating only the cost information but retaining the current allocation process. C. CAPPING CURRENT PERIOD CONSUMPTION DATA The policy objective of mitigation is to reduce the impacts of a change in the transmission tariff structure on current customers. The policy is intended to be discriminatory, effectively penalizing new loads compared to otherwise identical existing loads. It would not be reasonable to provide this credit to <u>any</u> new loads, whether or not they are on an existing site. (The alternative of providing this credit to <u>all</u> new loads appears infeasible.) One way of implementing this would be to set a cap on the 'current period consumption data' used in the mitigation calculation, such that peak demand used in that calculation cannot exceed past historic levels (say from 2017 to 2019). D. SCOPE OF MITIGATION CALCULATION – UNDUE DISCRIMINATION Most customers receive transmission charges through a distribution utility; only a limited number of PODs / customers happen to be directly invoiced by the AESO (EUA 101(2)). These PODs / customers are visible to the AESO. The AESO is understood to be proposing to allocate the costs of this mitigation across all other transmission system users (although the specific mechanism for this back-allocation of credits does not appear to have been provided as yet.) Other customers deal with the local distribution utility, but receive a flow-through of the AESO tariff (e.g. FortisAlberta's Rate 65, ATCO Electric's Rate T31, ENMAX Power's Rate D700, EPCOR Distirbution & Transmission's Rate SAS-DC). It is not clear that these PODs / customers are included in the AESO's mitigation calculations, as they do not deal directly with the AESO. If these 'flow-through' sites **<u>are not</u>** included in the mitigation program, there is arguably undue discrimination compared to AESO direct connect sites, in that physically identical customer supply situations may be treated quite differently.

		If these distribution 'flow-through' sites **are** included in the mitigation calculation, then the AESO needs to know the specifics of the distribution utility's arrangements at each POD. If a single customer is served by a POD, then it receives mitigation payments; if two or more customers are served by a POD, then there are no mitigation payments. From the AESO's perspective, this certainly looks like undue discrimination. The AESO serves Points Of Delivery. Customers would have every reason to be upset that their competitor down the road receives mitigation payments, but because they share a POD their otherwise identical load does not generate any mitigation payments that could be flowed through to them by the distribution utility. A reasonable solution that respects the industry's legal structure might be for the AESO to implement the mitigation program at the POD level, without discriminating as to how that POD bill is paid for. If the POD serves a distribution utility, its treadment will be considered in the appropriate distribution utility proceeding; if a POD serves a non-utility, that party determines what should be done.
7.	Do you have any further implementation considerations the AESO should consider?	It would be helpful for all if the AESO provided numeric examples of its proposed resolution of the calculation details of its mitigation program. How does the AESO have the authority to negotiate a "Memorandum Of Understanding" that is in any way binding on the Commission, particularly when it was arrived at without broad stakeholder involvement? The purpose of creating and parties 'signing off' on such a document is unclear indeed.
8.	Additional comments	Best wishes to all in this difficult process.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment: June 17, 2021 through July 9, 2021	**Contact:** Leonard Olien
Comments From: CanREA	**Phone:** 587-971-0049
Date: July 9, 2021	**Email**: lolien@renewablesassociation.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	The session was valuable. The session would have been more helpful if there had been examples prepared to illustrate how the proposed must-bid provision in the modernized DOS service will interact with the proposed rules for energy storage participation in the energy and anciallary services markets.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	In general, CanREA is supportive of the revised DOS modernization recommendation. Specific concerns are addressed in Q4.

4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	CanREA is concerned by certain comments made during the meeting relating to the use of modernized DOS and participation in Ancillary Services markets. The current DTS treatment of energy storage is an economic barrier to AS and energy market participation, and therefore, the use of a DOS contract should not affect the ability of a resource to participate in the AS market. Rather it is the responsibility of the market participant to ensure that the resource is prepared to respond to any AS obligations. Any provision from AESO on energy storage regarding participation in the A/S market would be discriminatory as fuel supply certainty is not a qualification for other energy sources CanREA understands that the 20% capacity factor limit is in place to minimize the risk of migration from DTS to DOS. The 20% limit is likely to be a restriction on long duration energy storage which ultimately results in unfair treatment. CanREA maintains that a higher limit would continue impede migration to DOS from DTS while removing the unfair barrier to long-term energy storage participation in the market. CanREA supports the change from requiring a participant to submit a business case to requiring a simple representation. CanREA maintains that a statement such as “The asset is an energy storage facility” should: a) Be a sufficient assertion for any given energy storage resource to qualify for the modernized DOS b) Preclude any need for further evaluation of the resource operational behaviour beyond calculating the capacity factor c) Remove the risk that the storage resource would lose access to DOS except for repeated failure to follow dispatch instructions to curtail withdrawls from the grid.

5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	CanREA would like the AESO to prepare some examples of how the must-bid provision of the modernized DOS would interact with the recommended market rules for the participation of energy storage and hybrid resources in the energy and AS markets. CanREA would like clarification that the use of a DOS contract does not preclude a storage resource from participation in the AS markets. CanREA would like to see modelling to justify a capacity factor value that is based on future behaviour and includes consideration of long-duration storage. CanREA would like to know the smallest DTS volume that can be contracted for. The number 0.1 MW was mentioned verbally.
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	
7.	Do you have any further implementation considerations the AESO should consider?	CanREA understands that the AESO will file for the modernized DOS with the AUC along with the revised Bulk and Regional Tariff which will lead to expected implementation date in 2024. Given the exceptional growth in energy storage deployment in other jurisdictions, CanREA is concert about the time lag in implementing the modernized DOS and the negative impact on potential investment. CanREA looks forward to further discussions with the AESO to identify regulatory efficiencies that can lead to an earlier implementation for the modernized DOS.
8.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Matthew Davis
Comments From:	Capital Power			**Phone:**	403.540.6087
Date:	2021/07/09			**Email**:	mdavis@capitalpower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	Capital Power appreciates the opportunity to provide comments on the June 24, 2021 stakeholder session. The session was valuable in that it allowed for further discussion on the AESO's DOS modernization plans and provided an update on AESO activities prior to filing its preferred bulk and regional tariff design. At the session, the AESO was unable to answer some stakeholder questions, but indicated that they would take away those questions to have them answered. While it is preferable to have questions answered in the session, Capital Power appreciates that not every answer is readily available and thus appreciates the AESO following up with session attendees and other market participants with answers. The areas of alignment and misalignment have been clear through the process, particularly once the AESO provided its preferred design. While Capital Power appreciates the AESO's compilation of the areas of alignment and misalignment, the effort has not added materially to Capital Power's understanding.

	Questions	Stakeholder Comments
		Capital Power did find the session particularly useful in hearing additional details on the AESO's DOS modernization proposal. Capital Power re-iterates that the pace of this development over the past few months could have supported additional engagement. Capital Power appreciates the AESO's update on the mitigation options and the efforts to provide insight into the process.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	Capital Power believes that the AESO has adequately articulated the areas of alignment and misalignment for the bulk and regional tariff design. The AESO has not though provided as much qualification as to the degree of which participants are misaligned with the AESO's preferred design.
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	While Capital Power is supportive of general framework the AESO is proposing for DOS modernization, it is less supportive of certain details, and in some cases not supportive of it at all. Specific concerns are highlighted below. Capital Power is somewhat supportive of the qualification process for DOS occurring as part of the connection process. The AESO's comments in the session that it could occur around stage 2 of the process is positive as Capital Power believes that having clarity on the tariff treatment early in that process is essential for project development. While Capital Power understand that is subject to further determination, it appreciates this opportunity to indicate where in the interconnection process it should occur. As outlined in Capital Power's previous comments (session 5B), it is not supportive of the load factor limitation for energy storage as it creates level playing field concerns. Capital Power would note that the AESO's representation requirements, while an improvement over the business case, does not necessarily reduce the effort required by market participants. Further, the AESO's monitoring actions as drafted, create risk to project developers should DOS be revoked.

	Questions	Stakeholder Comments
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	Please see Capital Power's response to 3 above.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	Capital Power would appreciate the AESO following up on its question from the stakeholder session. Specifically: *On slide 26, the AESO indicated transition DOS over the 20% LF would cost $17M for 5 years. Is it possible to share what the maximum load factor the AESO calculated was required for this mitigation option and result?*
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	At this time, Capital Power is undecided on its support for the targeted mitigation approach being taken by the AESO. While Capital Power does view modernization of DOS as a potential mitigating rate design, the temporary nature of the allowances may be less than ideal. Capital Power remains supportive of rate design measures, which DOS could be construed as, over billing adjustments, which is the AESO's other alternative.
7.	Do you have any further implementation considerations the AESO should consider?	Capital Power has no further comments at this time.
8.	Additional comments	Capital Power has no further comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Blair Wood
Comments From:	ConocoPhillips Canada			**Phone:**	403 532 3575
Date:	2021/07/09			**Email**:	Blair.Wood@conocophillips.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	(i) Yes the session was valuable. (ii) a. Yes b. Yes c. Yes
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	NA

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	NA
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	NA
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	NA
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	b)
7.	Do you have any further implementation considerations the AESO should consider?	The AESO is using a 10% bill impact on transmission as a qualifying measure for mitigation. Conoco would recommend changing the mitigation such that a market participant would only qualify if a bill impact for transmission and energy combined is greater than 10%, as per the normal AUC practice.
8.	Additional comments	NA

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Raj Retnanandan
Comments From:	Consumers CoaliTion Of Alberta	**Phone:**	Contact Phone Number
Date:	[2021/07/09]	**Email**:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	Please refer to 3 below.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	Please refer to 3 below.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	CCA is not supportive of the proposed DOS rate as it does not require a business case that would demonstrate the economic rationale for a customer choosing the DOS rate. CCA is concerned that the AESO's DOS proposal could result in erosion of firm service billing determinants, potentially resulting in higher rates to residential customers.
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	CCA submits the proposed DOS rate is fundamentally flawed as it appears to violate the cardinal principle that the DOS rate should be for temporary use of energy transactions that would not otherwise occur.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	None
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Not supportive. CCA does not support the targeted mitigation engagement because the DOS rate that is the centrepiece of this effort is fundamentally flawed and could result in erosion of firm billing determinants.
7.	Do you have any further implementation considerations the AESO should consider?	Not applicable
8.	Additional comments	None

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Christine Runge (Power Advisory)
Comments From:	DCG Consortium The DCG Consortium is comprised of the following members: BluEarth Renewables Inc., Canadian Solar Solutions Inc., Elemental Energy Renewables Inc., RWE Renewables Canada Holding Inc. and Siemens Energy Canada Limited. This submission represents the consensus view of the group and is submitted on behalf of the group by Power Advisory LLC	**Phone:**	403-613-7624
		Email:	crunge@poweradvisoryllc.com
Date:	2021-07-09		

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	
7.	Do you have any further implementation considerations the AESO should consider?	

8.	Additional comments	The DCG Consortium notes that its concerns about the five-year average 12CP calculation were recorded on slide 64, however, these concerns were not addressed or responded to. The DCG Consortium would like to reiterate that it is important the questions and comments raised are responded to in the AESO's filed application in order to avoid the additional regulatory burden of the DCG Consoritum asking the same questions in IRs and filing the same mathematical comments in evidence. For our complete comments on these matters, please see the DCG Consortium comment matricies in response to Session 5 and Session 6A.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Justin Rangooni
Comments From:	Energy Storage Canada			**Phone:**	647-627-1815
Date:	2021/07/09			**Email**:	jrangooni@energystoragecanada.org

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	Energy Storage Canada (ESC) found Session 6B valuable. The AESO provided further details on the proposed Modernization of Demand Opportunity Service (DOS) rate design and how energy storage would be incorporated. Further, the AESO provided time to answers clarifying questions for ESC members and ESC. ESC did receive additional clarity on both a & b; ESC has limited interest in c.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	An area of misalignment that has not been listed for energy storage is that DOS rate design should be technology agnostic. As noted in areas of alignment, energy storage is unique. Requiring a technology agnostic rate design for both energy storage and price sensitive load customers does not recognize and support the uniqueness of energy storage. The AESO should explore additional adjustments to the modernized DOS to support energy storage. In particular, if the AESO is going to pursue modernizing the DOS as the preferred treatment for energy storage; the AESO should include specific treatment for energy storage in the DOS rate design that reflects the uniqueness of energy storage.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Undecided. The modernized DOS rate framework provides a support in many key areas for energy storage resources including recognition that energy storage's use of the transmission system is opportunistic. On the other hand, the access to an opportunity rate based on the AESO's sole judgement of project economics is inappropriate and does not reflect the multiple areas where energy storage is unique (e.g., storage consumption does not lead to transmission network build-out, storage participates as a generator in the wholesale energy market, etc.).
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	ESC has concerns with the DOS modernization recommendations. First, the maximum load factor proposed by the AESO may not be supportive of long duration energy storage resources. The AESO should consider a slightly higher maximum load factor. Second, the AESO has stated that integrating energy storage into the bulk & regional tariff design is a priority. The eligibility requirements for the modernized DOS rate proposed by the AESO based on project economics is short-term and does not provide a permanent solution to energy storage needs. Energy storage does not need firm capacity and must be offered a permanent option for an opportunity service similar to the XOS rate. Finally, the proposed approach of customer representation followed by detailed audit to seek out misrepresentation is not appropriate and should be removed from the modernized DOS rate.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	The AESO has stated that customers can select their DTS amounts that is required to receive DOS rate. Will storage be allowed to select their DTS amount without quantification or approval by the AESO? For energy bidding; can the AESO provide an example for hybrid facilities (e.g., storage + solar)? It is unclear how a DOS recall that may occur due to a regional transmission system constraint may impact the market operation of hybrid projects.

6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	No comment from ESC
7.	Do you have any further implementation considerations the AESO should consider?	AESO should re-consider capability maps for DOS availability. System capability heat maps are produced by Alberta Distribution Facility Owners (DFOs) that provide guidance for connection capability without significant investment in resources. A similar approach during the Long-Term Outlook (LTO) or other system planning processes should be considered by the AESO. For example, the AESO has published a Transmission Capability Assessment for renewable generation over the past few years, a similar document could be developed for DOS capacity. Guidance on where in the transmission system excess capacity is greatest provides market participants with valuable input in assessing risks and rewards in siting resources.
8.	Additional comments	ESC continues to have questions understanding the volatility of the preferred rate design. Can the AESO provide example calculations of the Functionalization Ratio for 2015 to 2020 and into the future based on the LTO 2021? ESC has expressed interest in understanding how the XOS rate will change with the preferred rate design. Can the AESO describe if any eligibility criteria will change as part of the Bulk & Regional tariff design?

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Mark McGillivray
Comments From:	ENMAX Corporation			**Phone:**	
Date:	2021/07/08			**Email**:	MMcGillivray@enmax.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	The session was helpful. ENMAX looks forward to viewing the AESO Tariff application.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	No comment.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Undecided. Further details would be required on how the market rules would work. A new purpose-built rate for all types and sizes of storage is preferred compared to retrofitting an existing mechanism.
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	Requiring DOS load to bid into the energy market and comply with ISO rules 24x7 may inadvertently be a barrier for smaller energy storage projects to participate.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	See response to Question 3.
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	ENMAX has had limited visibility of the AESO's targeted mitigation engagement and outcomes, but overall, supports efforts to reduce impacts to those customers facing a large rate shock increase. A gradual introduction of the new rates should be considered for all customers to reduce the rate shock. It is important to note that mitigation actions and outcomes should not significantly shift costs on to other participants, and it is unclear at this point if this will be the case in the AESO proposals.
7.	Do you have any further implementation considerations the AESO should consider?	Further clarity would be required on the timing of implementation for the proposed DOS modernization and how this would align with the AESO's energy storage roadmap and upcoming consultation process to amend various ISO rules.

8.	Additional comments	On slide 64 of the AESO's presentation, the AESO indicated that there was a concern about the impact on DCG credits as a result of phasing in the five-year average and that the DFO calculation of DCG credits will need to recognize the transition of these credits. ENMAX requests more information on this particular comment and the impacts to a DFO's calculation as DCG credits are phased out.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Gerald Zurek
Comments From:	EPCOR Distribution & Transmisson Inc	**Phone:**	780-686-1186
Date:	2021/06/30	**Email**:	gzurek@epcor.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	EDTI found the session valuable to help understand the DOS rate. Yes Yes Yes
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	None that EDTI is aware of.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Undecided
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	None that EDTI is aware of.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	No
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Undecided
7.	Do you have any further implementation considerations the AESO should consider?	No
8.	Additional comments	EDTI has no additional comments.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Jordan Balaban
Comments From:	Greengate Power			**Phone:**	403 930 1300
Date:	2021/07/09			**Email**:	jordan@greengatepower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	i) It was a valuable session to understand the AESO's intended design for its upcoming tariff. It would have been useful to participants, as the AESO's filing date gets closer, to have more details on the implementation features of DOS. ii) a) Yes. b) Yes. c) Yes.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	NA

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	b) Somewhat supportive. Greengate is supportive of using DOS for energy storage assets. Greengate remains concerned over the level of the proposed DOS rates and seeks further clarity on the required declaration.

4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	**Concerns**. Greengate has ongoing concerns with the following aspects of the DOS modernization recommendation: **1**. **Variable Energy Charge**. Since the basis of the proposed DOS rate includes all energy charges, the DOS rate has increased substantially with the AESO's proposed rate design. It is not clear how the AESO has drawn a cost causation link between the impact of a DOS asset connecting and the proposed variable energy charge since the variable energy charge is derived from costs that are fixed. Greengate recommends revising the preferred rate design to mitigate or eliminate the artificial variable energy charge, such that DOS rate does not include a charge that it does not cause. 2. **Back-Charge Risk**. The AESO will not require a business case submission (i.e., proof that DTS is not economic) to qualify for DOS. However, market participants can be left with substantial risk in choosing to apply for DOS since at a later date, the AESO may reassess the application and back-charge DOS customers with DTS rates. The AESO should clarify this issue by specifying the calculation details regarding the economics on the DTS evaluation. 3. **Declaration to Qualify**. Similarly, it is not clear what commitment will be made when executing the declaration to qualify. It is also not clear what period the declaration should be intended to cover. These details must be clear prior to the AESO's filing its proposed tariff. **Support**. Greengate generally supports the AESO's recommendation to allow **customers to determine their DTS contract level**. During Tariff Session 5B, numerous stakeholders opposed the AESO's position that energy storage assets must include a portion of the charging volume under the asset's Rate DTS contract. It is understood and accepted that an energy storage facility will have a DTS contract for the auxiliary loads required to operate an asset, which is common practice for generating facilities interconnecting into the AIES. Regarding DTS rate and DOS rate contract levels, Greengate supports the AESO's revised recommendation

		that “the customer will determine the appropriate contract capacities and assume the risks of such contract levels” as relates to recall risk.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	How does the AESO justify that a DOS asset should be charged the high variable energy charge from a cost causation principle perspective? How will market participants that intend to declare an asset as eligible for DOS properly support their AESO declaration? What details will be included in the DOS declaration? What is the specific wording of the declaration? What period will the declaration be binding? How will the AESO determine the accuracy and eligibility for DOS based on the declaration? How will the AESO determine compliance to DOS eligibility requirements on an ongoing basis after an asset qualifies?
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	NA
7.	Do you have any further implementation considerations the AESO should consider?	NA
8.	Additional comments	NA

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Kurtis Glasier
Comments From:	Heartland Generation Ltd. (“Heartland Generation”)	**Phone:**	(587) 228-9617
Date:	[2021/07/09]	**Email**:	Kurtis.Glasier@heartlandgeneration.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	Heartland Generation found Session 6B, hosted on June 24, 2021, to be valuable. Session 6B provided additional clarity, specifically on the proposed targeted mitigation engagement. The mitigation options have been less transparent up to this point for those not directly engaged.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	Heartland Generation disagrees with the AESO's characterization of alignment with the point, "Energy Storage is unique in that it is not the producer or the end consumer of electric energy, nor is it the transmitter." Heartland Generation does not view Energy Storage as unique, from the perspective of Tariff treatment. Energy Storage would likely benefit from an opportunity service rate structure, as its characteristics resemble that level of service; however, this should not be a unique rate for energy storage specifically, and should be available to other tariff customers that qualify. The AESO could better encapsulate this misalignment by stating that some participants view storage as neither the originator nor end consumer of electric energy, while other participants view energy storage as *both* the consumer (especially given process losses of storage) and producer of energy during a different time period. As both a producer and consumer of electric energy, energy storage should be eligible to participate in all sectors of the electricity market for which they meet the technical qualifications.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Heartland Generation is somewhat supportive of DOS modernization. The proposed DOS modernization is an improvement over the existing rate DOS.
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	The proposed changes do not seem to adequately address customers desire for an interruptible service or opportunity service rate. Heartland Generation has detailed a description of how an efficient DOS rate could be defined and developed in its response to Session 5B (specifically, Question #3 in the previous comment matrix).
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	Heartland Generation understands the DOS modernization recommendation. However, it seems to have limited use cases for specific customers. It would be helpful if the AESO could provide the types/categories of customers they anticipate using rate DOS in the future and how this rate better meets their needs; this is especially relevant given the very low utilization of the current rate DOS.
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Undecided. Heartland Generation is not sure what the benefit to the Memorandum of Agreement (MOA) for a select number of chosen participants will be. The mitigation options discussed seem to all imply that the costs of the mitigation is not revenue neutral; this means that customers not signatory to the MOA will be responsible in part for funding the mitigation options.

7.	Do you have any further implementation considerations the AESO should consider?	The AESO published new rate estimates on July 7, 2021, which includes projections for rate XOS/XOM. This spreadsheet shows rate XOS/XOM almost doubling from the current $8.28/MWh to ~$15/MWh. This is a significant increase to a single rate class that has not been included in the current consultation or targeted mitigation discussions. In the same way that the AESO proposed to modernize rate DOS, the AESO should examine and consult on whether or not the methodology to calculate rate XOS/XOM should likewise be updated/improved.
8.	Additional comments	Heartland Generation remains concerned about the broader context of a significant tariff redesign at this time, with so many uncertain policy issues (e.g., the forthcoming *Transmission Regulation* expiry and possible fulsome review, the outstanding policy direction and/or legislative changes regarding self-supply and export, the alignment of transmission and distribution interconnections/tariffs, and the distributed generation credits methodology). There is a massive confluence of related and impactful changes in the electricity industry, and the timing due to operational/commercial pressures from COVID-19 could not be worse. The AESO should seriously consider whether a tariff design overhaul should be tabled until more of these policy/regulatory issues have been settled. As things are, it may be within the public's best interest to maintain the current bulk and regional tariff design.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Vittoria Bellissimo
Comments From:	Industrial Power Consumers Association of Alberta (IPCAA)	**Phone:**	403 966 2700
Date:	2021/07/09	**Email**:	Vittoria.Bellissimo@IPCAA.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	(i) The session was valuable. (ii) Yes.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	The AESO has covered the areas of alignment and misalignment at a high level.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	d) Somewhat not supportive. This will likely work for energy storage projects; however, the 20% load factor requirement continues to be a concern for load customers. Given this requirement, it is clear that DOS is strictly targeted at energy storage projects, not at Alberta industrial loads. Ultimately, the solution to Alberta's high transmission costs is load growth and this proposal does nothing to encourage or enhance load growth.
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	As stated previously, the 20% load factor requirement continues to be a concern for load customers. The AESO did not provide any analysis on the selection of the 20% restriction nor the rationale besides a qualitative statement. It would be helpful for customers to see the analysis that contributed to this recommendation. IPCAA is concerned with the availability of DOS service over a longer time period. For example, when load grows in an area and transmission capacity becomes constrained, making DOS unavailable. This risk and the lack of information about this risk may make the DOS option much less appealing for customers – which is especially problematic for customers who cannot afford the proposed increases in Rate DTS. Customers do not have any visibility as to when the system is anticipating stress in the area (unless they complete a routine system study which could be expensive).
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	Please see above. No additional questions at this time.

6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	e) Not supportive. It is difficult to understand why a company would sign this MOA. IPCAA is concerned that these mitigation options only offer a run-to-failure option for some of these customers. As stated previously, our long-term goal should be increasing load in Alberta. How does this help us achieve this goal?
7.	Do you have any further implementation considerations the AESO should consider?	N/A
8.	Additional comments	As stated previously, the AESO should be exploring tariff options from other jurisdictions that could potentially grow load in Alberta.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Sharmen Andrew
Comments From:	MATL Canada / MATL LLP	**Phone:**	403-818-0058
Date:	2021/07/09	**Email**:	sharmen.andrew@bhe-canada.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	Session 6B was helpful, and provided further clarity on agenda items.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	Further consultation may be required to understand the areas of alignment and misalignment relative to export opportunity services.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Not supportive. There are unanswered questions about the impact of DOS modernization and the preferred rate design on energy exports. There is a concern that the net increase in export costs could be unfair and disproportionate to the net increase in DOS costs.
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	The Estimated Rate Calculations Toll v0.2 published on July 7, 2021 by the AESO confirms that XOM/XOS costs will increase by more than the 10% threshold set by the AESO, and it does not appear that there has been consultation with stakeholders that predominantly utilize XOM/XOS services. There is a concern that DOS may be treated prefentially to XOM and XOS, specifically during the transition period. MATL is unaware of any mitigations being proposed for stakeholders that are impacted by rate changes to XOM/XOS services.

5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	1) MATL understands that the new tariff redesign will increase the cost of exporting energy from Alberta (i.e., through higher XOM/XOS charges, or additional charges beyond XOM/XOS). MATL has the following questions that need to be answered:: a) How will the AESO determine the new XOM/XOS rate, and/or other charges? The AESO has provided a calculator on July 7, 2021. Please provide an example calculation in an excel spreadsheet(with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. Please demonstrate all potential impacts to XOM/XOS within the calculator and explain how it may impact MATL and its customers. b) Will the cost increase be higher or lower when compared to services that are are recalled after XOM/XOS such as DOS? Please provide an example calculation in an excel spreadsheet (with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff, including proposed mitigations. c) The AESO has assumed in its rate calculator that the export volumes will be 130,000MWh in the future. Please explain the basis for this amount and how the AESO assessed the amount of export volumes that will result from higher XOM/XOS rates? Please demonstrate the reduced exports that will result from an increase in the XOM/XOS rates. Please provide an example calculation in an excel spreadsheet(with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. d) Is the AESO expecting an overall reduction in offsets from export opportunity service revenue? If so, by how much? e) Please list and fully explain all mitigations that will be put in place by the AESO for stakeholders impacted by the increase in XOM/XOS charges? Please also list and fully explain all mitigation that will not be put in place by the AESO and the reason for them not being considered? f) Non-firm interruptible rate class was not accepted by the AESO for DOS mitigations as described in the Session 6B on June 24, 2021. Given that XOM/XOS is already a non-firm interuptable rate class, please explain if revisiting the method for calculating XOM/XOS charge would avoid adverse impacts to exports?

		Please explain the impact if the AESO tariff were to provide firm transmission service for XOM/XOS services. 2) Will the new tariff redesign increase the cost of importing energy into Alberta (i.e., through higher IOS charges, or additional charges beyond IOS)? If yes: a) How will the AESO determine the new IOS rate, and/or other charges? Please provide an example calculation in an excel spreadsheet(with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. b) How has the AESO assessed the reduced import volumes that will result from higher IOS rates? c) With respect to the AESO's existing and future practices of operating international cross border interties, has the AESO considered compliance to the United States-Mexico-Canada Agreement (USMCA)?
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Not supportive. There are unanswered questions about the impact of DOS modernization and the preferred rate design on energy exports. There is a concern that the net increase in export costs could be unfair and disproportionate to the net increase in DOS costs.
7.	Do you have any further implementation considerations the AESO should consider?	The AESO should consider mitigations for XOM/XOS as has with DOS. There are unanswered questions about the impact of DOS modernization and the preferred rate design on energy exports. There is a concern that the net increase in export costs could be unfair and disproportionate to the net increase in DOS costs.
8.	Additional comments	MATL Canada / MATL LLP requests that the AESO consult with MATL and its customers on the proposed changes to XOM/XOS rates, as it appears that they will be materially impacted beyond the 10% threshold set by the AESO.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Horst Klinkenborg
Comments From:	Suncor Energy Inc.	**Phone:**	(403) 819-7125
Date:	2021/07/09	**Email**:	Horst.klinkenborg@suncor.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	(i) The June 24th session was not valuable to Suncor. There are disconnects between stakeholders and the AESO that cannot be rectified by an information session. (ii) a. Suncor understands what the AESO considers areas of (mis-)alignment. Suncor has concerns with the stated points of alignment regarding energy storage. See 2. b. Suncor understands the proposed revised DOS recommendation. c. Suncor understands the proposed mitigation options.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	Suncor disagrees with the first two stated points of alignment for energy storage. The remaining points seem to be actual points of alignment. Given the fundamental differences in perspectives regarding the tariff design, the items of misalignment are likely only a subset of actual misalignments. Regarding energy storage: Energy storage is as of yet not clearly defined. From a tariff perspective, the important characteristic is that energy storage is both a producer and a consumer of electricity. Energy storage should be eligible to participate in all aspects of the markets according to their capabilities. This may include the listed aspects and potentially additional aspects.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Supportive/Not supportive The revised DOS modernization is a clear improvement over existing DOS. However, neither the current DOS nor the revised DOS is the opportunity/interruptible service that consumers need or want.
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	Suncor has previously stated it's concern about the AESO's DOS design in response to Session 5B. See also 8.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	Suncor understands the recommendation.
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Not supportive. The mitigation proposals do not address the fundamental issues with the tariff design. See 8.
7.	Do you have any further implementation considerations the AESO should consider?	As previously stated in response to Session 6A, the AESO should not implement a new design and should instead file a tariff based on the existing design. This would create time to receive policy clarity and allow stakeholders to fully evaluate the appropriateness of this novel design.

8.	Additional comments	Alberta requires a tariff design that properly reflects the impact of load diversity and (non-)coincidence. According to the AESO, load shapes are a core element when planning for load on the system and when creating transmission system planning studies (https://www.aeso.ca/assets/Uploads/Session-5B-DOS-Presentation2-v2.pdf, slide 38). However, they are not adequately reflected in the tariff. Once this is rectified, a proper opportunity/interruptible service can be developped that fills the gaps. It is not inherently clear that at that point any form of targeted mitigation would be required.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Luis Pando
Comments From:	TransAlta Corporation			**Phone:**	(403) 267-3627
Date:	2021/07/09			**Email**:	Luis_Pando@transalta.com

Instructions:

1. Please fill out the section above as indicated.
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4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	***TransAlta welcomes the additional clarity provided around DOS modernization but still has concerns about some elements of the proposal.*** We appreciate the additional details provided about the modernized DOS rate and also understand that the AESO has developed this recommendation in a short period of time without much input from stakeholders. We are concerned about certain aspects of the modernized DOS rate and believe that the rate should be redesigned to address these issues, which we explain further in our response to question 3 below. While we understand that it is the intent of the AESO to work out the details and explain the detailed mechanics of the modernized DOS rate and process in a future Information Document (ID), we are concerned that capturing this important detailed information in a non-authoritative document is not affording stakeholders a fair opportunity to fully understand the AESO proposal. ***TransAlta was expecting the AESO to address all concerns raised by stakeholders before closing the consultation.*** It would have been more efficient and valuable to address all outstanding questions and explain assumptions that have been contested by stakeholders during the consultation instead of deferring this until the filing of the tariff application. There are cost savings and efficiency benefit in providing these answers within the stakeholder process where the AESO can explain its answers in a two-way dialogue with market participants rather than in a regulatory proceeding in formal, written submissions. We encourage the AESO to consider these cost and efficiency benefits before it unilaterally determines that it would prefer to answer stakeholder questions in the regulatory proceeding rather than the consultation process. TransAlta supports the implementation of targeted mitigation mechanisms. We believe that it is important to allow load customers to adjust to this new design and avoid undue rate shock. We also understand that different customers may have different preferences on mitigation mechanism. For these reasons, we encourage the AESO to be accommodative and pursue meaningful mitigation measures rather than selecting the approach that is just easiest to implement.

2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	***The session only confirmed areas of alignment and misalignment that were already evident and did not provide any answers to comments.*** The AESO confirmed what parties have already expressed throughout the consultation by identifying areas of alignment and misalignment. While we appreciate that this effort assists in issue identification for the future Alberta Utilities Commission (AUC) ISO Tariff regulatory proceeding, it does little to address when misalignments are due to lack of information. The AESO has not answered many important questions about its preferred rate design nor has it justified or presented that factual analysis that underpins the assumptions used to develop its rate design. The AESO has only stated that it intends to answer some of the concerns raised by stakeholders in its tariff application. As stated above, we disagree that the regulatory process is an efficient forum to first present this information to stakeholders and recommend that the AESO consider a stakeholder session when it has more fully developed its proposal and prior to making its regulatory filing in October. We expect the AESO to test the potential impacts of the preferred-rate design and demonstrate this unrealistic scenario of limited self-supply and exports. For this purpose, the AESO should review its Delivered Cost of Electricity study using its proposed tariff and present the results as part of the consultation. TransAlta considers that the AESO has not fully explained the following points that are the basis of its proposal: • How the preferred-rate design achieves the principle of efficient price signals, incentives load growth and avoids inefficient self-supply decisions? • The rationale behind classifying costs between demand and energy before the functionalization step. • How does the allocation of more costs to energy complies with the principle of cost causation and reflect the time of use of transmission? • How the concepts of “minimum” versus “actual” system and the use of a regional delineation and AESO’s planning areas explains drivers for transmission costs and the proposed allocation between demand and

		energy? Are these static concepts or do they change as generation and load change? • Why did NERA's report did not consider co-generation and other forms of renewable generation in its estimation of self-supply under the preferred rate design? • How does the tariff deals with the issue of abundance of existing transmission? • The rationale behind using variable charges to recover fixed transmission costs. • What is the justification for using the proposed 5-year coincident peak average and not 1-2-3-4-year averages and why should months outside summer and winter should be considered?

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	***TransAlta is somewhat supportive of the changes the AESO is proposing for a modernized DOS but still requires more information on the details to fully support the recommendation.*** As stated in our comments to Session 5B, we do not agree that the AESO should have a role in reviewing a business case under a modernized design and welcome the removal of this unnecessary requirement as it is administratively burdensome. TransAlta is somewhat supportive of the replacement of the business case with a representation but has concerns that the requirements of the latter will not entail a big difference from the current economic test nor achieve a significant red tape reduction. ***The AESO's proposal to monitor the use of DOS should be explained more clearly as this increases the risk for DOS being revoked.*** We also need more information about the AESO's monitoring of DOS misuse and how the criteria will trigger an automatic presumption of DOS misuse. Even though the AESO explained that the dispute resolution process in the ISO rules would apply, we still require information about the requirements and the reasons for a possible investigation or penalty. ***The use of historical data does not reflect the current market conditions or broader application of DOS going forward.*** We struggle with historical data being useful or reliable enough to determine a maximum load factor, particularly for energy storage. We do not have enough information to support the AESO's proposed maximum load factor or how it will be applied. As stated during the session, the assessment of the 20 per cent maximum load factor needs to consider market opportunities that may occur during the year and that will entail surpassing the maximum load factor limit, and allow market participants to explain their conduct.
4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	See our responses to 3 above.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	See our response to 3 above.

6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	***TransAlta is "somewhat supportive" with respect to its support to the targeted mitigation strategy.*** Many impacted parties have expressed concerns with the options presented by the AESO, particularly over the use of bill credits as they could be construed as a subsidy. It is also unclear whether any of these parties will choose any of the alternatives and sign a Memorandum of Agreement with the AESO as part of the application. Therefore, we recommend the AESO to continue to explore alternatives such as interruptible/opportunity rates.
7.	Do you have any further implementation considerations the AESO should consider?	***TransAlta would like clarity around the possibility for energy storage projects to qualify for modernized DOS in the future.*** TransAlta is concerned that the modernized DOS rate will, at earliest, be implement in January 2024. We believe that achieving certainty this late will negatively impact energy storage development. We ask the AESO to consider another approach such as splitting off energy storage rates so as to avoid having those rates being held up until the approval of full bulk and regional tariff redesign package.
8.	Additional comments	No additional comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Mark Thompson
Comments From:	TC Energy Corp. (TCE)	**Phone:**	403-589-7193
Date:	2021/07/09	**Email**:	markj_thompson@tcenergy.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	TCE appreciates all opportunities for stakeholder consultation. The presentation of more details regarding the AESO's DOS modernization recommendation and the mitigation options were helpful. It would have been helpful for the AESO to present the analysis to substantiate its concerns regarding Rate DTS cannibalization. TCE appreciates that the AESO revised its Estimating Rate Calculations Tool to include Rate XOS.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	Overall, TCE supports the implementation of a demand opportunity service for the charging needs of energy storage facilities. While TCE supports certain elements of the AESO's proposed DOS modernization recommendation, we do not support other elements of the recommendation.

4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	Business Case/Customer Representation The replacement of the business case with the customer representation does not address TCE's primary concern that only those energy storage assets where Rate DTS would be uneconomic can qualify for this rate. As such, TCE's FEOC and discrimination concerns remain. DTS Contract Level TCE supports the AESO's proposal to allow the customer to choose the appropriate DTS level for its project. TCE however is concerned by the AESO's statement that this choice may impact a project's ancillary service qualification. This would be inconsistent with the treatement of other generators in Alberta that are not required to maintain a specific level of firm fuel supply. 20% Maximum Load Factor TCE continues to have concerns regarding this qualification requirement. DOS Monitoring TCE is further concerned that the AESO would consider revoking Rate DOS service from a customer that exceeded this threshold on the grounds that Rate DTS would have been economic. Such a conclusion cannot be made on the basis that a customer chose to operate after exceeding the 20% load factor threshold knowing that in doing so they would be charged at a Rate DTS level because it ignores sunk costs. These sunk costs could have made a project uneconomic under Rate DTS. Revoking Rate DOS service on this basis would be inefficient as it would hinder investment.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	TCE has no further questions at this time.

6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	TCE's concerns regarding the targeted mitigation remain.
7.	Do you have any further implementation considerations the AESO should consider?	TCE has no further comments at this time.
8.	Additional comments	TCE has no further comments at this time.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021	through	July 9, 2021	**Contact:**	Kipp Horton
Comments From:	Turning Point Generation			**Phone:**	(403) 233-2259
Date:	July 8, 2021			**Email**:	Kipp.horton@windriver.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	Turning Point Generation (TPG) found the session valuable in order to further understand the AESO's proposed DOS modernization recommendation. TPG is focused upon AESO's proposed tariff treatment of energy storage including related aspects of the preferred rate design. TPG is not focused on the mitigation options and therefore has not comments on the mitigation options.
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	Yes, TPG believes there is significant misalignment on the technology agnostic treatment of energy storage. The AESO has repeatedly stated that this principle is to stand and be maintained. We believe that applying the maximum load factor to energy storage under the modernized DOS proposal is not consistent with the technology agnostic principle.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	c) Undecided

4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	Yes, TPG has two major concerns with the revised DOS modernization as it relates to treatment of energy storage. 1. Max Load Factor – TPG believes that applying a maximum load factor to energy storage applications is inappropriate and does not achieve the guiding principle of technology agnostic treatment. Specifically, the 20% maximum load factor will significantly constrain the operations of long-duration storage assets. This constraint will likely limit the responsiveness and flexibility that are inherent in these storage technologies; at the expense of increased grid reliability. If a maximum load factor is required, higher capped limits may work to mitigate these undesirable outcomes. In this regard, the AESO should recognize that energy storage and price-sensitive loads require different treatment even if both are receiving the same modernized DOS rate. 2. Energy Storage Representation for DOS Qualification – TPG understands the AESO's concerns regarding the potential defection of customers from DTS to a modernized DOS rate. Customer representations make sense for price-sensitive loads that may be trying to avoid DTS to lower costs versus seeking opportunity in available transmission system capacity to sell services to the Alberta electricity grid like energy storage. Energy storage resources participate as a generator in the wholesale energy market unlike price-sensitive loads. The AESO should recognize that energy storage and price-sensitive loads require different treatment even if both are receiving the same modernized DOS rate. Energy storage participants should not be required to provide the proposed customer representation.

5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	None.
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	No comment.
7.	Do you have any further implementation considerations the AESO should consider?	None.
8.	Additional comments	None. TPG appreciates the AESO's continued consultation on these important topics.

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

Stakeholder Comment Matrix – June 17, 2021

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B

Period of Comment:	June 17, 2021 through July 9, 2021	**Contact:**	Megan Gill
Comments From:	The Office of the Utilities Consumer Advocate	**Phone:**	403 476 4998
Date:	[2021/06/28]	**Email**:	Megan.Gill@gov.ab.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed evaluation per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **July 9, 2021**.

The AESO is seeking comments from Stakeholders on Session 6B. Please be as specific as possible with your responses. Thank you.

	Questions	Stakeholder Comments
1.	(i) Please comment on Session 6B hosted on June 24, 2021. Was the session valuable? Was there something the AESO could have done to make the session more helpful? (ii) Did you come out of Session 6B with additional clarity and a better understanding of the: a. Preferred rate design areas of alignment and misalignment? b. Revised DOS modernization recommendation? c. Mitigation options?	i) Yes the session was helpful. ii) a) Yes b) Yes c) Yes
2.	Do you think the areas of alignment and/or areas of misalignment need to include any additional elements? Please be specific.	In determining the preferred tariff design the AESO considered and modeled various alternatives. In the upcoming proceeding, the UCA would like the AESO to share the assessment criteria used when analyzing the other models and designs it considered inferior to the preferred design. This will allow the UCA to better understand how the AESO determined that the preferred rate design was the optimal choice, given the current legislative framework and cost causation principles.

	Questions	Stakeholder Comments
3.	How would you describe your level of support for the revised DOS modernization recommendation? a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	The UCA is not supportive of the revised DOS modernization recommendation. The UCA's concerns stem from the elimination of the requirement for market participants looking to procure energy at the DOS rate from needing to provide a business case clearly demonstrating the poor economics of their operations under the DTS rate. Omitting this vital screening process combined with the ability to reduce DTS contract levels opens the door to significant cannibalization of DTS revenues. While the UCA sympathizes with the need for the AESO to eliminate red tape in line with government's direction, it is important to acknowledge that this alternative proposal (i.e customer representation) will require greater AESO oversight over more market participants to ensure that DOS is being used as intended. Audits and clawbacks are all backwards looking mechanisms and not having real-time oversight of the market could potentially carry stability risk with regards to the efficiency of the wholesale market.

4.	Are there other elements of the revised DOS modernization recommendation design you support or have concerns with? Please be specific.	Combining DOS in a bid/offer process for bilateral transfers complicates administration and audit, making it difficult to ensure that the foundational economic opportunity thresholds are met in practice. It is expected that administrative costs would increase along with this increased complexity. If the AESO wishes to offer a rate that encourages the development of energy storage facilities, then a new energy storage specific rate would be more efficient and effective in avoiding cannibalization risks than the modified DOS. DOS was intended to function as an opportunity service accommodating only marginally economic business opportunities with secure protection against transactions that could otherwise have proceeded on rate DTS.. DOS was not intended to provide mitigation for increases in the cost of DTS by changing the balance of DOS/DTS consumption. Mitigation of DTS rate increases requires a direct mitigation mechanism that does not interfere with the effective application and management of DOS.
5.	Do you have additional clarifying questions that need to be answered to support your understanding of the revised DOS modernization recommendation?	It is not clear why the AESO decided to modify DOS given the revenue cannibalization risk. What function is the modified DOS intended to perform that could not be met by the original version of DOS?
6.	How would you describe your level of support for the targeted mitigation engagement outcomes? Please describe why or why not. a) Supportive b) Somewhat supportive c) Undecided d) Somewhat not supportive e) Not supportive	The UCA is supportive of the targeted mitigation engagement outcomes.

7.	Do you have any further implementation considerations the AESO should consider?	
8.	Additional comments	

Thank you for your input. Please email your comments to: tariffdesign@aeso.ca.

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July 6th, 2021

Alberta Electric System Operator
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Attention:	Michael Law	President and CEO, AESO
	Miranda K. Erickson	Vice President, Markets, AESO
	Karl Johannson	Board Chair, AESO

Re: West Fraser concerns with AESO tariff redesign and mitigation process

Dear Mr. Law, Ms. Erickson and Mr. Johannson,

We at West Fraser Mills Ltd. (WF) are writing to you regarding the ongoing rate restructuring efforts conducted at Alberta Electric System Operator (AESO). WF has participated in the AESO tariff and mitigation sessions between April and June 2021 and has invested a cumulative time equivalent of 8 working days for mid-senior level attendees in meetings and engagement sessions alone.

The new rate redesign proposed by AESO will lead to a 10 - 40% increase in transmission costs at the three divisions identified by the AESO as Highly Impacted parties. The AESO tariff presents a disruptive, run to failure option for our operations in Slave Lake, Whitecourt, and Blue Ridge. WF operates 15 divisions across Alberta – located in 11 resource-based rural communities where operational stability has a direct impact on the overall health of the community and local economy.

As requested at the last session, the Memorandum of Agreement has been marked up by WF. The information marked as Notice to draft (NTD) has been added based on our understanding and the interpretation of proposed tariffs, and the impacts that rate restructuring and proposed mitigation will have on our divisions.

WF has been a corporate leader at taking action to improve energy efficiency at our energy intensive and trade exposed operations. We have also invested in multi-million-dollar projects to increase production of bioenergy. Our flexible loads have consistently responded to peak demand, and high-power pool price, have provided ancillary services and operate as high efficiency, high load factor customers. Despite these efforts, we have seen our transmission rates more than triple over the past 10 years.

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The high-power pool price resulting from economic withholding of power in the province puts WF operations at a further disadvantage – the viability and sustainability of our energy intensive operations is threatened by the delivered cost of power.

The impact on these operations is reduced production volumes, limitations to the variety of products we make, and impacts to profitability. Interrupting operations to control costs leads to more downtime and in turn, less revenue for the AESO.

We are naturally concerned with the proposed rate redesign and the lack of reasonable approaches to mitigation. The current mitigation in our opinion is a deferral for 3 years – following which operations are left with unfair and unsustainable choices. Current paths of action include either disconnecting from the grid, or a difficult analysis of the viability of operations in Alberta. Neither option provides an efficient outcome for WF or for the grid.

The current proposed tariff essentially has high load factor customers like Pulp and Paper mills subsidizing low load factor customers like oil and gas sites with cogeneration. Referring to the AESO materials and bill impact calculators – high load factor customers will see a bill impact of greater than 30% by year 5. In some cases, this may even be higher. We need more detailed conversations on the plans to mitigate impacts. The deferral of impacts should not be labeled as mitigation. The AESO team has not presented any rate classes or instruments that would allow high load factor industrial consumers to adapt in the future.

During our engagement sessions – we have repeatedly requested the economic and technical study materials that formed the basis of the tariff redesign. These requests were made to the AESO team but with no response. This new rate design is unconventional, unproven and the implications on industry, grid economics and the Alberta socio-economy must be closely studied. In the absence of these materials, we are unable to fully understand the fundamentals employed by AESO in redesigning the tariff.

The ongoing engagement session did not provide any sensitivity analysis towards the social, governance and business risks involved because of these rate redesigns. The proposed tariffs clearly create an unfavorable economic impact on large consumers that are price responsive, high efficiency, high load factor and diversified industrial customers in province of Alberta.

WF requests that the AESO executive strongly examine the possibility of giving due consideration to customers that provide a benefit to the grid of being energy efficient and price sensitive. This can be achieved through permanent mitigation rate classes included in the new tariff. We look forward to more detailed conversations in this matter.

We look forward to your response.

Yours truly,

Keith Carter
Vice President
Pulp and Energy Operations
West Fraser Mills Ltd.

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Cc:
Shawn Vollicks, West Fraser, General Manager Slave Lake Pulp
Hardeep Khun-Khun, West Fraser, General Manager Ranger Board
Rod Albers, West Fraser, Manager, Energy and Biocarbon
Shannon Fehr, West Fraser, Engineering & Technical Manager
Colette Chekerda, ADC, Executive Director
Stephanie Clark, Government of Alberta, ADM

Stakeholder Comments on the AESO's Estimating Rate Calculations – July 16, 2021

Stakeholder comments [Posted July 22, 2021]

1. AltaLink Management Ltd.
2. Canada West Ski Areas Association (CWSAA)
3. Heartland Generation Ltd.
4. Industrial Power Consumers Association of Alberta (IPCAA)
5. MATL Canada & MATL LLP (MATL)
6. TC Energy Corp. (TCE)
7. TransAlta Corporation (TransAlta)

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Stakeholder Comments on the AESO's Estimating Rate Calculations – July 16, 2021

Company	Stakeholder Comments
AltaLink Management	• No comments on Import/export revenue • Highlight the fact that the revenue requirement values for the 2020 and 2021 test years have changed in the updated Calculations Tool (line 9, columns C and D). The values no longer tie to the 2020 and 2021 Tariff Update applications. I believe the AESOs filed Tariff 2020 and 2021 Updates included an estimate for import/export revenue; it appears, on the surface, that these amounts are now double-counted.* **The AESO responded to this comment by publishing Estimating Rate Calculations Tool v0.3 on its website on July 15, 2021.*
CWSAA	See attached submission
Heartland Generation	Question: Relatively minor, but curious about how the "Estimated DOS/XOS Rate" in cells F38 and F42, respectively, are calculated. The $15 estimates don't seem to be a simple average of the test rates (inclusive or exclusive of 2019-2021 test years). It is likely that this value is a very rough approximation without a strict associated calculation. Any information on these values and how they are calculated would be appreciated. Concerns: Further to Heartland Generations comments on Session 6B, we are concerned about the significant and material impact of the drastic increase to rate XOS. This sudden increase to rate XOS during all hours of the year will have serious repercussions to the commercial viability of exports in the vast majority of hours. This is especially true of traditionally lower-priced hours when exports could take advantage of opportunities in neighbouring markets. During these periods of depressed Alberta pool prices, exporters can remain operational and provide reliability/ancillary services/etc. products to the Alberta grid while collecting the foreign price for the majority of production. It is my understanding that the doubling of rate XOS (as this estimate indicates) will evaporate these economic opportunities by eliminating an already slim price spread. This will subsequently force Alberta generators to possibly shutoff during periods when they could have remained operational/online (and thus no longer provide ancillary support to the Alberta grid). Further, the impact of these increased rate XOS fees are felt primarily during periods of lower grid utilization and/or system stress. Charging rate XOS as a flat energy charge is contrary to logic, and at a minimum the AESO should investigate and report on the correlation between rate XOS usage and transmission system costs/stress. A possible conclusion from this report could be a profiling of rate XOS to best reflect transmission capacity/costs through time; there is inherent logic behind shaping rate XOS as different $/MWh charges at different hours of the day. The designation of rate XOS as an opportunity service best illustrates the need to modernize all opportunity service products considering the preferred tariff design. As is, the estimated rate XOS will cause market harm to an already fragile intertie relationship as exports will be further disincentivized relative to the treatment of imports.

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Company	Stakeholder Comments
	Heartland Generation requests that the AESO conduct further consultation regarding rate XOS modernization. This could begin with an AESO impact assessment of increasing the associated charges by almost double in all hours for exporters. This research should include impacts to perceived fairness between imports/exports on the intertie and consequences of disincentivizing exports on the domestic Alberta markets for ancillary services and other similar products.
IPCAA	In its spreadsheet, the AESO has used information from the 2020 Long-Term Transmission Plan based on the AESO's Reference Case to calculate Rate DTS - Rates IPCAA would recommend that: • The AESO also provide Rate DTS - Rates based on the "High Cogeneration Sensitivity" scenario. With rising carbon prices and the financial and environmental incentives for industry to install co-generation, the "High Cogeneration Sensitivity" scenario could very well materialize. • The AESO also provide an equivalent analysis for the four distribution utilities. The AESO should include the unit rates ($/kW and $/kWh) for each utility so that consumers can carry out rate impact assessments. Without this information, it will be extremely difficult for consumers to provide evidence to the AUC on potential impacts caused by the proposed tariff design.
MATL	1. MATL understands that the new tariff redesign will increase the cost of exporting energy from Alberta (i.e., through higher XOM/XOS charges, or additional charges beyond XOM/XOS). MATL has the following questions: (a) How will the AESO determine the new XOM/XOS rate, and/or other charges? The AESO has provided a calculator on July 7, 2021 & July 15, 2021. Please provide an example calculation in an excel spreadsheet (with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. Please demonstrate all potential impacts to XOM/XOS within the calculator and explain how it may impact MATL and its customers. Please provide further explanation on the rationale of the 20% multiplier applied to the Bulk & Regional System Calculations, and the 32% multiplier applied to the Ancillary Services Revenue Requirement. (b) Will the cost increase be higher or lower when compared to services that are recalled after XOM/XOS such as DOS? Please provide an example calculation in an excel spreadsheet (with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff, including proposed mitigations. (c) The AESO has assumed in its rate calculator that the export volumes will be 130,000MWh in the future. Please explain the basis for this amount and how the AESO assessed the amount of export volumes that will result from higher XOM/XOS rates? Please demonstrate the reduced exports that will result from an increase in the XOM/XOS rates. Please provide an example calculation in an excel spreadsheet (with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. (d) Is the AESO expecting an overall reduction in offsets from export opportunity service revenue? If so, by how much? (e) Please list and fully explain all mitigations that will be put in place by the AESO for stakeholders impacted by the increase in XOM/XOS charges? Please also list and fully explain all mitigation that will not be put in place by the AESO and the reason for them not being considered.

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Company	Stakeholder Comments
	(f) Non-firm interruptible rate class was not accepted by the AESO for DOS mitigations as described in the Session 6B on June 24, 2021. Given that XOM/XOS is already a non-firm interruptible rate class, please explain if revisiting the method for calculating XOM/XOS charge would avoid adverse impacts to exports. Please explain the impact if the AESO tariff were to provide firm transmission service for XOM/XOS services. 2. Will the new tariff redesign increase the cost of importing energy into Alberta (i.e., through higher IOS charges, or additional charges beyond IOS)? If yes: (a) How will the AESO determine the new IOS rate, and/or other charges? Please provide an example calculation in an excel spreadsheet(with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. (b) How has the AESO assessed the reduced import volumes that will result from higher IOS rates? (c) With respect to the AESO's existing and future practices of operating international cross border interties, has the AESO considered compliance to the United States-Mexico-Canada Agreement (USMCA)? With these comments, MATL Canada & MATL LLP is also reiterating its request that the AESO consult with MATL and its customers on the proposed changes to XOM/XOS rates, as there will be a material impact beyond the 10% threshold set by the AESO. MATL is available to discuss the above questions and comments. Due to vacation schedules, anytime after August 10 would be the best time to schedule a consultation.
TCE	The updated rate estimate included for the first time the impact to Rate XOS resulting from the AESO's proposed Bulk & Regional rate design. The following comments are with respect to Rate XOS. As a Rate XOS customer, TC Energy is concerned that the proposed rate design will cause Rate XOS to increase by approximately 80%. This is substantial and can be expected to significantly impact future export opportunities. TC Energy is further concerned that Rate XOS will be inconsistent with prior Commission rulings and cost causation. As a result, we recommend that the AESO consult with parties specifically with respect to Rate XOS. TC Energy has the following questions with respect to Rate XOS: 1. What mitigation measures will the AESO propose for Rate XOS customers that will see an 80% rate impact? 2. What impact will this rate increase have on future exports?
TransAlta	TransAlta appreciates the AESO revised Estimated Rate Calculations Tool but has concerns with the lack of information on the rate for export opportunity services. The estimates provided by the AESO include a significant increase to rate XOS/XOM from the current ~ $8/MWh to ~$15/MWh. TransAlta recommends the AESO to hold further consultation to openly discuss with stakeholders its proposal for rate XOS/XOM including a discussion about any analysis that the AESO has performed on cost-causation including any alternatives that were considered as the methodology behind this proposed XOS/XOM rate. The AESO has not justified the proposed increase to rate XOS/XOM in terms of cost causation and efficient price signals and has not provided information about the impact of the preferred rate design on energy exports. It is unclear how the change to allocate more costs to the energy component is reasonably driven by exporting electricity from the province. The AESO is sending a price signal that represents a significant change to the economics of exporting. We are concerned that this rate change will have unintended consequences and would

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Company	Stakeholder Comments
	like to understand the AESO's analysis of how this change could impact export activity. The substantial increase in rate XOS/XOM could potentially reduce demand to export which in turn may reduce the contribution from XOS/XOM to transmission costs and create a shortfall that needs to be recouped from other customers. The AESO must demonstrate that its proposed rate XOS/XOM is not discriminatory and is not treating customers unfairly. We recommend that the AESO explain stakeholders how it determined the appropriateness of applying such a significant increase in the energy charge for the new XOM/XOS rate and provide any analysis that was undertaken of the expected impacts of the proposed change to export activity. We wish to understand the basis for the AESO's estimate that export volumes will be 130,000 MWh/year and will remain at that level for future years and request the analysis that was conducted to determine this estimate. We are concerned with the distorting effect that such a high export rate could have on the wholesale market, which will reduce the attractiveness of and opportunity for export sales, and could result in higher costs to Albertans - Alberta generators would be even more reliant on the Alberta market to earn all of their revenues. Furthermore, we recommend that the AESO consider phasing in this rate over time to provide the market time to adjust to this significant increase in rate just as it is doing with other industrial customers that are being impacted with costs that are greater than 10% of the current rate. Finally, it is unclear whether the new tariff redesign will increase the cost of importing energy into Alberta through higher IOS charges. The AESO should provide this information before filing its tariff, including details about how will the AESO determine the new IOS rate, and/or other charges and assessment of impact on import volumes that will result from higher IOS rates.

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CWSAA – Comments & Questions Regarding AESO Updated Rate Estimates

SUMMARY

" Comments and questions regarding the updated rate estimates can be submitted by email to tariffdesign@aeso.ca by July 16, 2021. "

The vast majority of Alberta's electricity consumers receive a flow-through of the AESO's transmission tariff through their local distribution company. The AESO's preferred tariff structure would have potentially major impacts, which can only be assessed by using a distribution flow-through version of that tariff. The information provided by Fortis, EPCOR and ENMAX is insufficient to carry out the required impact assessments; the actual tariff rate sheets are necessary.

The companies also have an inconsistent jumble of demand ratchet policies, which are being applied to AESO bulk tariff charges which have no demand ratchet. This monstrous regulatory inefficiency must be addressed, lest customers literally across the street from one another receive radically different impacts from the single, standard provincial transmission tariff.

With the AESO's coordination, the distribution companies will surely cooperate in providing this information; if cooperation is not forthcoming, the AUC's guidance may be necessary.

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1 CONTEXT OF COMMENTS

> "The Commission expects parties to provide evidence of the potential impacts of any proposed bulk and regional tariff rate design as part of the Commission's consideration of the application." [1]

The AESO's bill impact tool will be very useful for parties who are served at the transmission level. Unfortunately this tool is of no assistance in assessing potential impacts on the majority of Alberta's electric system customers, who are served through distribution utilities' unique versions of the standard, province-wide AESO tariff.

The industry's fragmentation into separate transmission and distribution entities has led to significant seams issues between the two areas, some of which are currently under regulatory review. The AESO tariff flow-through is another such seams issue which must be addressed in order for customer representatives to estimate and analyze these potential rate impacts.

2 DISTRIBUTION UTILITIES ARE INDIFFERENT TO TRANSMISSION FLOW-THROUGH

Ever since PBR Decision 2012-237, para. 666:

> …the AESO related cost items will be dollar-for-dollar flow-through items in the [electric distribution] companies' PBR plans "

The electric distribution companies can neither gain nor lose in this flow-through process, and should therefore be supportive of any calculations and analysis required for its implementation.

3 ASSESSING THE DIFFICULTY OF ESTIMATING DISTRIBUTION FLOW-THROUGH RATES

One might hypothesize that all the data required to estimate distribution flow-through rates under the AESO's preferred tariff design is already available, and it should be a simple matter for customer representatives to calculate these rates in their impact analysis.

To test that hypothesis, the appended analysis reviews the publicly available data and calculation tools.

[1] 25175_X0142_2021-06-01 AUC letter - Ruling on the Alberta Electric System Operator extension request _000175, para.9

[1] The existing and preferred AESO DTS rates are known, and

[2] the forecast DTS & DT rate class billing determinants are said to be available in the annual PBR rate adjustment proceedings.

[3] In those PBR applications, both FortisAlberta and EPCOR Distribution & Transmission provide forecast transmission revenues by rate class, which can be compared to the revenue forecasts provided in the AESO impact analysis. For unknown reason(s), the numbers do not match, and the variances seem quite random.

[4] To assess the overall rates process, the current transmission rate can be compared to the rates implied in the companies' AESO tariff impact analysis.

The residential rate class is universally billed on a ¢/kWh basis for transmission charges, which simplifies the analysis. The implied rate as per the impact analysis can be calculated by taking the stated revenues and dividing them by the PBR forecast. (Except for ATCO, whose impact analysis has not yet been provided).

The result is somewhat disconcerting: the numbers don't match, by a significant amount.

	Total 2019 DTS (On Currently Approved AESO Structure)	2021 Energy (kWh)	Implied Unit Rate	Current Tariff Rate	$ Difference	% Difference
	[A]=Data	[B]=Data	[C]=[A]/[B]	[D]=Data	[E]=[D]-[C]	[F]=[E]/[D]
ATCO Electric Inc.	< Not Provided >	1,400,729,231				
ENMAX Power Corp.	$ 112,475,630	3,044,093,073	$ 0.03695	0.038763	$ 0.0018	4.7%
EPCOR Distribution & Transmission Inc.	$ 77,126,402	2,316,573,488	$ 0.03329	0.03610	$ 0.0028	7.8%
FortisAlberta Inc.	$ 139,040,000	3,339,937,368	$ 0.04163	0.04394	$ 0.0023	5.3%

This analysis in no way suggests that the companies have made any errors in their calculations. There are no doubt several calculation errors in the analysis above, which a technical expert who works with these calculations on an everyday basis would be able to identify.

Its purpose is only to demonstrate that it is extremely difficult to confidently calculate the transmission unit rates that the companies must have used in their internal calculations. The only way in which the typical bill impacts could have been accurately calculated is if the companies had worked out the actual tariff unit rate components. Since this information must already exist, the distribution companies should kindly provide it (with the possible exception of ATCO Electric, which does not appear to have provided any tariff impact analysis).

Without knowing the electric distribution companies' flow-through rates, it is extremely difficult for parties to estimate the customer impacts of the AESO's preferred tariff design option.

4 INCONSISTENCY OF COMPANIES' TRANSMISSION TARIFF FLOW-THROUGH

Both the current and the preferred AESO tariff structures recover bulk / demand related charges through a monthly unratcheted billing determinant. However the distribution utilities have a collectively chaotic jumble of ratchet policies, summarized in the following table. **ATCO Electric** consistently uses an 85% X 12 month ratchet, **ENMAX Power** consistently uses a 90% X 12 month ratchet, while **EPCOR** covers all alternatives.

In **Fortis'** 2012-2014 Phase II Distribution Tariff proceeding (ID 2363, Decision 2014-018), the Commission concluded "that mirroring of the AESO's charges in Fortis' rates is consistent with cost causation" [¶175] and as a result Fortis is the only company that mirrors the AESO's current and proposed rate structures for its general service rate classes.

	TREATMENT OF UNRATCHETED TRANSMISSION CHARGE (Bulk / Demand)				
		Monthly	85% X 12 Mon	90% X 12 Mon.	90% X 24 Mon.
FAI	RATE 22 - FARM SERVICE – DEMAND METERED		X		
FAI	RATE 41 - SMALL GENERAL SERVICE	X			
FAI	RATE 45 - OIL & GAS SERVICE		X		
FAI	RATE 61 - GENERAL SERVICE	X			
FAI	RATE 63 - LARGE GENERAL SERVICE	X			
EDTI	Commercial/Industrial 50 kVA to <150 kVA			X	
EDTI	Commercial/Industrial 150 kVA to <5,000 kVA		X		
EDTI	Primary Commercial/Industrial 150 kVA to <5,000 kVA		X		
EDTI	Commercial/Industrial Greater than 5,000 kVA				X
EDTI	Commercial/Industrial Greater than 5,000 kVA Totalized				X
EPC	Rate D300 - Medium Commercial			X	
EPC	Rate D310 - Large Commercial - Secondary			X	
EPC	Rate D410 - Large Commercial - Primary			X	
AE	Rate D21 - Standard Small General Service		X		
AE	Rate D24 - Standard Small General Service - Isolated Industrial Areas		X		
AE	Rate D31 - Large General Service / Industrial - Distribution Connected		X		
AE	Rate T31 - Large General Service / Industrial - Transmission Connected		X		
AE	Rate D32 - Generator Interconnection & Standby Power		X		
AE	Rate D34 -Large General Service / Industrial - Isolated Industrial Areas		X		
AE	Rate D41 - Small Oilfield and Pumping Power		X		
AE	Rate D44 - Small Oilfield and Pumping Power - Isolated Industrial Areas		X		

The AESO's preferred tariff structure greatly increases the importance of knowing the individual tariff rate components. The unratcheted 'bulk' system charge is dropping by 41% while ratcheted 'regional' system charge is dropping by 23%; this is offset by a 367% increase in the energy charge.

With such massive dislocations occurring, accurate end user rates are essential. Most customers' consumption shows some degree of seasonality, and the preferred tariff structure would greatly alter the costs flowing from seasonal usage.

The Commission has directed Fortis to flow the 'bulk' system charge through to end use customers using "CWSAA's proposed new billing determinant of un-ratcheted 'kW of billing period capacity' for rates 61 and 63." [2014-018 ¶175] The 'kW of billing period capacity' is simply 'the highest metered kW demand in the billing period', a value which is readily available for all demand-metered customers.

The Electric Utilities Act contains a clear policy statement regarding the AESO tariff, that

> (3) The rates set out in the tariff
>
> (a) shall not be different for owners of electric distribution systems, customers who are industrial systems or a person who has made an arrangement under section 101(2) as a result of the location of those systems or persons on the transmission system, and
>
> (b) are not unjust or unreasonable simply because they comply with clause (a).

It is of course reasonable that the AESO tariff flow-through by electric distribution companies reflect local system realities; but these inter-company differences appear to be historical accidents, left unaddressed ever since the change in AESO tariff structure in 2006. This is surely an opportunity to improve regulatory efficiency by adopting a consistent tariff flow-through approach.

Without prejudice as to the ultimate outcome, customers need to assess the potential impacts of a more accurate, harmonized tariff flow-through. This should be provided as an alternative scenario, in addition to rates under the current companies' tariff structures.

5 RELIEF REQUESTED – AESO COORDINATION OF ANALYSIS

What is required is a set of System Access Service rate schedules from each of the utilities, with all the required unit rates populated using the AESO's preferred tariff design, and a narrative defining the specific data sources and calculations used. These unit rates must already exist, given that the companies have calculated typical bill impacts.

The AESO is responsible for its tariff application, and for enabling parties to assess the impacts of its proposals. The AESO is therefore responsible for coordinating with the electric distribution companies to provide the flow-through rates that are required to assess "the potential impacts of any proposed bulk and regional tariff rate design."
In the unlikely event that the companies were not cooperative, the AESO could seek guidance from the AUC. In the unlikely event that the AESO is unwilling to provide this coordination, the parties could approach the AUC with a request that the necessary unit rates be provided.

6 TECHNICAL REVIEW OF DATA & CALCULATION TOOLS AVAILABLE

The required data and calculation tools are described in the identically worded notes to the three utilities' rate impact calculations (see endnote): [i]

1. "Analysis completed by <Company> based on its Transmission Cost Allocation method and Rate Design to DT rate classes as currently approved by the Commission."

2. "Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in <Company's> 2021 Annual PBR rate filing) as summed across all <Company's> D-connected PODs."

To summarize, the two inputs are prices and volumes:
[1] the AESO 2019 DTS rates, and
[2] the forecast DTS & DT rate class billing determinants [per PBR filings]. [2]

The two calculation processes are allocation and rate design:
[3] the Transmission Cost Allocation method (to rate classes), and
[4] the Rate Design method.

6.1 AESO 2019 DTS Rates

The AESO 2019 DTS rates are publicly available, per the AESO (see for example the Bill Calculation Tool, tab "Adjust Load Profile") :

Connection Charge					
Bulk System Charge					
3(a)	Coincident metered demand	$10,087.00	/MW/month	$5,980.00	/MW/month
Regional System Charge					
3(b)	Billing capacity	$2,668.00	/MW/month	$2,055.00	/MW/month
Energy Charge					
3(c)	Metered energy	$2.18	/MWh	$10.19	/MWh

[2] "Forecast billing determinants are generally used to allocate K, K-bar, Y and Z factors to rate classes and to calculate the resulting rate adjustments." [25843_X[]_25843-D01-2020 Fortis 2021 Annual PBR Rate Adjustment_000103 ¶ 39, see also 25864_X[]_25864-D01-2020 AE 2021 Annual PBR Rate Adjustment_000055 ¶ 35, and 25865_X[]_25865-D01-2020 EPC 2021 Annual PBR Rate Adjustment_000060 ¶ 32]

6.2 Forecast DTS & DT rate class billing determinants

[2] Forecast DTS & DT rate class billing determinants are available in the annual PBR filings:

Proceeding	Description
25866	EDTI 2021 Annual PBR Rate Adjustment Filing
25865	ENMAX Power Corporation 2021 PBR Rate Adjustment Application
25864	ATCO Electric 2021 Performance Based Regulation ("PBR") Rates Application
25843	FortisAlberta 2021 Annual Rate Adjustment Filing

However the availability of information differs greatly between the four companies.

- FortisAlberta provided a 'bottom up' transmission cost, revenue and annual transmission rate update (TACDA) together with the load forecast as part of its annual PBR filing ID 25843. [3]
    - Note that Fortis uses (unratcheted) 'Monthly non-coincident peak demand' to allocate bulk system transmission charges. [ii]
    - The other three companies use the same ratcheted billing demand approach for both bulk and regional charge recovery (discussed above).

- EPCOR Distribution & Transmission also provided a 'bottom up' transmission update together with the load forecast. [4]

- ATCO Electric provided a 'top down' 2021 transmission rate update in its 2021 PBR application, applying "a scaling approach to its 2020 transmission rates approved in Decision 25645-D01-2020."[5]

- ENMAX Power did not address transmission rate updating in its 2021 PBR application. [6]

[3] "64. In its application, Fortis requested approval of its 2021 SAS rates, to be effective January 1, 2021.56 Fortis indicated that its proposed 2021 SAS rates reflect the rates applied for by the AESO in Proceeding 26054…."
"65. Fortis indicated that to determine the rate class-specific changes in the transmission access component for distribution-connected rate classes, it used the methodologies from its last Phase II distribution tariff application, approved in Decision 2014-01860 and the associated compliance filing, Decision 2014-224."
[4] 25866_X[]_25866-D01-2020 EDTI 2021 Annual Performance-Based Regulation Rate Adjustment, ¶ 59
[5] 25864_X[]_25864-D01-2020 AE 2021 Annual PBR Rate Adjustment, ¶ 49
[6] 25865_X[]_25865-D01-2020 EPC 2021 Annual PBR Rate Adjustment, ¶ 32

6.3 Transmission Cost Allocation method (to rate classes)

The Fortis and EPCOR forecasts contain transmission rate class revenue forecasts which can be compared with the forecasts provided in the AESO impact analysis, as follows. (Note that the % differences are quite irregularly distributed.)

FORTIS ALBERTA INC.

25843_X0005.01_Schedule 3.2 2021 Updated Transmission Cost Allocation - Tab 3.2B DTS Connection

Summary of Transmission Costs by Rate Class ($ 000)

Line	Rate Class Description	Total AESO DTS Charges [A]=Data	Total 2019 DTS (On Currently Approved AESO Structure) [B]=Data	$ Difference [C]=[B]-[A]	% Difference [D]=[C]/[B]
1	Residential	$ 137,071	$ 139,040	$ 1,969	1.4%
2	FortisAlberta Farm	$ 28,011	$ 28,269	$ 258	0.9%
3	REA Farm	$ 23,287	$ 23,575	$ 288	1.2%
4	FortisAlberta Irrigation	$ 17,162	$ 16,637	$ (525)	-3.2%
5	Exterior Lighting	$ 1,964	$ 1,956	$ (8)	-0.4%
6	Small General Service	$ 53,749	$ 56,522	$ 2,773	4.9%
7	Oil and Gas	$ 24,216	$ 25,391	$ 1,175	4.6%
8	General Service	$ 208,561	$ 230,570	$ 22,009	9.5%
9	Large General Service	$ 110,269	$ 113,876	$ 3,607	3.2%
10	Distribution-Connected	$ 604,291	$ 635,836	$ 31,545	5.0%

EPCOR DISTRIBUTION & TRANSMISSION INC.

25866_X0007.01_Appendix E - 2021 SAS COSS_Blackline, Tab SAS-1a 2021

Table 2 - SAS Revenue Requirement Allocated to SAS Rate Classes

	Revenue requirement w/o DC and CST	Total AESO DTS Charges [A]=Data	Total 2019 DTS (On Currently Approved AESO Structure) [B]=Data	$ Difference [C]=[B]-[A]	% Difference [D]=[C]/[B]
1	Residential	$ 79,956,127	$ 77,126,402	(2,829,725)	-3.7%
2	< 50kVA	$ 25,662,480	$ 24,725,583	(936,897)	-3.8%
3	50 to 149 kVA	$ 34,863,775	$ 33,609,945	(1,253,830)	-3.7%
4	150 to 4,999 kVA	$ 65,514,148	$ 63,044,365	(2,469,783)	-3.9%
5	Direct Connects *	$ 10,560,340	$ 10,282,842	(277,498)	-2.7%
6	150 to 4,999 - Primary	$ 22,882,916	$ 21,321,132	(1,561,784)	-7.3%
7	>5,000 kVA - Primary (CS)	$ 23,075,648	$ 22,059,494	(1,016,154)	-4.6%
8	CST *	$ 7,511,504	$ 7,347,761	(163,743)	-2.2%
9	Street Lights	$ 805,593	$ 1,059,008	253,415	23.9%
10	Traffic Lights	$ 119,524	$ 118,991	(533)	-0.4%
11	Lane Lights	$ 50,458	$ 49,369	(1,089)	-2.2%
12	Security Lights	$ 69,940	$ 68,725	(1,215)	-1.8%
13	**Total**	271,072,454	260,813,617	(10,258,837)	-3.9%

There are surely good reasons for these differences, but considerable research appears necessary in order to elucidate their causes; the data come from different sources at different times, involving several different years and critical adjustments like loss factors between the point of delivery and the customer meter.

Since there are no specific sources listed for the companies' calculations, the search for understanding may be prolonged. For ENMAX and ATCO, the challenge is somewhat greater given the lesser amount of available information.

6.4 The Rate Design method

For rate classes billed on energy only (residential, small commercial…), calculating unit rates under the existing and proposed rates should in principle be simple. We need only divide the calculated dollar amounts by the kWh energy forecast to obtain the two rates.

The energy data source is "the forecast DTS and DT rate class billing determinants (as approved in <Company's> 2021 Annual PBR rate filing) as summed across all <Company's> D-connected PODs."

Proceeding	Description	Source File	Reference	2021 kWh
25864	ATCO Electric 2021 Performance Based Regulation ("PBR") Rates Application	25864-X0051, AE-AUC-2020NOV26-001(b) Attachment 3, Appendix I, schedules S.1-S.3	2.1 Summary of Billing Determinants by Revenue Class - Cell I13	1,400,729,231
25865	ENMAX Power Corporation 2021 PBR Rate Adjustment Application	25865_X0046_Appendix 5 - Rate Schedules_000046	13.0 2020-2021 Monthly Billing Determinants and Q Factor Supporting Calculations - Cell AD13	3,044,093,073
25866	EDTI 2021 Annual PBR Rate Adjustment Filing	25803_X0016_EDTI-AUC-2020SEP14-003 Attachment 1_000016	2.0 Revenue True-up of The Previous TAC Annual Rider - Cell D31 (from Sch. 9.0)	2,316,573,488
25843	FortisAlberta 2021 Annual Rate Adjustment Filing	25843_X0007_Schedule 2.4 A to D - 2021 Billing Determinants and Analysis_000007	2.4-B 2021 BD Comparision - Cell H12	3,339,937,368

Taking the revenue data provided by the companies in their impact analyses, "Total 2019 DTS (On Currently Approved AESO Structure)", and calculating a ¢/kWh unit rate that can be compared to current tariffs, we have: [7]

	Total 2019 DTS (On Currently Approved AESO Structure)	2021 Energy (kWh)	Implied Unit Rate	Current Tariff Rate	$ Difference	% Difference
	[A]=Data	[B]=Data	[C]=[A]/[B]	[D]=Data	[E]=[D]-[C]	[F]=[E]/[D]
ATCO Electric Inc.	< Not Provided >	1,400,729,231				
ENMAX Power Corp.	$ 112,475,630	3,044,093,073	$ 0.03695	0.038763	$ 0.0018	4.7%
EPCOR Distribution & Transmission Inc.	$ 77,126,402	2,316,573,488	$ 0.03329	0.03610	$ 0.0028	7.8%
FortisAlberta Inc.	$ 139,040,000	3,339,937,368	$ 0.04163	0.04394	$ 0.0023	5.3%

The AESO's proposal represents major tariff structure change which cannot be assessed by simple rate class % impact calculations. Particularly for seasonal customers (which the CWSAA's ski hill members all are) it is essential to have the actual transmission tariff flow-through rate structures for impact assessment.

All that is needed here is for the four distribution utilities to make public the calculations which three of them have already completed but not disclosed. The three co-operating distribution utilities (EDTI, EPC and FAI) have all provided the same format of information, which speaks to a degree of helpful coordination for which AESO no doubt deserves the credit.

In particular, the estimated impacts on low / typical / high usage customers could only be calculated if unit rates ($ / kW, $ / kWh) had been calculated. Please provide those unit rates, so that customers can carry out rate impact assessments.

There are at least four possible resolutions to this situation:

[A] The AESO could coordinate the four distribution utilities' voluntary provision of this information, and if full cooperation is not forthcoming then

[B] The AESO could itself carry out these calculations, which would ensure transparency and broad access to consistent estimates. Presumably the AESO would itself have understood, reviewed and confirmed the distribution utilities' calculations, and would have the expertise to carry out these calculations as needed.

[C] Industry participants could individually carry out these calculations, likely with different results depending on assumptions made, which could well waste considerable time in the regulatory process as the varying customer impact calculations would then need to be compared through litigation.

[7] Sources: https://www.enmax.com/ForYourBusinessSite/Documents/2021-07-01-DT-Tariff-Rate-Schedule.pdf
https://www.epcor.com/products-services/power/rates-tariffs-fees/Documents2/sas_april2021.pdf
https://www.fortisalberta.com/docs/default-source/default-document-library/2021-july-rates-options-and-riders.pdf?sfvrsn=7eaf9e1b_4

[D] Any party could presumably make a motion in Proceeding 25175 requesting that the AESO or the distribution utilities be directed to provide the necessary customer level rates, so that consistent impact assessments can be carried out by the industry.

ENDNOTES

[i] **Electric distribution companies' statements re: transmission cost allocation & rates:**

FortisAlberta Inc.

1. Analysis completed by FortisAlberta based on its Transmission Cost Allocation method and Rate Design to DT rate classes as currently approved by the Commission.

2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in FortisAlberta's 2021 Annual PBR rate filing) as summed across all FortisAlberta D-connected PODs .

ENMAX Power Corp.

1. Analysis completed by EPC based on its Transmission Cost Allocation method and rate design to DT rate classes as currently approved by the Commission.

2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in EPC's 2021 Annual PBR rate filing) as summed across all EPC D-connected PODs.

EPCOR Distribution & Transmission Inc.

1. Analysis completed by EPCOR based on its approved System Access Service Cost of Service and Rate Design methodology.

2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in EPCOR's 2021 Annual PBR rate filing) as summed across all EPCOR Distribution-connected PODs

[ii] **FortisAlberta – Transmission Cost Allocation Summary**

25916_X[]_25916-D01-2021 Fortis 2022 Phase II Distribution Tariff Application_000272

Table 2. Summary of transmission cost allocation for distribution-connected load

AESO tariff billing components (i.e., becomes Fortis's sub-functionalization)	AESO tariff billing determinants	Fortis's classification of transmission charges	Fortis's allocation method
[A]	[B]	[C]	[D]
Bulk system demand charges	Coincident system peak demand	Monthly non-coincident peak demand	Rate class forecast monthly coincident peak demand, based on 3-year average of historical load settlement data
Billing capacity and point of delivery (POD) charges	Per POD billing capacity[11]	Annual non-coincident peak demand	Rate class forecast monthly non-coincident peak demand, based on three-year average of historical load settlement data and ratcheted to 90 per cent (to align with the AESO's per billing capacity charges)
Metered energy charges (including the DTS tariff's Bulk System, Local System, Operating Reserve, and Voltage Control Metered Energy charges)	Metered energy	Metered energy	Rate class forecast metered energy
Other transmission charges (including Demand Under-Frequency Load Shedding Credit and Interchange costs)	Monthly capacity and metered energy	Metered energy	Rate class percentage of total demand transmission services charges

Source: Exhibit 25916-X0001, application, paragraphs 97-103, 108-116, and Exhibit 25916-X0121, Attachment FAI-AUC-2021JAN15-001.01.

Bulk and Regional Tariff Design Session 6B Summary

Bulk and Regional Tariff Design Stakeholder Engagement Session 6B hosted on June 24, 2021

I. Purpose and objectives of the session

The purpose of the session is to engage stakeholders in a discussion of the AESO's targeted mitigation discussion outcomes, Session 5B (DOS) and Session 6A stakeholder feedback, and areas of alignment. The session objectives include:

- Provide an overview and seek stakeholder input on the outcomes of the targeted mitigation engagement
- Share our learnings and seek stakeholder input on Session 5B (DOS) and Session 6A stakeholder feedback and areas of alignment
- Present and discuss implementation considerations
- Seek to understand outstanding stakeholder concerns

II.Session agenda

Time	Agenda Item	Presenter
8:00 – 8:15	Welcome, introduction, purpose, and session objectives	AESO / Stack'd
8:15 – 9:00	Targeted mitigation engagement • Mitigation process and outcomes • Mitigation options • Mitigation next steps • Q&A	AESO
9:00 – 10:00	DOS modernization recommendation feedback and revisions (Session 5B) • Summary of learnings and feedback themes • Revisions to the DOS modernization recommendation resulting from feedback • Q&A	AESO
10:00 – 10:30	Break	
10:30 – 11:10	DOS modernization recommendation feedback and revisions (Session 5B) cont. • Summary of learnings and feedback themes • Revisions to the DOS modernization recommendation resulting from feedback • Q&A	AESO
11:10 – 11:30	What we heard – Session 6A • Summary of learnings • Q&A	AESO

Public

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11:30 – 12:00	Areas of alignment and misalignment • Summary • Q&A	AESO
12:00 – 12:20	Break	
12:20 – 12:30	Implementation considerations • Q&A	AESO
12:30 – 1:00	Session close-out and next steps • Rate sheets written consultation • Overall engagement survey • AESO application and the AUC process • Q&A	AESO

III. Attendees

Company
2332823 Alberta Ltd.
Alberta Direct Connect Consumers Association (“ADC”)
Alberta Electric System Operator (“AESO”)
Alberta Newsprint Company (“ANC”)
Alberta Utilities Commission (“AUC”)
AltaLink Management Ltd.
AltaSteel Inc
ATCO Electric
Best Consulting Solutions Inc.
BluEarth Renewables Inc.
Brubaker & Associates, Inc. on behalf of ADC
Canadian Renewable Energy Association (“CanREA”)
Capital Power
Chapman Ventures Inc.
Consumers Coalition of Alberta (“CCA”)
City of Grande Prairie
City of Medicine Hat
City of Red Deer
Customized Energy Solutions
DePal Consulting Limited
Dow Chemical Canada ULC

Public

Company
DZE
Enel NA
Energy Storage Canada
ENMAX Corporation
EPCOR Distribution & Transmission Inc.
ERCO Worldwide
FortisAlberta Inc.
Heartland Generation Ltd.
Industrial Power Consumers Association of Alberta (“IPCAA”)
Lionstooth Energy
MATL Canada / MATL LLP
Millar Western Forest Products
Morgan Stanley
Palezieux Regulatory Solutions Inc.
Power Advisory LLC
Rodan Energy Solutions
Solas Energy Consulting Inc.
Suncor Energy Inc.
TC Energy
The Office of the Utilities Consumer Advocate (“UCA”)
TransAlta Corporation
Turning Point Generation
URICA Asset Optimization
West Fraser Mills Ltd
Weyerhaeuser
Wolf Midstream Inc.
Stack’d Consulting, Inc.
Attendees by phone
15878894627

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IV. Overall outcomes from the day

The main objective of the session was for the AESO to engage stakeholders in a final discussion regarding AESO's preferred rate design and address outstanding stakeholder concerns prior to submission of the application to the Alberta Utilities Commission (AUC or Commission). Participants engaged in discussion and overall, the majority of stakeholders felt that this was a valuable session that allowed them to share their feedback.

V. Session highlights

Captured below are the highlights of the questions and discussion on a topic-by-topic basis. For a detailed review of the session, please refer to the session recording, posted at www.aeso.ca.

Topic 1: Targeted Mitigation Engagement

i. Stakeholder commentary

- Clarifying comments:
  - *IPCAA:* Why would a company sign this Memorandum of Agreement (MOA)? The AUC is not likely to allow greater than 10 per cent rate shock and these options are not helpful to the impacted companies.
  - *IPCAA:* This is a run-to-failure option for some of these customers. How does this help our overall goal of increasing load in Alberta in the long term? Are we going to lose these loads and if we are, what contribution are we losing to the grid? Why are we going after these customers so hard, I would rather keep them on the system and have them pay what they pay.
  - *Best Consulting Solutions:* You use Bill Credit instead of Invoice Credits, is there a reason? or difference?
  - *UCA:* Why not just the bill credit on energy? Simple, accurate and avoids torturing DOS structure and intent.
  - *ERCO:* what is the downside risk to the most impacted customers of not signing the MOA?

ii. AESO clarification

- Response to clarifying comments:
  - The reason why the AESO started this mitigation process is because we think that, if the significantly impacted parties are in agreement that the options are valuable, that will create greater weight to the options that go forward and potentially make it easier for the Commission to accept them.
    - These customers have shown that they are elastic to electricity costs and prices and have responded historically. This mitigation will allow them the period of transition to respond as they historically have done. The AESO views mitigation as a transition mechanism to lessen rate shock.

Public

- Regarding the use of terminology, there is no difference between Bill Credits and Invoice Credits.
- Regarding bill credits, some parties have identified that bill credits aren't a feasible option for them. The mitigation option of DOS gives companies a transitionary time to change their operations.
- Regarding the MOA, the options that go forward with our application hold more weight if customers sign the MOA. If parties don't sign on the MOA, the AESO will still include options for mitigation.

Topic 2: DOS modernization recommendation feedback and revisions (Session 5B)

i. Stakeholder commentary

- Clarifying questions:
  - *UCA:* How often would the audit for companies occur?
  - *CanREA:* What is the smallest DTS (Demand Transmission Service) contract that the AESO can handle? Less than 1 MW?
  - *TC Energy:* The AESO has said there is no business case underlying the representation. This contradicts the fact that there must be a business case that suggests that in order to receive DOS, the project is not feasible under rate DTS. If the party has already made the representation that DTS is infeasible, I don't actually know that you're going to get cannibalization, but it does limit revenue. For certain opportunities, it looks like we'd be exceeding 20 per cent, but not by a lot. Has the AESO done any analysis at, for example, 25 per cent?
  - *CCA:* We recognize there could be potential a DOS energy revenue increase. However, could the introduction of DOS trigger reductions in existing DTS contract levels and what would be the net revenue impact of these two effects?
  - *CanREA:* If a customer is already operating under DTS, how do they justify that they will only operate under DOS?
  - *Best Consulting Solutions:* If the customers are not required to take all the DOS energy, how does bidding assist the AESO?
  - *CanREA:* Can the AESO explain or soon provide examples of bidding related to DOS in combination with: 1) matched-asset method, where bids need to be less than lowest offer and 2) Variable Energy Resource (VER) block method, for hybrid resources where $0 offers are used for wind/solar energy?
  - *TransAlta:* On Slide 52 (DOS monitoring), how is the criteria established? What would constitute a violation of the criteria and what would be the opportunities for the customer to rebut that presumption? Can the AESO provide more context on the criteria?
  - *Capital Power:* The AESO is responsible for the final determination, but there are instances where a higher energy charge is worth it to chase a market opportunity that is not day in day out. Would the AESO view that as a mitigating circumstance through their regular monitoring or would the AESO view that as a violation?

Public

- *Best Consulting Solutions:* Not sure about the idea of bidding on DOS. Seeing that it becomes a risk and more work for customers to do that. Worried that we're creating more of a complex system and not going to see the benefit.

ii. AESO clarification

- Response to clarifying questions:
  - Monitoring will occur month to month at the end of each settlement period as well as an annual assessment every 12 months, from the time a customer started DOS as to whether they've exceeded that maximum load factor limit. And then AESO would use that as the determination if the AESO needs to look further into that customers particular use of DOS.
  - Regarding small DTS contracts, we have had a less than 1 MW DTS contracts.
  - Regarding the business case for DOS, the business case itself is not evaluated.
  - Regarding operating under DTS or DOS, if it is economic to use DTS for your load, the AESO would maintain you would continue to use DTS and not switch to DOS.
  - Regarding the bidding component of DOS, the AESO has the visibility of how much block volume of DTS is being taken. We also know the DTS contract capacity, and you can subtract that from the SCADA measurement to determine in real-time the amount of DOS energy consumed. That means we can simply go to the merit order and dispatch the blocks, which gives a signal to participants to not take DOS energy until the dispatch is done. It is integrated into the merit order and can see it in real time to control the recall.
    - Think of the bidding DOS as similar to that of wind and solar offers.
  - There are more advanced bidding approaches and the AESO will build and provide examples of bidding related to DOS in combination with the linked-asset method and the VER block method.
  - Regarding the criteria, the assessments themselves would be done monthly and we would look at those and compare it to what was stated within the application. A key violation of the criteria would be failing to respond to dispatch or directive. Over the year, if a DOS customer is exceeding the maximum capacity or load factor, they are signaling to the AESO that it is not operating within the terms of DOS. The AESO would allow the customer to provide additional information to explain the exceedances as part of the audit process.
  - Regarding instances where a higher energy charge is used to chase a market opportunity, the AESO would look to your explanation as to why the exceedance occurred. It would need to be a case-by-case assessment.

iii. Stakeholder commentary

- There was discussion regarding the Representation:
  - *CanREA:* Would the Representation [application] be approved when the SASR is accepted, that is in the move to queue Stage 2, so that participants have qualification certainty?
  - *UCA:* Who on behalf of the customer signs this Representation? Also wondering what about the structure of auditing or monitoring – would the AESO do this? Would there be a target to monitor/audit in a particular period?

Public

- *TransAlta:* If you're relying on the Representation, are customers allowed to change their Representation? With respect to the monitoring, could you provide more details about the additional remedies that would be added to the current terms and conditions?
- *DePal Consulting:* Regarding the Representation, can the AESO provide an example document clarifying the items that need to be stated in the representation? Is the Representation a one-time document based upon various reasonable assumptions at the time the Representation is made?

iv. AESO clarification

- Response to questions regarding the Representation:
  - We are still working on the process of the integration of DOS into the SASR process, but it would likely be in the Stage 2 area that we would accept the Representation.
  - Regarding the signing of the Representation, it would likely be an officer of the company that would sign off on it. The Representation sits with the director or officer that signs off on it. The AESO would perform the monitoring and audit of DOS usage using the existing monitoring processes set up for monitoring and audit of compliance to ISO rules.
  - The Representation is the agreement that you will not be using DOS in place of DTS. If you can no longer represent that, the requirement would be for you to discontinue your use of DOS. You may need to provide an update on the description of your use of DOS – we would allow that ability to update some of the other data that's provided in the application.
  - The application would contain the Representation. The Representation is a standard statement that's not written by the customer. Customers sign off on it saying their use of DOS is appropriate.

v. Stakeholder commentary

- Some participants were concerned with the AESO's proposed solution of a 20 per cent load factor to mitigate DTS cannibalization:
  - *Power Advisory:* The 20 per cent load factor was a point in the sand – has the AESO looked at higher maximum load factors that still maintain the stop from DTS cannibalization? I understand you have to draw from somewhere but to use historical data seems unrepresentative as the future use of DOS will be very different from historic use of DOS.
  - *Capital Power:* On slide 26 (Estimated value of the mitigation options), the AESO indicated transition DOS over 20 per cent load factor would cost $17 million for five years. Is it possible to share what the maximum load factor the AESO had to go to for this mitigation option and result?
  - *TC Energy:* We would like a slight increase to the 20 per cent load factor so we're not limiting any opportunities for energy storage.
  - *CanREA:* If the 20 per cent is not chosen appropriately, does it not potentially discriminate against certain technologies and is therefore not agnostic?

Public

- *TC Energy:* I don't think that just because you've exceeded your 20 per cent threshold that DTS is economic for you. A positive margin may not be significant enough to cover your fixed costs. We have to be careful that we're not talking short-term economics, we're talking long-term economics.
- *Power Advisory:* Year to year, you'll have different opportunities in different years. While the load factor might look firm from a historic viewpoint, that's not necessarily the case. Would like to see an example done for energy storage just to understand how the AESO will monitor this.

vi. AESO clarification

- Response to questions regarding the 20 per cent load factor:
  - The AESO came to the conclusion that 20 per cent was the right level. We've seen up to 20-30 different customers on DOS which is a fair sample of historical use. There were two other guides we used to help set 20 per cent: one was how much of the DTS capacity is used on a regular basis and the other was the statistical assessment of where in our load represents inefficient load, both of which are also around 20 per cent.
  - The 20 percent load factor determination did not consider specific technologies. It is an assessment of what is an appropriate quantitative replacement for "short-term and temporary use" clause in existing DOS in order to remove the subjectivity in application process.
  - We're looking to set up a modernized DOS that provides opportunity to use the service for those who wouldn't have been able to otherwise without creating the risk of cannibalization of DTS.

vii. Stakeholder commentary

- There was discussion around how DOS applies specifically to energy storage:
  - *AUC:* My understanding is that for certain energy storage applications, some of the ancillary services are load. If energy storage is participating in these ancillary services, will DOS be turned off for these ancillary services?
  - *BluEarth Renewables:* On Slide 41 (DTS contract level will be determined by the customer), regarding the risk of de-qualification ancillary services under DOS, how would the AESO view energy storage's application as ancillary service provider under modernized DOS? Is this a binary view- energy storage can not be qualified as an ancillary service provider under DOS?

viii. AESO clarification

- Response to questions regarding energy storage:
  - Energy storage can provide ancillary services both on the supply side and demand side. What the AESO is cautioning is that one of the requirements for ancillary services is that it needs to be reliably there. If all you have is DOS energy and if you're in a state for using this DOS energy and we recall this energy, you could lose the potential to provide the ancillary service. Customers need to be careful if they're looking to participate in the ancillary services market to consider that not having any DTS may result in a qualification risk.

Public

Topic 3: What we heard – Session 6A

i. Stakeholder commentary

- Clarifying comments:
  - *MATL Canada:* Haven't heard much in terms of the impacts of costs of exporting energy from Alberta. Will there be increases to the cost of exporting energy from Alberta? If that's the case, we'd like to understand how the AESO will determine the XOM (Export Opportunity Merchant Service) or XOS (Export Opportunity Service) charges. Because export prices can be price sensitive, has the AESO assessed how the reduced export volumes would result in higher charges?
  - *TC Energy:* We need to know what the magnitude of change will be. It's important that the parties have an opportunity to be consulted on the changes to rate XOS before we end up in the proceeding.
  - *Best Consulting Solutions:* What is meant by "Alberta's electricity use cases" on Slide 75 (Areas of Alignment & Misalignment – Energy Storage Treatment)?

ii. AESO clarification

- Response to clarifying comments:
  - We have put out a spreadsheet that identifies what the DTS and DOS rates are going forward. Similar to DOS where we're not reviewing or changing the rate derivation methodology for other opportunity services. We're not reviewing the overall methodology, but we can give you information on what we think the changes will be.
  - Regarding Slide 75, the AESO copied the bullet from a previous presentation (Session 4, slide 41) when we were referring to the use cases energy storage can provide; meaning more the value stacking or attributes they're able to monetize.

Topic 4: Next steps

i. Stakeholder commentary

- Clarifying comments:
  - *TransAlta:* Does the AESO plan to formally respond to all of the AUC's information requests before filing?
  - *CanREA:* The AESO has said that they will only make one filing. Would the AESO be open to other mechanisms that could allow for earlier approval of the modernized DOS?

ii. AESO clarification

- Response to clarifying comments:
  - Regarding the AUC's information requestions, if you go back to previous materials, the AESO has tied responses to specific questions from the Commission.
  - In the spirit of achieving regulatory efficiency, the AESO will consider the best filing strategy for the ISO tariff and modernized DOS recommendation.

Public

Individual Site Bill Impact Tool

This bill impact tool is not authoritative and is for information purposes only and intended to provide guidance. In the event of any discrepancy between this tool and any authoritative document[1] in effect, the authoritative document governs.

1 Purpose

This bill impact tool is intended to allow ratepayers to assess historical annual impact with respect to the AESO's preferred bulk and regional tariff rate design ("Preferred Rate Design") described in the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5 published on March 18, 2021 and presented in the corresponding AESO's Stakeholder Session 5 on March 25, 2021.

The purpose of this bill impact tool is to allow a market participant to estimate the annual historical charges for system access service under the AESO's Preferred Rate Design, including Rate DTS, *Demand Transmission Service* , and Rate PSC, *Primary Service Credit* .

The calculations in this bill impact tool provide estimated charges under the Preferred Rate Design only. The AESO calculates certain actual charges on an hourly basis rather than on average annual amounts, and ***actual charges under any future tariff design may differ from the estimated amounts presented in this bill impact tool*** .

2 Current Design and Preferred Rate Design Rate Calculations

Current Design (Test Year 2019) and Preferred Rate Design (Test Year Future) rates are calculated using actual 2019 billing detemrinants for all sites and 2019 revenue requirement. The rates only differ by changing the functionalizaiton and classification from current approved in the 2021 ISO tariff to the preferred rate design.

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This section describes how a market participant may complete the bill impact tool to estimate and compare annual charges (based on historical load information) for system access service under the existing 2021 ISO Tariff bulk and regional tariff design and under the AESO's Preferred Rate Design.

Initial Steps

Paste single site annual billing determinants on cell "A2" of the 'Site Data Input' tab.
This summary data can be provided by the AESO (in coordination with the DFO if necessary)

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The information included in the 'Site Data Input' tab will allow calculations on the 'Annual Summary' tab and will provide annual summary of bill impact resulting from the preferred rate design.

Adjusting Input Data

The 'Adjust Load Profile' tab provides the opportunity to override historical load profile or billing determinant information.

For assistance with this tool and Site Data Input data, please contact the AESO at: tariffdesign@aeso.ca

Attachments

Annual Summary - Summary of bill impact by year
Adjust Load Profile - Allow ratepayers to override input values to assess impact
Site Data Input - Tab to allow annual billing or load profile information by year

Revision History

Date	Description
2021-03-18	v 0.1 - Initial release with draft Test Year 2019 values
2021-03-22	v 0.2 - Fixed to work with all Excel versions and Contract Capacity to pull appropriate year selected (not just 2019)
2021-03-30	v 0.3 - Fixed to ensure adjusted load profile data aligned with results from 'Adjust Load Profile' data
2021-04-06	v 0.4 - Fixed to pull actual annual average pool price into 'Adjust Load Profile' tab

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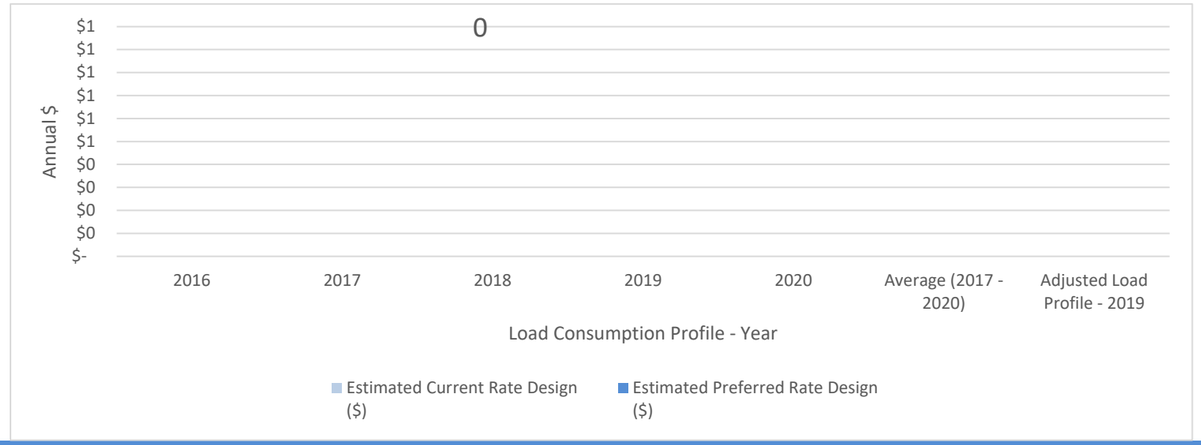
Market Participant: **0**
Site Description: **0**
Account ID: **0**
Date: August 17, 2021

Threshold for targeted mitigation engagement*:	
2019 Load Profile Year:	#N/A
2017-2020 Average:	#N/A

*Sites with greater than 10% impact (estimated transmission costs) will be invited to targeted mitigation engagement



Estimated Transmission Costs

Load Profile Year	Contract Capacity (MW)	Annual Billing Capacity (MW)	Annual Coincident Peak (MW)	Coincidence Factor (%)	Annual Energy (MWh)	Load Factor (%)	Estimated Current Rate Design ($)	Estimated Preferred Rate Design ($)	Estimated Impact ($)	Estimated Impact (%)
2016	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2017	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2018	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
2020	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Average (2017 - 2020)							#N/A	#N/A	#N/A	#N/A
Adjusted Load Profile - 2019	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

Confidentiality: Proprietary When Completed

Market Participant: **0**

Site Description: **0**

Account: **0**

Date: August 17, 2021

Tariff: Test Year 2019

Billing Quantity		Factor	Monthly Average	Applicable Volumes	
(a)	Substation fraction (SF)			#N/A	
(b)	Rate PSC Applicable			#N/A	
(c)	Highest metered demand		#N/A	#N/A	MW
(d)	Average coincident metered demand	#N/A	#N/A	#N/A	MW
(e)	Contract Capacity		#N/A	#N/A	MW
(f)	Metered energy	#N/A	#N/A	#N/A	MWh
(g)	Billing capacity		#N/A	#N/A	MW
(h)	% of pool price for operating reserve charge			#N/A	
(i)	Apparent power factor difference			#N/A	MVA
(k)	Site Average Pool Price on Energy Settlement			#N/A	/MWh
(l)	Annual Average Pool Price			$54.88	/MWh

Rate or Rider Component					Rate		Volume		Amount
Rate DTS: Demand Transmission Service									
Connection Charge									
Bulk System Charge									
3(a)	Coincident metered demand				$10,087.00	/MW/month	#N/A	MW	#N/A
Regional System Charge									
3(b)	Billing capacity				$2,668.00	/MW/month	#N/A	MW	#N/A
Energy Charge									
3(c)	Metered energy				$2.18	/MWh	#N/A	MWh	#N/A
Point of Delivery Charge									
3(e)	Substation fraction				$11,278.00	/month	#N/A		#N/A
3(f)	First (7.5 × SF) MW of billing capacity				$4,566.00	/MW/month	#N/A	MW	#N/A
3(g)	Next (9.5 × SF) MW of billing capacity				$2,860.00	/MW/month	#N/A	MW	#N/A
3(h)	Next (23 × SF) MW of billing capacity				$1,995.00	/MW/month	#N/A	MW	#N/A
3(i)	All remaining MW of billing capacity				$1,292.00	/MW/month	#N/A	MW	#N/A
Total Wires									**#N/A**
Operating Reserve Charge Estimate									
4	Metered energy	pool price	#N/A	=	$54.88	/MWh	#N/A	MWh	#N/A
Transmission Constraint Rebalancing Charge Estimate									
5	Metered energy				$0.002	/MWh	#N/A	MW	#N/A
Voltage Control Charge									
6	Metered energy				$0.06	/MWh	#N/A	MWh	#N/A
Other System Support Services Charge									
7(a)	Highest metered demand				$38.00	/MW/month	#N/A	MW	#N/A
7(b)	Apparent power difference				$400.00	/MVA/month	#N/A	MVA	#N/A
Total Rate DTS									**#N/A**
Rate Primary Service Credit									
	Substation fraction				($8,910.00)	/month	#N/A		#N/A
	First (7.5 × SF) MW of billing capacity				($3,607.00)	/MW/month	#N/A	MWh	#N/A
	Next (9.5 × SF) MW of billing capacity				($2,259.00)	/MW/month	#N/A	MWh	#N/A
	Next (23 × SF) MW of billing capacity				($1,576.00)	/MW/month	#N/A	MWh	#N/A
	All remaining MW of billing capacity				($1,292.00)	/MW/month	#N/A	MWh	#N/A
Total Rate PSC Credit									**#N/A**
Transmission Costs									**#N/A**
Energy Market Settlement									**#N/A**
Total Bill									**#N/A**

Confidentiality: Proprietary When Completed

Year	Market Participant	Site Description	Account_ID	Substation Fraction	Rate PSC (Yes/No)	CONTRACT CAPACITY (MW)	ENERGY (MWh)	CMD (MW)	BILLING CAPACITY (MW)	MAX HMD (MW)	ACTUAL HMD (MW)	Energy Settlement ($)	Operating Reserve Charges ($)	Transmission Constraint Reblancing Charge ($)	Voltage Control Charges ($)	Other System Support Services Charge ($)	Power Factor Deficiency Charge ($)

*Input annual data into Cell A2 for years 2016, 2017, 2018, 2019 and 2020

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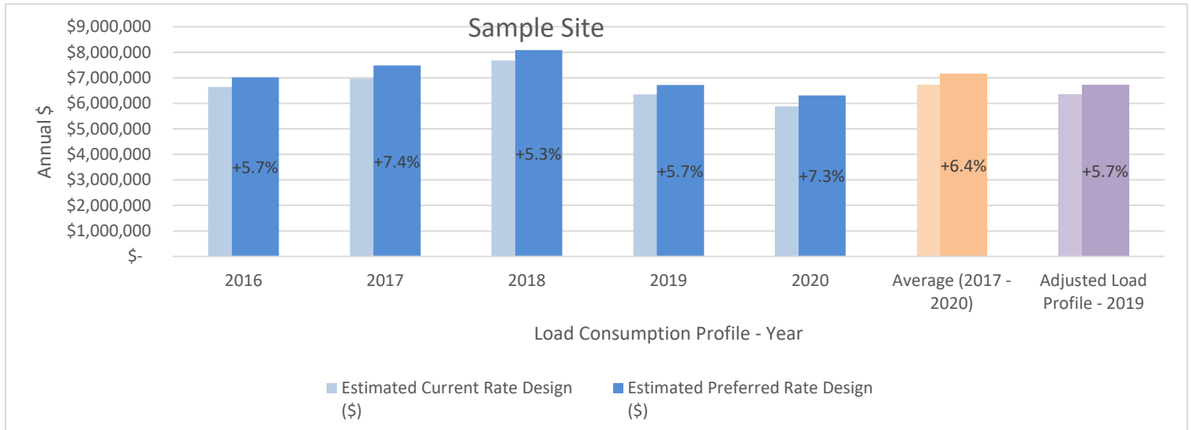
Market Participant: **DFO**
Site Description: **Sample Site**
Account ID: **1000XXXXX**
Date: August 17, 2021

Threshold for targeted mitigation engagement*:	
2019 Load Profile Year:	No
2017-2020 Average:	No

*Sites with greater than 10% impact (estimated transmission costs) will be invited to targeted mitigation engagement



Estimated Transmission Costs

Load Profile Year	Contract Capacity (MW)	Annual Billing Capacity (MW)	Annual Coincident Peak (MW)	Coincidence Factor (%)	Annual Energy (MWh)	Load Factor (%)	Estimated Current Rate Design ($)	Estimated Preferred Rate Design ($)	Estimated Impact ($)	Estimated Impact (%)
2016	43.4	469	300	83.7%	237,025	90.4%	$ 6,635,891	$ 7,016,289	$ 380,398	+5.7%
2017	43.4	469	315	79.5%	261,944	90.4%	$ 6,965,785	$ 7,480,937	$ 515,152	+7.4%
2018	43.4	469	321	82.4%	251,907	88.4%	$ 7,674,997	$ 8,085,251	$ 410,254	+5.3%
2019	43.4	469	247	73.3%	207,360	84.3%	$ 6,353,887	$ 6,713,093	$ 359,206	+5.7%
2020	43.4	469	214	67.9%	199,593	86.4%	$ 5,883,626	$ 6,314,913	$ 431,287	+7.3%
Average (2017 - 2020)							$ 6,719,574	$ 7,148,548	$ 428,975	+6.4%
Adjusted Load Profile - 2019	43.4	469	247	73.3%	207,360	84.3%	$ 6,353,887	$ 6,713,093	$ 359,206	+5.7%

Confidentiality: Proprietary When Completed

Market Participant: **DFO**
Site Description: **Sample Site**
Account: **1000XXXXX**
Date: August 17, 2021

Tariff: Test Year 2019

Billing Quantity		Factor	Monthly Average	Applicable Volumes	
(a)	Substation fraction (SF)			1.00000	
(b)	Rate PSC Applicable			No	
(c)	Highest metered demand		28.1	337.1	MW
(d)	Average coincident metered demand	73.3%	20.6	247.0	MW
(e)	Contract Capacity		43.4	43.4	MW
(f)	Metered energy	84.3%	17,280	207,360	MWh
(g)	Billing capacity		39.1	468.7	MW
(h)	% of pool price for operating reserve charge			6.45%	
(i)	Apparent power factor difference			0.0	MVA
(k)	Site Average Pool Price on Energy Settlement			$51.88	/MWh
(l)	Annual Average Pool Price			$54.88	/MWh

Rate or Rider Component				Rate		Volume		Amount
Rate DTS: Demand Transmission Service								
Connection Charge								
Bulk System Charge								
3(a)	Coincident metered demand			$10,087.00	/MW/month	247.0	MW	$2,491,467
Regional System Charge								
3(b)	Billing capacity			$2,668.00	/MW/month	468.7	MW	$1,250,545
Energy Charge								
3(c)	Metered energy			$2.18	/MWh	207,360	MWh	$452,044
Point of Delivery Charge								
3(e)	Substation fraction			$11,278.00	/month	1.00000		$135,336
3(f)	First (7.5 × SF) MW of billing capacity			$4,566.00	/MW/month	7.5	MW	$410,940
3(g)	Next (9.5 × SF) MW of billing capacity			$2,860.00	/MW/month	9.5	MW	$326,040
3(h)	Next (23 × SF) MW of billing capacity			$1,995.00	/MW/month	22.1	MW	$528,116
3(i)	All remaining MW of billing capacity			$1,292.00	/MW/month	0.0	MW	$0
Total Wires								**$5,594,489**
Operating Reserve Charge Estimate								
4	Metered energy	pool price	× 6.45% =	$54.88	/MWh	207,360	MWh	$733,733
Transmission Constraint Rebalancing Charge Estimate								
5	Metered energy			$0.002	/MWh	207,360	MW	$415
Voltage Control Charge								
6	Metered energy			$0.06	/MWh	207,360	MWh	$12,442
Other System Support Services Charge								
7(a)	Highest metered demand			$38.00	/MW/month	337.1	MW	$12,809
7(b)	Apparent power difference			$400.00	/MVA/month	0.0	MVA	$0
Total Rate DTS								**$6,353,887**
Rate Primary Service Credit								
	Substation fraction			($8,910.00)	/month	1.00000		$0
	First (7.5 × SF) MW of billing capacity			($3,607.00)	/MW/month	7.5	MWh	$0
	Next (9.5 × SF) MW of billing capacity			($2,259.00)	/MW/month	9.5	MWh	$0
	Next (23 × SF) MW of billing capacity			($1,576.00)	/MW/month	22.1	MWh	$0
	All remaining MW of billing capacity			($1,292.00)	/MW/month	0.0	MWh	$0
Total Rate PSC Credit								**$0**
Transmission Costs								**$6,353,887**
Energy Market Settlement								**$10,756,893**
Total Bill								**$17,110,780**

Confidentiality: Proprietary When Completed

Year	Market Participant	Site Description	Account_ID	Substation Fraction	Rate PSC (Yes/No)	CONTRACT CAPACITY (MW)	ENERGY (MWh)	CMD (MW)	BILLING CAPACITY (MW)	MAX HMD (MW)	ACTUAL HMD (MW)	Energy Settlement ($)	Operating Reserve Charges ($)	Transmission Constraint Reblancing Charge ($)	Voltage Control Charges ($)	Other System Support Services Charge ($)	Power Factor Deficiency Charge ($)
2016	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	237,024.8	299.7	468.7	33.6	358.1	$ 4,341,871	$ 416,880	$ 28	$ 12,371	$ 14,539	$ -
2017	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	261,944.0	315.5	468.7	38.0	396.9	$ 5,762,210	$ 530,156	$ 48	$ 16,604	$ 16,297	$ -
2018	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	251,907.2	321.5	468.7	35.1	390.2	$ 12,043,433	$ 1,201,944	$ 124	$ 20,530	$ 16,252	$ -
2019	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	207,359.8	247.0	468.7	33.2	337.1	$ 10,756,893	$ 733,733	$ 721	$ 9,389	$ 10,988	$ -
2020	DFO	Sample Site	1000XXXXX	1.0000	No	43.4	199,592.6	214.3	468.7	29.3	315.6	$ 8,961,157	$ 611,540	$ 1,239	$ 9,037	$ 10,287	$ -

*Input annual data into Cell A2 for years 2016, 2017, 2018, 2019 and 2020

5-Year Average 12-Coincident Peak

This illustrative tool is not authoritative and is for information purposes only and intended to provide guidance. In the event of any discrepancy between this tool and any authoritative document[1] in effect, the authoritative document governs.

1 Purpose

This illustrative tool is intended to allow stakeholders to understand and assess the concept of the 5-Year Average 12-Coincident Peak ("CP") ("5-Year 12CP Average") (described in the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5 published on March 18, 2021 and presented in the corresponding AESO's Stakeholder Session 5 on March 25, 2021, and Technical Session II on March 31, 2021.)

The description and explanations in this illustrative tool provide estimate calculations under the Preferred Rate Design only (as described in the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5 ("Preferred Rate Design"). The AESO calculates certain actual charges on an hourly basis rather than on average annual amounts, and ***actual charges under any future tariff design will differ from the estimated amounts presented in this illustrative tool***.

2 Use of 5-Year Average 12CP Illustrative Tool

This section describes how stakeholders may use this illustrative tool to understand the 5-Year 12CP Average included in the AESO's Preferred Rate Design.

Calculations - 5yr Average-Tariff Coincident Metered Demand (TCMD)

This tab describes the calculations for the 5-Year 12CP Average proposal and how it could be rolled out in a future tariff design.

Actual Load at Time of CP (Actual Coincident Metered Demand) and Rolling 5yr Average (Tariff Coincident Metered Demand)

Use the 'Actual Load at time of CP-ACMD' tab to enter values and calculations for the 5-Year 12CP Average is calculated in the 'Rolling 5yr Average-TCMD' tab

Differences

The 'Differences' tab calculates difference between ACMD and 5-Year 12CP Average (TCMD)

For assistance with this tool and Site Data Input data, please contact the AESO at: tariffdesign@aeso.ca

Attachments

Calculations - 5-Year 12CP Average - Provide full calculation descriptions
Actual Load at time of CP-ACMD - Tab to allow data entry and following tab to calculate 5-Year 12CP Average
Rolling 5yr Average-TCMD - Actual calculations using previous tab as inputs
Differences - Calculates differences between ACMD and 5-Year 12CP Average (TCMD)

Revision History

Date	Description
2021-04-13	v 0.1 - Initial release

[1] "Authoritative document" is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and associated regulations, and that contain binding legal requirements for either market participants or the AESO, or both. Authoritative documents include: the ISO rules, the reliability standards and the ISO tariff.

5-Year 12CP Average Calculations

Definitions:

ACMD	Actual MWs at time of system demand (Rate DTS and Rate FTS) is greatest (at time of (a) 15-interval or (b) 1-hour interval)
TCMD	Calculated value resulting from calculations proposed as AESO Preferred Rate Design

Rolling Out Period (Years 1 - 4):

Year 1 TCMD $TCMD_{Month} = Average(\ [Year\ 1]ACMD_{Month}\ ) = [Year\ 1]ACMD_{Month}$

Year 2 TCMD $TCMD_{Month} = Average(\ [Year\ 2]ACMD_{Month}, [Year\ 1]ACMD_{Month})$

Year 3 TCMD $TCMD_{Month} = Average(\ [Year\ 3]ACMD_{Month}, [Year\ 2]ACMD_{Month}, [Year\ 1]ACMD_{Month}\ )$

Year 4 TCMD $TCMD_{Month} = Average([Year\ 4]ACMD_{Month}, [Year\ 3]ACMD_{Month}, [Year\ 2]ACMD_{Month}, [Year\ 1]ACMD_{Month}\ )$

Year 5 TCMD . . . $TCMD_{Month} = Average([Year\ 5], ACMD_{Month}, [Year\ 4]ACMD_{Month}, [Year\ 3]ACMD_{Month}, [Year\ 2]ACMD_{Month}, [Year\ 1]ACMD_{Month}\ )$

DETAILED	January	February	March	April	May	June	July	August
Year 1	=Average (Year 1 January ACMD)	=Average (Year 1 February ACMD)	=Average (Year 1 March ACMD)	=Average (Year 1 April ACMD)	=Average (Year 1 May ACMD)	=Average (Year 1 June ACMD)	=Average (Year 1 July ACMD)	=Average (Year 1 August ACMD)
Year 2	=Average (Year 2 January ACMD, Year 1 January ACMD)	=Average (Year 2 February ACMD, Year 1 February ACMD)	=Average (Year 2 March ACMD, Year 1 March ACMD)	=Average (Year 2 April ACMD, Year 1 April ACMD)	=Average (Year 2 May ACMD, Year 1 May ACMD)	=Average (Year 2 June ACMD, Year 1 June ACMD)	=Average (Year 2 July ACMD, Year 1 July ACMD)	=Average (Year 2 August ACMD, Year 1 August ACMD)
Year 3	=Average (Year 3 January ACMD, Year 2 January ACMD, Year 1 January ACMD)	=Average (Year 3 February ACMD, Year 2 February ACMD, Year 1 February ACMD)	=Average (Year 3 March ACMD, Year 2 March ACMD, Year 1 March ACMD)	=Average (Year 3 April ACMD, Year 2 April ACMD, Year 1 April ACMD)	=Average (Year 3 May ACMD, Year 2 May ACMD, Year 1 May ACMD)	=Average (Year 3 June ACMD, Year 2 June ACMD, Year 1 June ACMD)	=Average (Year 3 July ACMD, Year 2 July ACMD, Year 1 July ACMD)	=Average (Year 3 August ACMD, Year 2 August ACMD, Year 1 August ACMD)
Year 4	=Average (Year 4 ACMD, Year 3 January ACMD, Year 2 January ACMD, Year 1 January ACMD)	=Average (Year 4 ACMD, Year 3 February ACMD, Year 2 February ACMD, Year 1 February ACMD)	=Average (Year 4 ACMD, Year 3 March ACMD, Year 2 March ACMD, Year 1 March ACMD)	=Average (Year 4 ACMD, Year 3 April ACMD, Year 2 April ACMD, Year 1 April ACMD)	=Average (Year 4 ACMD, Year 3 May ACMD, Year 2 May ACMD, Year 1 May ACMD)	=Average (Year 4 ACMD, Year 3 June ACMD, Year 2 June ACMD, Year 1 June ACMD)	=Average (Year 4 ACMD, Year 3 July ACMD, Year 2 July ACMD, Year 1 July ACMD)	=Average (Year 4 ACMD, Year 3 August ACMD, Year 2 August ACMD, Year 1 August ACMD)
Year 5	=Average (Year 5 January ACMD, Year 4 January ACMD, Year 3 January ACMD, Year 2 January ACMD, Year 1 January ACMD)	=Average (Year 5 February ACMD, Year 4 February ACMD, Year 3 February ACMD, Year 2 February ACMD, Year 1 February ACMD)	=Average (Year 5 March ACMD, Year 4 March ACMD, Year 3 March ACMD, Year 2 March ACMD, Year 1 March ACMD)	=Average (Year 5 April ACMD, Year 4 April ACMD, Year 3 April ACMD, Year 2 April ACMD, Year 1 April ACMD)	=Average (Year 5 May ACMD, Year 4 May ACMD, Year 3 May ACMD, Year 2 May ACMD, Year 1 May ACMD)	=Average (Year 5 June ACMD, Year 4 June ACMD, Year 3 June ACMD, Year 2 June ACMD, Year 1 June ACMD)	=Average (Year 5 July ACMD, Year 4 July ACMD, Year 3 July ACMD, Year 2 July ACMD, Year 1 July ACMD)	=Average (Year 5 August ACMD, Year 4 August ACMD, Year 3 August ACMD, Year 2 August ACMD, Year 1 August ACMD)
Year 6	=Average (Year 6 January ACMD, Year 5 January ACMD, Year 4 January ACMD, Year 3 January ACMD, Year 2 January ACMD)	=Average (Year 6 February ACMD, Year 5 February ACMD, Year 4 February ACMD, Year 3 February ACMD, Year 2 February ACMD)	=Average (Year 6 March ACMD, Year 5 March ACMD, Year 4 March ACMD, Year 3 March ACMD, Year 2 March ACMD)	=Average (Year 6 April ACMD, Year 5 April ACMD, Year 4 April ACMD, Year 3 April ACMD, Year 2 April ACMD)	=Average (Year 6 May ACMD, Year 5 May ACMD, Year 4 May ACMD, Year 3 May ACMD, Year 2 May ACMD)	=Average (Year 6 June ACMD, Year 5 June ACMD, Year 4 June ACMD, Year 3 June ACMD, Year 2 June ACMD)	=Average (Year 6 July ACMD, Year 5 July ACMD, Year 4 July ACMD, Year 3 July ACMD, Year 2 July ACMD)	=Average (Year 6 August ACMD, Year 5 August ACMD, Year 4 August ACMD, Year 3 August ACMD, Year 2 August ACMD)
Year 7	=Average (Year 7 January ACMD, Year 6 January ACMD, Year 5 January ACMD, Year 4 January ACMD, Year 3 January ACMD)	=Average (Year 7 February ACMD, Year 6 February ACMD, Year 5 February ACMD, Year 4 February ACMD, Year 3 February ACMD)	=Average (Year 7 March ACMD, Year 6 March ACMD, Year 5 March ACMD, Year 4 March ACMD, Year 3 March ACMD)	=Average (Year 7 April ACMD, Year 6 April ACMD, Year 5 April ACMD, Year 4 April ACMD, Year 3 April ACMD)	=Average (Year 7 May ACMD, Year 6 May ACMD, Year 5 May ACMD, Year 4 May ACMD, Year 3 May ACMD)	=Average (Year 7 June ACMD, Year 6 June ACMD, Year 5 June ACMD, Year 4 June ACMD, Year 3 June ACMD)	=Average (Year 7 July ACMD, Year 6 July ACMD, Year 5 July ACMD, Year 4 July ACMD, Year 3 July ACMD)	=Average (Year 7 August ACMD, Year 6 August ACMD, Year 5 August ACMD, Year 4 August ACMD, Year 3 August ACMD)

Year 8	=Average (Year 8 January ACMD, Year 7 January ACMD, Year 6 January ACMD, Year 5 January ACMD, Year 4 January ACMD)	=Average (Year 8 February ACMD, Year 7 February ACMD, Year 6 February ACMD, Year 5 February ACMD, Year 4 February ACMD)	=Average (Year 8 March ACMD, Year 7 March ACMD, Year 6 March ACMD, Year 5 March ACMD, Year 4 March ACMD)	=Average (Year 8 April ACMD, Year 7 April ACMD, Year 6 April ACMD, Year 5 April ACMD, Year 4 April ACMD)	=Average (Year 8 May ACMD, Year 7 May ACMD, Year 6 May ACMD, Year 5 May ACMD, Year 4 May ACMD)	=Average (Year 8 June ACMD, Year 7 June ACMD, Year 6 June ACMD, Year 5 June ACMD, Year 4 June ACMD)	=Average (Year 8 July ACMD, Year 7 July ACMD, Year 6 July ACMD, Year 5 July ACMD, Year 4 July ACMD)	=Average (Year 8 August ACMD, Year 7 August ACMD, Year 6 August ACMD, Year 5 August ACMD, Year 4 August ACMD)
Year 9	=Average (Year 9 January ACMD, Year 8 January ACMD, Year 7 January ACMD, Year 6 January ACMD, Year 5 January ACMD)	=Average (Year 9 February ACMD, Year 8 February ACMD, Year 7 February ACMD, Year 6 February ACMD, Year 5 February ACMD)	=Average (Year 9 March ACMD, Year 8 March ACMD, Year 7 March ACMD, Year 6 March ACMD, Year 5 March ACMD)	=Average (Year 9 April ACMD, Year 8 April ACMD, Year 7 April ACMD, Year 6 April ACMD, Year 5 April ACMD)	=Average (Year 9 May ACMD, Year 8 May ACMD, Year 7 May ACMD, Year 6 May ACMD, Year 5 May ACMD)	=Average (Year 9 June ACMD, Year 8 June ACMD, Year 7 June ACMD, Year 6 June ACMD, Year 5 June ACMD)	=Average (Year 9 July ACMD, Year 8 July ACMD, Year 7 July ACMD, Year 6 July ACMD, Year 5 July ACMD)	=Average (Year 9 August ACMD, Year 8 August ACMD, Year 7 August ACMD, Year 6 August ACMD, Year 5 August ACMD)
Year 10	=Average (Year 10 January ACMD, Year 9 January ACMD, Year 8 January ACMD, Year 7 January ACMD, Year 6 January ACMD)	=Average (Year 10 February ACMD, Year 9 February ACMD, Year 8 February ACMD, Year 7 February ACMD, Year 6 February ACMD)	=Average (Year 10 March ACMD, Year 9 March ACMD, Year 8 March ACMD, Year 7 March ACMD, Year 6 March ACMD)	=Average (Year 10 April ACMD, Year 9 April ACMD, Year 8 April ACMD, Year 7 April ACMD, Year 6 April ACMD)	=Average (Year 10 May ACMD, Year 9 May ACMD, Year 8 May ACMD, Year 7 May ACMD, Year 6 May ACMD)	=Average (Year 10 June ACMD, Year 9 June ACMD, Year 8 June ACMD, Year 7 June ACMD, Year 6 June ACMD)	=Average (Year 10 July ACMD, Year 9 July ACMD, Year 8 July ACMD, Year 7 July ACMD, Year 6 July ACMD)	=Average (Year 10 August ACMD, Year 9 August ACMD, Year 8 August ACMD, Year 7 August ACMD, Year 6 August ACMD)
Year 11	=Average (Year 11 January ACMD, Year 10 January ACMD, Year 9 January ACMD, Year 8 January ACMD, Year 7 January ACMD)	=Average (Year 11 February ACMD, Year 10 February ACMD, Year 9 February ACMD, Year 8 February ACMD, Year 7 February ACMD)	=Average (Year 11 March ACMD, Year 10 March ACMD, Year 9 March ACMD, Year 8 March ACMD, Year 7 March ACMD)	=Average (Year 11 April ACMD, Year 10 April ACMD, Year 9 April ACMD, Year 8 April ACMD, Year 7 April ACMD)	=Average (Year 11 May ACMD, Year 10 May ACMD, Year 9 May ACMD, Year 8 May ACMD, Year 7 May ACMD)	=Average (Year 11 June ACMD, Year 10 June ACMD, Year 9 June ACMD, Year 8 June ACMD, Year 7 June ACMD)	=Average (Year 11 July ACMD, Year 10 July ACMD, Year 9 July ACMD, Year 8 July ACMD, Year 7 July ACMD)	=Average (Year 11 August ACMD, Year 10 August ACMD, Year 9 August ACMD, Year 8 August ACMD, Year 7 August ACMD)
Year 12	=Average (Year 12 January ACMD, Year 11 January ACMD, Year 10 January ACMD, Year 9 January ACMD, Year 8 January ACMD)	=Average (Year 12 February ACMD, Year 11 February ACMD, Year 10 February ACMD, Year 9 February ACMD, Year 8 February ACMD)	=Average (Year 12 March ACMD, Year 11 March ACMD, Year 10 March ACMD, Year 9 March ACMD, Year 8 March ACMD)	=Average (Year 12 April ACMD, Year 11 April ACMD, Year 10 April ACMD, Year 9 April ACMD, Year 8 April ACMD)	=Average (Year 12 May ACMD, Year 11 May ACMD, Year 10 May ACMD, Year 9 May ACMD, Year 8 May ACMD)	=Average (Year 12 June ACMD, Year 11 June ACMD, Year 10 June ACMD, Year 9 June ACMD, Year 8 June ACMD)	=Average (Year 12 July ACMD, Year 11 July ACMD, Year 10 July ACMD, Year 9 July ACMD, Year 8 July ACMD)	=Average (Year 12 August ACMD, Year 11 August ACMD, Year 10 August ACMD, Year 9 August ACMD, Year 8 August ACMD)

September	October	November	December
=Average (Year 1 September ACMD)	=Average (Year 1 October ACMD)	=Average (Year 1 November ACMD)	=Average (Year 1 December ACMD)
=Average (Year 2 September ACMD, Year 1 September ACMD)	=Average (Year 2 October ACMD, Year 1 October ACMD)	=Average (Year 2 November ACMD, Year 1 November ACMD)	=Average (Year 2 December ACMD, Year 1 December ACMD)
=Average (Year 3 September ACMD, Year 2 September ACMD, Year 1 September ACMD)	=Average (Year 3 October ACMD, Year 2 October ACMD, Year 1 October ACMD)	=Average (Year 3 November ACMD, Year 2 November ACMD, Year 1 November ACMD)	=Average (Year 3 December ACMD, Year 2 December ACMD, Year 1 December ACMD)
=Average (Year 4 ACMD, Year 3 September ACMD, Year 2 September ACMD, Year 1 September ACMD)	=Average (Year 4 ACMD, Year 3 October ACMD, Year 2 October ACMD, Year 1 October ACMD)	=Average (Year 4 ACMD, Year 3 November ACMD, Year 2 November ACMD, Year 1 November ACMD)	=Average (Year 4 ACMD, Year 3 December ACMD, Year 2 December ACMD, Year 1 December ACMD)
=Average (Year 5 September ACMD, Year 4 September ACMD, Year 3 September ACMD, Year 2 September ACMD, Year 1 September ACMD)	=Average (Year 5 October ACMD, Year 4 October ACMD, Year 3 October ACMD, Year 2 October ACMD, Year 1 October ACMD)	=Average (Year 5 November ACMD, Year 4 November ACMD, Year 3 November ACMD, Year 2 November ACMD, Year 1 November ACMD)	=Average (Year 5 December ACMD, Year 4 December ACMD, Year 3 December ACMD, Year 2 December ACMD, Year 1 December ACMD)
=Average (Year 6 September ACMD, Year 5 September ACMD, Year 4 September ACMD, Year 3 September ACMD, Year 2 September ACMD)	=Average (Year 6 October ACMD, Year 5 October ACMD, Year 4 October ACMD, Year 3 October ACMD, Year 2 October ACMD)	=Average (Year 6 November ACMD, Year 5 November ACMD, Year 4 November ACMD, Year 3 November ACMD, Year 2 November ACMD)	=Average (Year 6 December ACMD, Year 5 December ACMD, Year 4 December ACMD, Year 3 December ACMD, Year 2 December ACMD)
=Average (Year 7 September ACMD, Year 6 September ACMD, Year 5 September ACMD, Year 4 September ACMD, Year 3 September ACMD)	=Average (Year 7 October ACMD, Year 6 October ACMD, Year 5 October ACMD, Year 4 October ACMD, Year 3 October ACMD)	=Average (Year 7 November ACMD, Year 6 November ACMD, Year 5 November ACMD, Year 4 November ACMD, Year 3 November ACMD)	=Average (Year 7 December ACMD, Year 6 December ACMD, Year 5 December ACMD, Year 4 December ACMD, Year 3 December ACMD)

=Average (Year 8 September ACMD, Year 7 September ACMD, Year 6 September ACMD, Year 5 September ACMD, Year 4 September ACMD)	=Average (Year 8 October ACMD, Year 7 October ACMD, Year 6 October ACMD, Year 5 October ACMD, Year 4 October ACMD)	=Average (Year 8 November ACMD, Year 7 November ACMD, Year 6 November ACMD, Year 5 November ACMD, Year 4 November ACMD)	=Average (Year 8 December ACMD, Year 7 December ACMD, Year 6 December ACMD, Year 5 December ACMD, Year 4 December ACMD)
=Average (Year 9 September ACMD, Year 8 September ACMD, Year 7 September ACMD, Year 6 September ACMD, Year 5 September ACMD)	=Average (Year 9 October ACMD, Year 8 October ACMD, Year 7 October ACMD, Year 6 October ACMD, Year 5 October ACMD)	=Average (Year 9 November ACMD, Year 8 November ACMD, Year 7 November ACMD, Year 6 November ACMD, Year 5 November ACMD)	=Average (Year 9 December ACMD, Year 8 December ACMD, Year 7 December ACMD, Year 6 December ACMD, Year 5 December ACMD)
=Average (Year 10 September ACMD, Year 9 September ACMD, Year 8 September ACMD, Year 7 September ACMD, Year 6 September ACMD)	=Average (Year 10 October ACMD, Year 9 October ACMD, Year 8 October ACMD, Year 7 October ACMD, Year 6 October ACMD)	=Average (Year 10 November ACMD, Year 9 November ACMD, Year 8 November ACMD, Year 7 November ACMD, Year 6 November ACMD)	=Average (Year 10 December ACMD, Year 9 December ACMD, Year 8 December ACMD, Year 7 December ACMD, Year 6 December ACMD)
=Average (Year 11 September ACMD, Year 10 September ACMD, Year 9 September ACMD, Year 8 September ACMD, Year 7 September ACMD)	=Average (Year 11 October ACMD, Year 10 October ACMD, Year 9 October ACMD, Year 8 October ACMD, Year 7 October ACMD)	=Average (Year 11 November ACMD, Year 10 November ACMD, Year 9 November ACMD, Year 8 November ACMD, Year 7 November ACMD)	=Average (Year 11 December ACMD, Year 10 December ACMD, Year 9 December ACMD, Year 8 December ACMD, Year 7 December ACMD)
=Average (Year 12 September ACMD, Year 11 September ACMD, Year 10 September ACMD, Year 9 September ACMD, Year 8 September ACMD)	=Average (Year 12 October ACMD, Year 11 October ACMD, Year 10 October ACMD, Year 9 October ACMD, Year 8 October ACMD)	=Average (Year 12 November ACMD, Year 11 November ACMD, Year 10 November ACMD, Year 9 November ACMD, Year 8 November ACMD)	=Average (Year 12 December ACMD, Year 11 December ACMD, Year 10 December ACMD, Year 9 December ACMD, Year 8 December ACMD)

YEAR		January	February	March	April	May	June	July	August	September	October	November	December
2023	Year 1	10	15	13	12	9	0	7	15	17	10	9	9
2024	Year 2	0	12	10	10	5	7	0	7	10	12	5	10
2025	Year 3	7	9	15	8	12	5	0	14	11	13	7	6
2026	Year 4	5	7	14	6	0	9	5	11	12	15	5	2
2027	Year 5	2	5	11	10	2	0	2	10	6	8	5	9
2028	Year 6	2	7	2	12	3	0	0	6	1	9	3	3
2029	Year 7	6	14	6	10	5	0	0	3	6	3	2	7
2030	Year 8	5	8	3	8	6	0	5	11	13	1	0	3
2031	Year 9	2	6	10	6	7	0	3	3	3	1	7	8
2032	Year 10	4	8	4	10	2	0	1	7	10	2	5	5
2033	Year 11	10	15	13	12	9	0	7	15	17	10	9	9
2034	Year 12	7	13	7	10	7	0	4	5	6	1	5	6

**Sample data included to illustrate actual calculations*

YEAR		January	February	March	April	May	June	July	August	September	October	November	December	Total TCMD (with 5-yr Ratchet)
2023	Year 1	10.0	15.0	13.0	12.0	9.0	0.0	7.0	15.0	17.0	10.0	9.0	9.0	126.0
2024	Year 2	5.0	13.5	11.5	11.0	7.0	3.5	3.5	11.0	13.5	11.0	7.0	9.5	107.0
2025	Year 3	5.7	12.0	12.7	10.0	8.7	4.0	2.3	12.0	12.7	11.7	7.0	8.3	107.0
2026	Year 4	5.5	10.8	13.0	9.0	6.5	5.3	3.0	11.8	12.5	12.5	6.5	6.8	103.0
2027	Year 5	4.8	9.6	12.6	9.2	5.6	4.2	2.8	11.4	11.2	11.6	6.2	7.2	96.4
2028	Year 6	3.2	8	10.4	9.2	4.4	4.2	1.4	9.6	8	11.4	5	6	80.8
2029	Year 7	4.4	8.4	9.6	9.2	4.4	2.8	1.4	8.8	7.2	9.6	4.4	5.4	75.6
2030	Year 8	4	8.2	7.2	9.2	3.2	1.8	2.4	8.2	7.6	7.2	3	4.8	66.8
2031	Year 9	3.4	8	6.4	9.2	4.6	0	2	6.6	5.8	4.4	3.4	6	59.8
2032	Year 10	3.8	8.6	5	9.2	4.6	0	1.8	6	6.6	3.2	3.4	5.2	57.4
2033	Year 11	5.4	10.2	7.2	9.2	5.8	0	3.2	7.8	9.8	3.4	4.6	6.4	73.0
2034	Year 12	5.6	10	7.4	9.2	6.2	0	4	8.2	9.8	3	5.2	6.2	74.8

YEAR		January	February	March	April	May	June	July	August	September	October	November	December
2023	Year 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2024	Year 2	5.0	1.5	1.5	1.0	2.0	-3.5	3.5	4.0	3.5	-1.0	2.0	-0.5
2025	Year 3	-1.3	3.0	-2.3	2.0	-3.3	-1.0	2.3	-2.0	1.7	-1.3	0.0	2.3
2026	Year 4	0.5	3.8	-1.0	3.0	6.5	-3.8	-2.0	0.8	0.5	-2.5	1.5	4.8
2027	Year 5	2.8	4.6	1.6	-0.8	3.6	4.2	0.8	1.4	5.2	3.6	1.2	-1.8
2028	Year 6	1.2	1.0	8.4	-2.8	1.4	4.2	1.4	3.6	7.0	2.4	2.0	3.0
2029	Year 7	-1.6	-5.6	3.6	-0.8	-0.6	2.8	1.4	5.8	1.2	6.6	2.4	-1.6
2030	Year 8	-1.0	0.2	4.2	1.2	-2.8	1.8	-2.6	-2.8	-5.4	6.2	3.0	1.8
2031	Year 9	1.4	2.0	-3.6	3.2	-2.4	0.0	-1.0	3.6	2.8	3.4	-3.6	-2.0
2032	Year 10	-0.2	0.6	1.0	-0.8	2.6	0.0	0.8	-1.0	-3.4	1.2	-1.6	0.2
2033	Year 11	-4.6	-4.8	-5.8	-2.8	-3.2	0.0	-3.8	-7.2	-7.2	-6.6	-4.4	-2.6
2034	Year 12	-1.4	-3.0	0.4	-0.8	-0.8	0.0	0.0	3.2	3.8	2.0	0.2	0.2

Approach proposed to classify transmission costs between demand and energy

The following methodology is proposed to determine the share of costs classified as demand and energy in the preferred rate design, as presented at Session 5 on March 25, 2021. The AESO is sharing this further information to increase understanding on this aspect of the preferred design.

Premise

The minimum system is that required to meet peak load and is classified to demand related billing determinants. Infrastructure beyond the minimum system is that required to support the in-merit flow of energy across the province and is classified to an energy related billing determinant.

The following methodology has been developed to characterize the share of costs attributable to the minimum system required to meet peak load (demand) and the share of costs attributable to facilitating the in-merit flow of energy (energy).

Methodology

Peak demand and peak generation in a year is identified from hourly metered DTS load and hourly metered generation by planning area. The hour at which an area experiences peak demand may or may not be different from the hour when the area experiences peak generation, and these hours may or may not differ by planning area. Planning areas are described in the map below.

The aggregated peak load and positive differences between peak load and peak generation by area estimates the proportion of the minimum system relative to the actual system and the resulting cost classification for Alberta:

- If peak generation minus peak load is negative, then for this classification methodology the transmission system is deemed to primarily serve load for this area. The system in the area is the minimum system, resulting in the transmission for this area being 100% demand related, since the demand related transmission is at least as large as the energy related transmission. (Example area 1)

- If peak generation minus peak load is positive, then for this classification methodology the transmission system is greater than the minimum system and is deemed to both serve peak load and to facilitate in merit flow of energy for this area. The incremental peak generation above peak load is used to characterize the amount of system, above the minimum system, facilitating in merit energy and represents the portion classified to energy. In other words, the actual system in this area is deemed to be greater than the minimum system needed to serve demand. (Example area 2)

This information from each planning area is aggregated to determine the share of network costs (currently referred to as Bulk & Regional costs) classified to demand and energy.

Alberta Electric System Operator

Calgary Place, 2500, 330-5th Avenue SW Calgary, AB T2P 0L4

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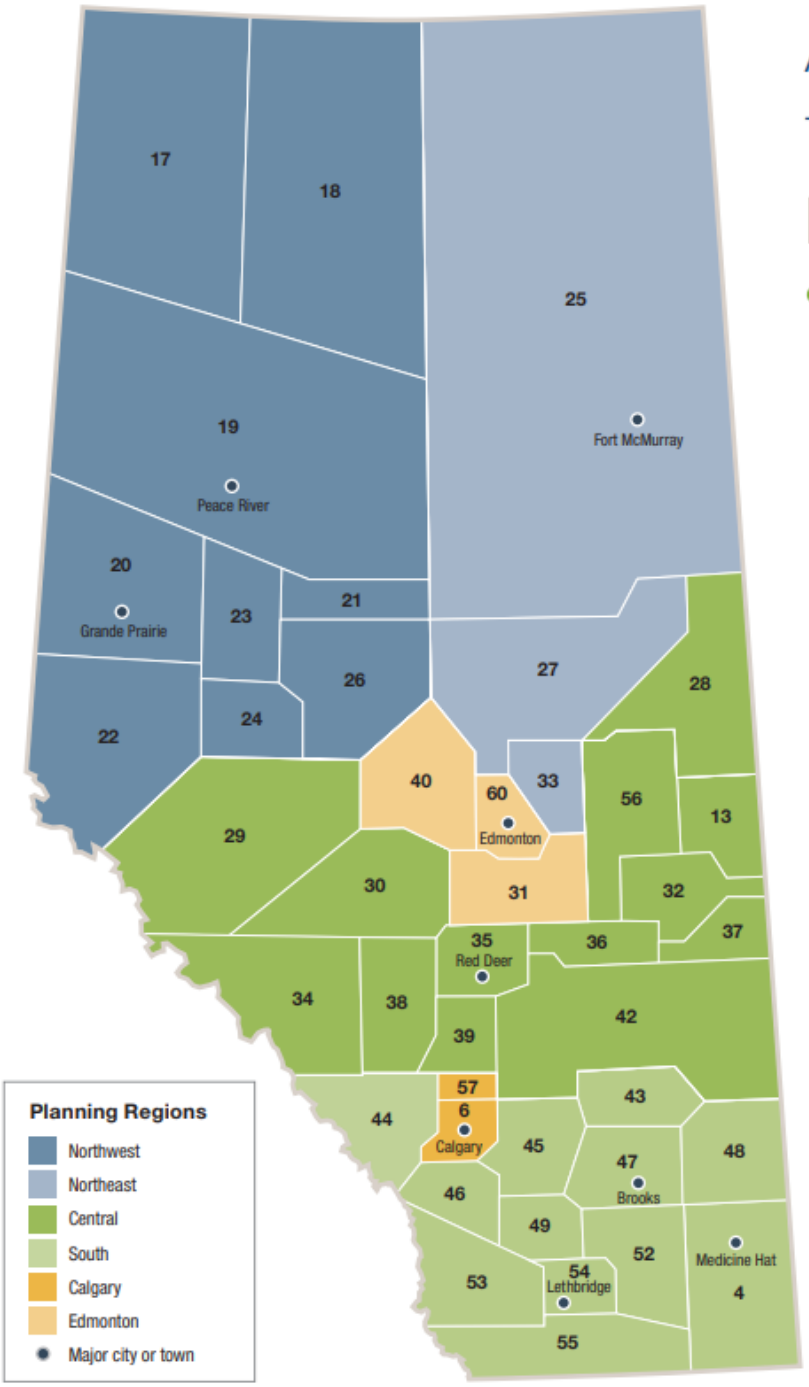
AESO transmission planning areas



NUMERICAL

4	Medicine Hat
6	Calgary
13	Lloydminster
17	Rainbow Lake
18	High Level
19	Peace River
20	Grande Prairie
21	High Prairie
22	Grande Cache
23	Valleyview
24	Fox Creek
25	Fort McMurray
26	Swan Hills
27	Athabasca/Lac La Biche
28	Cold Lake
29	Hinton/Edson
30	Drayton Valley
31	Wetaskiwin
32	Wainwright
33	Fort Saskatchewan
34	Abraham Lake
35	Red Deer
36	Alliance/Battle River
37	Provost
38	Caroline
39	Didsbury
40	Wabamun
42	Hanna
43	Sheerness
44	Seebe
45	Strathmore/Blackie
46	High River
47	Brooks
48	Empress
49	Stavely
52	Vauxhall
53	Fort Macleod
54	Lethbridge
55	Glenwood
56	Vegreville
57	Airdrie
60	Edmonton

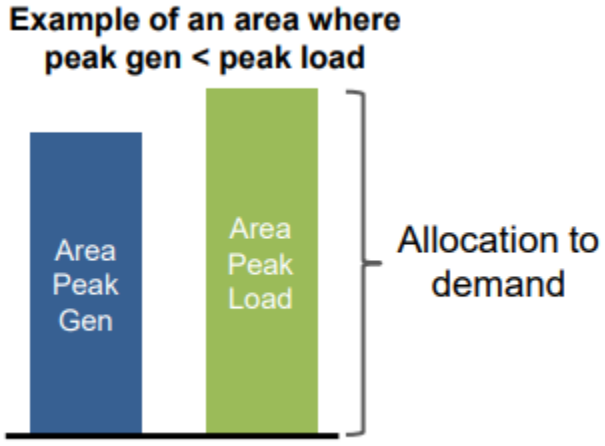
ALPHABETICAL

34	Abraham Lake
57	Airdrie
36	Alliance/Battle River
27	Athabasca/Lac La Biche
47	Brooks
6	Calgary
38	Caroline
28	Cold Lake
39	Didsbury
30	Drayton Valley
60	Edmonton
48	Empress
53	Fort Macleod
25	Fort McMurray
33	Fort Saskatchewan
24	Fox Creek
55	Glenwood
22	Grande Cache
20	Grande Prairie
42	Hanna
21	High Prairie
18	High Level
46	High River
29	Hinton/Edson
54	Lethbridge
13	Lloydminster
4	Medicine Hat
19	Peace River
37	Provost
17	Rainbow Lake
35	Red Deer
44	Seebe
43	Sheerness
49	Stavely
45	Strathmore/Blackie
26	Swan Hills
23	Valleyview
52	Vauxhall
56	Vegreville
40	Wabamun
32	Wainwright
31	Wetaskiwin

Public

As further description, a simplified example considering Alberta is made up of two areas is included below.

Example Area 1:

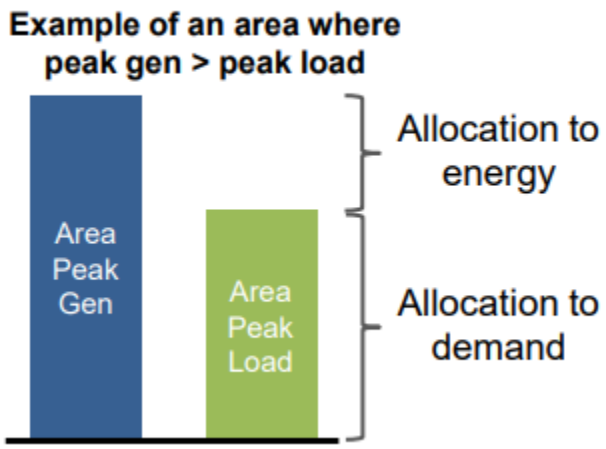


	Hour of Occurrence	Area Load (MW)	Area Generation (MW)
Area Peak Load	X	120	80
Area Peak Gen	Y	100	100

Peak generation (MW)	Peak Load (MW)	Difference (MW, if negative, then 0)	Area Classification to Demand (Peak Load) (MW)	Area Classification to Energy (Difference) (MW)
100	120	0	120	0

Public

Example area 2:



	Hour of Occurrence	Area Load (MW)	Area Generation (MW)
Area Peak Load	A	50	120
Area Peak Gen	B	40	150

Peak generation (MW)	Peak Load (MW)	Difference (MW, if negative, then 0)	Area Classification to Demand (Peak Load) (MW)	Area Classification to Energy (Difference) (MW)
150	50	100	50	100

Public

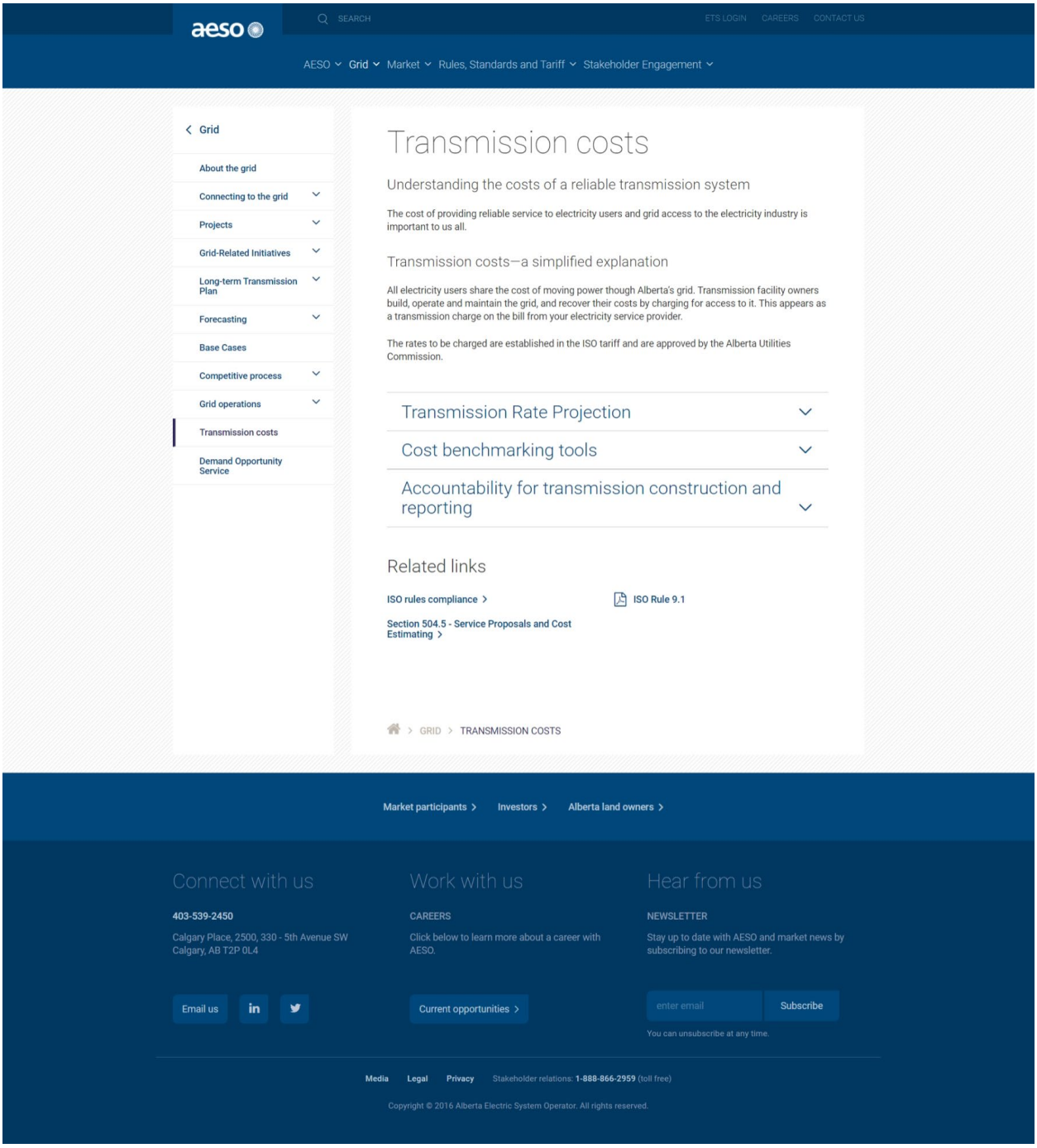
The above is completed for all 42 planning areas to determine the overall classification to demand and energy. In this example there are just two areas.

	Classification to Demand (MW)	Classification to Energy (MW)
Area 1	120	0
Area 2	50	100
Total	**170**	**100**
System Classification	**63% (170/270)**	**37% (100/270)**

This estimates the classification to demand and energy applied to the network cost (the bulk and regional portion of wires costs). The resulting classification for 2020 are 60 per cent demand and 40 per cent energy, and have changed minimally since 2015. The AESO is proposing to update the estimate of the percentage classification once every five years, and use that estimated percentage in the annual rates updates.

Public

https://www.aeso.ca/grid/transmission-costs/



FortisAlberta Inc.
AESO Bulk and Regional Tariff Design Stakeholder Engagement

April 12, 2021

Analysis of AESO Preferred DTS Tariff Design (as presented @ AESO Session 5) and as flowed-through to FortisAlberta Distribution Tariff (DT) Rate Classes

Line No.	Rate Class Description	Rate Code	A **Total 2019 DTS** (On Currently Approved AESO Structure) ('000)	B **Total 2019 DTS** (On AESO Preferred Structure) ('000)	C **Estimated % Impact to Transmission Component of FortisAlberta DT** (if AESO Preferred Design were approved)	D **Typical Range of Estimated % Impact to Transmission Component of FortisAlberta DT** (for individual customers within a rate class) **Low** Load Factor / Usage Customer	E **Typical** Load Factor / Usage Customer	F **High** Load Factor / Usage Customer	G **Load Factor / kW of Capacity Assumptions** used in calculating Columns D through E **Low** Load Factor	H **Typical** Load Factor	I **High** Load Factor	J **Low** kW of Capacity	K **Typical** kW of Capacity	L **High** kW of Capacity
1	**Residential**	**11**	$ 139,040	$ 135,534	**-2.5%**	-2.5%	-2.5%	-2.5%						
2	**FortisAlberta Farm**	**21-23**	28,269	27,518	**-2.7%**	-2.7%	-2.7%	-2.7%	*Note: Given that all transmission costs are metered and recovered exclusively through an energy charge in Rates 11 through 26, and a wattage charge for Lighting 3X, the % bill impact is uniform across full range of load factors / kWs.*					
3	**REA Farm**	**24-29**	23,575	23,043	**-2.3%**	-2.3%	-2.3%	-2.3%						
4	**FortisAlberta Irrigation**	**26**	16,637	15,870	**-4.6%**	-4.6%	-4.6%	-4.6%						
5	**Exterior Lighting**	**3X**	1,956	1,925	**-1.6%**	-1.7%	-1.7%	-1.7%						
6	**Small General Service**	**41**	56,522	55,367	**-2.0%**	-17.9%	-6.4%	1.6%	10.0%	25.0%	37.0%	3	5	19
7	**Oil and Gas**	**44-45**	25,391	26,392	**3.9%**	-18.9%	-2.3%	5.0%	10.0%	37.0%	51.0%	3	8	31
8	**General Service**	**61**	230,570	230,433	**-0.1%**	-5.6%	-2.3%	2.7%	30.0%	35.5%	54.3%	106	433	1,500
9	**Large General Service**	**63**	113,876	116,038	**1.9%**	-1.7%	1.1%	3.7%	25.0%	30.0%	40.0%	2,000	3,458	8,805
10	**Total FortisAlberta D-connected PODs**	**—**	**635,836**	**632,121**	**-0.6%**									

Bill Impact Analysis Assumptions:

1. Analysis completed by FortisAlberta based on its Transmission Cost Allocation method and Rate Design to DT rate classes as currently approved by the Commission.
2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in FortisAlberta's 2021 Annual PBR rate filing) as summed across all FortisAlberta D-connected PODs .
3. Range of Estimated % Impact to T component of FortisAlberta's DT will vary based on individual customer's load characteristics / billing determinants and were calculated using a modified version of the bill impact 4.2 series schedules as filed in FortisAlberta's 2021 PBR Rates Filing.
4. The underlying Low, Typical and High load factor and usage scenarios used to determine bill impacts in Columns D through L are for illustrative purposes only, and provide a reasonable range of potential impacts for the majority of customers in the DT rate class.
5. FortisAlberta Rate 65 - Transmission Connected Service customers that are served by a dedicated AESO POD and receive a direct flow-through of the AESO's DTS tariff can estimate their bill impacts using the AESO-provided bill impact tool.

FortisAlberta Inc. DISCLAIMER:

1. FortisAlberta Inc. provides the information contained in this schedule for informational purposes only for those participating in the AESO Bulk and Regional Tariff Design Stakeholder Engagement. The information provided in this document is not intended as advice to, or concerning, particular customers or circumstances. The information contained in this workbook is provided on an "as is" basis, without warranty or condition of any kind, either express or implied, including warranties of completeness, accuracy, usability, fitness for a particular purpose or merchantability. The user of the information assumes all risk for the use of this information. FortisAlberta, on behalf of its affiliates, officers, directors, employees, agents, consultants and contractors, completely disclaims all liability for the use of the information provided in this workbook by any recipient, including liability for any losses, damages, lawsuits, claims or expenses, including, but not limited to, consequential losses anyone may incur as a result of using this information.

2. The information provided in this schedule has been provided only to assist FortisAlberta distribution tariff customers, participating in the AESO Bulk and Regional Tariff Design Stakeholder Engagement, in assessing potential bill impacts to the transmission component of FortisAlberta's distribution tariff that may result if the AESO's preferred DTS rate design is approved. The information contained in this bill impact schedule is provided only for this express purpose and may not be used, or relied on, for any other purpose. No party may reproduce, alter, or publish the information contained in this doument without the express prior written consent of FortisAlberta Inc.

3. FortisAlberta notes that the estimated bill impacts for individual distribution-connected customers will vary from the estimates provided in this workbook as a result of actual demand, kWh usage and load factor at the FortisAlberta Point of Service and the actual approved rates. Further, FortisAlberta notes that the information in this workbook will also vary if any changes are made to the transmission component of FortisAlberta's distribution tariff, as approved from time to time by the Commission.

ENMAX Power Corporation
141 – 50 Avenue SE
Calgary, AB T2G 4S7
Tel (403) 514-3000
enmax.com

April 21, 2021 ***- via Electronic Filing -***

Alberta Electric System Operator
2500, 330 – 5th Avenue SW
Calgary, AB T2P 0L4

Attention: Nicole LeBlanc
Director, Markets & Tariff

Dear Ms. LeBlanc:

Re: AESO Bulk and Regional Tariff Design Stakeholder Engagement
ENMAX Power Corporation ("EPC") Analysis of Potential Distribution Tariff Bill Impacts

EPC provides the attached analysis of potential bill impacts in response to requests from the AESO and customers in the Bulk and Regional Tariff Stakeholder Engagement ("Stakeholder Engagement"). The attached bill impact analysis provides an estimate of the potential range of impacts to the transmission component of an individual customer's bill based on the AESO's preferred DTS rate design relative to the AESO's test year rates as presented in Session #5 of the Stakeholder Engagement.

As noted in the Disclaimer section of the bill impact analysis, EPC is providing this information for the sole purpose of assisting EPC distribution tariff customers, participating in the Stakeholder Engagement to assess their potential bill impacts to the transmission component should the AESO's preferred DTS rate design be approved. EPC consents to the AESO distributing this bill impact analysis to parties participating in the Stakeholder Engagement and it being posted to the AESO website. The information contained in this bill impact analysis is not to be used for any other purpose. Please contact me should you have any additional questions at 403-390-7748.

Regards,

Wesley Manfro
Regulatory Specialist, Regulatory Applications

Attach.

ENMAX Power Corporation ("EPC")
AESO Bulk and Regional Tariff Design Stakeholder Engagement

21-Apr-2021

Analysis of AESO Preferred DTS Tariff Design (as presented @ AESO Session 5) and as flowed-through to EPC's Distribution Tariff ("DT") Rate Classes

			A	B	C	D	E	F	G	H	I	J	K	L
			Total 2019 DTS (On Currently Approved AESO Structure)	**Total 2019 DTS** (On AESO Preferred Structure)	**Estimated % Impact to Transmission Component of EPC DT** (if AESO Preferred Design were approved)	**Typical Range of Estimated % Impact to Transmission Component of EPC DT** (for individual customers within a rate class)			**Capacity Assumptions** used in calculating Columns D through E					
Line No.	Rate Class Description	Rate Code				**Low** Load Factor / Usage Customer	**Typical** Load Factor / Usage Customer	**High** Load Factor / Usage Customer	**Low** Load Factor	**Typical** Load Factor	**High** Load Factor	**Low** Avg. kVA	**Typical** Avg. kVA	**High** Avg. kVA
1	Residential	D100	$ 112,475,630	$ 108,252,915	**-3.8%**	-3.8%	-3.8%	-3.8%						
2	Small Commercial	D200	14,725,900	14,015,496	**-4.8%**	-4.8%	-4.8%	-4.8%						
3	Medium Commercial	D300	49,204,401	47,950,530	**-2.5%**	-6.5%	-1.2%	5.0%	16.6%	45.2%	84.5%	78	96	90
4	Large Commercial - Secondary	D310	93,236,747	91,107,402	**-2.3%**	-6.9%	-2.2%	3.4%	16.6%	45.3%	84.1%	262	347	628
5	Large Commercial - Primary	D410	48,574,438	49,302,090	**1.5%**	-0.6%	1.3%	4.4%	15.8%	46.6%	81.0%	1,086	2,368	5,247
6	Streetlighting	D500	2,939,880	3,095,098	**5.3%**	5.3%	5.3%	5.3%						
7	Total EPC D-connected PODs	-	**321,156,996**	**313,723,530**	**-2.3%**									

Bill Impact Analysis Assumptions:

1. Analysis completed by EPC based on its Transmission Cost Allocation method and rate design to DT rate classes as currently approved by the Commission.
2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in EPC's 2021 Annual PBR rate filing) as summed across all EPC D-connected PODs.
3. Range of Estimated % Impact to T component of EPC's DT will vary based on individual customer's load characteristics / billing determinants and were calculated using a modified version of the bill impact schedules filed in all EPC rate applications.
4. The underlying low, typical, and high load factor and usage scenarios used to determine bill impacts in Columns D through L are for illustrative purposes only, and provide a reasonable range of potential impacts for the majority of customers in the DT rate class.
5. EPC's D600 rate class receive direct flow-through of the AESO's DTS tariff and can be estimated using the AESO-provided bill impact tool.

EPC Disclaimer:

1) EPC provides the information contained in this schedule for informational purposes only for those participating in the AESO Bulk and Regional Tariff Design Stakeholder Engagement. The information in this document is provided on an "as is" basis, without warranty or condition of any kind, either express or implied, The user of the information assumes all risk for the use of this information. EPC, on behalf of its affiliates, officers, directors, employees, agents, consultants or contractors, disclaims all liability for the use of the information provided, including liability for any losses, damages, lawsuits, claims or expenses.

2) The information provided in this schedule has been provided only to assit EPC distribution tariff customers, participating in the AESO Bulk and Regional Tariff Design Stakeholder Engagement, in assessing potential bill impacts to the transmission component of EPC's distribution tariff that may result if the AESO's preferred rate design is approved. The information contained in this bill impact schedule is provided only for this express purpose and is not to be used for any other purposes. Without EPC's prior written consent, parties receiving this information will not, directly or indirectly, disclose the information to any person or entity.

3) EPC notes that the estimated bill impacts for individual distribution-connected customers will vary from the estimates provided in this workbook as a result of actual demand, energy usage, and load factor and the actual approved rates. Further, EPC notes that the information in this workbook will also vary if any changes are made to the transmission component of EPC's distribution tariff, as approved from time to time by the Commission.

Historical DOS statistics

Number of transaction requests by type:

Type	# of Sites	# of transaction requests
DOS 7 minute	31 (2 sites currently)	2501
DOS 1 hour	11 (last used in 2004)	207
DOS term	22 (1 site currently)	66

DOS recalls occur for three primary reasons:

1) supply adequacy (Energy Emergency Alert (EEA) events)
2) real-time transmission constraint
3) voltage support

Number of recalls by reason:

Year	Reason	# of DOS recalls
2006 - 2012	Supply Adequacy	32 EEA events
	Constraint and Voltage	70
2013 - 2021	Supply Adequacy	41 EEA events
	Constraint and Voltage	1*

*Information on transmission constraint frequency resolved by in merit generation is available in the *Estimated Cost of Constraint* report on ets.aeso.ca

Date and Hour Ending (HE) Comparison

Year	Month	Hourly CMD (Day)[1]	15 Minute CMD (Day)[2]	Hourly CMD (HE)[1]	15 Minute CMD (HE)[2]	Difference HE	Difference Day
2016	9	1	1	13	12	1	0
2016	10	24	24	10	10	0	0
2016	11	28	29	18	18	0	-1
2016	12	16	16	18	18	0	0
2017	1	9	9	18	18	0	0
2017	2	7	6	19	18	1	1
2017	3	8	8	20	20	0	0
2017	4	24	26	17	11	6	-2
2017	5	31	31	17	17	0	0
2017	6	26	26	16	16	0	0
2017	7	27	27	16	16	0	0
2017	8	28	28	17	17	0	0
2017	9	7	7	17	18	-1	0
2017	10	30	30	19	8	11	0
2017	11	15	21	18	18	0	-6
2017	12	28	28	18	18	0	0
2018	1	11	11	18	18	0	0
2018	2	5	5	19	18	1	0
2018	3	5	5	20	19	1	0
2018	4	5	5	9	9	0	0
2018	5	28	28	17	17	0	0
2018	6	25	25	15	15	0	0
2018	7	17	17	17	17	0	0
2018	8	10	10	15	14	1	0
2018	9	14	14	14	13	1	0
2018	10	15	21	16	19	-3	-6
2018	11	5	5	18	18	0	0
2018	12	3	12	18	17	1	-9
2019	1	8	8	18	18	0	0
2019	2	5	5	19	18	1	0
2019	3	6	6	20	19	1	0
2019	4	18	18	18	17	1	0
2019	5	29	29	17	17	0	0
2019	6	13	13	15	15	0	0
2019	7	23	23	17	17	0	0
2019	8	2	2	16	16	0	0
2019	9	3	3	18	18	0	0
2019	10	28	28	19	19	0	0
2019	11	27	27	18	18	0	0
2019	12	9	9	18	18	0	0
2020	1	14	14	18	18	0	0
2020	2	18	3	19	18	1	15
2020	3	13	13	12	12	0	0
2020	4	1	1	11	11	0	0
2020	5	21	21	13	12	1	0
2020	6	23	23	17	17	0	0
2020	7	28	28	17	16	1	0
2020	8	18	18	17	16	1	0

MW Comparison

Year	Month	Hourly CMD (MW)[1]	15 Minute CMD (MW)[2]	Difference MW
2016	9	7,255.2	7,267.6	-12
2016	10	7,472.3	7,483.9	-12
2016	11	8,108.4	8,134.4	-26
2016	12	8,628.8	8,643.5	-15
2017	1	8,422.8	8,438.7	-16
2017	2	8,157.8	8,195.7	-38
2017	3	7,816.6	7,837.3	-21
2017	4	7,056.8	7,069.3	-12
2017	5	7,584.6	7,597.7	-13
2017	6	7,742.4	7,743.6	-1
2017	7	8,091.6	8,106.8	-15
2017	8	7,864.9	7,881.1	-16
2017	9	7,936.2	7,961.8	-26
2017	10	7,332.3	7,383.8	-51
2017	11	8,208.4	8,222.8	-14
2017	12	8,382.2	8,400.6	-18
2018	1	8,643.3	8,664.3	-21
2018	2	8,333.2	8,366.7	-34
2018	3	7,877.2	7,913.9	-37
2018	4	7,540.7	7,560.7	-20
2018	5	7,776.8	7,806.4	-30
2018	6	7,899.5	7,915.7	-16
2018	7	8,303.7	8,318.2	-14
2018	8	8,449.7	8,469.0	-19
2018	9	7,319.6	7,340.1	-20
2018	10	7,499.8	7,519.6	-20
2018	11	8,030.4	8,061.3	-31
2018	12	8,079.4	8,108.6	-29
2019	1	8,174.9	8,188.6	-14
2019	2	8,413.5	8,476.8	-63
2019	3	7,929.7	7,972.2	-43
2019	4	6,970.8	6,998.4	-28
2019	5	7,419.3	7,444.5	-25
2019	6	7,575.1	7,587.6	-13
2019	7	7,922.9	7,934.3	-11
2019	8	7,851.7	7,864.1	-12
2019	9	7,342.6	7,354.5	-12
2019	10	7,562.5	7,597.5	-35
2019	11	7,902.7	7,924.8	-22
2019	12	8,088.6	8,111.7	-23
2020	1	8,468.4	8,496.1	-28
2020	2	7,915.8	7,959.7	-44
2020	3	7,678.3	7,684.3	-6
2020	4	7,216.8	7,232.0	-15
2020	5	6,589.5	6,616.7	-27
2020	6	7,117.1	7,122.0	-5
2020	7	7,769.1	7,785.3	-16
2020	8	7,952.0	7,966.1	-14

2020	9	10	10	18	18	0	0	2020	9	7,021.5	7,046.8	-25
2020	10	29	22	11	19	-8	7	2020	10	7,408.4	7,434.3	-26

[1]Source: Operating Reserve Charge Supplement - Updated April 15, 2021
https://www.aeso.ca/index.php/rules-standards-and-tariff/tariff/operating-reserve-charge-supplement-2/

[2]Source: Coincident Metered Demand Supplement - Updated April 15, 2021
https://www.aeso.ca/rules-standards-and-tariff/tariff/coincident-metered-demand-supplement/

Revision History

Date	Description
2021-05-03	v 1.0 - Initial release

			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
						Monthly Bill Impacts			Load Factors			Monthly Demand (KW)			Monthly Energy (KWh)		
	Rate Class Description	Rate Code	Total 2019 DTS (On Currently Approved AESO Structure)	Total 2019 DTS (On AESO Preferred Structure)	Estimated % Impact to Transmission Component	Low	Typical	High	Low	Typical	High	Low	Typical	High	Low	Typical	High
1	Residential	R	77,126,402	77,009,679	-0.15%	-0.15%	-0.15%	-0.15%							300	523	1,200
2	Small Commercial (< 50 kVA)	SC	24,725,583	24,080,334	-2.61%	-2.61%	-2.61%	-2.61%							1,183	2,434	10,643
3	Medium Commercial (50 to 149 kVA)	MC	33,609,945	33,135,849	-1.41%	-5.02%	-5.02%	-5.02%	0.331	0.331	0.331	50	82	120	12,089	19,854	29,013
4	TOU (150 to 4999 kVA)	TOU	63,044,365	59,744,734	-5.23%	-14.46%	-7.58%	-1.24%	0.293	0.438	0.583	76	306	535	16,266	97,620	227,572
5	Direct Connects to T.A.	DC	10,282,842	11,203,228	8.95%	Charges flowed through to customer											
6	TOUP (150 to 4999 kVA - Primary)	TOUP	22,040,692	21,321,132	-3.26%	-13.15%	-4.80%	2.77%	0.298	0.467	0.636	341	1,393	2,445	74,214	474,750	1,134,577
7	Customer Specific (> 5000 kVA - Primary)	CS	22,251,508	22,059,494	-0.86%	-6.07%	1.86%	9.05%	0.392	0.548	0.704	1,823	4,705	7,587	522,251	1,882,343	3,897,069
8	Customer Specific, Totalized	CST	7,290,436	7,347,761	0.79%	-4.81%	4.92%	15.05%	0.320	0.520	0.740	48,000	50,300	54,000	11,212,800	19,093,880	29,170,800
9	Street Lights	SL	789,838	1,059,008	34.08%		38.70%			0.473			13,945			4,813,420	
10	Traffic Lights	TL	115,468	118,991	3.05%		3.05%			1.000			465			339,781	
11	Lane Lights	LL	49,369	64,051	29.74%		29.74%			0.473			916			316,409	
12	Security Lights	SEL	68,725	95,321	38.70%	38.70%	38.70%	38.70%	0.456	0.456	0.456	0.2	0.8	1.2	50	264	400
13	Total		**261,395,172**	**257,239,582**	**-1.59%**												

Bill Impact Assumptions

1. Analysis completed by EPCOR based on its aprooved System Access Service Cost of Service and Rate Design methodology.

2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in EPCOR's 2021 Annual PBR rate filing) as summed across all EPCOR Distribution-connected PODs

3. Range of Estimated % Impact to Transmission component of EPCOR's DT will vary based on individual customer's load characteristics / billing determinants and were calculated using the bill impact schedules as filed in EPCOR's 2021 Annual PBR Rates Filing.

4. The underlying low, typical, and high load factor and usage scenarios used to determine bill impacts in Columns D through O are for illustrative purposes only, and provide a reasonable range of potential impacts for the majority of customers in the DT rate class.

5. EPCOR's Direct Connect (DC) to Transmission System Customers receive direct flow-through of the AESO's DTS tariff and can be estimated using the AESO-provided bill impact tool.

EPCOR Disclaimer

1) EPCOR provides the information contained in this schedule for informational purposes only for those participating in the AESO Bulk and Regional Tariff Design Stakeholder Engagement. The information in this document is provided on an "as is" basis, without warranty of condition of any kind, either express or implied. The user of the information assumes all risks associated with for the use of this information. EPCOR, on behalf of its affiliates, officers, directors, employees, agents, consultants or contractors, disclaims all liability for any errors or omissions in or the use of the information provided, including liability for any losses, damages, lawsuits, claims or expenses and assumes no obligation to update forward looking information.

2) The information provided in this schedule has been provided only to assist EPCOR distribution tariff customers, participating in the AESO Bulk and Regional Tariff Design Stakeholder Engagement, in assessing potential bill impacts to the transmission component of EPCOR's distribution tariff that may result if the AESO's preferred rate design is approved. The information contained in this bill impact schedule is provided only for this express purpose and is not to be used for any other purposes. Without EPCOR's prior written consent, parties receiving this information will not, directly or indirectly, disclose the information to any person or entity.

3) EPCOR notes that the estimated bill impacts for individual distribution-connected customers will vary from the estimates provided in this workbook as a result of actual demand, energy usage, and load factor and the actual approved rates. Further, EPCOR notes that the information in this workbook will also vary if any changes are made to the transmission component of EPCOR's distribution tariff, as approved from time to time by the Commission.

Notice

To: AESO Stakeholders

Date: Tuesday, May 25, 2021

Subject: **NERA Economic Consulting Report on Estimated Customer Response to Preferred Rate Design**

Further to the AESO's presentation of its Preferred Bulk and Regional Tariff Rate Design at its March 25, 2021 Stakeholder Session 5, the AESO received stakeholder feedback and certain questions from the Alberta Utilities Commission ("AUC") staff with respect to self-supply response to the Preferred Bulk and Regional Tariff Rate Design. In response to this feedback and the AUC questions, the AESO has posted a report prepared by NERA Economic Consulting entitled: Estimating Customer Response to Our Recommended Bulk and Regional Tariff Design (the "Customer Response Report"). The Customer Response Report will be discussed as part of the AESO's upcoming Bulk and Regional Tariff Design Stakeholder Session 6A on June 3, 2021, where stakeholders will have the opportunity to provide feedback on the report during that session and afterwards. The AESO is providing the Customer Response Report in advance of Stakeholder Session 6A to provide stakeholders additional time to review the document in advance of providing Session 6A materials on May 27, 2021. This is consistent with the AESO's Transparent and Timely Stakeholder Engagement Principle to assist stakeholders in understanding and evaluating the AESO's Preferred Bulk and Regional Tariff Rate Design.

Please direct any questions to tariffdesign@aeso.ca.

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NERA
ECONOMIC CONSULTING

Estimating Customer Response to Our Recommended Bulk and Regional Tariff Design

Prepared for the AESO

25 May 2021

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1. Executive Summary

1. NERA Economic Consulting ("NERA") has been asked to estimate the likely customer response and potential changes in self-supply outcomes by load arising from the Bulk and Regional tariff design that we recommended to the Alberta Electric System Operation ("AESO"), as described at the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5. In this report, we describe our analysis of the anticipated customer response to the change in transmission tariff.

1.1. Our recommended tariff should encourage more efficient self-supply decisions by customers

2. Customers can reduce their costs of electricity by choosing to self-supply and generate power at their own premises instead of purchasing power from the grid. A customer's decision to self-supply balances the benefit associated with not consuming power from the grid with the additional costs that the customer incurs to self-supply power. A customer's choice to self-supply may be efficient and lower the total costs of electricity provision if the avoided system costs of serving that customers' self-supplied load from the grid exceeded the costs incurred by the customer to self-supply over the long-run.

3. However, customers cannot know the costs that their demand imposes on the grid. They rely on regulated transmission and distribution tariffs and wholesale market prices to signal, to the extent possible, the costs incurred to supply them. Therefore, transmission charges which are cost-reflective will tend to encourage overall efficient self-supply decisions by customers.

1.2. Marginal cost approaches to transmission tariff design may not promote efficient self-supply decisions without locational pricing

4. In theory, a marginal cost approach to transmission tariff design should send an efficient price signal, that reflects the costs imposed by incremental changes in demand on the system, through a charge which varies with customers' consumption behaviour. The remaining costs should be recovered in a way that avoids distorting the consumption decisions that customers take in response to the marginal cost component of the tariff.

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5. Changes in customers' demands have different impacts on transmission system costs, depending on where they are located. The AESO provides transmission capacity to move electricity from areas where the supply of in-merit energy exceeds demand, to areas where demand exceeds supply. Therefore, increasing demand in areas of surplus in-merit energy may reduce transmission costs (implying a negative marginal cost), while higher demand increases transmission costs in areas where demand exceeds supply (implying a positive marginal cost).

6. In developing our recommended Bulk and Regional tariff methodology, we have been asked to assume that rates do not differ based upon the location of load on the transmission system. In the absence of the ability to differentiate the marginal cost component of the tariff by location, a tariff that reflects the marginal cost of transmission would be unable to account for the fact that the marginal cost of accommodating demand in some areas is likely to be positive, while the marginal cost of accommodating demand in other areas may be zero or even negative.

7. Therefore, a marginal cost-based tariff that applies in all areas cannot reflect these differences and therefore cannot send efficient signals regarding the marginal transmission costs associated with accommodating changes in demand in Alberta.

1.3. An embedded cost approach encourages efficient, long-run self-supply decisions

8. By contrast, an embedded cost methodology seeks to signal to customers the long-run costs of providing transmission, in a way that identifies which costs have been incurred historically to accommodate (or have been caused by) particular patterns of usage, particular customers and/or particular services. By ensuring that the structure of tariffs (the balance between fixed, demand-related, and energy-related tariffs), reflects the cost structure of the transmission grid, the tariff can encourage efficiency in users' self-supply decisions.

9. In the AESO's case, it is currently charging for the majority of transmisison costs through a 12CP charge, to an extent that is not justified on grounds of cost causation as explained in the Stakeholder Session 5 presentation. The current tariff is therefore promoting inefficient self-supply decisions aiming to avoid 12CP charges. By

contrast, our recommended tariff better reflects the dual purposes of transmission in Alberta: to meet peak demand and accommodate the flow of in-merit energy.

10. However, even if the tariff is designed to reflect the cost structure of the transmission system, and therefore promote efficient decisions to use the grid or self-supply in the long-term, there remains a possibility that a tariff set to recover historical costs will cause customers to inefficiently self-supply in cases where those customers make lower contributions to historical costs. We therefore estimate customer response to our recommended tariff using a modelling procedure.

1.4. We estimate that customer response to our recommended tariff is likely to be extremely limited

11. In order to better assess how customers may respond to our recommended transmission tariff, we model the optimal self-supply decisions for industrial sites in Alberta. Our approach follows three steps:

    A. Step 1: We construct a model that estimates the optimal self-supply decisions for industrial sites across Alberta, based on a simple comparison of the costs of purchasing power from the grid and self-generation costs.

    B. Step 2: However, this optimisation model overstates the actual self-supply for customers because we do not model other costs associated with self-supply such as costs and risks associated with business complexity or financing. To estimate how customers' actual self-supply decisions will be affected by a change in the transmission tariff, we estimate a regression equation to capture how likely customers are to self-supply, given the economic incentive to self-supply identified in Step 1.

    C. Step 3: We then use our regression to predict customers' response to the change in incentive to self-supply under our recommended tariff.

12. We estimate that self-supply could increase under our recommended tariff by up to 2,801 GWh which is equivalent to a shift in costs from self-supplying customers to other customers of approximately 1.90 per cent of the total revenue requirement for bulk and regional costs in 2019. Our estimate of customer response is a total effect

that includes any dynamic responses[1] by customers to self-supply decisions of other customers.

13. Our estimate of customers' response is conservative because it ignores the potential for customers to increase purchases of power from the grid in response to lower 12CP charges in our recommended tariff relative to the current tariff.

14. Hence, we predict an extremely limited increase in self-supply by industrial customers under our recommended tariff, and any change in customers' self-supply decisions that does arise will tend to result in more efficient patterns of electricity usage than under the current methodology.

1.5. The economic case for self-supply is likely to significantly worsen in the next decade due to rising gas and carbon prices

15. While the impact of our recommended tariff on self-supply is likely to be limited given the current costs of self-supply, the economic case for self-supply in Alberta is likely to worsen in the next decade, even under a low energy consumption growth scenario. Both carbon and gas prices are forecast to rise over the next decade. For instance, we understand that the Federal Government has announced that, under its carbon tax regime, taxes will increase from $30 per tCO2 to $170 per tCO2 in 2030.

16. The impact of future growth in gas and carbon prices on incentives to self-supply depends on how the costs of self-supply change relative to the pool price. Higher carbon and gas prices will increase the pool price for power, as generators incur higher costs to produce power, thereby increasing the cost savings associated with self-supply. On the other hand, rising gas prices and carbon prices will also result in higher costs of self-supply using gas-based generation, decreasing the cost savings associated with self-supply relative to purchasing power from the grid.

17. Gas-based generation options available for self-supply are generally smaller and therefore less efficient (requiring more gas to produce one unit of electricity) than grid-level generation plants. Consequently, the costs of self-supplying power will

[1] By the term "dynamic response", we refer to our modelling procedure accounting for some customers' decisions to self-supply pushing up tariffs for other customers, leading them to self-supply too. Our reported results consider these knock-on effects of the initial change in the tariff to our recommended design.

increase more than the pool price in response to higher carbon and gas prices, because self-suppliers require more gas (and release more emissions) to generate one unit of electricity.

18. We estimate that rising carbon and gas costs will make self-supply technologies more expensive over time, when compared to the cost of purchasing power from the grid. For two representative self-supply technologies, we estimate that by 2030, the fuel and carbon costs of producing one MWh using self-supply plant will be $25.40 or $32.47 per MWh (in real 2019 terms) more expensive respectively than producing a MWh using grid technology, relative to around $10 per MWh today. Therefore, we expect that upward pressure on fuel and carbon prices is expected to further reduce the incentive to self-supply.

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2. Introduction

19. We have been asked by the Alberta Electric System Operator ("AESO") to estimate the likely customer response and potential changes in self-supply outcomes by load arising from our recommended Bulk and Regional tariff design, described at Bulk and Regional Tariff Design Stakeholder Engagement Session 5. In this report, we describe our analysis of the anticipated customer response to the change in transmission tariff.

20. Our report is structured as follows:

    A. In Section 3, we discuss the factors that may influence a customers' decision to self-supply including the costs of self-supply options and the costs of purchasing power from the grid, and determine whether such decisions are efficient:

        i. In Section 3.1, we discuss the definition of efficient and inefficient self-supply decisions.

        ii. In Section 3.2, we discuss the ability of marginal and embedded cost tariff methodologies to promote efficient self-supply decisions in the Alberta context.

        iii. In Section 3.3, we provide a short discussion of current self-supply choices made by customers in Alberta under the current tariff.

        iv. In Section 3.4, we analyse the impact of our recommended tariff on the decision to self-supply. We provide the results of our modelling procedure developed to examine how changes in the AESO's tariff affect self-supply decisions by industrial customers. Overall, we find that any reduction in energy demand from the transmission system resulting from changing to our recommended tariff design is likely to be extremely limited, based on the current costs of self-supply.

        v. In Section 3.5, we examine how incentives to self-supply are likely to change in the future due to forecast changes in the economics of self-supply. We find that the economics of self-supply are set to worsen in the future, even under a low consumption growth scenario, because self-supply technologies are

impacted by rising carbon prices to a greater extent than grid level technologies.

B. In Section 4, we summarise our findings.

C. In Appendix A, we provide a detailed description of our modelling procedure used to estimate customer response, as reported in Section 3.4.

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3. Customer Response to the Tariff

3.1. The Decision to Self-Supply

3.1.1. A customers' decision to self-supply

21. Customers can reduce their costs of electricity by choosing to self-supply and generate power at their own premises instead of purchasing power from the grid. A customer's decision to self-supply balances the benefit associated with not consuming power from the grid with the additional costs that the customer incurs to self-supply power.

22. Customers that choose to self-supply incur costs to do so. The costs of self-supply may include:

    A. The upfront **capital costs** associated with building or procuring a generator to use for self-supply, which would usually be depreciated and financed over the useful life of the generator;

    B. The **fixed annual operating and maintenance (O&M) costs** of generating power using the installed generator;

    C. The **variable costs** associated with generating power which may include the variable O&M costs of the generator, the costs of fuel for the generator, and the carbon costs associated with using fossil fuel generation; and

    D. **Other costs** associated with self-supply such as the costs of land for the generator, personnel, administrative costs, and costs associated with any additional complexity and risk to business operations relative to purchasing power from the grid.

23. The costs of self-supply may also be offset if an industrial customer uses a bi-product from generating its own power in its industrial processes. For instance, industrial customers that self-supply power using cogeneration technology may also benefit from using heat and/or steam in industrial processes.

24. A customer that chooses to self-supply also avoids the costs of purchasing that self-supplied power from the grid. A customer that chooses to consume power from the grid incurs multiple costs, that primarily consist of:[2]

    A. **Energy costs** associated with purchasing energy from the pool;

    B. **Transmission charges** as defined by the ISO tariff for use of the transmission system;

    C. **Distribution charges**, paid by distribution connected customers, for the use of the distribution system;

    D. **Local access fees** which are fees charged by municipal districts to customers in those service areas; and

    E. **Administrative charges**, for customers which purchase energy through an electricity retailer, associated with the billing and administration of the customer's account by the retailer.

25. The costs that customers avoid from self-supplying and incur from purchasing power from the grid depend on how and when they use electricity:

    A. Depending on their connection to the system, customers may not have to pay all of the above charges when consuming electricity from the grid.

        i. A transmission connected, industrial customer purchasing power from the grid would incur energy costs and transmission charges.

        ii. An industrial customer purchasing power from the grid but connected to a distribution system might incur energy costs, transmission charges, and distribution charges.

    B. Customers pay different amounts in energy, transmission, and distribution charges depending on when they purchase electricity from the grid. For instance, customers consuming at peak times will likely pay higher energy costs because the pool price tends to be higher and may also pay more in transmission charges if they consume during times of coincident peak. Other charges, such as a flat

[2] AESO (31 May 2020), Delivered Cost of Electricity Report, p. 15.

rate energy charge would be incurred irrespective of when customers consume from the grid.

C. Charges levied per customer do not vary depending on how much or when the customer consumes energy from the grid. Such charges are difficult to avoid through self-supply decisions, unless customers disconnect from the grid entirely.

D. Charges levied on billing capacity do not vary with customers' energy consumption across all hours, but do vary with customers' contracted capacity or peak energy consumption across the year. However, customers choosing to self-supply may reduce their contracted capacity as having generation on-site may reduce their reliance on the grid for peak requirements.

26. Therefore, customers incur different costs to self-supply and avoid different costs associated with purchasing power from the grid, depending on how and when they choose to self-supply.

27. A customer's decision to self-supply is not a binary decision. There are multiple different ways that a customer could self-supply that each result in a different net consumption profile from the grid. We distinguish four approaches and technologies that could be used to self-supply:

A. **Intermittent generation:** Customers could install intermittent generators to self-supply such as rooftop solar photovoltaic (PV) generators. The profile of such generation is not controllable by the customer and therefore the customer would still need to connect to the grid or install other forms of on-site generation that could run when the intermittent resource is not available. The customer would avoid paying some costs when it was generating, such as energy charges in the transmission tariff and the pool price. However, it would tend not to avoid peak charges, except to the extent that the generator happens by chance to be producing at peak time.

B. **Peaking generation:** Customers could install peaking generators characterized by low capital costs but high variable costs of generation. Customers can choose when to run peaking generation and would likely use it to reduce their consumption during peak periods, when they can avoid network charges linked to

coincident peak load, energy charges, and energy costs associated with higher pool prices. However, peaking generators will be less economic to run in off-peak periods meaning customers would likely remain connected to the grid and consume power from the grid during those times.

C. **Baseload generation:** Customers could install baseload generators, characterized by higher capital costs but lower variable costs of generation relative to peaking generators. Baseload generators will be economic in more hours than peaking generators, and could be used to self-supply in all hours throughout the year. However, customers deploying baseload technologies for self-supply would still need to be connected to the grid as they would be reliant on the grid for back-up in cases where their generator suffers a forced outage. Customers with baseload generation would avoid most energy costs and charges, apart from the occasions where it relied on the grid for back-up, and peak charges, unless it needed to use the grid for back-up during a peak period. However, customers would remain liable for any per customer, per connection, or contract capacity charges as they would remain connected to the grid. As we discuss above, customers may also utilise baseload generation to produce bi-products for use in industrial processes.

D. **Disconnection or grid defection:** Lastly, customers could completely disconnect from the grid, and rely entirely on their own power generation capacity. Customers that disconnect from the grid would avoid all energy costs, transmission charges, and distribution charges. However, they may incur higher costs to self-supply, as they would need to have technology in place to operate in an "islanded" mode of operation, without the ability to draw on the grid for support.

28. Customers can also avoid taking power from the grid at certain times to avoid charges, but without investing to self-supply. Management of load, by reducing or eliminating power consumption, can be used to avoid coincident peak charges which are levied on consumption during small time intervals throughout the year, or the purchase of energy at relatively high pool prices. However, customers would need to be able to predict when such time intervals occur. In management of their load at any

moment in time, customers face a trade-off between the opportunity cost of using power and the savings associated with avoiding the charges levied.

29. Customers may also invest in energy storage options to complement self-supply technologies or to help them manage their load and avoid periods of time associated with relatively higher costs of purchasing power from the grid.

30. Customers' decisions on how and whether to self-supply depend on their individual circumstances, namely how and when they consume power from the grid. A customer considering whether to self-supply could choose a combination of the approaches to self-supply (listed in Paragraph 27 above) to best meet its energy requirements.

31. In making self-supply decisions, a customer's load size is also an important determinant of the self-supply options available to it. The upfront capital costs of some self-supply options, e.g. baseload generators, often make them uneconomic for customers with smaller loads. Customers with smaller loads may be limited to smaller back-up/peaking plant, intermittent generation options, and load management. On the other hand, larger industrial and commercial customers are more likely to be able to pursue a wider range of self-supply options, including peaking and baseload generation or disconnection from the grid.

32. Customers are also constrained in their decisions to self-supply by other factors. Space and land availability may constrain the use of some self-supply options, such as the use of solar PV for larger industrial loads. Local emissions limits may also restrict the self-supply options available to customers. Lastly, industrials may face capital constraints in funding the upfront capital costs of self-supply options.

33. From the customers' perspective, optimal decisions to self-supply balance the costs incurred to generate their own power with the avoided costs of purchasing power from the grid. We would expect customers to take a holistic decision of whether to self-supply based on all the benefits and avoided costs of purchasing power from the grid (i.e. not just the transmission tariff).

    A. If the customer incurs fewer costs to self-supply than it would to purchase power from the grid (accounting for any associated benefits of self-supply, such as heat supply), then the customer would optimally choose to self-supply.

B. If the customer incurs more costs to self-supply than it would to purchase power from the grid (even after accounting for associated benefits of self-supply), then the customer would optimally choose not to self-supply.

34. Given that self-generation decisions typically involve investment in long-lived generation assets, we would expect a customer's decision on whether to self-supply to consider a forward-looking assessment of the costs of self-supply relative to the avoided costs of consuming from the grid.

3.1.2. Efficient and inefficient self-supply decisions

35. Economics defines a concept named "productive efficiency".[3] A market is productively efficient when it meets the demand from customers at lowest possible cost. The power market would achieve productive efficiency if customers' loads are met at lowest possible system costs, irrespective of which parties incur those costs.

36. It is not necessarily inefficient for the system if customers choose to self-supply. In fact, a customer's choice to self-supply may be efficient and lower the total costs of electricity provision:

A. A customer choosing to self-supply would improve productive efficiency if the avoided system costs of serving that customers' self-supplied load from the grid exceeded the costs incurred by the customer to self-supply over the long-run (net of any other costs and benefits from doing so, such as the value of heat); whereas

B. A customer choosing to self-supply would reduce productive efficiency if the avoided system costs of serving that customers' self-supplied load from the grid are less than the customer's incurred costs to self-supply over the long-run (net of any other costs and benefits from doing so, such as the value of heat).

37. Customers cannot know the costs that their load imposes on the grid. They rely on regulated transmission and distribution tariffs and wholesale market prices to signal, to the extent possible, the costs incurred to supply them. Therefore, transmission

[3] See for instance, Michael. J. Farrell (1957), The Measurement of Productive Efficiency, Vol. 120, No. 3, p. 253-290.

charges which are cost-reflective will tend to encourage overall efficient self-supply decisions by customers.

38. Following a change in the transmission tariff, customers may make different, and *more efficient*, self-supply decisions in response to a transmission tariff that itself better reflects the costs of transmission incurred to serve that customer's load. For instance, compared to the current tariff, our recommended tariff reduces costs recovered through a charge on 12CP in order to better meet principles of cost causation. Consequently, customers are more incentivised to consume power from the grid during times of coincident peak, thereby reducing inefficient self-supply decisions relative to the current tariff.

39. In its Distribution System Inquiry, the Alberta Utilities Commission (AUC) distinguishes customers' decisions to self-supply by whether they constitute "economic" or "uneconomic bypass" from the grid.[4] The AUC defines uneconomic bypass:[5]

> *"uneconomic bypass describes a situation where a customer's bypass decision (i.e., supplying its needs through other means) shifts fixed cost recovery, whether in whole or in part, to other customers. This occurs when a customer's decision to self-supply electricity does not change (or even increases) system costs, but results in that customer paying a smaller share of the fixed costs. This unrecovered fixed cost must then be collected from other customers"*

40. The AUC defines "economic bypass":[6]

> *"In contrast, economic bypass occurs when a customer supplying its needs through other means results in reduced costs for other customers. This happens when a customer's decision to self-supply electricity lowers system costs; so it is not only the self-supplying customer who is paying less for the system costs, but the costs for other customers are also reduced"*

4 AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 97 and 98.

5 AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 97.

6 AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 98.

41. As we discuss above, our recommended tariff seeks to more accurately signal the long-run costs of providing transmission in Alberta. Self-supply decisions in response to cost reflective tariffs promote efficiency in the overall supply of electricity, and will tend to reduce the costs faced by the customers who purchase energy from the grid. Changes to customers' self-supply decisions in response to our recommended tariff should therefore tend to be more efficient than under the current tariff, resulting in incentives that will encourage what the AUC terms economic bypass (and discourage uneconomic bypass) in the long-run than the current tariff design.

42. However, even though our recommended tariff seeks to better reflect the cost structure of the transmission system than the existing tariff in order to promote efficient decision-making on customers' usage of the grid or self-supply decisions, there remains a risk of inefficient self-supply decisions. Specifically, any tariff has to recover the current operating and historically incurred capital costs of the transmission system in Alberta. If the costs incurred historically are higher than the costs that would be associated with the costs of meeting customers' demands for electricity in the future, then there is a risk that any tariff set to recover historical costs will cause customers to self-supply.

43. In other words, customers that respond to the price signals sent by the recommended tariff design might make lower contributions to historical costs, thereby shifting recovery of those costs to other customers. As explained below, marginal cost pricing provides a potential solution to this challenge that has been discussed in the context of distribution tariff reform in Alberta.

3.2. Marginal Cost Tariffs as a Possible Means of Promoting Efficient Self-Supply Decisions

3.2.1. Theory suggests marginal cost tariffs promote efficient self-supply decisions

44. Economic theory, and the practical application of rate design in North America and elsewhere, sometimes uses a "marginal cost approach" as a potential solution to this problem of historical costs exceeding the forward-looking costs associated with future changes in demand for electricity. The marginal cost approach sets tariffs based on an

estimate of how a change in demand from a customer will affect the future costs of the utility.[7]

45. A theoretical advantage of a marginal cost approach is the ability to send an efficient price signal that reflects the costs imposed by incremental changes in demand on the system. This price signal should be sent through a charge which is "avoidable" or varies with customers' consumption behaviour. In theory, these prices promote efficiency by allowing customers to trade-off the benefits they derive from consuming electricity drawn from the transmission system, which may include the value derived from consumption or the costs of alternative self-generation options, against the transmission costs their consumption creates (as well as other costs such as the wholesale market price).

46. The concept of marginal cost-based pricing is discussed in the context of distribution network rate design in the AUC's Distribution System Inquiry:[8]

> *"distribution rates should contain a variable component to provide a forward-looking price signal to customers to manage their use of distribution system services that will affect the future costs of the network. This forward-looking component is based on variable charges (volumetric charges or avoidable demand, such as CP charges)"*

47. However, setting prices equal to an estimate of marginal cost will not usually (except by coincidence) generate enough revenue to recover the revenue requirement.[9] The difference between the revenue earned under marginal cost prices and the revenue requirement is often called the "residual" costs.

48. Consequently, in order to recover the revenue requirement efficiently, the marginal cost methodology prescribes that the residual should be recovered in a way that avoids distorting the consumption decisions that customers would take in response to the

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7 National Association of Regulatory Utility Commissioners (NARUC), Electric Utility Cost Allocation Manual, January 1992, pp. 12-14.

8 AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 311.

9 NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 147.

efficient price signals conveyed by marginal cost component of the tariff alone. As explained in the AUC's Distribution System Inquiry:[10]

"Whenever an attempt is made to recover embedded or sunk costs (also referred to as "residual costs" in the quote above) through charges that customers can avoid (such as volumetric charges or CP demand charges), improper incentives (i.e., incentives contrary to the public interest in the least cost provisioning of electricity) arise to invest in self-supply, resulting in (i) under-recovery of fixed system costs; (ii) cost shifting to other customers; and (iii) uneconomic bypass"

49. In light of the above, methods to recover residual costs in a marginal cost-based tariff include:

A. Ramsey pricing, which recovers residual costs based on the relative elasticities of demand for different classes of customers.[11] Those classes with the highest price sensitivity will be charged the price closest to marginal cost (hence recovering less residual cost) while those that are least likely to respond to price will be charged the price that deviates the most from marginal costs (reflecting more residual costs).[12]

B. However, recognising that it can be challenging to identify the price elasticity of demand for all customers, the tariff could recover residual costs based on a charge levied on a billing determinant which is least likely to distort customer behaviour (and the price signal sent by the marginal cost component of the charge).[13]

C. Another method to recoup residual costs is to apply a proportional mark-up to the marginal-cost component of the charge.[14] While this approach is simple to administer, and can result in a similar outcome to Ramsey pricing if customer classes that impose the highest marginal costs also have the least price elastic

[10] AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 310.

[11] The elasticity of demand describes the extent to which customers can and are willing to change their behavior to avoid the charge. A higher elasticity of demand refers to a customer that is more willing to change their behavior to avoid the charge.

[12] NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 155-160.

[13] NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 162.

[14] NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 160-162.

demand, this methodology distorts the marginal cost price signal, and so undermines the efficiency properties of marginal cost pricing.

50. The choice of methodology to recover residual costs should also consider the equity of the tariff design.[15] For instance, levying a fixed charge per customer may disproportionately impact smaller customers relative to larger ones.

3.2.2. Challenges of applying a marginal cost approach to set the AESO's tariff

51. While the marginal cost approach is theoretically appealing as a means of encouraging efficient self-supply decisions, the current legislative framework in Alberta significantly limits the potential benefits of using a marginal cost approach in the AESO's tariff.

52. The efficiency of a marginal cost approach to set a regulated utility tariff that will apply to a wide set of customers (e.g. across a whole "class" of ratepayers) relies on the assumption that all such customers' consumption decisions would have a similar impact on the utility's costs. For instance, in a distribution system, it is reasonable to assume that changes in customers' consumption decisions (or growth in the number of customers) will have a similar effect on the distribution utility's costs because the majority of residential electricity customers have similar sized connections and are served with similar types of infrastructure.

53. In a transmission system, by contrast, it is not safe to assume that changes in all customers' demands have the same impact on the transmission system's costs:

A. New demand connecting to the system in a location that is close to new generation may help the AESO to avoid the need to reinforce the transmission system to evacuate power from the new generation facility. As such, the marginal cost of accommodating this particular change in demand would be negative.

B. On the other hand, additional energy consumption in locations near generators due for retirement, or in locations where demand is already high relative to the

[15] NARUC, Electric Utility Cost Allocation Manual, January 1992, p. 164-165.

generation located nearby, may increase transmission costs. The marginal cost of accommodating such changes in demand would be positive.

54. In practice, the investments that the AESO identifies in the 2020 Long Term Plan (LTP) suggest that changes in customers' consumption decisions (e.g. demand, energy) in different locations of the network could be associated with different amounts of avoidable costs. For instance, while the AESO is currently only planning a single investment in the Northeast planning region to support voltage, it is planning multiple new single-circuit lines to alleviate *load* thermal constraints in the Northwest, two new bulk line circuits in the Central planning region to alleviate *generation* thermal constraints, and a new regional line in the Calgary planning region to alleviate *load* thermal and voltage constraints. Hence, changes in customers' consumption decisions in Calgary are unlikely to drive the same change in transmission costs associated with the identified investments in the Northwest as changes in customers' consumption decisions in the Northwest.

55. In developing our recommended Bulk and Regional tariff methodology, we have been asked to assume that rates cannot differ based upon the location of load on the transmission system. In absence of the ability to differentiate the marginal cost component of the tariff by location, a tariff that reflects the marginal cost of transmission would be unable to account for the fact that the marginal cost of accommodating demand in some areas is likely to be positive, while the marginal cost of accommodating in other areas may be zero or even negative.

56. Therefore, the marginal cost component of the tariff would inevitably differ from the marginal cost of transmission investment associated with accommodating an additional unit of demand at that particular location of the network. As such, a tariff set using a marginal cost approach would not necessarily lead to an efficient outcome.

57. To take a practical example, the electricity transmission pricing methodology in Great Britain sets tariffs that seek to approximate the long-run marginal cost of transmission, such that transmission users receive a forward-looking signal regarding the costs they impose on the grid. However, the primary purpose of these forward-looking signals is to send locational signals regarding the long-run investment cost

users impose on the grid in different *locations*, with charges for demand customers varying from £20.38 to £61.68 ($35.33 to $106.91) per kW per year, depending on location.[16] Customers also pay a non-locational charge per kW to cover residual costs.

58. Hence, even if marginal cost-based distribution tariffs may have the potential to encourage the efficient use of distribution systems in Alberta, the legislative framework in Alberta limits the potential benefits of a marginal cost methodology to set *transmission* tariffs. The relative importance of locational signals at the transmission system level compared to the distribution system level is recognised in the Distribution System Inquiry:[17]

> *"experts indicated that while there may be merits of locational pricing on the transmission system, there probably is much less value in locational pricing on the distribution systems, at this time"*

59. Whilst we assess that the use of a marginal cost-based approach for transmission pricing in Alberta is principally limited by the inability to vary the marginal cost component of the tariff by location, using such a methodology to set transmission tariffs would also entail challenges associated with the recovery of the remaining residual costs:

    A. The large increase in transmission investment seen since 2014 has not been accompanied by significant growth in coincident peak demand.[18] Over this historical period, load growth has also been relatively low. Consequently, we would expect a tariff based on a marginal cost approach to have a small marginal cost component and large residual cost component. Large residual cost components of the tariff create challenges for the recovery of those costs, whilst

[16] Half-hourly demand tariff reported for zones in Northern Scotland and South Western in Transmission Network Use of System Tariffs in 2021-22. See: National Grid (January 2021), Final TNUoS Tariffs 2021-22, Table 9. Currency converted using current exchange rate of GBP 1: 1.73 CAD.

[17] AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 317.

[18] AESO (10 December 2020), Bulk and Regional Tariff Design Stakeholder Engagement 4, Slides 47-48, available at https://www.aeso.ca/assets/Uploads/Presentation-Session-5.pdf.

preserving the efficient price signal sent by the marginal cost component of the tariff.

60. As we explain above, under a Ramsey pricing approach, residual costs could be recovered from customers in proportion to their estimated price elasticities of demand (higher charges levied on customers with lower price elasticities of demand). However, estimating the price elasticity of demand for different customer groups is difficult in practice. Moreover, it involves levying costs on customer classes based on their willingness and/or ability to respond to charges. This approach would not seek to follow principles of cost causation but instead target the minimal customer response to the residual component of the tariff. The approach may also raise equity concerns.

61. Hence, a more practical implementation might be to levy the residual costs on billing determinants that are less likely to produce a response from the customer. For instance, the Distribution System Inquiry states that residual costs should be recovered from billing determinants that are non-avoidable, or difficult to avoid, such as fixed monthly charges or "non-bypassable demand charges" such as non-coincidental peak demand or contract capacity charges.[19]

62. However, unlike distribution systems, a relatively small number of customers are connected to the transmission system, and they vary materially in terms of their size usage of the system. For instance, transmission customers comprise small and large industrials, some of which make very little use of the grid except as a back-up to on-site generation, as well as distribution systems. Therefore, levying a fixed fee per customer or connection point to recover transmission residual costs would not follow principles of cost causation, and is likely to lead to inequitable charges as small customers would make the same financial contribution to residual costs as much larger customers.

63. In addition, it is not clear whether any billing determinant would be truly "non-avoidable" for many transmission customers. As explained above, large industrial customers that connect directly to the transmission system can choose to reduce their coincident or non-coincident demand by self-generating, or disconnecting from the

[19] AUC (19 February 2021), 24116-D01-2021, Distribution System Inquiry, para. 309.

grid and self-supplying the entirety of their energy needs. High transmission charges could also make it uneconomic to operate within Alberta. Hence, even a fixed charge per customer per month may be avoidable for a large industrial customer connected to the transmission grid.

64. As noted above, as an alternative to recovering residual costs from the customers with least price elastic demand or the billing determinants that are least avoidable, an alternative approach would be to use proportional mark-ups to uplift marginal cost-based tariffs. In this case, it is likely that proportional mark-ups would need to be large given the relative size of residual costs relative to marginal costs. Therefore, proportional mark-ups will likely significantly distort any price signal sent by the marginal cost component of the charge.

65. However, as noted above, the limitations associated with efficient recovery of residual costs are secondary to the limitations associated with the inability of the transmission tariff to accurately reflect marginal cost unless it has locational differentiation.

3.2.3. The lack of locational pricing would restrict or negate the efficiency benefits from the AESO introducing a marginal cost methodology

66. Economic theory shows that marginal cost prices may send more efficient signals to consumers of the impact of changes in load on the costs of transmission. However, these theoretical benefits of a marginal cost approach cannot be realised in the AESO's context, if rates of the transmission tariff do not differ based upon the location of load on the transmission system.

67. In simple terms, the AESO provides transmission capacity to move electricity from areas where the supply of in-merit energy exceeds demand, to areas where demand exceeds supply. Increasing demand in areas of surplus in-merit energy may therefore reduce transmission costs (implying a negative marginal cost), while higher demand increases transmission costs in areas where demand exceeds supply (implying a positive marginal cost). A marginal cost-based tariff that applies in all areas cannot reflect these differences and therefore cannot send efficient signals regarding the marginal transmission costs associated with of accommodating changes in demand in Alberta.

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3.2.4. An embedded approach will tend to promote more efficient self-supply decisions than a marginal approach in the Albertan context

68. The AESO's current tariff methodology is an embedded cost approach. In contrast to the marginal cost approach, which aims to set a forward-looking signal regarding the additional costs that would be associated with future load growth, the embedded cost approach designs tariffs based on historical spending on capital investment and operating expenses during a specific time period.[20]

69. In this context, the embedded cost methodology seeks to signal to customers the long-run costs of providing transmission, in a way that identifies which costs have been incurred historically to accommodate (or have been caused by) particular patterns of usage, particular customers and/or particular services. Embedded methodologies need to be designed to achieve this objective, and thereby send signals to users regarding the historical costs associated with their usage of the transmission grid.

70. By setting charges to reflect the costs incurred historically to serve particular customers or types of grid usage, the embedded methodology can send signals through tariffs that reflect such patterns of cost causation. By ensuring that the structure of tariffs (the balance between fixed, demand-related, and energy-related tariffs), reflects the cost structure of the transmission grid, the tariff can encourage efficiency in users' self-supply decisions.

71. The embedded cost approach is commonly criticized for sending less efficient price signals to consumers, because prices may not reflect the cost of consuming the next unit of electricity. Instead, prices reflect the historical, average cost of service, so consumption decisions made in response to the tariff may be less efficient than if the tariff were set equal to marginal cost. However, in this particular context, i.e. electricity transmission in a jurisdiction where locational differentiation of transmission tariffs is not permitted, this common criticism of the embedded methodology would be unjustified. As we explain above, the AESO's Bulk and

[20] National Association of Regulatory Utility Commissioners (NARUC), Electric Utility Cost Allocation Manual, January 1992, pp. 12-14.

Regional tariff cannot accurately reflect the marginal cost of transmission without differing rates based upon the location of load on the transmission system.

72. Given this limitation of marginal cost-based pricing in this context, an embedded methodology provides a reasonable guide to the costs associated with particular customers' usage of the transmission system. We therefore recommend that a tariff based on an embedded cost approach is more likely to promote efficient self-supply decisions than a tariff based on marginal cost pricing principles.

73. Nonetheless, we quantify the likely effect of our recommended tariff design (as outlined in the presentation delivered at Stakeholder Session 5) on self-supply decisions by customers, as described further below.

3.3. Self-Supply in Alberta

74. As we discuss in Section 3.1.1, industrial customers tend to have a larger number of options to self-supply than residential or small commercial customers because they have larger loads. Industrial customers account for approximately 65 per cent of annual Alberta Internal Load ("AIL"). The remaining load comes from commercial customers (20 per cent), residential customers (13 per cent), and farms (3 per cent).[21]

75. Some industrial customers are already self-supplying under the current tariff. Approximately 24 per cent of annual AIL is self-supplied, or roughly 37 per cent of industrial load.[22] We understand that industrial customers choosing to self-supply include those with petrochemical facilities, pulp/paper and forestry facilities, and oil sands customers. In particular, we understand that oil sands industrial customers have invested in cogeneration self-supply options, and benefit from the production of heat for use in their production processes.[23]

76. The majority of remaining industrial customers which are not pursuing self-supply options are distribution-connected. Approximately 6 per cent of total AIL comes

[21] AESO (31 May 2020), Delivered Cost of Electricity Report, p. 9.

[22] AESO (31 May 2020), Delivered Cost of Electricity Report, p. 9.

[23] AESO (31 May 2020), Delivered Cost of Electricity Report, p. 9.

from transmission-connected industrial customers which are not currently self-supplying.

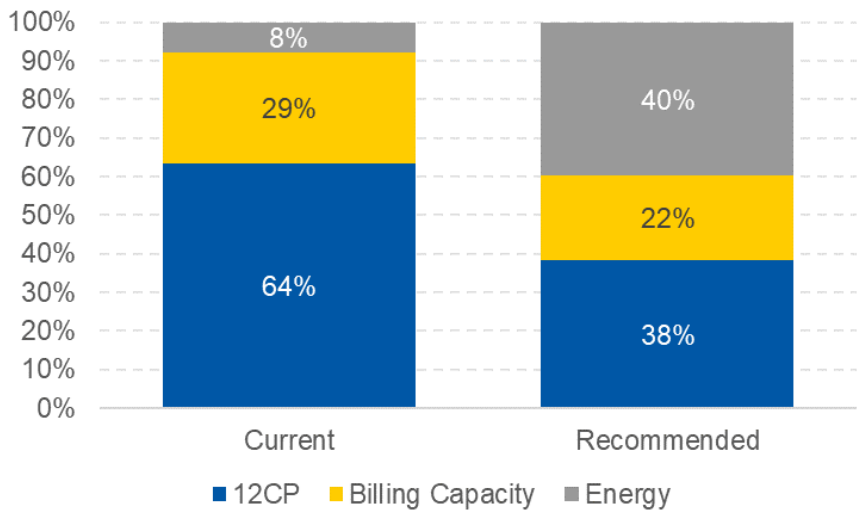
77. In addition to those industrial customers that have already invested in self-supply, other customers are responding to the current transmission tariff by reducing their load at times of 12CP.

3.4. The Recommended Tariff and Self-Supply

3.4.1. Impact of the change of tariff on customers

78. Our recommended tariff design recovers more costs from energy-based charges, and fewer costs from charges levied on billing capacity and 12CP, as illustrated in Figure 3.1 below.

Figure 3.1: Recovery of Bulk and Regional Costs Under Current and Recommended Tariff



Note: Based on 2020 data provided by the AESO. Excludes POD costs. Source: NERA analysis.

79. The change in tariff from the current methodology to our recommended methodology affects what customers pay for electricity in different ways depending on how and when they draw power from the grid.

80. In the panel chart below, we illustrate how our recommended tariff affects the amount that four illustrative customers would pay in transmission charges, assuming no other changes in their consumption behaviour.

A. In Panel A, we illustrate a baseload industrial customer. We construct its load profile from the assumptions used in the AESO's Delivered Cost of Electricity Report, and assume the customer has peak load of 6.77 megawatts (MW) with an average annual load of 4.97 MW (i.e. a load factor of 73 per cent). We assume the customer draws 6.77 MW of energy during times of coincident peak, and also has contract capacity of 6.77 MW.

B. In Panel B, we illustrate a baseload industrial customer, with similar characteristics to that in Panel A, but with average annual load of 6.77 MW (a load factor of 100 per cent).

C. In Panel C, we illustrate an industrial customer using the grid for back-up. The customer has very low average load of 0.35 MW (a load factor of 5 per cent). However, the customer may draw up to 6.77 MW of load at times when it needs to use the grid for back-up. We assume the customer does not use the grid for back-up during times of coincident peak, as defined by the 12 CP hours.

D. In Panel D, we illustrate an industrial customer with the same characteristics as the industrial customer in Panel A, but which avoids paying charges during the 12 CP hours through load management.

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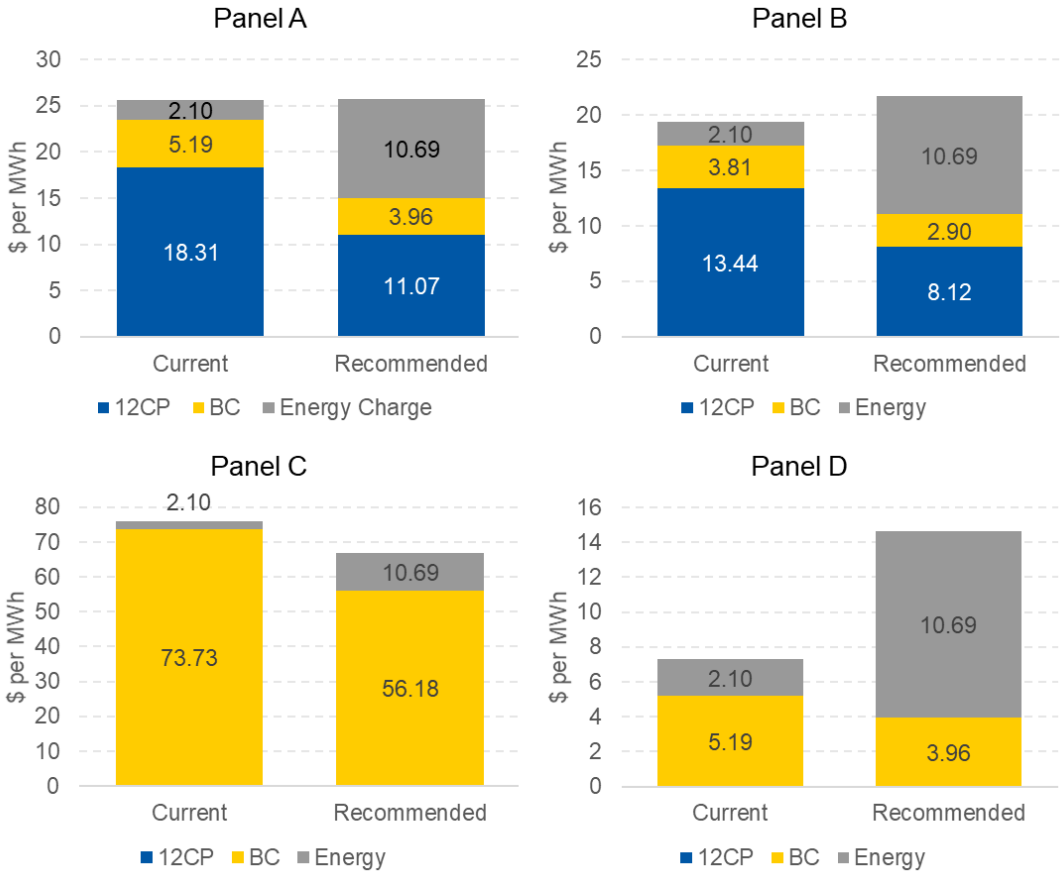
Figure 3.2: Change in Tariffs for Illustrative Industrial Customers



Note: Based on 2020 data. For simplicity, we assume a customers' consumption during coincident peak does not vary across years and therefore the movement to a five-year average 12CP charge does not impact customers charges. Excludes POD Costs. Source: NERA Illustration.

81. Implementing the classification and functionalization of costs envisaged by our recommended tariff design using data for 2020, our recommended tariff design would recover more costs from energy-based charges than the current tariff. Therefore, transmission charges for customers with high load factors and high energy consumption, such as the customer in Panel B would tend to increase under our recommended tariff. Also, customers which have previously avoided 12 CP hours, such as the customer in Panel D, could see a rise in charges under our recommended tariff, which recovers more costs from energy in all hours and fewer costs from charges levied on 12CP.

82. However, because our recommended tariff recovers fewer costs from the 12CP and contract capacity charges, customers with lower load factors that consume at these

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times, such as customers in Panel A and Panel C, tend to have lower charges under our recommended tariff.

83. Our analysis suggests that some customers' incentives to self-supply would increase, while other customers' incentives to self-supply would reduce following our recommended change in the tariff.

84. However, our analysis above assumes customers' consumption behaviour does not change in response to the change in tariff. In reality, our recommended tariff design may incentivise customers to change how and when they use the grid:

A. The reduction in the 12CP charge may reduce customers' incentive to avoid consumption at times of coincident peak, thereby increasing usage of the grid at these times;

B. The reduction in the charge on contracted demand also increases customers' incentive to hold contracted capacity to the grid to use the grid as back-up, which may reduce incentives for grid defection; and

C. The increase in the energy charge may decrease customers' incentive to take energy from the grid across the year.

85. Such changes will tend to be efficient in the long-run, because our recommended tariff is more cost reflective than the current tariff for the reasons explained above and in the Stakeholder Session 5 presentation. The more cost reflective price signal will therefore promote more efficient decisions as to whether to self-supply. However, to help the AESO and stakeholders quantify the likely impact of the change in tariff on self-supply decisions, we have performed quantitative analysis to estimate the likely impact on industrial customers' decisions to self-supply resulting from our recommended tariff.

3.4.2. Incentives to self-supply under the current and recommended tariff

86. As explained below in Section 3.4.3, we have considered in detail how the change in tariff will affect all industrial customers' self-supply incentives. However, by way of an example, consider the case of the customer in Panel B above. This customer has a 100 per cent load factor, consuming 6.77 MW in all hours of the year. We assume

this customer is directly connected to the transmission system, thereby incurring only transmission charges and the cost of energy to purchase power from the grid.

87. For the purpose of this illustration, we assume that the customer could choose to self-supply using a baseload gas generator. We adopt the costs of a aeroderivative combustion engine ("ACE") plant with cost assumptions as detailed in the AESO's Cost of New Entrant Analysis.[24] We outline the cost assumptions for this plant in more detail in Appendix A.2.4. Given the customer has a load factor of 100 per cent, we compare the cost per MWh of self-supplying all of its energy with an ACE plant of capacity 6.77 MW relative to purchasing its power from the grid. We assume the customer remains connected to the grid for back-up but does not draw any energy.

88. We illustrate the costs of self-supply relative to purchasing power under the current and our recommended tariff per MWh of consumption across a year in Figure 3.3 below. The figure uses a baseload pool price of $49.39 per MWh, based on the average pool price in 2020.[25]

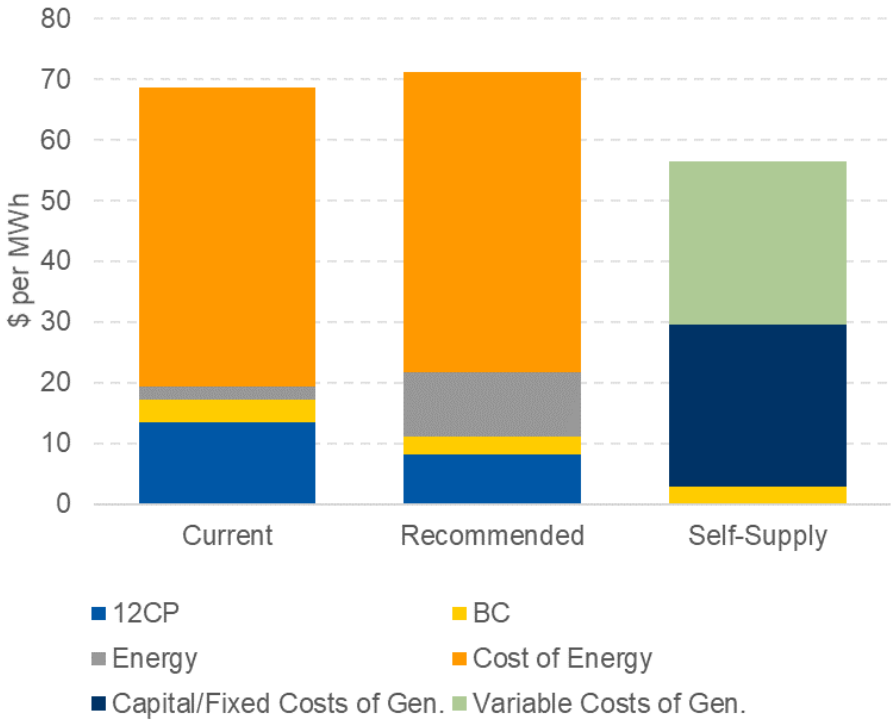
89. Our analysis suggests that the costs of self-supply across the year for the Panel B customer are below the costs of purchasing power from the grid under both the current and recommended transmission tariff designs. This finding corroborates the AESO's Delivered Cost of Electricity Report, see Figure 3.4 below.[26] The AESO identifies, using a different customer load profile and self-supply technology, that the delivered cost of electricity through self-supply (the purple, yellow, and blue bars) is lower for the illustrative, transmission-connected industrial customer than the costs of purchasing energy from the grid under the current tariff (the purple and yellow bars).

[24] Johannes P. Pfeifenberger et al. (4 September 2018), AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date.

[25] AESO data sourced from its 2020 Q4 Update – Transmission Rate Projection.

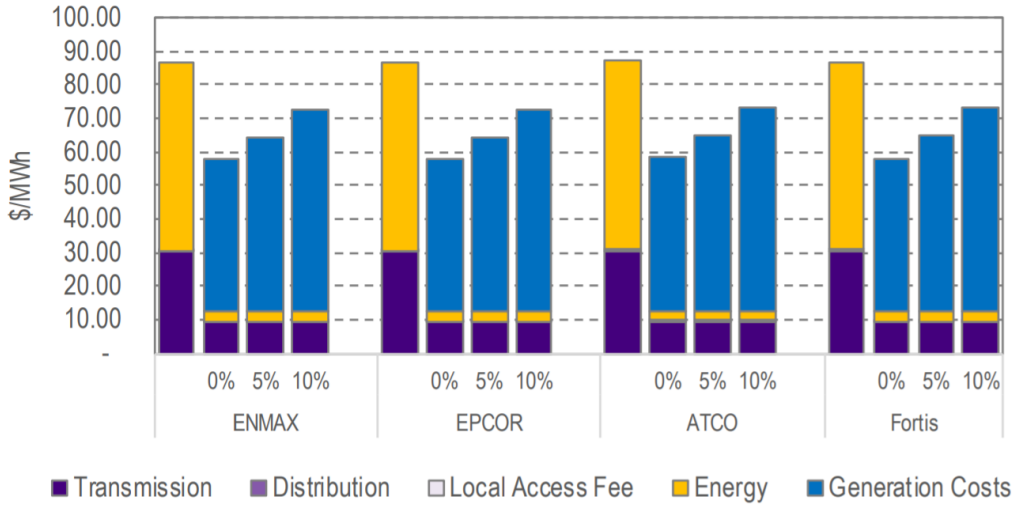
[26] AESO (31 May 2020), Delivered Cost of Electricity Report, Figure 9.5-1.

Figure 3.3: Illustrative Cost of Self-Supply Relative to Purchasing Power from the Grid Under Current and Recommended Transmission Tariff (2020 C$)



Note: 2020 gas price of C$1.92 used as reported by the AER. POD costs not included in transmission tariff. Source: NERA analysis.

Figure 3.4: AESO's Delivered Cost of Electricity for an Illustrative Industrial Customer Across Service Territories in 2019



Note: The purple and yellow bars in the left-hand column of each service area illustrate the costs of purchasing power from the grid. The three purple, yellow, and blue bars on the right-hand columns of each service area illustrate the costs of self-supplying power at different rates of return. Source: AESO (31 May 2020), Delivered Cost of Electricity Report, Figure 9.5-1.

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90. However, as we discuss in Section 3.3, only 37 per cent of industrial load is currently self-supplied, despite the suggestion from the analysis above that the economics of self-supply is favourable under the current tariff:

A. Industrial customers with different load profiles have different costs of purchasing power from the grid or self-supplying, as compared to the baseload customer used in the example above.

B. Industrials incur additional costs to self-supply beyond the capital and operating costs required to build and operate self-supply generation units. Other costs may include the costs of land (which may not be available at all close to industrial sites), costs of personnel, and the costs/risks associated with additional business complexity or administration. These costs are additional factors not captured in the above analysis which can lead to industrial customers continuing to purchase power from the grid, even if a simple cost comparison suggests it may be cheaper to self-supply.

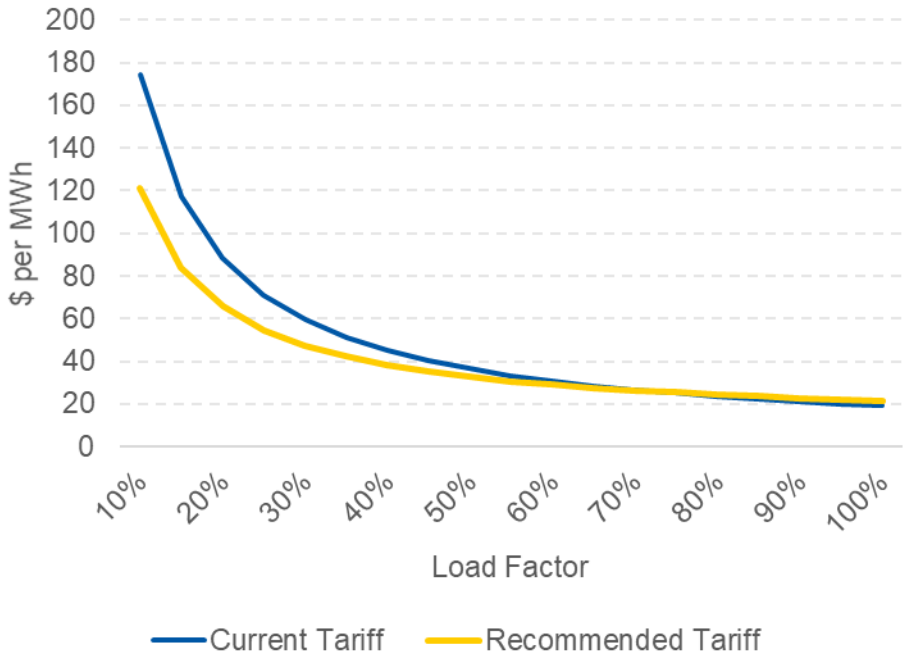
C. On the other hand, the options for customers to self-supply are more diverse than in our analysis above, as customers can choose from an array of technologies to self-supply such as baseload or peaking generation. It is reasonable to assume that customers will choose the least-cost self-supply option across technologies when considering the costs of self-supply compared to purchasing power from the grid.

91. As well as showing that self-supply appears cheaper than purchasing power from the grid, our analysis in Figure 3.3 suggests that the self-supply incentives for customers with a high load factor do not change materially following the change in tariff. Therefore, this illustrative analysis suggests that the increase in costs associated with purchasing power from the grid for a customer with a high load factor is likely to be small.

92. Moreover, for customers with lower load factors like those in Panel A and Panel C, we would expect the customers to face a lower incentive to self-supply, as the cost of purchasing power falls under our recommended tariff relative to the current tariff. In Figure 3.5 below, we illustrate transmission charges for customers with the same

characteristics as the customer in Panel B, with billing capacity and 12CP consumption of 6.77 MW, but with varying load factors. We do not illustrate the costs of purchasing energy from the grid in the Figure. Transmission charges are lower under our recommended tariff for this illustrative customer up to a load factor of between 70 to 75 per cent.

Figure 3.5: Illustrative Transmission Charges for Illustrative Customers with Varying Load Factors Under Current and Recommended Transmission Tariff (2020 C$)



Note: POD Costs Excluded. Source: NERA Illustration.

93. For customers currently avoiding 12CP, such as in Panel D, it is more difficult to determine the impact of the change in tariff on their incentive to self-supply. Whilst these customers face a lower incentive to self-supply during times of coincident peak under the recommended tariff, they face higher costs of purchasing energy from the grid during times other than coincident peak.

3.4.3. Our modelling procedure to estimate the customer response to our recommended tariff

94. In reality, customers' optimal decisions to self-supply are more complicated than the illustrative customer in Figure 3.3 above. Customers with high load factors rarely have 100 per cent load factors, which means their incentives to self-supply depend on cost savings that vary by the hours in which they are consuming power from the grid.

Moreover, because customers take different amounts of energy across hours, it may be optimal for them to install generators that allow them to self-supply all or part of their load, or a combination of types of generators to use in different hours of the year.

95. Therefore, to better assess the potential customer response to the change in tariff we conducted quantitative modelling to analyse how self-supply decisions may change for industrial sites after the introduction of our recommended tariff, which we explain in more detail in Appendix A.

96. Our modelling procedure uses hourly load data provided by the AESO for 133 industrial sites in 2018 and 2019 to assess whether and to what extent it would be economic for each site to self-supply rather than purchase power from the grid across the year, considering both wholesale prices and transmission tariffs. For each customer, we estimate the optimal amount of self-supply under both the current and our recommended tariff to examine how self-supply will change in response to our recommended tariff.

97. However, because our modelling procedure predicts the amount of self-supply based on whether it would be cheaper to self-supply or buy power from the grid, it significantly overstates the tendency for customers to deploy self-supply options. As we discuss in Section 3.1.1, this arises because we do not account for other costs customers face to self-supply that we cannot observe, such as land costs or capital constraints.

98. To address this, we introduce a statistical procedure to estimate how likely customers have been in the past to self-supply, as a function of the potential cost savings a customer could make from self-supplying, based on each customers' characteristics. We assess the performance of our statistical approach by using it to predict existing actual self-supply under the current tariff. We find our approach accurately predicts self-supply (see Appendix A.3.2).

99. We then use our statistical approach to predict actual customer responses to the change in the incentive to self-supply under our recommended tariff.

100. Our analysis focuses on the likely customer response to the increase in the energy charge under our recommended tariff relative to the current tariff. We do not consider

customer response to the decrease in 12CP charges under our recommended tariff relative to the current tariff, except through the extent to which it changes their decisions to optimally self-supply. In other words, we do not consider how decreases in the 12CP charge under our recommended tariff may increase customers' gross load during times of 12CP, and therefore our analysis is conservative with respect to self-supply by customers during times of coincident peak.

101. Overall, our approach predicts an extremely limited increase in self-supply by industrial customers under our recommended tariff. We estimate that self-supply could increase under our recommended tariff by up to 2,801 GWh which is equivalent to 4.69 per cent of the total metered energy billing determinant, used to calculate the transmission energy charge, in 2019.

102. As we explain in Appendix A, our estimate of customer response is a total effect that includes any dynamic responses by customers to self-supply decisions of other customers. This "dynamic response" accounts for the effect of higher self-supply pushing up tariffs levied on the remaining demand, which may increase further the incentives customers have to self-supply.

103. It is also equivalent to a total cost shift of C$ 29.92 million (in real 2019 terms) from self-supply customers to other customers, which is approximately 1.9 per cent of the total revenue requirement for B&R costs in 2019.

104. Therefore, whilst, in Section 3.1.2, we identified the possibility that a tariff set to recover historical costs will cause customers to self-supply, despite sending efficient price signals over the costs of providing transmission in the long run. Our modelling approach suggests that under current system conditions, any reduction in energy demand from the transmission system resulting from our recommended tariff design is likely to be extremely limited.

3.5. Future Trends in the Economics of Self-Supply

105. While the impact of our recommended tariff on self-supply is likely to be limited given the current costs of self-supply, the economic case for self-supply in Alberta is likely to worsen in the next decade.

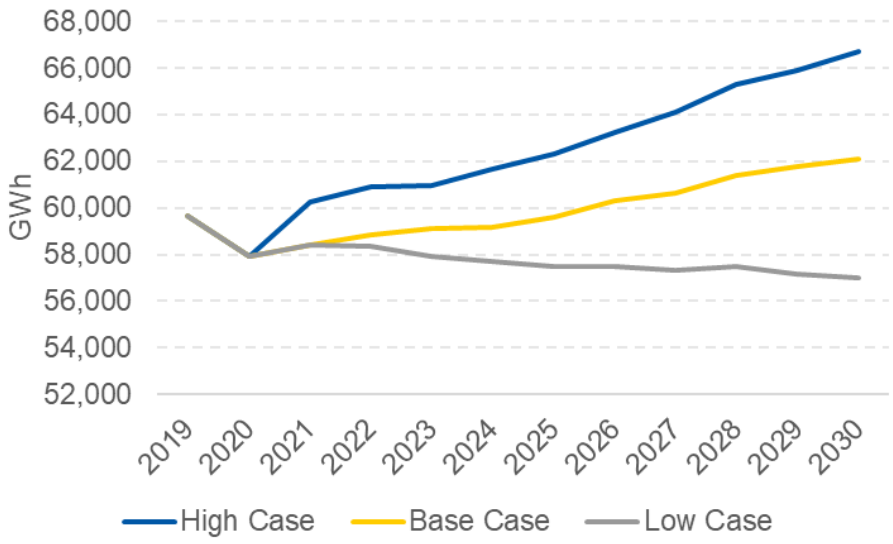
106. As we discuss in Section 3.1.1, customers' decisions to self-supply will necessarily be forward-looking because the upfront capital costs of investing in generators are offset by savings relative to purchasing power from the grid over future years (i.e. over the useful life of the generator). Therefore, not only do the current incentives to self-supply affect a customer's decision to self-supply, but also their expectations regarding future cost savings relative to purchasing power from the grid.

107. We identify two potential drivers of the future costs that customers would incur (and benefits they would obtain) by self-supplying power rather than purchasing it from the grid: future trends in transmission charges and future trends in the variable costs of self-supply.

3.5.1. Future trends in transmission charges

108. The AESO's low growth sensitivity projection of demand transmission service load in Alberta shows declining forecast energy consumption through to 2030, as shown in Figure 3.6. We focus on the low growth scenario to ensure we do not understate the potential for transmission tariffs to rise, and therefore avoid understating customers' incentive to self-supply.

Figure 3.6: AESO's Forecast of Total Energy Consumption



Source: NERA Analysis of AESO Data.[27]

[27] AESO data sourced from its 2020 Q4 Update – Transmission Rate Projection.

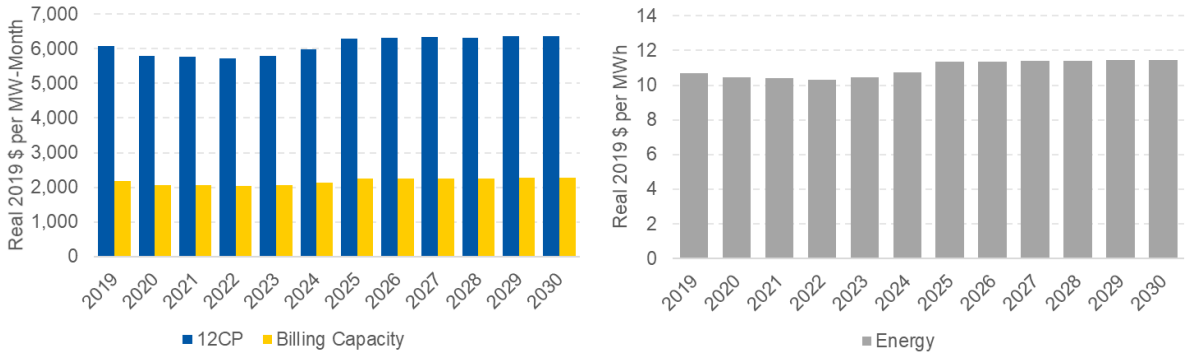
109. Reductions in demand which are coupled with the same revenue requirement can lead to a rise in transmission charges in order to ensure cost recovery. Using the low growth sensitivity forecast, the AESO's forecast revenue requirement, and the same percentage recovery of costs by billing determinant as 2020, we forecast transmission charges under our recommended tariff design.[28] Our forecast is an approximation because, amongst other reasons:

A. We assume the same revenue requirement forecast under the baseline demand projection is appropriate for the low demand forecast projection.

B. We do not account for changes in the classification of costs in our methodology in light of the changing use of the system over the forecast horizon.

110. We illustrate our forecast of transmission charges (in real 2019 C$) in Figure 3.7 below.

Figure 3.7: Forecast Transmission Charges Under Our Recommended Tariff in the AESO's Low Energy Growth Scenario



Note: Source: NERA analysis of AESO data. Inflation forecast from 2020 taken unchanged from the AESO's Rate Projection, and originally sourced from Statistics Canada Table 326-0020, Data Vector V41692327, and Conference Board of Canada Data Vector RPCPIA.

111. Our forecast suggests that transmission charges will rise slightly as energy consumption falls over the period to 2030. In absence of a reduction in other costs of purchasing power from the grid, such as the pool price which may fall with lower energy consumption, higher transmission charges will increase the costs of purchasing

[28] We also construct a low growth sensitivity forecast of coincident metered demand that forms the charging basis of the 12CP billing determinant, and billing capacity. To do so, we examine the ratio of total annual energy consumption and coincident metered demand and billing capacity in the AESO's central projection. We then apply the same ratio to forecast the coincident metered demand billing determinant and billing capacity billing determinant from the low growth forecast of energy consumption.

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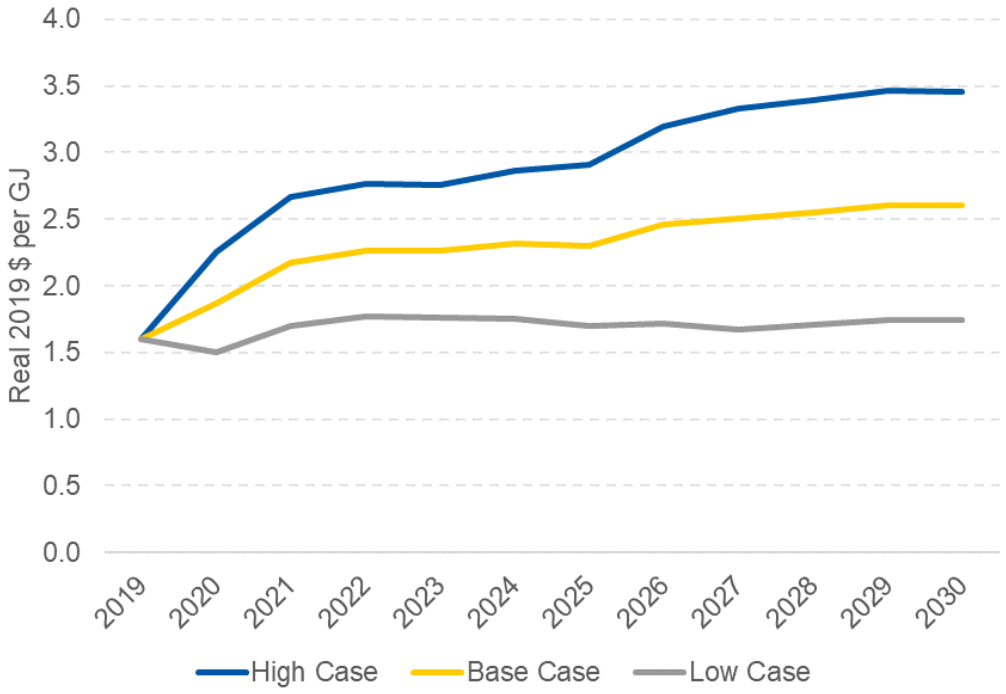
power from the grid for some customers thereby, in theory, increasing the cost savings associated with self-supply.

3.5.2. Future trends in the fuel and carbon costs of self-supply

112. However, the costs of self-supply are also likely to change over this timeframe. Higher costs of self-supply reduce the cost savings associated with self-supply relative to purchasing power from the grid. We identify two key drivers of the costs of generating power to self-supply that are particularly likely to change in the coming years: fuel costs and the carbon price.

113. We have examined the forecast annual average AECO-C natural gas price from 2019 to 2030 as published by the Alberta Energy Regulator (AER).[29] We show the forecast in Figure 3.8 below. As shown, the gas price is forecast to rise in real terms relative to 2021.

Figure 3.8: AER's Forecast AECO-C Natural Gas Price

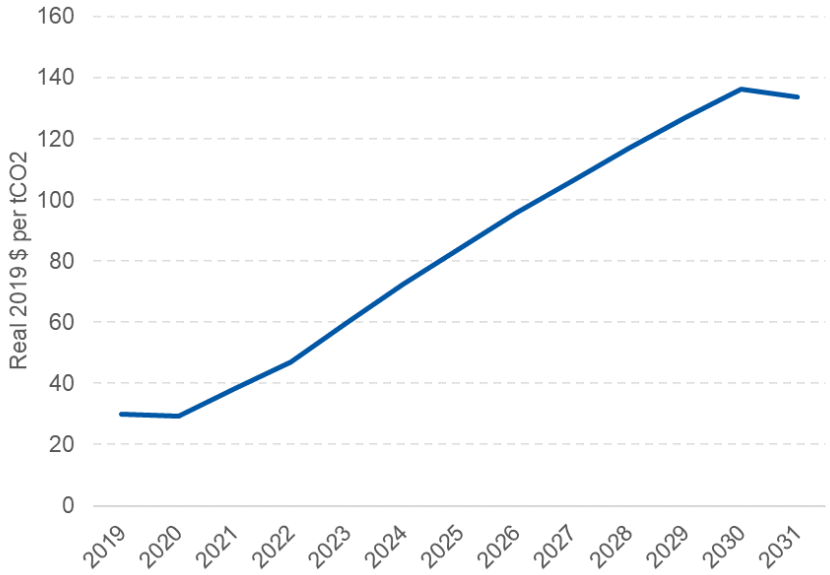


Source: NERA analysis of AER data.

[29] Alberta Energy Regulators Forecast of AECO-C gas prices updated June 2020 and accessed here: https://www.aer.ca/providing-information/data-and-reports/statistical-reports/st98/prices-and-capital-expenditure/natural-gas-prices/aeco-c-price. Last Accessed 12 May 2021.

114. We also examine forecast annual carbon prices. The Federal Government implemented a federal carbon tax through the Greenhouse Gas Pollution Pricing Act in 2018.[30] We understand that under this regime the carbon tax, which is currently $30 per tCO2, is intended to rise to $170 per tCO2 in 2030, with a $10 per tCO2 rise in 2021 and 2022, and a $15 per tCO2 rise per year starting from 2023. We illustrate this rise (in real 2019 C$) in Figure 3.9 below.

Figure 3.9: Forecast Federal Carbon Tax



Source: NERA analysis.

115. The impact of future growth in gas and carbon prices on incentives to self-supply depends on how the costs of self-supply change *relative* to the pool price. Higher carbon and gas prices will increase the wholesale price for power, as generators incur higher costs to produce power. Higher pool prices increase the costs of purchasing power from the grid, and thereby increase the cost savings associated with self-supply. On the other hand, rising gas prices and carbon prices will also result in higher costs of self-supply using gas-based generation, decreasing the cost savings associated with self-supply relative to purchasing power from the grid.

116. To the extent that gas-fired generators are the marginal source of in-merit energy in the wholesale market, the relative efficiency of grid-connected and gas generators

[30] *Greenhouse Gas Pollution Pricing Act*, SC 2018, c 12, s 186.

used to self-supply will drive whether changes in the carbon or gas price will impact the pool price more or less than the costs of self-supply. Customers installing gas generators to self-supply will likely not require, or be able to install, generators of the scale used to generate power for the grid. The smaller generators used to self-supply are likely to be less efficient than the larger generators used to generate power for the grid. Using more inefficient generators means that self-supplying customers will need to use more gas to generate energy relative to grid-serving generators, resulting in higher gas costs and carbon costs per unit of energy generated.

117. To examine this, we compare the heat rates of representative plants that customers could use to self-supply with the heat rates of representative gas plants used to generate power for the system.[31] More specifically, we compare the heat rates of a combined cycle gas plant (CCGT) that we assume would be used to generate power for the grid with the heat rates of an ACE plant and a gas-fired reciprocating internal combustion engine ("RICE") which could be used to self-supply. We detail the assumptions and sources of costs of each plant in Appendix A.2.4. We compare the heat rates in Table 3.1 below.

Table 3.1: Comparison of Heat Rates Across System and Self-Supply Plant

		CCGT	ACE	RICE
Heat Rate	GJ per MWh	6.72	9.68	10.50
Additional Heat Rate Relative to CCGT	*GJ per MWh*		*2.96*	*3.78*

Note: Heat Rates Treated as Net HHV, underlying sources do not specify. Source: NERA Analysis.

118. As the table shows, both ACE and RICE plants require more fuel relative to a CCGT to produce one MWh of electricity. We convert the additional energy requirement per MWh shown in the table to an additional gas requirement per MWh, and then an additional gas cost per MWh using the AER Low Case. We select the Low Case to ensure we do not understate the economic case for self-supply.

[31] The heat rate of a plant specifies how much gas is required to generate a unit of power. Whilst peaking, simple cycle gas plants also generate power for the system, they do so in fewer hours of the year than baseload, combined cycle gas plants which is why we consider baseload plants in our analysis.

119. Given the ACE and RICE plants require more gas to produce one MWh, self-suppliers will also incur more in carbon costs to run the plant. To calculate the additional carbon costs, we assume the ACE and RICE plants are subject to the federal carbon tax, and are also part of Alberta's Technology Innovation and Emissions Reduction ("TIER") regulation, meaning that they only pay carbon taxes on emissions above the "best in gas" standard. We assume the CCGT in our analysis has emissions that meet the best in gas standard.[32] Therefore, because we are examining the carbon costs associated with the *incremental* costs incurred by self-supply technologies relative to a best in gas CCGT, we assume all of the additional gas used by ACE or RICE technologies relative to CCGT will be subject to carbon taxes.

120. To calculate the additional carbon emissions associated with the additional gas required by self-supply technologies, we calculate the extra emissions associated with the higher gas requirement for ACE and RICE technologies relative to CCGT plants, as shown in Table 3.2 below. We then calculate the carbon costs for alternative technologies by multiplying this extra volume of emissions by the carbon price shown in Figure 3.9 above.

Table 3.2: Additional Emissions Associated with Self-Supply

	Units	System CCGT	ACE	RICE
Heat Rate (Net HHV)	GJ per MWh	6.72	9.68	10.50
Emissions Rate	t per MWh	0.338	0.486	0.527
Additional Gas Use Per MWh	GJ per MWh		2.96	3.78
Additional Emissions Per MWh	t per MWh		0.1485	0.1898

**Note: As we discuss in Appendix A.2.4, we recalculate the emissions rate for all plants using (i) tCO2/therm = 0.0053[33] (ii) Btu/therm = 100,000;[34] therm/GJ = 0.105506.[35] Source: NERA Analysis.*

[32] Whilst we recognise that the current "best in gas" standard corresponds to an emissions rate of 0.37 CO2t per MWh, we also understand that the threshold rate should fall over time. Therefore, we assume self-suppliers pay carbon taxes on all fuel use above the emissions rate of the system CCGT of 0.338 CO2t per MWh from the EIA in our analysis.

[33] EIA, Greenhouse Gases Equivalencies Calculator - Calculations and References, Last Accessed 17 May 2021, Link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[34] EIA, FAQs, Last Accessed 17 May 2021, Link: https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

[35] EIA, Energy Conversion Calculators – Natural Gas, Last Accessed 17 May 2021, Link: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

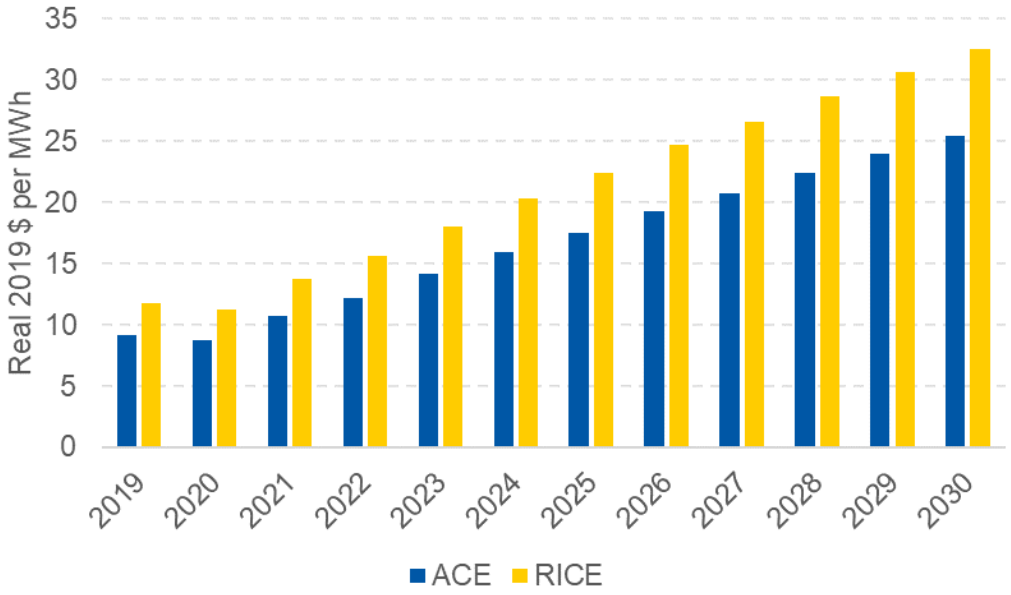
121. We illustrate the additional variable costs of self-supply using the ACE and RICE generator relative to a system CCGT in Figure 3.10 below. The figure shows the additional costs to generate one MWh using self-supply technologies rather than purchasing energy generated using a CCGT, supplied to the customer via the transmission grid.

122. The figure shows that we expect rising carbon and gas costs will make self-supply technologies more expensive over time, when compared to the cost of purchasing power from the grid:

A. By 2030, the fuel and carbon costs of producing a MWh using an ACE or RICE generator will be $25.40 or $32.47 per MWh (in real 2019 terms) more expensive, respectively, than producing that MWh using grid technology, relative to around $10 per MWh today.

B. Therefore, upward pressure on fuel and carbon prices is expected to reduce the incentive to self-supply.

Figure 3.10: Forecast Additional Fuel and Carbon Costs of Self-Supply Relative to CCGT Technology



Source: NERA analysis.

3.5.3. Future trends in the economics of self-supply

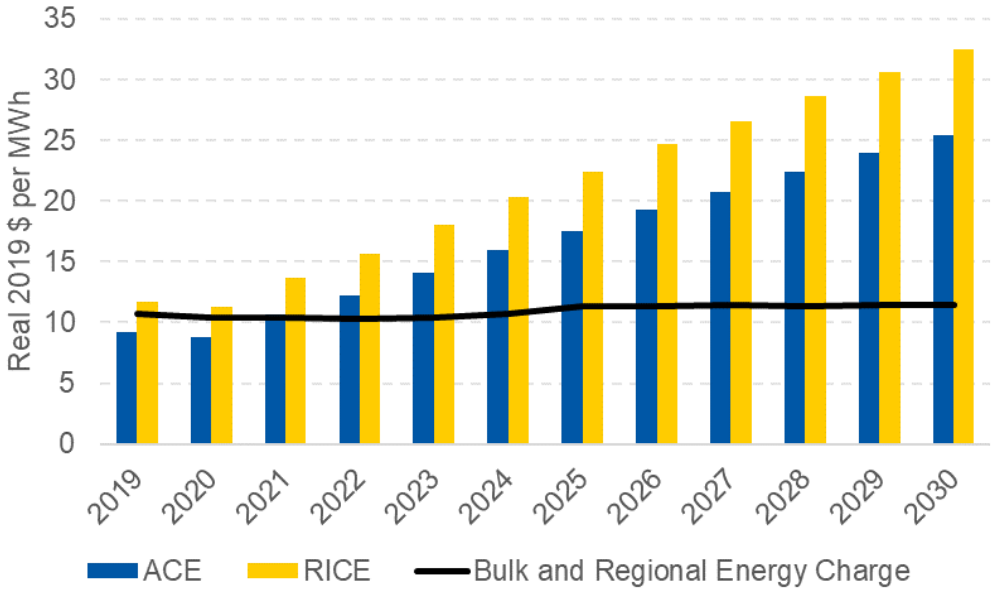
123. We illustrate in Figure 3.11 below the two drivers of future trends in the economics of self-supply:

A. Changes to the energy component of the transmission tariff under our recommended tariff structure,[36] and assuming the AESO's low demand growth scenario (see also Figure 3.7); and

B. The additional fuel and carbon costs of self-supply, driven by changes in gas and carbon prices (see also Figure 3.10).

124. The figure illustrates the additional costs incurred to self-supply one MWh using self-supply technology instead of purchasing that power from the grid (where it is generated by a CCGT), compared to the energy component of the transmission tariff.

Figure 3.11: Future Trends in the Economics of Self-Supply



Source: NERA analysis.

125. While we show above and in Appendix A that in current cost conditions, we estimate that our recommended tariff will not materially increase self-supply, the projection in Figure 3.11 shows that the economics of self-supply for industrial customers is also

[36] We focus on the energy charge of the transmission tariff because it is the component that increases in our recommended tariff relative to the current tariff.

set to worsen in the coming years due to the effects of carbon pricing. In other words, even though we estimate that our recommended change in the tariff will have a small effect on self-supply volumes, the incentives to self-supply are set to worsen materially in the coming years which means we expect an increase in energy charges will not cause significant reductions in the volume of energy supplied from the grid.

4. Summary

126. Some electricity industry participants (both in Alberta and globally) may have legitimate concerns about the risks of grid bypass and grid defection, especially in relation to transmission and distribution companies that already recover all (or the majority of) their costs from tariffs levied on energy consumption.

127. A proportionate response to these concerns is to adjust tariffs to ensure they have a cost structure that reflects the cost structure of the service in question as closely as possible, which we strive to do through our recommended tariff design.

128. Designing a tariff with the intention of minimising self-supply would be a disproportionate response. In fact, customers should be encouraged to self-supply when the costs they incur to do so are below the costs of supplying them from the grid. Self-supply decisions in response to cost reflective tariffs promote efficiency in the overall supply of electricity, and will tend to reduce the costs faced by the customers who purchase energy from the grid.

129. In the AESO's case, it is currently charging for the majority of its costs through a 12CP charge, the extent to which is not justified on grounds of cost causation as explained in the Stakeholder Session 5 presentation. The current tariff is therefore promoting *inefficient* self-supply decisions aiming to avoid 12CP charges. By contrast, our recommended tariff better reflects the dual purposes of transmission in Alberta: to meet peak demand and accommodate the flow of in-merit energy.

130. Therefore, customer response to the change in transmission tariff through different self-supply decisions will improve efficiency because the new transmission tariff is more cost reflective. However, even if a tariff is designed to reflect the cost structure of the transmission system, and therefore promote efficient decisions to use the grid or self-supply in the long-term, there remains a possibility that a tariff set to recover historical costs will cause customers to inefficiently self-supply in the short-term in cases where those customers make lower contributions to historical costs.

131. We therefore estimate customer response to our recommended tariff using a modelling procedure. We estimate that self-supply could increase under our recommended tariff by up to 2,801 GWh which is equivalent to a shift in costs from

self-supplying customers to other customers of approximately 1.90 per cent of the total revenue requirement for bulk and regional costs in 2019. Our estimate of customer response is a total effect that includes any dynamic responses by customers to self-supply decisions of other customers.

132. Our estimate of customer response ignores the potential for customers to increase purchasing of power from the grid during times of coincident peak in response to lower 12CP charges in our recommended tariff relative to the current tariff.

133. Hence, we predict an extremely limited increase in self-supply by industrial customers under our recommended tariff, and any change in customers' self-supply decisions that does arise will tend to result in more efficient patterns of electricity usage than under the current methodology.

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Appendix A. Estimating Customer Response to Our Recommended Tariff

A.1. Overview of Our Approach

134. As we discuss in Section 3.4, our analysis of customers' decisions to self-supply using illustrative consumption profiles simplifies the self-supply decision. Customers' actual self-supply decisions depend on how and when they use electricity, which for most customers vary across hours of the year (and is rarely at a 100 per cent load factor as we assume for the customer in Panel B in Figure 3.2).

135. Customers consider different self-supply technologies, and different ways of optimally self-supplying using those technologies, depending on their consumption profile. For instance, as we discuss in Paragraph 27, customers can consider peaking generators for use during hours of the year when the costs of purchasing power from the grid are highest, or baseload generators for use during a larger number of hours of the year.

136. The choice of self-supply technology depends on the individual circumstances of the customer, and balances the fixed and variable costs of operating the self-supply technology with the avoided costs of purchasing power from the grid, which vary across hours of the year with the customers' consumption profile.

137. In order to better assess how customers may respond to our recommended transmission tariff, we model the optimal self-supply decisions for industrial sites in Alberta. Our approach is formed of three steps:

    A. ***Step 1:*** We construct a model that estimates the optimal self-supply decisions for industrial sites across Alberta, based on a simple comparison of the costs of purchasing power from the grid and self-generation costs. The model allows different customers (industrial sites) to use different self-supply technologies, and operate those technologies in different ways to optimise their decision to self-supply or purchase power from the grid. By performing this optimization for each customer, we estimate the optimal amount of self-supply across Alberta under the current and our recommended tariff.

B. ***Step 2:*** However, this optimisation model overstates the actual self-supply for customers because we do not model other costs associated with self-supply such as costs and risks associated with business complexity or financing. Consequently, actual self-supply by customers will be lower than the optimal self-supply identified by the model in Step 1, or "incentive to self-supply", that we model. To estimate how customers' actual self-supply decisions will be affected by a change in the transmission tariff, we estimate a regression equation to capture how likely customers are to self-supply, given the economic incentive to self-supply identified in Step 1. This regression also controls for customers' characteristics such as size, location, and industry.

C. ***Step 3:*** We then use our regression to predict customers' response to the change in incentive to self-supply under our recommended tariff.

138. In this Appendix, we detail our modelling approach and results from each of the above steps in more detail.

A.2. Step 1: Modelling the Optimal Self-Supply Decision for Customers

139. We examine the optimal self-supply decision for customers using site-level, hourly gross load data in 2018 and 2019.[37] Of the 564 sites for which we have load data, 133 are sites with only load from industrial customers. We use the 133 industrial-only sites in our analysis.

A. We assume that there is a single industrial customer at each industrial-only site that is responsible for the entire load at that site.[38]

B. Sites which are not industrial-only, are often constituted by a mixture of industrial, residential, commercial, or other customers. We are unable to use these sites as we cannot distinguish the profile of consumption belonging to industrial customers from residential customers.

[37] By gross load, we mean total consumption of power at the site, irrespective of whether that power is sourced from the grid or through self-supply. We use net load to refer to the site's purchase of power from the grid, in other words, its gross load less any self-supply it chooses to undertake. We rely on AESO site-level load data in our analysis.

[38] Our assumption likely leads us to overstate self-supply, assuming a single industrial customer at each site means self-supply may be more economic than if the site comprised multiple, smaller customers.

140. For each industrial customer (site), we calculate both the costs of purchasing power from the grid without self-supplying and the customers' optimal self-supply decision in 2018 and 2019. To perform these calculations, we use the procedure described below.

A.2.1. We group hours of the year to reduce the computational requirements of the model

141. In order to reduce the computational requirements of the model, we group similar hours of the year together using a Price Duration Curve approach. In total we define 53 groups of hours that are similar in terms of the costs that would be incurred to purchase power from the grid.

142. We define separate groups of hours for 2018 and 2019 based on the pool price in 2018 and 2019 respectively. More specifically:

A. The first 51 groups of hours are defined by percentiles of the distribution of hourly pool prices observed during the year in question.[39]

B. The 52nd group of hours is defined to capture rare incidences of scarcity pricing in the pool, where the pool price equals the price cap of $1000 per MWh. If we did not define the 52nd group of hours in this way, the average price of the 51st group of hours would be high as it would be influenced by these rare occurrences of scarcity pricing, which would distort our estimate of the self-supply decision in the hours in the 51st bucket.

C. The last group of hours is defined to contain 12CP hours only.[40] We separate 12CP hours to allow customers' self-supply decisions to change in 12CP hours in order to avoid the 12CP charge. Our model likely overstates customer response, because we assume that all customers can perfectly predict hours of 12CP.

143. Having grouped the hours of the year in this way, we calculate the average pool price and each customers' average gross demand in each group of hours. The average pool

[39] This corresponds to prices every 2nd percentile, with an additional price group to capture prices close to zero.

[40] Whilst in reality, 12CP is defined by a fifteen-minute interval, we are restricted by the data to look at hours of 12CP. We levy the 12CP charge on customer consumption during the hour of 12CP.

price and average demand during each group of hours defines a "representative hour" that applies to all hours within this group.

144. The tables below show the Price Duration Curves used by the model to characterise the costs of purchasing electricity from the wholesale market in 2018 and 2019.

Table A.1: Price Duration Curve (2018)

Group	Number of Hours	Min Price In Group ($/MWh)	Average Pool Price	Transmission Tariff ($/MWh)	
				Current Design	*Recommended Design*
1	171	0.00	14.52	2.04	8.80
2	172	20.50	23.13	2.04	8.80
3	172	24.86	25.53	2.04	8.80
4	166	26.20	26.68	2.04	8.80
5	157	26.99	27.08	2.04	8.80
6	131	27.15	27.16	2.04	8.80
7	0	27.18		2.04	8.80
8	294	27.18	27.18	2.04	8.80
9	283	27.19	27.26	2.04	8.80
10	170	27.62	28.06	2.04	8.80
11	173	28.51	29.11	2.04	8.80
12	172	29.64	30.12	2.04	8.80
13	169	30.57	30.95	2.04	8.80
14	173	31.26	31.47	2.04	8.80
15	124	31.64	31.70	2.04	8.80
16	0	31.74		2.04	8.80
17	392	31.74	31.74	2.04	8.80
18	0	31.75		2.04	8.80
19	0	31.75		2.04	8.80
20	509	31.75	31.81	2.04	8.80
21	177	32.14	32.33	2.04	8.80
22	174	32.54	32.70	2.04	8.80
23	163	32.86	32.98	2.04	8.80
24	173	33.08	33.16	2.04	8.80
25	44	33.24	33.24	2.04	8.80
26	0	33.25		2.04	8.80
27	401	33.25	33.25	2.04	8.80
28	0	33.26		2.04	8.80
29	0	33.26		2.04	8.80
30	593	33.26	33.27	2.04	8.80
31	171	33.44	33.69	2.04	8.80
32	144	33.96	34.24	2.04	8.80
33	199	34.54	34.55	2.04	8.80
34	172	34.65	35.15	2.04	8.80
35	103	35.74	36.11	2.04	8.80
36	241	36.43	36.75	2.04	8.80
37	173	37.69	38.63	2.04	8.80
38	170	39.60	40.48	2.04	8.80
39	169	41.37	42.16	2.04	8.80
40	176	42.96	43.78	2.04	8.80
41	172	44.60	45.25	2.04	8.80
42	171	45.90	46.05	2.04	8.80
43	172	46.28	47.59	2.04	8.80
44	172	48.93	50.39	2.04	8.80
45	172	51.94	53.82	2.04	8.80
46	172	56.38	59.59	2.04	8.80
47	171	63.60	68.45	2.04	8.80
48	172	72.77	78.74	2.04	8.80
49	172	85.97	93.82	2.04	8.80
50	172	106.98	165.88	2.04	8.80
51	155	271.98	605.73	2.04	8.80
52	4	1,000	1,000	2.04	8.80
12CP	12			10,179	5,102

Note: Billing capacity charge not shown in transmission tariff. Source: NERA Analysis of AESO Data. Note: some "groups" appear to have zero hours because pool prices are only specified to 2 decimal places, so hours are allocated to a single group where two or more groups have identical prices.

Table A.2: Price Duration Curve (2019)

Group	Number of Hours	Min Price In Group ($/MWh)	Average Pool Price	Transmission Tariff ($/MWh)	
				Current Design	*Recommended Design*
1	171	0.00	18.80	2.13	10.68
2	171	23.28	24.49	2.13	10.68
3	173	25.56	26.32	2.13	10.68
4	172	27.02	27.44	2.13	10.68
5	171	27.94	28.15	2.13	10.68
6	136	28.34	28.43	2.13	10.68
7	207	28.47	28.52	2.13	10.68
8	173	28.62	28.70	2.13	10.68
9	172	28.81	28.93	2.13	10.68
10	171	29.06	29.36	2.13	10.68
11	168	29.65	29.91	2.13	10.68
12	176	30.11	30.51	2.13	10.68
13	171	30.93	31.25	2.13	10.68
14	172	31.60	31.85	2.13	10.68
15	167	32.03	32.22	2.13	10.68
16	175	32.42	32.53	2.13	10.68
17	161	32.59	32.60	2.13	10.68
18	147	32.65	32.71	2.13	10.68
19	204	32.78	32.79	2.13	10.68
20	175	32.85	32.91	2.13	10.68
21	154	32.97	33.00	2.13	10.68
22	179	33.05	33.10	2.13	10.68
23	92	33.15	33.18	2.13	10.68
24	115	33.22	33.22	2.13	10.68
25	317	33.23	33.30	2.13	10.68
26	164	33.47	33.50	2.13	10.68
27	183	33.54	33.59	2.13	10.68
28	171	33.76	33.88	2.13	10.68
29	172	34.03	34.28	2.13	10.68
30	173	34.53	34.80	2.13	10.68
31	172	34.93	35.13	2.13	10.68
32	168	35.51	35.98	2.13	10.68
33	174	36.50	36.95	2.13	10.68
34	173	37.53	38.17	2.13	10.68
35	172	38.79	39.43	2.13	10.68
36	172	40.12	40.81	2.13	10.68
37	170	41.56	42.40	2.13	10.68
38	172	43.26	44.11	2.13	10.68
39	172	44.92	45.69	2.13	10.68
40	173	46.58	47.68	2.13	10.68
41	172	48.72	49.94	2.13	10.68
42	171	51.09	52.38	2.13	10.68
43	172	53.57	54.96	2.13	10.68
44	172	56.60	58.88	2.13	10.68
45	172	61.20	64.18	2.13	10.68
46	172	67.13	70.83	2.13	10.68
47	171	74.99	79.41	2.13	10.68
48	172	84.37	88.91	2.13	10.68
49	172	93.36	110.14	2.13	10.68
50	172	143.11	226.92	2.13	10.68
51	158	346.08	642.24	2.13	10.68
52	1	1,000	1,000	2.13	10.68
12CP	12			10,526	6,075

Note: Billing capacity charge not shown in transmission tariff. Source: NERA Analysis of AESO Data. Note: some "groups" appear to have zero hours because pool prices are only specified to 2 decimal places, so hours are allocated to a single group where two or more groups have identical prices.

145. The Price Duration Curves above use historical hourly pool prices from 2018 and 2019.[41] They also use actual bulk and regional transmission charges in 2018 and 2019 to calculate transmission tariffs under the current tariff design.

146. We calculate transmission costs under our recommended tariff design using the approach described in the Stakeholder Session 5 presentation, using historical data on billing determinants, the total revenue requirement, and allocation factors calculated from hourly demand and generation data by area in each year.

147. We summarise the transmission charges that are used under our recommended tariff and the current tariff in 2018 and 2019 in Table A.3 below.

[41] Data provided by the AESO.

Table A.3: Bulk and Regional Transmission Charges Under Current and Our Recommended Tariff in 2018 and 2019

Current Tariff	2018	2019
12 CP ($ per MW-month)	10,177	10,524
BC ($ per MW-month)	2,281	2,359
Energy ($ per MWh)	2.04	2.13
Recommended Tariff	**2018**	**2019**
12 CP ($ per MW-month)	5,093	6,065
BC ($ per MW-month)	1,816	2,180
Energy ($ per MWh)	8.80	10.68

Note: Billing determinants sourced from AESO data. They may differ to those presented at the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5. Billing determinants are 96,044 (2018) and 97,698 (2019) MW-months for 12CP, 154,214 (2018) and 156,984 (2019) MW-months for billing capacity, and 61,000 (2018) and 59,678 (2019) GWh for energy consumption. Source: NERA Analysis.

A.2.2. We calculate how much each customer would pay if it did not self-supply

148. For each industrial customer, we calculate how much the customer would pay to purchase all of its gross demand from the grid under the current and recommended tariff in 2018 and 2019. We use the Price Duration Curves shown above and each customer's total gross demand (in MWh) within each group of hours.[42]

149. We summarise the costs of purchasing power from the grid across all customers under the current and recommended tariff in Figure A.1 below. The total cost that all industrial customers would have incurred to purchase their gross energy requirement from the grid would have increased slightly under our recommended tariff in 2019 relative to the current tariff, but decreased slightly in 2018.

A. The costs of purchasing power from the pool do not change between the two tariff scenarios, as we assume the pool price remains unchanged.

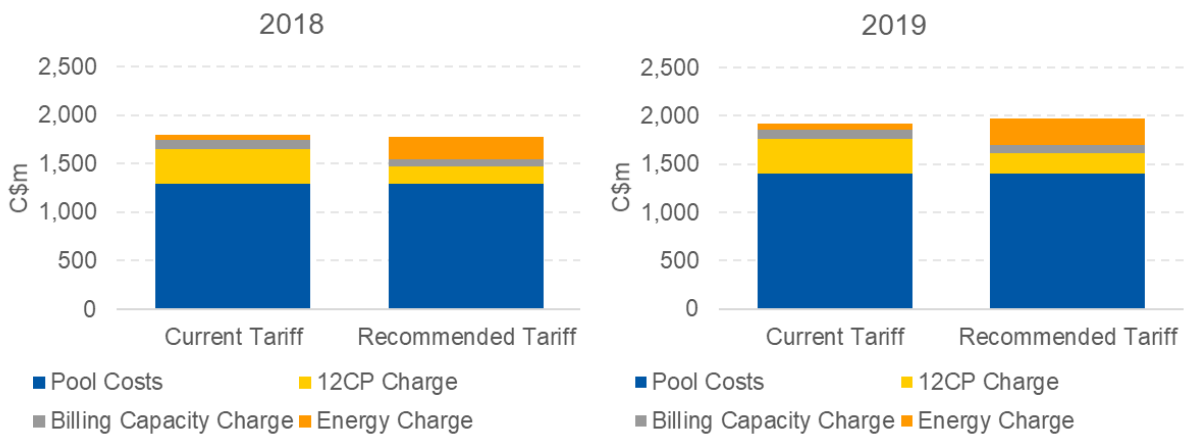
[42] Whilst our use of gross load data allows us to control for customers' existing self-supply decisions, we are unable to control for their load management decisions. In other words, a customer currently avoiding 12CP by reducing or eliminating its load during the 12CP hour, but without self-supplying, appears as if the customer has zero load in the hour. This means that we assume that the customer always chooses to avoid 12CP, if it is currently choosing to do so under the current tariff. Given our recommended tariff reduces the costs recovered by 12CP, our approach is likely to overstate the degree of 12CP avoidance under our recommended tariff.

B. The cost of 12CP charges falls under our recommended tariff, as the 12CP charge is lower under our recommended tariff design.

C. The cost of billing capacity charges falls under our recommended tariff. In our modelling, we assume customers' contract capacity is unchanged irrespective of its self-supply decision, as we assume the customer always relies on the grid for back-up.

D. The costs of paying the energy charge of the transmission tariff rise under our recommended tariff, as the energy charge is higher.

Figure A.1: Costs of Purchasing Power from the Grid Under the Current and Our Recommended Tariff



Note: POD costs not shown. Source: NERA analysis of AESO data.

A.2.3. We perform modelling to optimise the self-supply decision for each customer

150. We then perform optimisation modelling to identify the self-supply decision for each customer that would minimise its energy costs.

151. The model allows customers to choose to self-supply from two different technologies, or types of plant that we discuss in Appendix A.2.4 below. We do not constrain the capacity of plants that customers can build to be above a particular size, or the mix of the two alternative technologies. Hence, customers can build any amount (in MW terms) of either or both types of plant. This conservative assumption makes the costs of self-supply appear more attractive than they would be in reality, as generation units

typically come in standardised sizes, so each unit installed cannot be below a certain size.

152. Our model assumes that, if customers invest in plant, they incur capital costs and fixed O&M costs irrespective of how they subsequently use the plant. Having built a plant, the model optimises when the plant should be dispatched for self-supply, up to the capacity of the plant. When a customer self-supplies power from its plant:

A. It incurs variable O&M costs, fuels costs (natural gas costs), and carbon costs.[43]

B. It avoids serving its gross load from the pool, which would incur costs as per the Price Duration Curves shown above.

153. The model assumes that each customer chooses how many MW of each generation technology to build and the hours in which to run it, to minimise its total costs of meeting its gross load. The total cost function, which the model minimises using a "linear program" approach, constitutes the costs of purchasing power from the grid (pool price plus transmission costs) and the costs associated with self-supplying through investing in and running on-site plant.

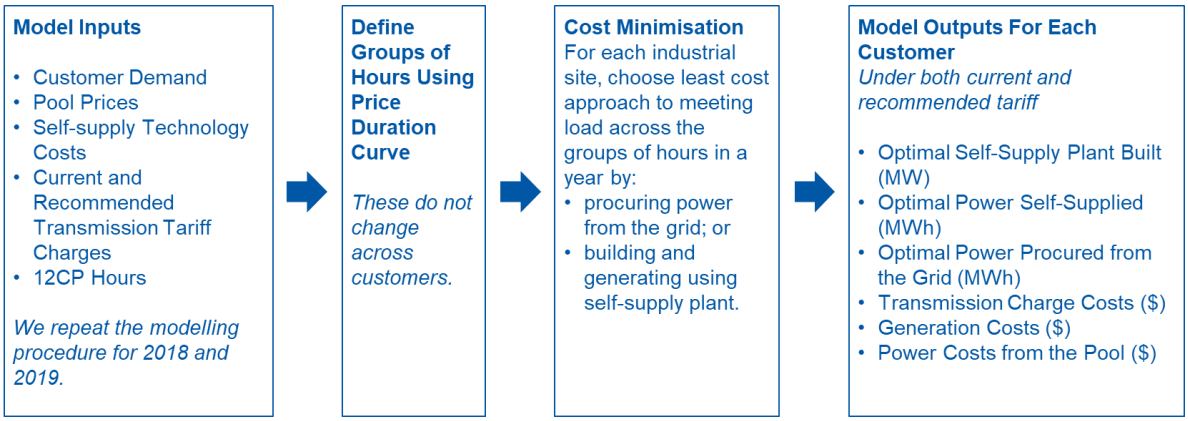
154. The model chooses how much capacity of each type of plant to build, and how much power to self-supply from each plant in each representative hour. It cannot produce more than the capacity of its plant in each representative hour, and the model is constrained to either use self-supply or power from the grid to meet the customer's gross load.[44]

155. We solve this linear programming problem for each customer (industrial site), under the current and recommended tariff, and separately for both 2018 and 2019. The solution of the problem for each customer defines its optimal self-supply under each tariff and in each year. We illustrate our modelling approach in Figure A.2 below.

[43] Throughout our analysis we source gas costs and forecasts from the Alberta Energy Regulators Forecast of AECO-C gas prices updated June 2020 and accessed here: https://www.aer.ca/providing-information/data-and-reports/statistical-reports/st98/prices-and-capital-expenditure/natural-gas-prices/aeco-c-price. Last Accessed 12 May 2021.

[44] We assume that customers cannot use self-supply technology to export power to the grid.

Figure A.2: Illustration of Our Modelling Approach



Source: NERA illustration.

A.2.4. Assumed self-supply technologies

156. We allow the model to choose between two technologies for self-supply:

A. An aeroderivative combustion engine ("ACE") fuelled by natural gas. The costs and assumptions of the ACE are derived from an AESO-commissioned study on the Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants.[45]

B. A reciprocating internal combustion engine ("RICE") fuelled by natural gas. The RICE costs and assumptions are derived from the AESO Delivered Cost of Energy Report.

157. We summarise our assumptions and sources for costs and operating conditions of each technology, the ACE and RICE, in Table A.4 and Table A.5 below respectively.

[45] Johannes P. Pfeifenberger et al. (4 September 2018), AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date.

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Table A.4: ACE Plant Cost Assumptions and Sources (2019 C$)

	Units	**ACE**	**Assumption/Source**
Initial Capex	*$/kW*	1,703	AESO Cost of New Entrant Analysis. Includes an indicative cost of land and upfront financing fees.
Heat Rate	*GJ/MWh*	9.68	AESO Cost of New Entrant Analysis.
Variable O&M	*$/MWh*	4.39	AESO Cost of New Entrant Analysis.
Fixed O&M	*$/kW-year*	48.26	AESO Cost of New Entrant Analysis.
Lifetime	*years*	20	AESO Cost of New Entrant Analysis.
Build time	*years*	2	Based on an internal combustion engine as cited by the EIA.
Emissions Intensity	*t/MWh*	0.49	NERA Calculation using (i) tCO2/therm = 0.0053[46] (ii) Btu/therm = 100,000;[47] therm/GJ = 0.105506.[48]
Rate of return	*%*	8.50%	AESO Cost of New Entrant Analysis.

Source: NERA Analysis of AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date; and Energy Information Administration (February 2021), Assumptions to the Annual Energy Outlook 2021: Electricity Market Module.

[46] EIA, Greenhouse Gases Equivalencies Calculator - Calculations and References, Last Accessed 17 May 2021, Link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[47] EIA, FAQs, Last Accessed 17 May 2021, Link: https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

[48] EIA, Energy Conversion Calculators – Natural Gas, Last Accessed 17 May 2021, Link: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

Table A.5: RICE Plant Cost Assumptions and Sources (2019 C$)

	Units	**RICE**	**Assumption/Source**
Initial Capex	*$/kW*	2,200	AESO Delivered Cost of Electricity Report 2020.
Heat Rate	*GJ/MWh*	10.50	AESO Delivered Cost of Electricity Report 2020.
Variable O&M	*$/MWh*	9.77	AESO Delivered Cost of Electricity Report 2020.
Fixed O&M	*$/kW-year*	0.00	AESO Delivered Cost of Electricity Report 2020. No fixed O&M costs mentioned in report so assumed to be zero. The risk with our assumption is that we understate the costs of self-supply technologies.
Lifetime	*years*	25	NERA assumption based on lifetime of plants cited in other sources. The AESO cites a 25-year asset life for a simple cycle gas plant in its Summary of Integrated Capacity and Energy Revenue Modelling, but a 20-year asset life for the ACE in the Cost of New Entry Analysis. In order to ensure we do not overstate the costs of self-supply, we assume a 25-year asset life.
Build time	*years*	2	Based on an internal combustion engine as cited by the EIA.
Emissions Intensity	*t/MWh*	0.53	NERA Calculation using (i) tCO2/therm = 0.0053[49] (ii) Btu/therm = 100,000;[50] therm/GJ = 0.105506.[51]
Rate of return	*%*	8.20%	NERA assumption based on rate of return cited by AESO for a simple cycle gas turbine in its Summary of Integrated Capacity and Energy Revenue Modelling.

Source: NERA Analysis of AESO (31 May 2020), Delivered Cost of Electricity Report; and Energy Information Administration (February 2021), Assumptions to the Annual Energy Outlook 2021: Electricity Market Module.

158. As can be seen in the above tables, the ACE and RICE have different cost profiles. The ACE has higher fixed costs each year than the RICE. However, the ACE has lower variable costs of generation than the RICE. We summarise the fixed and variable costs of each technology in Table A.6 below.

[49] EIA, Greenhouse Gases Equivalencies Calculator - Calculations and References, Last Accessed 17 May 2021, Link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[50] EIA, FAQs, Last Accessed 17 May 2021, Link: https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

[51] EIA, Energy Conversion Calculators – Natural Gas, Last Accessed 17 May 2021, Link: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

Table A.6: ACE and RICE Variable and Fixed Costs (2019 C$)

	ACE	RICE
Fixed Cost ($/kW/yr)	228	210
Variable Cost ($/MWh)	23.35	31.29

Source: NERA Analysis

159. Therefore, the ACE is a self-supply option similar to the baseload generation option that we outline in Paragraph 27 above. Whilst it is more expensive to build, it is more economically viable than RICE technology when run for more hours of the year, due to its lower variable costs. On the other hand, the RICE is similar to the peaking generation option that we outline in Paragraph 27 above. Whilst it is cheaper to build, it is only more economic than the ACE in fewer hours, due to its higher variable costs.

160. We considered a range of potential self-supply technologies in our analysis, drawing on both AESO studies as well as studies from the US Energy Information Administration ("EIA"). We summarise the characteristics of some of the alternative options we considered in Table A.7 below.

A. A key component of our assumption of available self-supply technologies is the size of the plant. For instance, whilst grid-scale CCGTs are more efficient than our chosen technologies, in practice, most industrial customers are unable to install a CCGT to self-supply because the minimum size of the plant is too large relative to an industrial customers' typical load.[52]

B. Therefore, we focus our analysis on plants with smaller minimum sizes for use in self-supply. In our optimization of the customers' self-supply decision, we do not constrain the minimum size of plant that the customer can build, and therefore our choice of self-supply technology should be appropriate for small-scale plant. Hence, we do not consider CCGT, Frame Combustion Turbine ("Frame CT"), and Simple Cycle Gas Turbine ("SCGT") technologies. Whilst the SCGT plant is similar in size to the ACE plant that we adopt, we consider the ACE plant to be

[52] For similar reasons, we assume that industrial customers cannot utilise intermittent technologies (combined with battery storage) because these technologies require significant land and therefore cannot be used to materially offset load. The AESO states, for industrial and large commercial customers, that "area available for PV arrays is likely insufficient to offset load" in its discussion of self-supply technologies in its Delivered Cost of Electricity Report. Source: AESO (May 2020), Delivered Cost of Electricity Report, p. 28.

more representative of the costs of installing self-supply technology, as the fixed cost estimate also includes other costs that merchant generators would incur in Alberta e.g. including an indicative cost of land.[53]

C. We considered using plant assumptions as detailed by the EIA in its Assumptions to the Annual Energy Outlook 2021.[54] More specifically, we considered utilising a distributed generation baseload gas plant ("DG Base"), and a distributed generation peaking gas plant ("DG Peak"). Both of these plants have small sizes of 2 MW and 1 MW respectively, and are therefore suitable for self-supply. The EIA also provides data for an Internal Combustion Engine ("ICE") which has a size of 21 MW which is likely more appropriate for self-supply options compared to the ACE which has a size of 93 MW.

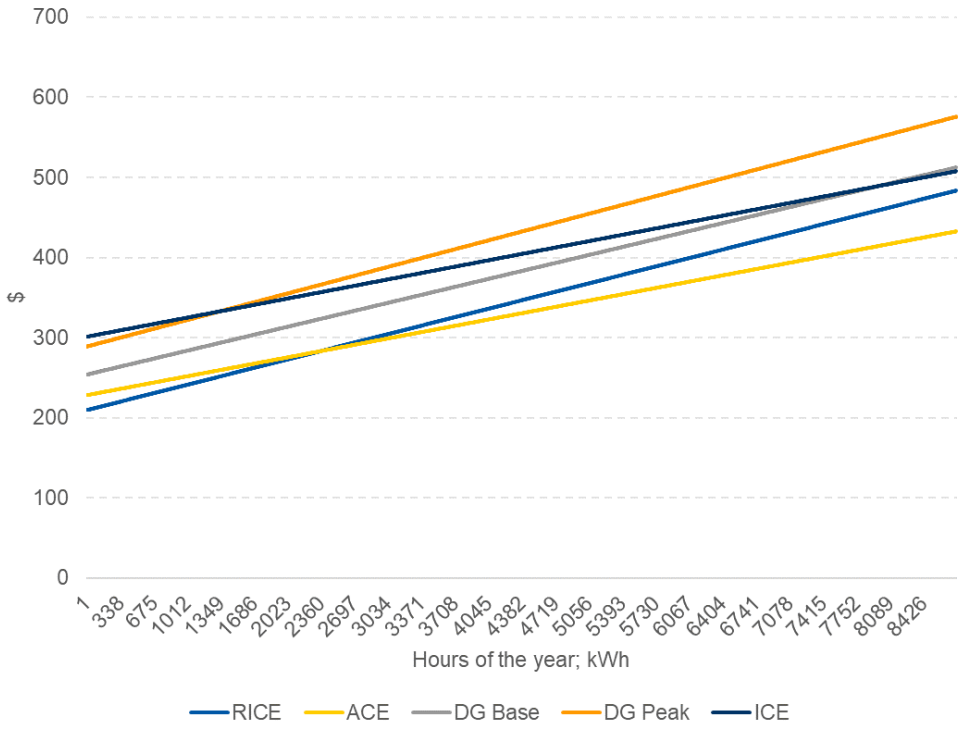
D. However, these plants are not cost competitive compared to the ACE and RICE plants. To illustrate this, we calculate a screening curve for the remaining self-supply technologies. The screening curve illustrates, for each technology, the total costs of building a 1 kW plant and then operating that plant for various hours of the year, generating 1 kWh per hour that it operates. We illustrate our screening curve in Figure A.3 below. It shows that either ACE or RICE technologies are the least cost technologies, across any amount of running hours.

53 The AESO source for the CCGT and SCGT were also cited in the context of the proposed capacity market which was not enacted. Source: AESO (January 2018), Summary of Integrated Capacity and Energy Revenue Modelling.

For land costs and other costs in the capital cost of the ACE plant, see: Johannes P. Pfeifenberger et al. (4 September 2018), AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date, Table 8.

54 Energy Information Administration (February 2021), Assumptions to the Annual Energy Outlook 2021: Electricity Market Module.

Figure A.3: Screening Curve for Self-Supply Technologies (2019 C$)



Source: NERA Analysis.

Table A.7: Self-Supply Technology Characteristics (2020 C$)

Cost	*Units*	RICE	CCGT	SCGT	ACE	Frame CT	CCGT	DG Base	DG Peak	ICE	CCGT
Initial Capex	*$/kW*	2,200	2,089	1,453	1,703	769	1,742	2,398	2,765	2,675	1,471
Heat Rate	*GJ/MWh*	10.50	7.20	10.50	9.68	10.06	6.81	9.43	10.47	8.75	6.72
Variable O&M	*$/MWh*	9.77	8.26	4.13	4.39	0.76	2.57	11.33	11.33	7.49	2.46
Fixed O&M	*$/kW-yr*		27.88	18.58	48.26	25.37	44.44	25.49	25.49	46.30	16.06
Lifetime	*years*			25	20	20	20				
Build time	*years*	2	3	2	2	2	3	3	2	2	3
Size	MW	<5	455	100	93	243	279	2	1	21	1083
Emissions intensity*	*t/MWh*	0.53	0.36	0.53	0.49	0.51	0.34	0.47	0.53	0.44	0.34
Rate of return	*%*			8.20%	8.50%	8.50%	8.50%				
Levelised Cost (incl Fixed O&M)	*$/kW/yr*	209.62	226.91	157.06	228.24	106.64	228.50	253.94	288.98	301.21	156.21
Source:		*AESO (1)*	*AESO (2)*	*AESO (2)*	*AESO (3)*	*AESO (3)*	*AESO (3)*	*EIA*	*EIA*	*EIA*	*EIA*

** Note: We recalculated all emissions intensities using the same assumptions for consistency and comparability. Our assumptions included (i) tCO2/therm = 0.0053[55] (ii) Btu/therm = 100,000;[56] therm/GJ = 0.105506.[57] Source: NERA Analysis of (1) AESO (31 May 2020), Delivered Cost of Electricity Report; (2) AESO (January 2018), Summary of Integrated Capacity and Energy Revenue Modelling; (3) Johannes P. Pfeifenberger et al. (4 September 2018), AESO Cost of New Entry Analysis: Combustion Turbines and Combined-Cycle Plants with November 1, 2021 Online Date, Table 8; and Energy Information Administration (February 2021), Assumptions to the Annual Energy Outlook 2021: Electricity Market Module.*

[55] EIA, Greenhouse Gases Equivalencies Calculator - Calculations and References, Last Accessed 17 May 2021, Link: https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

[56] EIA, FAQs, Last Accessed 17 May 2021, Link: https://www.eia.gov/tools/faqs/faq.php?id=45&t=8

[57] EIA, Energy Conversion Calculators – Natural Gas, Last Accessed 17 May 2021, Link: https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php

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A.2.5. Additional model assumptions

161. We also make assumptions relating to inflation, exchange rates, gas costs, and carbon costs. We detail these assumptions and our sources in Table A.8 below.

Table A.8: Overview of Model Assumptions

Assumption	Units	2018	2019	2020	Source
Exchange Rate	US$ to C$	1.2957	1.3269	1.3415	Bank of Canada, Annual Average Exchange Rates, Link: https://www.bankofcanada.ca/rates/exchange/annual-average-exchange-rates/, Last Accessed 05/05/2021.
Inflation Rate	%	1.40%	2.40%	1.84%	Inflation calculated as YoY percentage change in CPI from January each year. Source: Bank of Canada, Consumer Price Inflation, Link: https://www.bankofcanada.ca/rates/price-indexes/cpi/, Last Accessed 05/05/2021.
Gas Cost	$ per GJ	1.48	1.6	1.92	AER Forecast of AECO-C Gas. Average Annual Price, Base Case.
Carbon Cost	$ per tCO2	30	30	30	Government of Alberta (June 2018), Climate Leadership Plan 2018-2019.

Source: NERA Analysis.

A.2.6. Estimating optimal self-supply for customers

162. We run the model to estimate each customer's optimal self-supply decision using data for both 2018 and 2019 under both the current and recommended tariff designs. Our optimization model chooses the least cost combination of self-supply and purchasing of power from the grid across the year for each customer to meet its load.

163. In Table A.9 below, we outline the optimal investment in ACE and RICE plant resulting from our model of optimal self-supply decisions across customers under the current and recommended tariff. We find that most customers in our model build ACE plant, which has higher fixed costs than the RICE plant but lower variable costs. Under the recommended tariff, customers invest in more ACE plant but less RICE plant, suggesting that customers find it optimal to self-supply in more hours of the year due to the higher energy charge, thereby opting for the baseload instead of peaking technology.

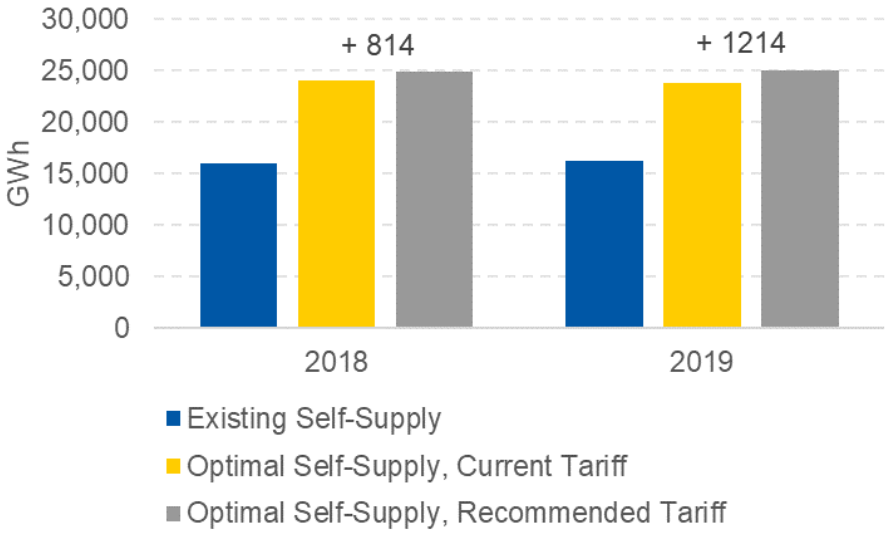
Table A.9: Modelled Optimal Self-Supply Plant Under Current and Recommended Tariff in 2018

	Capacity (MW)	ACE Capacity	RICE Capacity
Current Tariff	2,872	2,850	22
Recommended Tariff	2,893	2,887	6
Difference	21	37	-16

Source: NERA Analysis.

164. We illustrate the total change in energy self-supplied under the current and recommended tariff in Figure A.4 below. Our model suggests that optimal self-supply under the current tariff (yellow bars) is slightly lower than under our recommended tariff (grey bars). We find that moving from the current to the recommended tariff marginally increases optimal self-supply for customers in our sample by 814 GWh and 1,214 GWh in 2018 and 2019 respectively.

Figure A.4: Modelled Optimal Self-Supply Under Current and Recommended Tariff in 2018 and 2019



Source: NERA Analysis.

165. However, as can be seen in the figure, our model suggests much higher optimal self-supply under the current tariff (the yellow bars) than actually observed self-supply in 2018 and 2019 (the blue bars). Our model suggests optimal self-supply is approximately 50 and 47 per cent greater under the current tariff than actual self-

supply under the current tariff. This finding is similar to the AESO's finding in the Delivered Cost of Electricity Report, as we discuss in Section 3.4.2 above.

166. We would expect to observe this result for two key reasons:

A. Our model understates the cost of self-supply technologies. As we discuss in Appendix A.2.3, our model allows customers to build increments of capacity of self-supply technologies as we do not restrict the customer to a minimum size of plant. We also choose technologies available for self-supply that are more cost competitive than smaller plants appropriate for distributed generation but with higher operating costs.

B. Our model only considers the costs of self-supply associated with the fixed and variable costs of operating self-supply generators. In reality, customers incur other costs in their decision to self-supply, such as the costs and risks associated with business complexity and financing. Other industrial customers may not be able to self-supply due to their location in the province or lack of available land. We cannot directly observe these other costs associated with self-supply in the data available.

167. Therefore, to account for the additional costs associated with self-supply, we examine how customers' actual decisions to self-supply are linked to the incentive to self-supply identified by our optimisation modelling, as explained below.

A.3. Step 2: Estimating the Actual Self-Supply Response by Customers

168. We estimate a statistical relationship between actual self-supply decisions and the incentive to self-supply (as measured by the optimal self-supply generation amount predicted by our model in Step 1).[58]

169. We use an Ordinary Least Squares regression procedure to estimate the statistical relationship between actual self-supply and the incentive to self-supply across customers. In our regression, our dependent variable (the variable we are explaining)

[58] We could have utilized data for both 2018 and 2019 to estimate the statistical relationship. However, we only use data in 2018 so that we can test the performance of our model in predicting actual self-supply in 2019, as we discuss in Appendix A.3.2 below.

is total actual self-supply by customer across 2018 (in MWh), defined by the difference between each customer's metered gross demand and its metered net demand.

170. We use the total optimal self-supply by customer across 2018 (in MWh), taken from our model as our measure of the *incentive* to self-supply as an explanatory variable (the variable we are using to predict actual self-supply) in the regression. We illustrate our approach in Figure A.5.

Figure A.5: Illustration of Our Regression Approach

$$\text{Actual Self-Supply} = \alpha + \beta * (\text{Incentive to Self-Supply}) + \varepsilon$$

Where:

$$\text{Incentive to Self-Supply} = \text{Modelled Optimal Self-Supply}$$

α and β, are constants to be estimated, ε is an error term.

Source: NERA illustration.

171. Put simply, this procedure allows us to predict how much a customer would typically self-supply, as a function of how much an optimisation model suggests the customer should self-supply if it were making a least-cost trade-off between self-generation costs and purchasing power from the grid, as shown above.

A.3.1. We include a number of explanatory variables in our regression

172. We include a number of other explanatory variables that allow different customers to respond to the incentive to self-supply in different ways, depending on their characteristics. Formally, we use "interaction terms" in our regression which allow the statistical relationship between actual self-supply and the incentive to self-supply to change depending on customer characteristics. We include the following customer characteristics in our regression:

A. Contract Capacity: We allow the response of customers to the incentive to self-supply to change with contract capacity. As discussed in Appendix A.2, we assume each site contains a single industrial customer.

B. Industry Type: Customers' response to the incentive to self-supply might change depending on its industrial processes. We allow the response of customers to change with each customer's industry type. More specifically, we estimate different customer responses for the wood industry (pulp and paper or wood production), oilsands industry, pipeline industry, or other industry (chemical, steel, cement). We estimate a different customer response for customers with no listed industry.

C. Location in a City: We allow the response of customers to change if the customer is located in the Calgary or Edmonton planning region. Customers in more densely populated areas may have less land available for self-supply technology, reducing their responsiveness to the incentive to self-supply.

D. Industry System Designation ("ISD"): We allow the response of customers to change if the customer already has ISD status. We would expect customers with ISD status to be more responsive to the incentive to self-supply.

173. Formally, our regression is written in Table A.10 below.

Table A.10: Our Regression Approach

Type of Variable	Variable
Dependent Variable	Actual Self-Supply (MWh)
Constant	Constant
Explanatory Variable 1	Incentive to Self-Supply (MWh)
Explanatory Variable 2	Incentive to Self-Supply (MWh) x Contract Capacity (MW)
Explanatory Variable 3a	Incentive to Self-Supply (MWh) x Wood Industry (1/0 Dummy)
Explanatory Variable 3b	Incentive to Self-Supply (MWh) x Oilsands Industry (1/0 Dummy)
Explanatory Variable 3c	Incentive to Self-Supply (MWh) x Pipeline Industry (1/0 Dummy)
Explanatory Variable 3d	Incentive to Self-Supply (MWh) x Other Industry (1/0 Dummy)
Explanatory Variable 4	Incentive to Self-Supply (MWh) x Located in City (1/0 Dummy)
Explanatory Variable 5	Incentive to Self-Supply (MWh) x ISD (1/0 Dummy)
Residual	Residual Term

Note: A dummy variable takes the value of 1 if true for a customer or 0 otherwise. For instance, if a customer has an ISD then the dummy variable will equal 1, otherwise it will equal 0. Source: NERA Analysis.

A.3.2. We estimate our regression and analyse its predicative power using 2019 data

174. We estimate our regression using 2018 data and present our results in Table A.11.

Table A.11: Our Estimated Regression Using 2018 Data

Dependant Variable: MWh of Actual Self-Supply	Coefficient	p-Value
Incentive to Self-Supply *(MWh of Optimal Self-Supply as Estimated by Model)*	0.174	0.106
Interaction with ISD	0.485	0.000
Interaction with Contract Capacity	-0.001	0.000
Interaction with City	-0.301	0.185
R-Squared	0.9696	
Number of Observations	133	

Notes: Interactions with Industry Types Not Shown but Included in Model. All industry interaction explanatory variables are statistically significant with the exception of "pipeline". Incentive to self-supply is statistically significant when tested across all interaction terms. Source: NERA Analysis.

175. Our estimated regression suggests that as the incentive to self-supply increases, as measured by a 1 MWh increase in the optimal amount of self-supply identified by our model, actual self-supply by customers increases. We estimate how this relationship is affected by the characteristics of the customer:

    A. A customer with an ISD is found to be more responsive to the incentive to self-supply, increasing its actual self-supply by 0.485 MWh more than a customer without an ISD in response to a 1 MWh increase in the amount of self-supply that the optimisation model in Step 1 suggests is least cost.

    B. A customer located in the Edmonton or Calgary planning regions is found to be less responsive to the incentive to self-supply, increasing its actual self-supply by 0.301 MWh less than a customer outside these regions in response to a 1 MWh increase in the amount of self-supply that the optimisation model in Step 1 suggests is least cost.

    C. Contract capacity has a statistically significant and negative impact on the customer response to the incentive to self-supply. However, the size of this impact is very small.

176. Our regression also has a high degree of statistical fit, meaning that it explains the majority of the variation in actual self-supply across customers. Formally, the R-squared of our regression is 0.9696, meaning our regression explains 96.96 per cent of the variation in actual self-supply across customers in 2018 using the explanatory

variables. This is reassuring as it means our model has a strong predicative power to estimate actual self-supply from the amount of self-supply that the optimisation model in Step 1 suggests is least cost.

177. To further assess the predicative power of our regression, we use it to predict self-supply in 2018 and 2019 across industrial customers. We would expect our regression to perform well at predicting 2018 actual self-supply, because we estimate the regression using 2018 data. However, in this calculation we are particularly interested in the performance of our regression at predicting 2019 self-supply decisions, because this data is not used to calibrate the regression equation. We detail our results for our sample of customers in Table A.12 below.

Table A.12: Analysis of the Predicative Power of Our Regression

	2018	**2019**
Modelled Incentive to Self-Supply (GWh)	24,114	23,851
Actual Self-Supply (GWh)	16,055	16,245
Predicted Self-Supply Using Regression (GWh)	**16,624**	**16,534**
Difference Between Predicted and Actual Self-Supply (GWh)	570	289
Prediction Error Relative to Actual Self-Supply (%)	**3.55%**	**1.78%**

Source: NERA Analysis of AESO Data

178. Our regression performs well in predicting actual self-supply by customers in 2019. It predicts a volume of self-supply in 2019 within 2 per cent of the actual self-supply volume observed in that year. Therefore, we are reassured that our regression performs well at predicting actual self-supply based on data that is "out of sample", i.e. data that is not used to initially estimate the regression such as 2019 data.

179. Consequently, we are content that our regression predicts accurately the actual self-supply response by customers.

A.3.3. We considered alternative specifications of our regression

180. We considered an alternative specification of our regression which uses the cost savings associated with optimal self-supply relative to purchasing all power from the grid as a measure of the incentive to self-supply (rather than the MWh of optimal self-supply as in the "MWh Regression" above).

181. Similar to our "MWh Regression" our "Cost Regression" uses the same interaction terms to allow customers' responsiveness to the incentive to self-supply, as measured by our modelled costs savings associated with self-supply, to differ with their characteristics.

182. We estimate our "Cost Regression" using 2018 data and present our results in Table A.13.

Table A.13: Our Estimated "Cost Regression" Using 2018 Data

Dependant Variable: MWh of Actual Self-Supply	**Coefficient**	**p-Value**
Incentive to Self-Supply *(Cost Savings of Optimal Self-Supply as Estimated by Model)*	0.0093	0.103
Interaction with ISD	0.0254	0.000
Interaction with Contract Capacity	-0.0001	0.000
Interaction with City	-0.0172	0.169
R-Squared	0.9697	
Number of Observations	133	

Notes: Interactions with Industry Types Not Shown but Included in Model. All industry interactions explanatory variables are statistically significant with the exception of "pipeline". Incentive to self-supply is statistically significant when tested across all interaction terms. Source: NERA Analysis.

183. Our estimated "Cost Regression" suggests that as the incentive to self-supply increases, as measured by the cost savings associated with optimal self-supply relative to purchasing power from the grid in our model, actual self-supply by customers increases. We estimate that this relationship is also affected by the characteristics of the customer in a similar way to the "MWh Regression" as detailed in Table A.11 above.

184. Our "Cost Regression" also has a high degree of statistical fit, meaning that it explains the majority of the variation in actual self-supply across customers. The R-squared of our regression is 0.9697, meaning our regression explains 96.97 per cent of the variation in actual self-supply across customers in 2018 using the explanatory variables we include in it.

185. Similar to our test for the "MWh Regression", we further assess the predictive power of the "Cost Regression" by predicting self-supply in 2018 and 2019 across industrial

customers using our regression. We detail our results for our sample of customers in Table A.14 below.

Table A.14: Analysis of the Predicative Power of Our Regression

	2018	**2019**
Modelled Incentive to Self-Supply (GWh)	24,114	23,851
Actual Self-Supply (GWh)	16,055	16,245
Predicted Self-Supply Using Regression (GWh)	**16,605**	**19,561**
Difference Between Predicted and Actual Self-Supply (GWh)	550	3,316
Prediction Error Relative to Actual Self-Supply (%)	**3.43%**	**20.41%**

Source: NERA Analysis of AESO Data

186. Our "Cost Regression" performs better than our "MWh Regression" at predicting self-supply by customers in 2018.

187. However, our "Cost Regression" performs less well at predicting 2019 self-supply than our "MWh Regression", resulting in it predicting self-supply that is approximately 20 per cent higher than actually observed under the current tariff. We therefore use our "MWh Regression" to predict the actual self-supply response by customers to our recommended tariff in Appendix A.4 below.[59]

A.4. Step 3: Our Estimate of Self-Supply by Customers

A.4.1. Estimating the change in self-supply volumes due to the change in tariff design

188. Using our preferred specification, the "MWh Regression", we predict how self-supply by industrial customers would change under our recommended tariff design using data for 2018 and 2019. We report our results in Table A.15 below. We calculate two changes in self-supply:

A. We calculate the difference between predicted self-supply under our recommended tariff and predicted self-supply under the current tariff, where both are predicted using our modelling and regression procedure described above.

[59] We also considered logarithmic regressions to estimate the percentage increase in actual self-supply in response to a percentage increase in the incentive to self-supply. However, we could only estimate the logarithmic model on customers who are currently self-supplying (to prevent introducing non-linearity to the data) and these customers may be systematically different to the customers not self-supplying, leading to systematic bias in our estimate of self-supply.

This is shown in Row C of the table below. This calculation shows the change in self-supply predicted by our modelling procedure due to the change in the tariff design.

B. We calculate the difference between predicted self-supply under our recommended tariff and *actual* self-supply, as observed under the current tariff. This is shown in Row E of the table below. In other words, this calculation compares our modelled projection of self-supply after the change in the tariff design to the actual volume of self-supply today, i.e. under the current methodology.

Table A.15: Our Estimate of Customer Self-Supply in 2018 and 2019 Under Our Recommended Tariff

	Units: GWh	**2018**	**2019**
A	Predicted Self-Supply Under Recommended Tariff	17,249	17,401
B	Predicted Self-Supply Under Current Tariff	16,624	16,534
C = A – B	**Change in Self-Supply Under Recommended Tariff Relative to *Predicted* Self-Supply Under Current Tariff**	**625**	**867**
D	Actual Self-Supply Under Current Tariff	16,055	16,245
E = A – D	**Change in Self-Supply Under Recommended Tariff Relative to *Actual* Self-Supply Under Current Tariff**	**1,194**	**1,156**

Source: NERA Analysis.

189. We therefore predict an increase in self-supply across customers in our sample of between 625 and 1,194 GWh, depending on the approach used.

190. As we discuss in Appendix A.3.2, our regression overstates self-supply when compared against actual self-supply under the current tariff. Therefore, we control for this tendency by comparing our estimate of self-supply under the recommended tariff with *predicted* self-supply under the current tariff using our modelling procedure (Row C), rather than compare it to *actual* self-supply under the current tariff. If we do this, our model predicts an increase in self-supply across customers in our sample of 625 to 867 GWh.

191. We only model the optimal self-supply decision for industrial-only sites. Other industrial customers are located on shared sites with residential and other customers.

Therefore, to ensure we do not understate the incentive to self-supply, we scale our results to account for the industrial customers located on sites outside of our sample. More specifically, we calculate the scaling factor by examining the proportion of total industrial contract capacity constituted by our sample, and scaling by the result, as we show in Table A.16 below.

Table A.16: Calculation of the Scaling Factor for Our Modelling

A	Industrial-Only Site Contract Capacity	3,470 MW
B	Total Industrial Contract Capacity	7,186 MW
C = B / A	Scaling Factor	2.071

Source: NERA Analysis of AESO Data.

192. Scaling our results using this factor, **we estimate that self-supply will increase under our recommended tariff by 1,294 to 2,473 GWh relative to the current tariff** (not controlling for our model's tendency to overstate self-supply). This is equivalent to 2.17 to 4.14 per cent of the total metered energy billing determinant, used to calculate the transmission energy charge, in 2019.

193. Therefore, we estimate that customer response to our recommended tariff will be extremely limited.

A.4.2. We also considered whether a further customer response might arise from lower energy demand increasing the tariff

194. As customers choose to self-supply, the total metered energy billing determinant reduces. The AESO's revenue requirement does not change in the short run due to changes in demand,[60] so if customers choose to self-supply, the AESO needs to recover the same revenue requirement from a smaller billing determinant, resulting in a higher energy charge.[61] Therefore, whilst we estimate above an initial or "direct" self-supply response of between 1,294 to 2,473 GWh, we also need to account for any

[60] In the long run, as we discuss in Section 3.1.2, changes in self-supply decisions will result in changes in the AESO's costs.

[61] In practice, our recommended tariff methodology will adjust the division of costs with the changing use of the grid, as we estimate classification and allocation factors based on area level data. Therefore, decisions to self-supply will impact the classification of costs to energy. For simplicity, we maintain the same classification of costs for the purposes of this exercise.

In addition, reductions in energy consumption will also reduce the pool price and therefore the costs associated with purchasing electricity from the grid. Again for simplicity, we do not account for this factor in our analysis leading us to potentially overstate the self-supply response.

further self-supply response resulting from the direct self-supply response increasing the transmission tariff to the remaining customers.

195. We therefore recalculate our recommended tariff, with the energy charge recalculated using total metered energy *less* the direct self-supply response.[62] We use our highest estimate of the self-supply response (2,473 GWh) to recalculate the tariff. Our recalculated tariff has a higher energy charge but the same 12CP and billing capacity charge. We then estimate the change in self-supply using the same modelling procedure described above.

196. Having completed this procedure to estimate the "secondary" impact, we repeat the procedure a third time. We summarise our calculations and results in Table A.17 and Figure A.6 below.

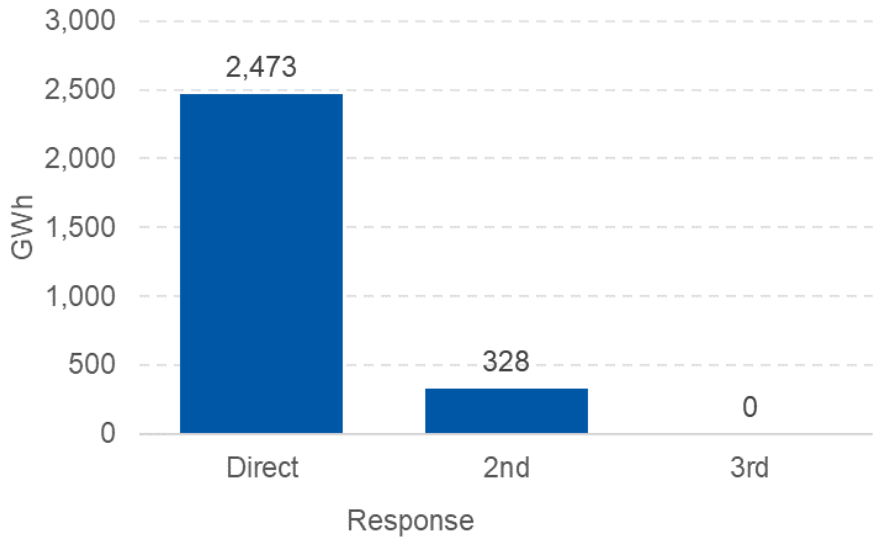
Table A.17: Our Estimate of the Dynamic Self-Supply Response to Our Recommended Tariff

	Direct	2nd	3rd
Costs Recovered from Energy Charge (C$m)	638	638	638
Energy Billing Determinant (GWh)	59,678	57,205	56,877
Energy Charge ($ per MWh)	10.68	11.14	11.21
Estimated Self-Supply Under Recommended Tariff (GWh)	**17,249**	**17,407**	**17,407**
Estimated Self-Supply Under Current Tariff (GWh)	16,055		
Additional Self-Supply Response (After Scaling, GWh)	**2,473**	**328**	**0**

*Note: * Numbers from 2018 as we take our maximum estimate of self-supply as our direct response to the tariff. Remaining numbers estimated using 2019 data. Source: NERA Analysis*

62 We use 2019 data in this modelling exercise.

Figure A.6: Our Estimate of the Dynamic Self-Supply Response to Our Recommended Tariff



Source: NERA Analysis.

197. These results show that any further increase in self-supply would be extremely limited. Even taking the top end of our estimated range, we estimate the total self-supply response will total 2,801 GWh. This is equivalent to 4.69 per cent of the total metered energy billing determinant, used to calculate the transmission energy charge, in 2019. It is also equivalent to a total cost shift of C$ 29.92 million (in real 2019 terms) from self-supply customers to other customers, which is approximately 4.69 per cent of total costs allocated to the flow of in-merit energy in 2019 and 1.90 per cent of the total revenue requirement for bulk and regional costs in 2019.

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Qualifications, assumptions and limiting conditions

NERA Economic Consulting ("NERA") has been asked to estimate the likely customer response and potential changes in self-supply outcomes by load arising from the Bulk and Regional tariff design that we recommended to the Alberta Electric System Operation ("AESO"), as described at the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5. The primary audience for this report includes AESO and interested Stakeholders.

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Demand Opportunity Service (DOS) Bid Examples

Purpose

The purpose of this document is to build on the DOS modernization recommendation explanation of DOS load bidding in the energy market, provided during the Bulk and Regional Tariff Design Stakeholder Engagement Session 5B (DOS) hosted by the AESO on May 20, 2021. The examples are intended to provide an overview of how DOS load could bid in a simple manner, recognizing that more sophisticated bidding strategies could be developed.

The information contained in this document is provided to stakeholders in the Bulk and Regional Tariff Design engagement for information purposes only and to further stakeholder understanding of the information presented at Session 5B (DOS) on May 20, 2021. The information in this document is not intended to be used or relied upon for any other purpose.

Bid submission and dispatch

Loads, using a dispatchable sink asset provided by the AESO, are able to bid into the energy market as a means of having their consumption dispatched in line with the price levels submitted through their bids. Bids are submitted with volume and price pairs like offers, where the bid indicates the volume of energy the sink will consume when price is below the bid price, and correspondingly indicating how much load will reduce should price exceed the bid price. Unlike offers, bids will not be paid for their response. Bid submission operates at the inverse to energy market offers.

Like energy market offers from a source asset, a participant may bid up to seven blocks of energy from a sink asset. Those seven blocks are then assigned to a dispatchable sink asset. For energy market offers, block zero is always the lowest priced block submitted. For bids, block zero is always the highest priced block submitted. Subsequent bid blocks are at least one cent lower in price than the previous block.

Bid blocks are “dispatched on”, meaning load is dispatched to consume, when the block price is above the system marginal price (SMP). Bid blocks are “dispatched off”, meaning load is dispatched to reduce, when the block price is at or below the SMP. When a bid block is “dispatched on” it means the energy in that block can be consumed as price has not yet reached the bid price, and the overall load should increase by the block size. When a bid block is “dispatched off” it means the energy in that block is to no longer be consumed as the price is above the bid price and the load should decrease by the size of the dispatched block.

Figure 1 below provides two different examples of bids for a 30 MW sink asset. The “in-merit” bid indicates the participant wants to be dispatched in much the same fashion as a “price-taker” offer by placing all the block MW at the energy market price cap. The “out-of-merit” bid indicates the participant does not want to be dispatched to consume by placing the bid block MW at the price floor.

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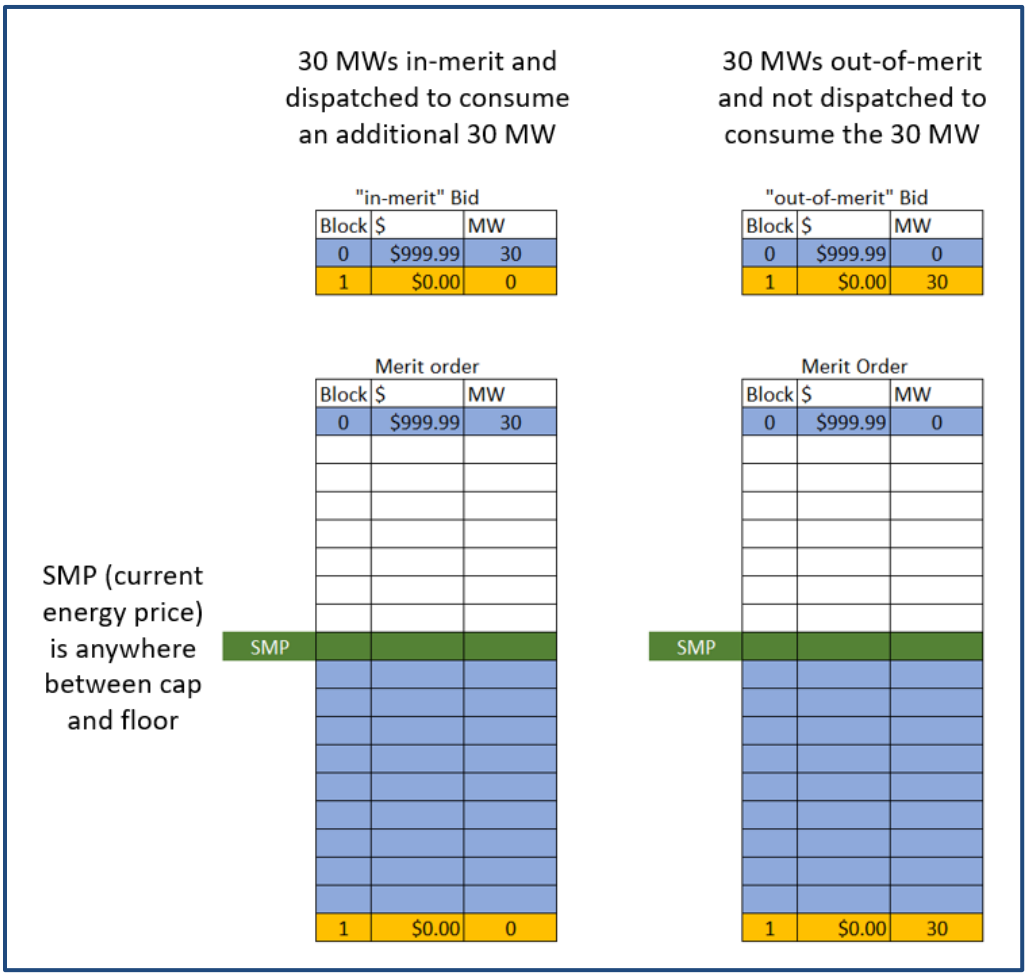
Figure 1: Bid prices and dispatch



The “must offer” requirement that applies for energy market offers, which requires all available capacity to be offered into the market does not directly apply for energy market bids. For sink assets in the energy market, bids may be submitted for all or part of the load attributed to the participant. Because of this bid feature the concept of “must bid the entire load” does not apply like “must offer” does for generators. However, the requirement to comply (i.e., “must comply to the dispatch instruction”) applies to both bids and offers.

The compliance requirements for bids are less stringent than those for offers. This is because the nature of bid load is dependent on the underlying base “un-bid” load. It is not possible to measurably distinguish un-bid load from the bid-in load because the load measurement only captures the total load at the dispatch point. This is illustrated in the following example shown in Figure 2.

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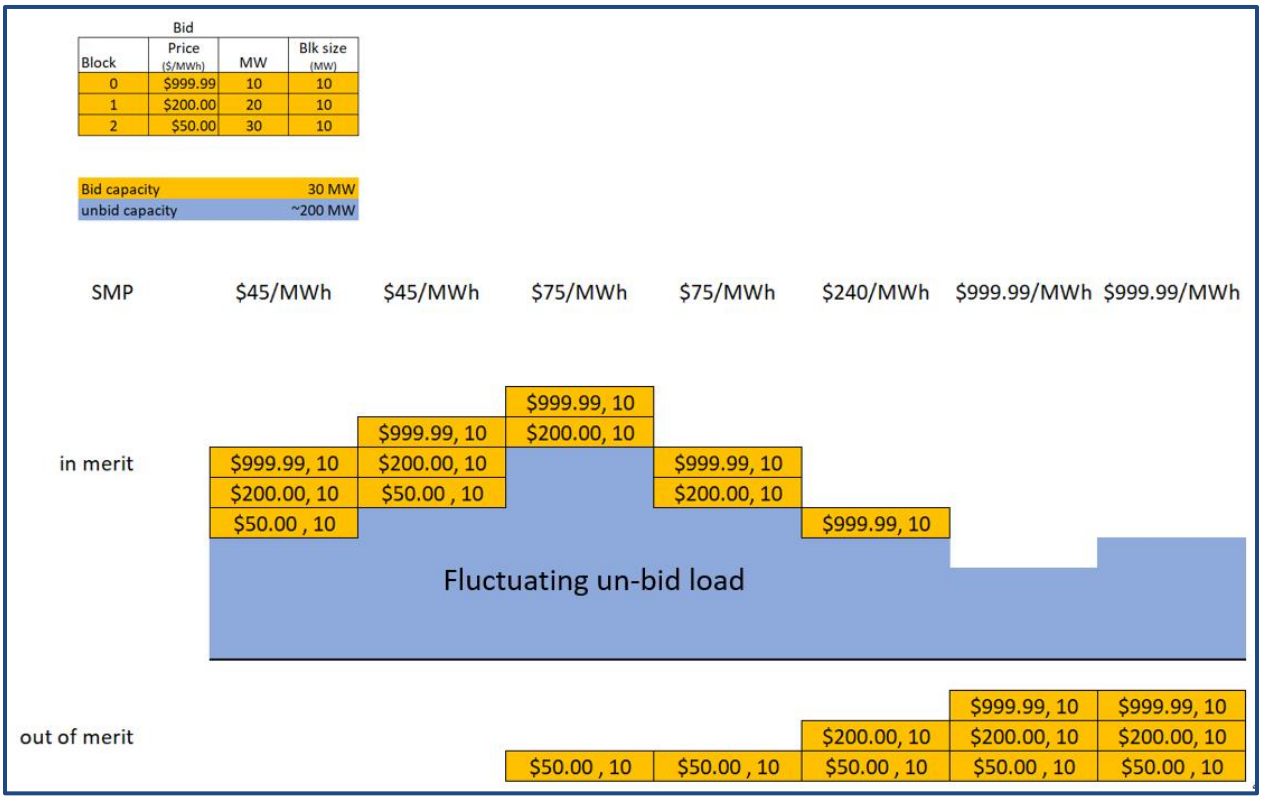
Figure 2: Bid dispatch and effect of underlying un-bid load on total load level



Dispatched bid load floats on top of the un-bid load. The metered demand represents the sum of the un-bid and bid load. For example, the AESO may dispatch on the bid load while at the same time the un-bid load is dropping. If this occurs it appears as if the participant did not adequately respond to the dispatch on instruction. Conversely, if the un-bid load is increasing at the same time as the bid load is dispatched on it appears as if the load increased to a level much greater than the dispatch. Because of the unpredictable nature of the un-bid load, the rules are relatively silent on what constitutes bid compliance.

For example, in Figure 2 when the system marginal price (SMP) increases from $45/MWh to $75/MWh, block two (the 10 MW block priced at $50.00/MWh) is dispatched off and the load would be expected to decrease by 10 MW, but according to the real-time measurements the load increased by 10 MW. The price then jumps from $75/MWh to $240/MWh and the load would be expected to decrease another 10 MW following the dispatch instruction to do so. The price continues to climb to the price cap at $999.99 at which point the remaining 10 MW in block zero is dispatched off and the load would be expected to decrease another 10 MW. Meanwhile, fluctuations in the un-bid load occur.

Treatment of DTS and DOS capacity within a bid

The AESO's DOS modernization recommendation uses the bid as the means to replace the transaction request where the bid acts as an on/off switch for intent to use DOS capacity. The "dispatch on" would represent the start of the DOS transaction and the "dispatch off" would represent the end of the same transaction.

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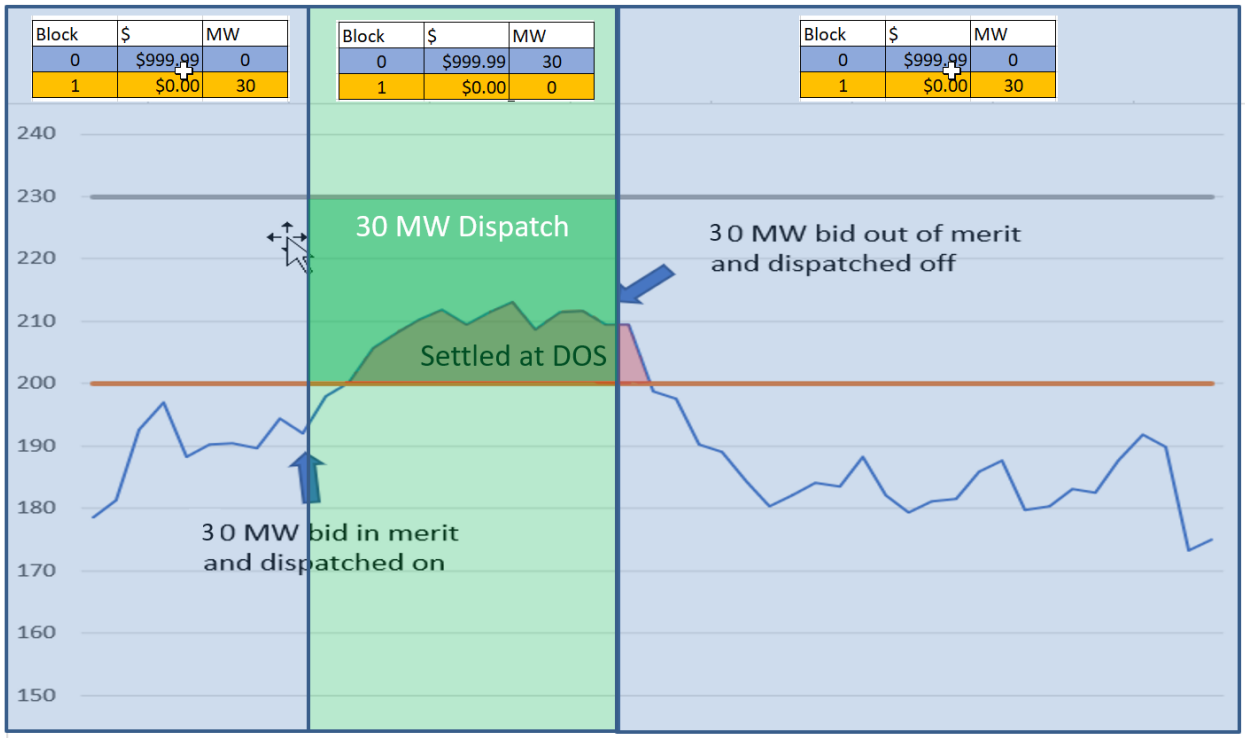
The AESO will assign the DOS participant with a sink asset whose capacity is equal to the volume of DOS contract capacity with which to submit a bid. The simplest way to approach bidding for the purposes of indicating the use of DOS capacity is for the participant to submit a bid with two blocks. Block zero is priced at $999.99/MWh and block one is priced at $0.00/MWh.

- If the participant is not planning to take DOS capacity in an hour the $0.00/MWh block will hold the DOS capacity and the $999.99/MWh block will have a block MW equal to zero. This effectively sets the DOS transaction switch in the off position.
- If the participant wishes to utilize the DOS capacity, the participant will move all, or the portion of the DOS capacity that the load wishes to consume, from the $0.00/MWh block to the $999.99/MWh block. This effectively sets the DOS transaction switch in the on position, for the amount of DOS capacity the participant wishes to use.

Toggling the energy between the two blocks will indicate to the system controller when the participant is taking or planning to take DOS energy and how much volume.

In the example shown in Figure 3, the participant starts off taking only DTS capacity by placing the 30 MW of DOS capacity in block one at $0.00/MWh. As per Section 203.3 of the ISO rules, *Energy Restatements*, at least two hours in advance of the hour the participant intends to use the DOS capacity, the bid for that hour is modified so the 30 MW of DOS capacity is priced at $999.99/MWh. At the top of the hour the bid will be in-merit and the system controller will issue a dispatch to the participant. This is equivalent to the start-time within the current DOS transaction request. The participant can leave the capacity in block zero for as many hours as the participant intends to use the DOS capacity.

Figure 3: Bid dispatch activates and deactivates the DOS transaction



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If the participant no longer wants to use the DOS capacity, the participant will move the energy from block zero ($999.99/MWh) into block one ($0.00/MWh) at least two hours in advance, as described in Section 203.3 of the ISO rules, *Energy Restatements*. At the top of the hour the system controller would dispatch the $999.99/MWh block off signaling to the participant that the DOS transaction has ended.

In the above example (Figure 3) it would appear the participant did not comply with the 30 MW dispatch instruction. Even though the bid was dispatched on for 30 MW, a maximum of 12 MW of DOS capacity was taken over the period. As explained in the example shown in Figure 2, the bid capacity was dispatched on but the underlying un-bid load was dropping off resulting in a net change of only 12 MW.

In the event the participant can no longer take DOS capacity due to an acceptable operating reason and wants to end the DOS transaction prematurely, the participant can, at any time, restate the volumes in the block and the system controller will dispatch the load off.

Settlement considerations of dispatch

If the DOS capacity was dispatched for any part of the hour, the hourly metered volume at or below the 200 MW DTS contract capacity will be settled in accordance with the DTS rate and the meter volume above the DTS contract capacity will be settled in accordance with the DOS rate.

Tariff settlement does not consider dispatch compliance, but DOS settlement is determined based on whether or not the DOS capacity was dispatched on.

Dispatch without using the DOS capacity

Like in the previous example, in Figure 4 below, the participant submits a bid with two blocks. Block zero priced at $999.99/MWh and block one priced at $0.00/MWh. If the participant is not looking to take DOS capacity in the hour the $0.00/MWh block will hold the DOS capacity. If the participant wants to utilize the DOS capacity, the participant will move all or a portion of the DOS capacity from the $0.00/MWh block to the $999.99/MWh block.

The participant starts off taking only DTS capacity by placing the 30 MW of DOS capacity in block one at $0.00/MWh. As per Section 203.3 of the ISO rules, *Energy Restatements,* at least two hours in advance of the hour the participant intends to use the DOS capacity, modifies the bid so that the 30 MW of DOS capacity is priced at $999.99/MWh. At the top of the hour the bid will be in-merit, and the system controller will issue a “dispatch on” to the participant and acts as the start-time of the current DOS transaction request. The participant can leave the capacity in block zero for as many hours as the participant intends to use the DOS capacity. However, in this example the participant’s load never exceeded the DTS contract levels the entire time block zero was in-merit and the 30 MW of load dispatched on. In accordance with the proposed DOS modernization rate design, the hours where the capacity in block zero was in-merit will all be settled at Rate DTS as no DOS capacity was actually utilized.

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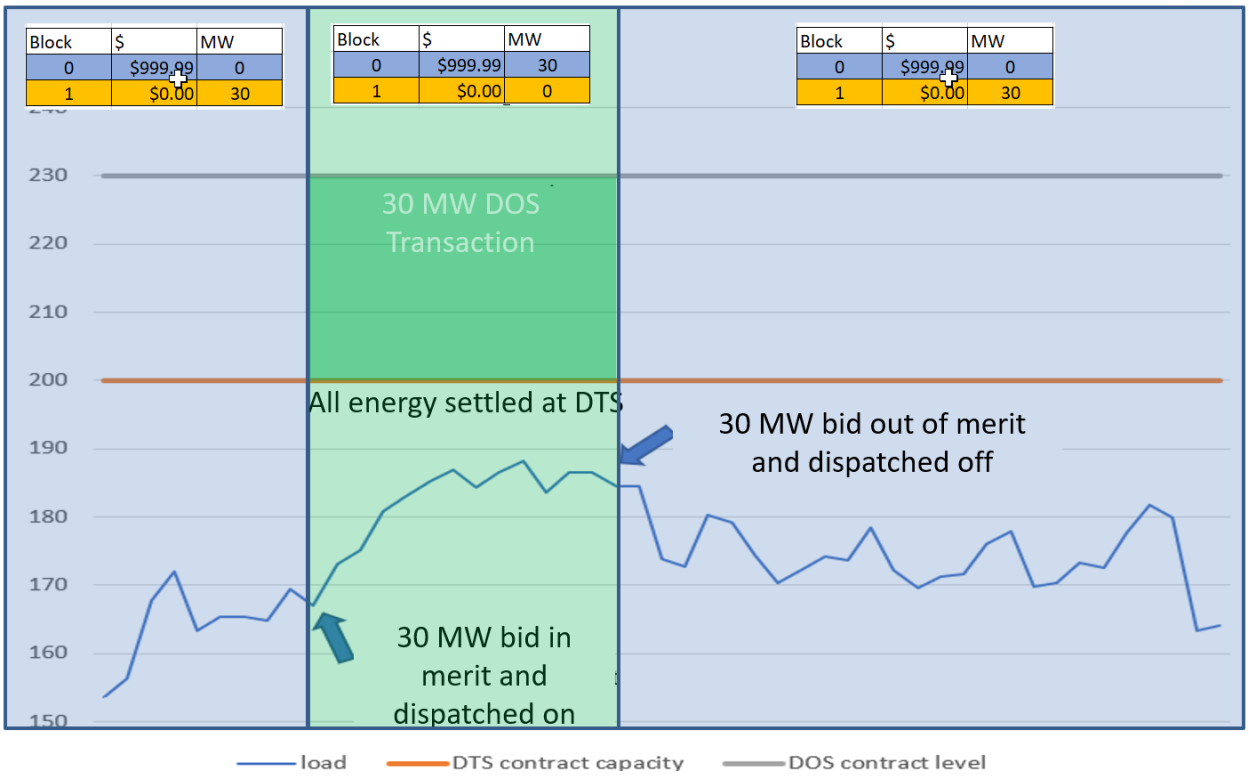
Figure 4:DOS energy is energy consumed above DTS levels



Using DOS capacity without a dispatch

In the proposed DOS modernization rate design, using DOS capacity without a corresponding dispatch is the same as using DOS capacity without submitting a transaction request under the current DOS rate. In both cases, all energy consumed above the DTS contract capacity will be allocated to DTS rather than DOS. For example, as shown in Figure 5 below, if the participant bids all MWs in block one, those MW remain out-of-merit and would not receive a dispatch on, assuming the price remains higher than $0.00/MWh. All energy consumed in this example would be assessed to Rate DTS.

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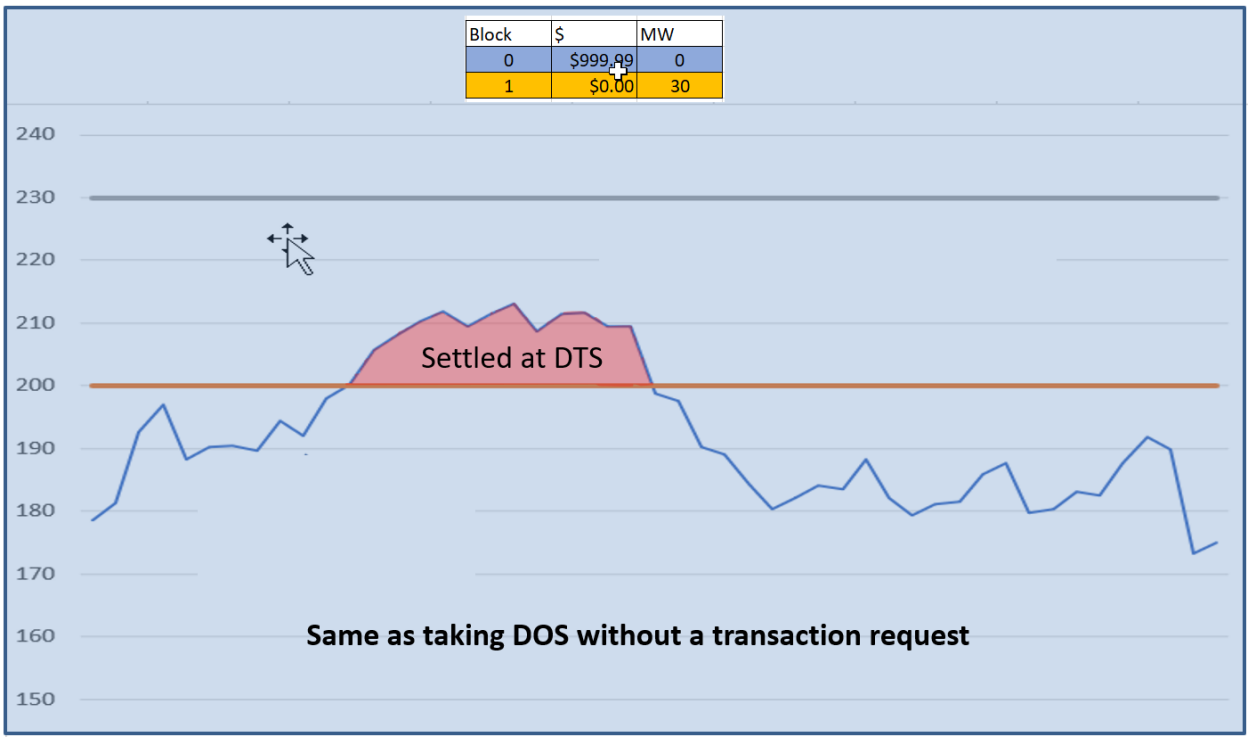
Figure 5: Using DOS capacity without a bid dispatch



Recalling DOS energy for constraint

If the participant has energy in the $999/MWh block and there is a need to recall the DOS capacity, the system controller would direct all or a portion of the $999/MWh block off by reducing the size of the block. The participant would receive a signal from the AESO's dispatch system (ADAMS) indicating the reduction in the available DOS capacity and a directive to only consume the remaining capacity, if any. When the capacity is restored the system controller will restore the volume in the energy merit order bid and the participant will be re-dispatched according to merit order.

The recall instruction is an instruction to not consume DOS capacity. It is not necessarily an instruction to reduce load. The participant load may already be below the DTS contract levels and there is no need to reduce load further. It will be the participant's responsibility to ensure the load is reduced to the appropriate level and sustained there. For example, if the directive was to no longer consume the entire 30 MW of DOS contract capacity the participant would need to ensure the total site load did not exceed DTS contract levels until dispatched to do so.

Recalling DOS energy for an EEA 1 alert

If the bid volume is priced at the top of the energy market merit order ($999.99/MWh) these are the last blocks dispatched before taking out of market actions to maintain system reliability during a supply shortfall. The instruction during an Energy Emergency Alert (EEA) 1 alert will be a dispatch off, to stop consuming energy in the $999.99/MWh block. Like the constraint recall example above, it will be the

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participant's responsibility to know whether they are consuming DOS energy at the time of the dispatch or not. The instruction is an instruction to stop consuming DOS energy and continue to not consume any DOS capacity until dispatched on (price drops below $999.99), which may or may not require a physical load reduction.

Failing to comply to DOS recalls

Failure to comply to an ISO directive to curtail DOS could result in suspension of DOS participation and a recalculation of the DTS contract capacity, administrative penalties, and the recovery of DTS revenue charged while under DOS.

Market terminology

Market terminology used in this document is defined in the *Consolidated Authoritative Document Glossary* located on the AESO website here:

https://www.aeso.ca/rules-standards-and-tariff/consolidated-authoritative-document-glossary/

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Estimating Rate Calculations

This illustrative tool is not authoritative and is for information purposes only and intended to provide guidance. In the event of any discrepancy between this tool and any authoritative document[1] in effect, the authoritative document governs.

1 Purpose

This illustrative tool is intended to allow stakeholders to review an estimate of future rates under the AESO's Preferred Rate Design (described in the AESO's Bulk and Regional Tariff Design Stakeholder Engagement Session 5 published on March 18, 2021 and presented in the corresponding AESO's Stakeholder Session 5 on March 25, 2021, and Technical Session II) by adjusting billing determinants and revenue requirement.

The description and explanations in this illustrative tool provide example calculations under the Preferred Rate Design only. The AESO calculates certain actual charges on an hourly basis rather than on average annual amounts, and ***actual charges under any future tariff design will differ from the estimated amounts presented in this illustrative tool due to actual inputs differing from these estimates***.

2 Use of the Estimating Rate Calculations Tool

This section describes how stakeholders may use the illustrative tool to understand an estimate of future impacts of the AESO's Preferred Rate Design. The calculations included here are in summary form. Detailed rate calculations to determine actual charges applied for to the Alberta Utilities Commission will be in a longer format, similar to the Rates Calculations spreadsheets filed in every ISO tariff update application.

Estimated Rate Calculations

This tab includes future estimates of rate calculations resulting from changes to the Bulk and Regional cost recovery functionalization (Column A and Lines 7 through 9)

Sources for information are included as Notes on this tab

For assistance with this tool and Site Data Input data, please contact the AESO at: tariffdesign@aeso.ca

Attachments

Estimated Rate Calculations - Calculates an estimate of rates based on estimated revenue requirement and billing determinants

Revision History

Date	Description
2021-04-13	v 0.1 - Initial release
2021-07-07	v 0.2 - Updated to include XOS/XOM rate estimations, fix cell reference error for future rate calculations
2021-07-15	v 0.3 - Updated to fix double counting of Rate XOS/XOM revenue in revenue offsets (Line 5, Columns C & D)

[1] "Authoritative document" is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and associated regulations, and that contain binding legal requirements for either market participants or the AESO, or both. Authoritative documents include: the ISO rules, the reliability standards and the ISO tariff.

Alberta Electric System Operator
AESO Preferred Rate Design

Estimated Rate Calculations Under Preferred Rate Design

Line No.	Description	A	B	C	D	E	F	G	H	I	j	K	L	M	N	O
	Source: Revenue Requirement		2019 ISO Tariff	2020 ISO Tariff	2021 ISO Tariff					2021 Transmission Rate Projection						
	Source: Billing Determinants		Latest	Update	Update					Estimated (see Growth Rates[2] below)						
			2019 Test Rates	2020 Test Rates	2021 Test Rates	2022 Test Rates	2023 Test Rates	2024 Test Rates	2025 Test Rates	2026 Test Rates	2027 Test Rates	2028 Test Rates	2029 Test Rates	2030 Test Rates	2031 Test Rates	2032 Test Rates
1	**Revenue Requirement ($000 000)**															
2	Total Wires		$ 1,835	$ 1,917	$ 1,952	$ 1,828	$ 1,968	$ 2,070	$ 2,198	$ 2,264	$ 2,331	$ 2,399	$ 2,468	$ 2,508	$ 2,529	$ 2,551
3	Other Industry and AESO G&A		$ 98	$ 99	$ 115	$ 117	$ 121	$ 124	$ 127	$ 131	$ 134	$ 137	$ 140	$ 144	$ 148	$ 151
4	Revenue Offsets		$ 18	$ 26	$ 36	$ 35	$ 36	$ 37	$ 38	$ 39	$ 40	$ 41	$ 42	$ 43	$ 44	$ 45
5	Other Revenue Offsets		$ 24	$ 35	$ 37	$ 37	$ 38	$ 39	$ 40	$ 41	$ 42	$ 43	$ 44	$ 45	$ 46	$ 47
5	Rate DOS Revenue (estimated)		-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0	-$ 0
6	Rate XOS/XOM Revenue (estimated)		-$ 6	-$ 9	-$ 1	-$ 2	-$ 2	-$ 2	-$ 2	-$ 2	-$ 2	-$ 2	-$ 2	-$ 2	-$ 2	-$ 2
7	**Revenue Requirement (Subtotal)**		**$ 1,950**	**$ 2,042**	**$ 2,102**	**$ 1,981**	**$ 2,124**	**$ 2,231**	**$ 2,363**	**$ 2,433**	**$ 2,505**	**$ 2,577**	**$ 2,650**	**$ 2,694**	**$ 2,720**	**$ 2,747**
8	Ancillary Services		$ 314	$ 258	$ 198	$ 236	$ 242	$ 248	$ 254	$ 260	$ 266	$ 272	$ 278	$ 285	$ 292	$ 298
9	**Total Revenue Requirement**		**$ 2,264**	**$ 2,300**	**$ 2,301**	**$ 2,217**	**$ 2,366**	**$ 2,479**	**$ 2,617**	**$ 2,693**	**$ 2,770**	**$ 2,849**	**$ 2,928**	**$ 2,979**	**$ 3,012**	**$ 3,045**
		Functionalization Ratio[1] (%)														
10	**Rate Calculations ($000 000)**															
11	Energy	31.1%	$ 606	$ 635	$ 654	$ 616	$ 660	$ 694	$ 735	$ 757	$ 779	$ 801	$ 824	$ 838	$ 846	$ 854
12	Demand - Bulk System	28.6%	$ 558	$ 584	$ 601	$ 566	$ 607	$ 638	$ 676	$ 696	$ 716	$ 737	$ 758	$ 770	$ 778	$ 785
13	Demand - Regional System	16.6%	$ 324	$ 339	$ 349	$ 329	$ 353	$ 370	$ 392	$ 404	$ 416	$ 428	$ 440	$ 447	$ 452	$ 456
14	Point of Delivery	23.7%	$ 463	$ 484	$ 499	$ 470	$ 504	$ 529	$ 561	$ 577	$ 594	$ 611	$ 629	$ 639	$ 645	$ 652
15	**Total Wires Cost Recovery**	**100.0%**	**$ 1,950**	**$ 2,042**	**$ 2,102**	**$ 1,981**	**$ 2,124**	**$ 2,231**	**$ 2,363**	**$ 2,433**	**$ 2,505**	**$ 2,577**	**$ 2,650**	**$ 2,694**	**$ 2,720**	**$ 2,747**
		Growth Rates[2]														
16	**Billing Determinants**															
17	Rate DTS Energy (MWh)	2021 TRP	59,687.8	61,157.0	58,398.9	58,860.7	59,127.2	59,158.9	59,622.4	60,311.0	60,650.8	61,376.4	61,789.4	62,085.8	63,058.1	64,126.2
18	Coincident Metered Demand (MW Months)[3]	(0.2%)	93,507.6	91,210.9	91,617.2	91,433.9	91,251.1	91,068.6	90,886.4	90,704.7	90,523.3	90,342.2	90,161.5	89,981.2	89,801.2	89,621.6
19	Billing Capacity (MW Months)	1.0%	157,948.9	160,561.5	159,954.2	161,553.8	163,169.3	164,801.0	166,449.0	168,113.5	169,794.7	171,492.6	173,207.5	174,939.6	176,689.0	178,455.9
20	Rate DOS - Dispatchable - Energy (MWh)					2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0	2,000.0
21	Rate DOS - Term Energy (MWh)					-	-	-	-	-	-	-	-	-	-	-
22	Rate XOS/XOM - Term Energy (MWh)					130,000.0	130,000.0	130,000.0	130,000.0	130,000.0	130,000.0	130,000.0	130,000.0	130,000.0	130,000.0	130,000.0
23	**Rate DTS - Rates**															
24	Energy Charge ($/MWh)		$ 10.16	$ 10.38	$ 11.19	$ 10.46	$ 11.17	$ 11.72	$ 12.32	$ 12.54	$ 12.84	$ 13.05	$ 13.33	$ 13.49	$ 13.41	$ 13.32
25	Coincident Demand Charge ($/MW)		$ 5,962	$ 6,400	$ 6,561	$ 6,194	$ 6,655	$ 7,003	$ 7,433	$ 7,670	$ 7,910	$ 8,154	$ 8,403	$ 8,561	$ 8,661	$ 8,763
26	Billing Capacity Charge ($/MW)		$ 2,049	$ 2,111	$ 2,182	$ 2,035	$ 2,161	$ 2,247	$ 2,357	$ 2,403	$ 2,449	$ 2,494	$ 2,540	$ 2,557	$ 2,556	$ 2,555
		Estimated DOS Rate[4]														
27	**Rate DOS Energy Charge**															
28	Energy Charge - DOS 7 Minutes ($/MWh)	$15	$ 15.42	$ 14.60	$ 14.59	$ 14.47	$ 15.26	$ 15.91	$ 16.58	$ 16.85	$ 17.23	$ 17.48	$ 17.83	$ 18.08	$ 18.03	$ 17.97
29	Energy Charge - DOS Term ($/MWh)	$90	$ 89.84	$ 90.65	$ 96.59	$ 91.13	$ 97.09	$ 101.81	$ 106.86	$ 108.76	$ 111.29	$ 113.11	$ 115.52	$ 116.94	$ 116.30	$ 115.55
		Estimated XOS/XOM Rate[5]														
30	**Rate XOS/XOM Energy Charge**															
31	Energy Charge - XOS/XOM ($/MWh)	$15	$ 14.79	$ 14.75	$ 15.53	$ 14.78	$ 15.73	$ 16.47	$ 17.26	$ 17.57	$ 17.97	$ 18.26	$ 18.65	$ 18.88	$ 18.79	$ 18.68

Note: 2020 ISO Tariff Update refers to Proceeding 25175 with the AUC
2021 ISO Tariff Update refers to Proceeding - Proceeding 26054 with the AUC
2021 Transmission Rate Projection refers to the AESO's 2021 Transmission Rate Projection (updated on April 9, 2021) located here on AESO's website: https://www.aeso.ca/grid/transmission-costs/

[1] Functionalization Ratios as presented in AESO's Preferred Rate Design - March 25, 2021

[2] Historical 5-Year growth rates for coincident metered demand and billing capacity are included. These values can be adjusted to illustrate impact on rates

[3] Coincident Metered Demand is not adjusted to reflect 5 Year Average 12CP as described in the 5-Year Average 12CP Illustrative Tool

[4] Estimated DOS Rate - As Rate DOS revenue is an offset to revenue requirement but DOS Rates calculations also rely on revenue requirement calculations, there are iterative calculations required for accuracy. For simplicity and estimation purposes, adjust this value to allow DOS revenue offset to be calculated in Rate DTS calculations

[5] Estimated XOS/XOM Rate - As Rate XOS/XOM revenue is an offset to revenue requirement but XOS/XOM Rates calculations also rely on revenue requirement calculations, there are iterative calculations required for accuracy. For simplicity and estimation purposes, adjust this value to allow DOS revenue offset to be calculated in Rate DTS calculations

Stakeholder Comments on the AESO's Estimating Rate Calculations – July 16, 2021

Stakeholder comments [Posted July 22, 2021]

1. AltaLink Management Ltd.
2. Canada West Ski Areas Association (CWSAA)
3. Heartland Generation Ltd.
4. Industrial Power Consumers Association of Alberta (IPCAA)
5. MATL Canada & MATL LLP (MATL)
6. TC Energy Corp. (TCE)
7. TransAlta Corporation (TransAlta)

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Stakeholder Comments on the AESO's Estimating Rate Calculations – July 16, 2021

Company	Stakeholder Comments
AltaLink Management	• No comments on Import/export revenue • Highlight the fact that the revenue requirement values for the 2020 and 2021 test years have changed in the updated Calculations Tool (line 9, columns C and D). The values no longer tie to the 2020 and 2021 Tariff Update applications. I believe the AESOs filed Tariff 2020 and 2021 Updates included an estimate for import/export revenue; it appears, on the surface, that these amounts are now double-counted.* **The AESO responded to this comment by publishing Estimating Rate Calculations Tool v0.3 on its website on July 15, 2021.*
CWSAA	See attached submission
Heartland Generation	Question: Relatively minor, but curious about how the "Estimated DOS/XOS Rate" in cells F38 and F42, respectively, are calculated. The $15 estimates don't seem to be a simple average of the test rates (inclusive or exclusive of 2019-2021 test years). It is likely that this value is a very rough approximation without a strict associated calculation. Any information on these values and how they are calculated would be appreciated. Concerns: Further to Heartland Generations comments on Session 6B, we are concerned about the significant and material impact of the drastic increase to rate XOS. This sudden increase to rate XOS during all hours of the year will have serious repercussions to the commercial viability of exports in the vast majority of hours. This is especially true of traditionally lower-priced hours when exports could take advantage of opportunities in neighbouring markets. During these periods of depressed Alberta pool prices, exporters can remain operational and provide reliability/ancillary services/etc. products to the Alberta grid while collecting the foreign price for the majority of production. It is my understanding that the doubling of rate XOS (as this estimate indicates) will evaporate these economic opportunities by eliminating an already slim price spread. This will subsequently force Alberta generators to possibly shutoff during periods when they could have remained operational/online (and thus no longer provide ancillary support to the Alberta grid). Further, the impact of these increased rate XOS fees are felt primarily during periods of lower grid utilization and/or system stress. Charging rate XOS as a flat energy charge is contrary to logic, and at a minimum the AESO should investigate and report on the correlation between rate XOS usage and transmission system costs/stress. A possible conclusion from this report could be a profiling of rate XOS to best reflect transmission capacity/costs through time; there is inherent logic behind shaping rate XOS as different $/MWh charges at different hours of the day. The designation of rate XOS as an opportunity service best illustrates the need to modernize all opportunity service products considering the preferred tariff design. As is, the estimated rate XOS will cause market harm to an already fragile intertie relationship as exports will be further disincentivized relative to the treatment of imports.

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Company	Stakeholder Comments
	Heartland Generation requests that the AESO conduct further consultation regarding rate XOS modernization. This could begin with an AESO impact assessment of increasing the associated charges by almost double in all hours for exporters. This research should include impacts to perceived fairness between imports/exports on the intertie and consequences of disincentivizing exports on the domestic Alberta markets for ancillary services and other similar products.
IPCAA	In its spreadsheet, the AESO has used information from the 2020 Long-Term Transmission Plan based on the AESO's Reference Case to calculate Rate DTS - Rates IPCAA would recommend that: • The AESO also provide Rate DTS - Rates based on the "High Cogeneration Sensitivity" scenario. With rising carbon prices and the financial and environmental incentives for industry to install co-generation, the "High Cogeneration Sensitivity" scenario could very well materialize. • The AESO also provide an equivalent analysis for the four distribution utilities. The AESO should include the unit rates ($/kW and $/kWh) for each utility so that consumers can carry out rate impact assessments. Without this information, it will be extremely difficult for consumers to provide evidence to the AUC on potential impacts caused by the proposed tariff design.
MATL	1. MATL understands that the new tariff redesign will increase the cost of exporting energy from Alberta (i.e., through higher XOM/XOS charges, or additional charges beyond XOM/XOS). MATL has the following questions: (a) How will the AESO determine the new XOM/XOS rate, and/or other charges? The AESO has provided a calculator on July 7, 2021 & July 15, 2021. Please provide an example calculation in an excel spreadsheet (with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. Please demonstrate all potential impacts to XOM/XOS within the calculator and explain how it may impact MATL and its customers. Please provide further explanation on the rationale of the 20% multiplier applied to the Bulk & Regional System Calculations, and the 32% multiplier applied to the Ancillary Services Revenue Requirement. (b) Will the cost increase be higher or lower when compared to services that are recalled after XOM/XOS such as DOS? Please provide an example calculation in an excel spreadsheet (with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff, including proposed mitigations. (c) The AESO has assumed in its rate calculator that the export volumes will be 130,000MWh in the future. Please explain the basis for this amount and how the AESO assessed the amount of export volumes that will result from higher XOM/XOS rates? Please demonstrate the reduced exports that will result from an increase in the XOM/XOS rates. Please provide an example calculation in an excel spreadsheet (with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. (d) Is the AESO expecting an overall reduction in offsets from export opportunity service revenue? If so, by how much? (e) Please list and fully explain all mitigations that will be put in place by the AESO for stakeholders impacted by the increase in XOM/XOS charges? Please also list and fully explain all mitigation that will not be put in place by the AESO and the reason for them not being considered.

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Company	Stakeholder Comments
	(f) Non-firm interruptible rate class was not accepted by the AESO for DOS mitigations as described in the Session 6B on June 24, 2021. Given that XOM/XOS is already a non-firm interruptible rate class, please explain if revisiting the method for calculating XOM/XOS charge would avoid adverse impacts to exports. Please explain the impact if the AESO tariff were to provide firm transmission service for XOM/XOS services. 2. Will the new tariff redesign increase the cost of importing energy into Alberta (i.e., through higher IOS charges, or additional charges beyond IOS)? If yes: (a) How will the AESO determine the new IOS rate, and/or other charges? Please provide an example calculation in an excel spreadsheet(with all formulas available) with the current AESO Tariff and under the proposed AESO Tariff. (b) How has the AESO assessed the reduced import volumes that will result from higher IOS rates? (c) With respect to the AESO's existing and future practices of operating international cross border interties, has the AESO considered compliance to the United States-Mexico-Canada Agreement (USMCA)? With these comments, MATL Canada & MATL LLP is also reiterating its request that the AESO consult with MATL and its customers on the proposed changes to XOM/XOS rates, as there will be a material impact beyond the 10% threshold set by the AESO. MATL is available to discuss the above questions and comments. Due to vacation schedules, anytime after August 10 would be the best time to schedule a consultation.
TCE	The updated rate estimate included for the first time the impact to Rate XOS resulting from the AESO's proposed Bulk & Regional rate design. The following comments are with respect to Rate XOS. As a Rate XOS customer, TC Energy is concerned that the proposed rate design will cause Rate XOS to increase by approximately 80%. This is substantial and can be expected to significantly impact future export opportunities. TC Energy is further concerned that Rate XOS will be inconsistent with prior Commission rulings and cost causation. As a result, we recommend that the AESO consult with parties specifically with respect to Rate XOS. TC Energy has the following questions with respect to Rate XOS: 1. What mitigation measures will the AESO propose for Rate XOS customers that will see an 80% rate impact? 2. What impact will this rate increase have on future exports?
TransAlta	TransAlta appreciates the AESO revised Estimated Rate Calculations Tool but has concerns with the lack of information on the rate for export opportunity services. The estimates provided by the AESO include a significant increase to rate XOS/XOM from the current ~ $8/MWh to ~$15/MWh. TransAlta recommends the AESO to hold further consultation to openly discuss with stakeholders its proposal for rate XOS/XOM including a discussion about any analysis that the AESO has performed on cost-causation including any alternatives that were considered as the methodology behind this proposed XOS/XOM rate. The AESO has not justified the proposed increase to rate XOS/XOM in terms of cost causation and efficient price signals and has not provided information about the impact of the preferred rate design on energy exports. It is unclear how the change to allocate more costs to the energy component is reasonably driven by exporting electricity from the province. The AESO is sending a price signal that represents a significant change to the economics of exporting. We are concerned that this rate change will have unintended consequences and would

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Company	Stakeholder Comments
	like to understand the AESO's analysis of how this change could impact export activity. The substantial increase in rate XOS/XOM could potentially reduce demand to export which in turn may reduce the contribution from XOS/XOM to transmission costs and create a shortfall that needs to be recouped from other customers. The AESO must demonstrate that its proposed rate XOS/XOM is not discriminatory and is not treating customers unfairly. We recommend that the AESO explain stakeholders how it determined the appropriateness of applying such a significant increase in the energy charge for the new XOM/XOS rate and provide any analysis that was undertaken of the expected impacts of the proposed change to export activity. We wish to understand the basis for the AESO's estimate that export volumes will be 130,000 MWh/year and will remain at that level for future years and request the analysis that was conducted to determine this estimate. We are concerned with the distorting effect that such a high export rate could have on the wholesale market, which will reduce the attractiveness of and opportunity for export sales, and could result in higher costs to Albertans - Alberta generators would be even more reliant on the Alberta market to earn all of their revenues. Furthermore, we recommend that the AESO consider phasing in this rate over time to provide the market time to adjust to this significant increase in rate just as it is doing with other industrial customers that are being impacted with costs that are greater than 10% of the current rate. Finally, it is unclear whether the new tariff redesign will increase the cost of importing energy into Alberta through higher IOS charges. The AESO should provide this information before filing its tariff, including details about how will the AESO determine the new IOS rate, and/or other charges and assessment of impact on import volumes that will result from higher IOS rates.

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CWSAA – Comments & Questions Regarding AESO Updated Rate Estimates

SUMMARY

" Comments and questions regarding the updated rate estimates can be submitted by email to tariffdesign@aeso.ca by July 16, 2021. "

The vast majority of Alberta's electricity consumers receive a flow-through of the AESO's transmission tariff through their local distribution company. The AESO's preferred tariff structure would have potentially major impacts, which can only be assessed by using a distribution flow-through version of that tariff. The information provided by Fortis, EPCOR and ENMAX is insufficient to carry out the required impact assessments; the actual tariff rate sheets are necessary.

The companies also have an inconsistent jumble of demand ratchet policies, which are being applied to AESO bulk tariff charges which have no demand ratchet. This monstrous regulatory inefficiency must be addressed, lest customers literally across the street from one another receive radically different impacts from the single, standard provincial transmission tariff.

With the AESO's coordination, the distribution companies will surely cooperate in providing this information; if cooperation is not forthcoming, the AUC's guidance may be necessary.

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1 CONTEXT OF COMMENTS

> "The Commission expects parties to provide evidence of the potential impacts of any proposed bulk and regional tariff rate design as part of the Commission's consideration of the application." [1]

The AESO's bill impact tool will be very useful for parties who are served at the transmission level. Unfortunately this tool is of no assistance in assessing potential impacts on the majority of Alberta's electric system customers, who are served through distribution utilities' unique versions of the standard, province-wide AESO tariff.

The industry's fragmentation into separate transmission and distribution entities has led to significant seams issues between the two areas, some of which are currently under regulatory review. The AESO tariff flow-through is another such seams issue which must be addressed in order for customer representatives to estimate and analyze these potential rate impacts.

2 DISTRIBUTION UTILITIES ARE INDIFFERENT TO TRANSMISSION FLOW-THROUGH

Ever since PBR Decision 2012-237, para. 666:

> …the AESO related cost items will be dollar-for-dollar flow-through items in the [electric distribution] companies' PBR plans "

The electric distribution companies can neither gain nor lose in this flow-through process, and should therefore be supportive of any calculations and analysis required for its implementation.

3 ASSESSING THE DIFFICULTY OF ESTIMATING DISTRIBUTION FLOW-THROUGH RATES

One might hypothesize that all the data required to estimate distribution flow-through rates under the AESO's preferred tariff design is already available, and it should be a simple matter for customer representatives to calculate these rates in their impact analysis.

To test that hypothesis, the appended analysis reviews the publicly available data and calculation tools.

[1] 25175_X0142_2021-06-01 AUC letter - Ruling on the Alberta Electric System Operator extension request _000175, para.9

[1] The existing and preferred AESO DTS rates are known, and

[2] the forecast DTS & DT rate class billing determinants are said to be available in the annual PBR rate adjustment proceedings.

[3] In those PBR applications, both FortisAlberta and EPCOR Distribution & Transmission provide forecast transmission revenues by rate class, which can be compared to the revenue forecasts provided in the AESO impact analysis. For unknown reason(s), the numbers do not match, and the variances seem quite random.

[4] To assess the overall rates process, the current transmission rate can be compared to the rates implied in the companies' AESO tariff impact analysis.

The residential rate class is universally billed on a ¢/kWh basis for transmission charges, which simplifies the analysis. The implied rate as per the impact analysis can be calculated by taking the stated revenues and dividing them by the PBR forecast. (Except for ATCO, whose impact analysis has not yet been provided).

The result is somewhat disconcerting: the numbers don't match, by a significant amount.

	Total 2019 DTS (On Currently Approved AESO Structure)	2021 Energy (kWh)	Implied Unit Rate	Current Tariff Rate	$ Difference	% Difference
	[A]=Data	[B]=Data	[C]=[A]/[B]	[D]=Data	[E]=[D]-[C]	[F]=[E]/[D]
ATCO Electric Inc.	< Not Provided >	1,400,729,231				
ENMAX Power Corp.	$ 112,475,630	3,044,093,073	$ 0.03695	0.038763	$ 0.0018	4.7%
EPCOR Distribution & Transmission Inc.	$ 77,126,402	2,316,573,488	$ 0.03329	0.03610	$ 0.0028	7.8%
FortisAlberta Inc.	$ 139,040,000	3,339,937,368	$ 0.04163	0.04394	$ 0.0023	5.3%

This analysis in no way suggests that the companies have made any errors in their calculations. There are no doubt several calculation errors in the analysis above, which a technical expert who works with these calculations on an everyday basis would be able to identify.

Its purpose is only to demonstrate that it is extremely difficult to confidently calculate the transmission unit rates that the companies must have used in their internal calculations. The only way in which the typical bill impacts could have been accurately calculated is if the companies had worked out the actual tariff unit rate components. Since this information must already exist, the distribution companies should kindly provide it (with the possible exception of ATCO Electric, which does not appear to have provided any tariff impact analysis).

Without knowing the electric distribution companies' flow-through rates, it is extremely difficult for parties to estimate the customer impacts of the AESO's preferred tariff design option.

4 INCONSISTENCY OF COMPANIES' TRANSMISSION TARIFF FLOW-THROUGH

Both the current and the preferred AESO tariff structures recover bulk / demand related charges through a monthly unratcheted billing determinant. However the distribution utilities have a collectively chaotic jumble of ratchet policies, summarized in the following table. **ATCO Electric** consistently uses an 85% X 12 month ratchet, **ENMAX Power** consistently uses a 90% X 12 month ratchet, while **EPCOR** covers all alternatives.

In **Fortis'** 2012-2014 Phase II Distribution Tariff proceeding (ID 2363, Decision 2014-018), the Commission concluded "that mirroring of the AESO's charges in Fortis' rates is consistent with cost causation" [¶175] and as a result Fortis is the only company that mirrors the AESO's current and proposed rate structures for its general service rate classes.

	TREATMENT OF UNRATCHETED TRANSMISSION CHARGE (Bulk / Demand)				
		Monthly	85% X 12 Mon	90% X 12 Mon.	90% X 24 Mon.
FAI	RATE 22 - FARM SERVICE – DEMAND METERED		X		
FAI	RATE 41 - SMALL GENERAL SERVICE	X			
FAI	RATE 45 - OIL & GAS SERVICE		X		
FAI	RATE 61 - GENERAL SERVICE	X			
FAI	RATE 63 - LARGE GENERAL SERVICE	X			
EDTI	Commercial/Industrial 50 kVA to <150 kVA			X	
EDTI	Commercial/Industrial 150 kVA to <5,000 kVA		X		
EDTI	Primary Commercial/Industrial 150 kVA to <5,000 kVA		X		
EDTI	Commercial/Industrial Greater than 5,000 kVA				X
EDTI	Commercial/Industrial Greater than 5,000 kVA Totalized				X
EPC	Rate D300 - Medium Commercial			X	
EPC	Rate D310 - Large Commercial - Secondary			X	
EPC	Rate D410 - Large Commercial - Primary			X	
AE	Rate D21 - Standard Small General Service		X		
AE	Rate D24 - Standard Small General Service - Isolated Industrial Areas		X		
AE	Rate D31 - Large General Service / Industrial - Distribution Connected		X		
AE	Rate T31 - Large General Service / Industrial - Transmission Connected		X		
AE	Rate D32 - Generator Interconnection & Standby Power		X		
AE	Rate D34 -Large General Service / Industrial - Isolated Industrial Areas		X		
AE	Rate D41 - Small Oilfield and Pumping Power		X		
AE	Rate D44 - Small Oilfield and Pumping Power - Isolated Industrial Areas		X		

The AESO's preferred tariff structure greatly increases the importance of knowing the individual tariff rate components. The unratcheted 'bulk' system charge is dropping by 41% while ratcheted 'regional' system charge is dropping by 23%; this is offset by a 367% increase in the energy charge.

With such massive dislocations occurring, accurate end user rates are essential. Most customers' consumption shows some degree of seasonality, and the preferred tariff structure would greatly alter the costs flowing from seasonal usage.

The Commission has directed Fortis to flow the 'bulk' system charge through to end use customers using "CWSAA's proposed new billing determinant of un-ratcheted 'kW of billing period capacity' for rates 61 and 63." [2014-018 ¶175] The 'kW of billing period capacity' is simply 'the highest metered kW demand in the billing period', a value which is readily available for all demand-metered customers.

The Electric Utilities Act contains a clear policy statement regarding the AESO tariff, that

> (3) The rates set out in the tariff
>
> (a) shall not be different for owners of electric distribution systems, customers who are industrial systems or a person who has made an arrangement under section 101(2) as a result of the location of those systems or persons on the transmission system, and
>
> (b) are not unjust or unreasonable simply because they comply with clause (a).

It is of course reasonable that the AESO tariff flow-through by electric distribution companies reflect local system realities; but these inter-company differences appear to be historical accidents, left unaddressed ever since the change in AESO tariff structure in 2006. This is surely an opportunity to improve regulatory efficiency by adopting a consistent tariff flow-through approach.

Without prejudice as to the ultimate outcome, customers need to assess the potential impacts of a more accurate, harmonized tariff flow-through. This should be provided as an alternative scenario, in addition to rates under the current companies' tariff structures.

5 RELIEF REQUESTED – AESO COORDINATION OF ANALYSIS

What is required is a set of System Access Service rate schedules from each of the utilities, with all the required unit rates populated using the AESO's preferred tariff design, and a narrative defining the specific data sources and calculations used. These unit rates must already exist, given that the companies have calculated typical bill impacts.

The AESO is responsible for its tariff application, and for enabling parties to assess the impacts of its proposals. The AESO is therefore responsible for coordinating with the electric distribution companies to provide the flow-through rates that are required to assess "the potential impacts of any proposed bulk and regional tariff rate design."
In the unlikely event that the companies were not cooperative, the AESO could seek guidance from the AUC. In the unlikely event that the AESO is unwilling to provide this coordination, the parties could approach the AUC with a request that the necessary unit rates be provided.

6 TECHNICAL REVIEW OF DATA & CALCULATION TOOLS AVAILABLE

The required data and calculation tools are described in the identically worded notes to the three utilities' rate impact calculations (see endnote): [i]

1. "Analysis completed by <Company> based on its Transmission Cost Allocation method and Rate Design to DT rate classes as currently approved by the Commission."

2. "Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in <Company's> 2021 Annual PBR rate filing) as summed across all <Company's> D-connected PODs."

To summarize, the two inputs are prices and volumes:
[1] the AESO 2019 DTS rates, and
[2] the forecast DTS & DT rate class billing determinants [per PBR filings]. [2]

The two calculation processes are allocation and rate design:
[3] the Transmission Cost Allocation method (to rate classes), and
[4] the Rate Design method.

6.1 AESO 2019 DTS Rates

The AESO 2019 DTS rates are publicly available, per the AESO (see for example the Bill Calculation Tool, tab "Adjust Load Profile") :

Connection Charge					
Bulk System Charge					
3(a)	Coincident metered demand	$10,087.00	/MW/month	$5,980.00	/MW/month
Regional System Charge					
3(b)	Billing capacity	$2,668.00	/MW/month	$2,055.00	/MW/month
Energy Charge					
3(c)	Metered energy	$2.18	/MWh	$10.19	/MWh

[2] "Forecast billing determinants are generally used to allocate K, K-bar, Y and Z factors to rate classes and to calculate the resulting rate adjustments." [25843_X[]_25843-D01-2020 Fortis 2021 Annual PBR Rate Adjustment_000103 ¶ 39, see also 25864_X[]_25864-D01-2020 AE 2021 Annual PBR Rate Adjustment_000055 ¶ 35, and 25865_X[]_25865-D01-2020 EPC 2021 Annual PBR Rate Adjustment_000060 ¶ 32]

6.2 Forecast DTS & DT rate class billing determinants

[2] Forecast DTS & DT rate class billing determinants are available in the annual PBR filings:

Proceeding	Description
25866	EDTI 2021 Annual PBR Rate Adjustment Filing
25865	ENMAX Power Corporation 2021 PBR Rate Adjustment Application
25864	ATCO Electric 2021 Performance Based Regulation ("PBR") Rates Application
25843	FortisAlberta 2021 Annual Rate Adjustment Filing

However the availability of information differs greatly between the four companies.

- FortisAlberta provided a 'bottom up' transmission cost, revenue and annual transmission rate update (TACDA) together with the load forecast as part of its annual PBR filing ID 25843. [3]
    - Note that Fortis uses (unratcheted) 'Monthly non-coincident peak demand' to allocate bulk system transmission charges. [ii]
    - The other three companies use the same ratcheted billing demand approach for both bulk and regional charge recovery (discussed above).

- EPCOR Distribution & Transmission also provided a 'bottom up' transmission update together with the load forecast. [4]

- ATCO Electric provided a 'top down' 2021 transmission rate update in its 2021 PBR application, applying "a scaling approach to its 2020 transmission rates approved in Decision 25645-D01-2020."[5]

- ENMAX Power did not address transmission rate updating in its 2021 PBR application. [6]

[3] "64. In its application, Fortis requested approval of its 2021 SAS rates, to be effective January 1, 2021.56 Fortis indicated that its proposed 2021 SAS rates reflect the rates applied for by the AESO in Proceeding 26054…."
"65. Fortis indicated that to determine the rate class-specific changes in the transmission access component for distribution-connected rate classes, it used the methodologies from its last Phase II distribution tariff application, approved in Decision 2014-01860 and the associated compliance filing, Decision 2014-224."
[4] 25866_X[]_25866-D01-2020 EDTI 2021 Annual Performance-Based Regulation Rate Adjustment, ¶ 59
[5] 25864_X[]_25864-D01-2020 AE 2021 Annual PBR Rate Adjustment, ¶ 49
[6] 25865_X[]_25865-D01-2020 EPC 2021 Annual PBR Rate Adjustment, ¶ 32

6.3 Transmission Cost Allocation method (to rate classes)

The Fortis and EPCOR forecasts contain transmission rate class revenue forecasts which can be compared with the forecasts provided in the AESO impact analysis, as follows. (Note that the % differences are quite irregularly distributed.)

FORTIS ALBERTA INC.

25843_X0005.01_Schedule 3.2 2021 Updated Transmission Cost Allocation - Tab 3.2B DTS Connection

Summary of Transmission Costs by Rate Class ($ 000)

Line	Rate Class Description	Total AESO DTS Charges [A]=Data	Total 2019 DTS (On Currently Approved AESO Structure) [B]=Data	$ Difference [C]=[B]-[A]	% Difference [D]=[C]/[B]
1	Residential	$ 137,071	$ 139,040	$ 1,969	1.4%
2	FortisAlberta Farm	$ 28,011	$ 28,269	$ 258	0.9%
3	REA Farm	$ 23,287	$ 23,575	$ 288	1.2%
4	FortisAlberta Irrigation	$ 17,162	$ 16,637	$ (525)	-3.2%
5	Exterior Lighting	$ 1,964	$ 1,956	$ (8)	-0.4%
6	Small General Service	$ 53,749	$ 56,522	$ 2,773	4.9%
7	Oil and Gas	$ 24,216	$ 25,391	$ 1,175	4.6%
8	General Service	$ 208,561	$ 230,570	$ 22,009	9.5%
9	Large General Service	$ 110,269	$ 113,876	$ 3,607	3.2%
10	Distribution-Connected	$ 604,291	$ 635,836	$ 31,545	5.0%

EPCOR DISTRIBUTION & TRANSMISSION INC.

25866_X0007.01_Appendix E - 2021 SAS COSS_Blackline, Tab SAS-1a 2021

Table 2 - SAS Revenue Requirement Allocated to SAS Rate Classes

	Revenue requirement w/o DC and CST	Total AESO DTS Charges [A]=Data	Total 2019 DTS (On Currently Approved AESO Structure) [B]=Data	$ Difference [C]=[B]-[A]	% Difference [D]=[C]/[B]
1	Residential	$ 79,956,127	$ 77,126,402	(2,829,725)	-3.7%
2	< 50kVA	$ 25,662,480	$ 24,725,583	(936,897)	-3.8%
3	50 to 149 kVA	$ 34,863,775	$ 33,609,945	(1,253,830)	-3.7%
4	150 to 4,999 kVA	$ 65,514,148	$ 63,044,365	(2,469,783)	-3.9%
5	Direct Connects *	$ 10,560,340	$ 10,282,842	(277,498)	-2.7%
6	150 to 4,999 - Primary	$ 22,882,916	$ 21,321,132	(1,561,784)	-7.3%
7	>5,000 kVA - Primary (CS)	$ 23,075,648	$ 22,059,494	(1,016,154)	-4.6%
8	CST *	$ 7,511,504	$ 7,347,761	(163,743)	-2.2%
9	Street Lights	$ 805,593	$ 1,059,008	253,415	23.9%
10	Traffic Lights	$ 119,524	$ 118,991	(533)	-0.4%
11	Lane Lights	$ 50,458	$ 49,369	(1,089)	-2.2%
12	Security Lights	$ 69,940	$ 68,725	(1,215)	-1.8%
13	**Total**	271,072,454	260,813,617	(10,258,837)	-3.9%

There are surely good reasons for these differences, but considerable research appears necessary in order to elucidate their causes; the data come from different sources at different times, involving several different years and critical adjustments like loss factors between the point of delivery and the customer meter.

Since there are no specific sources listed for the companies' calculations, the search for understanding may be prolonged. For ENMAX and ATCO, the challenge is somewhat greater given the lesser amount of available information.

6.4 The Rate Design method

For rate classes billed on energy only (residential, small commercial…), calculating unit rates under the existing and proposed rates should in principle be simple. We need only divide the calculated dollar amounts by the kWh energy forecast to obtain the two rates.

The energy data source is "the forecast DTS and DT rate class billing determinants (as approved in <Company's> 2021 Annual PBR rate filing) as summed across all <Company's> D-connected PODs."

Proceeding	Description	Source File	Reference	2021 kWh
25864	ATCO Electric 2021 Performance Based Regulation ("PBR") Rates Application	25864-X0051, AE-AUC-2020NOV26-001(b) Attachment 3, Appendix I, schedules S.1-S.3	2.1 Summary of Billing Determinants by Revenue Class - Cell I13	1,400,729,231
25865	ENMAX Power Corporation 2021 PBR Rate Adjustment Application	25865_X0046_Appendix 5 - Rate Schedules_000046	13.0 2020-2021 Monthly Billing Determinants and Q Factor Supporting Calculations - Cell AD13	3,044,093,073
25866	EDTI 2021 Annual PBR Rate Adjustment Filing	25803_X0016_EDTI-AUC-2020SEP14-003 Attachment 1_000016	2.0 Revenue True-up of The Previous TAC Annual Rider - Cell D31 (from Sch. 9.0)	2,316,573,488
25843	FortisAlberta 2021 Annual Rate Adjustment Filing	25843_X0007_Schedule 2.4 A to D - 2021 Billing Determinants and Analysis_000007	2.4-B 2021 BD Comparision - Cell H12	3,339,937,368

Taking the revenue data provided by the companies in their impact analyses, "Total 2019 DTS (On Currently Approved AESO Structure)", and calculating a ¢/kWh unit rate that can be compared to current tariffs, we have: [7]

	Total 2019 DTS (On Currently Approved AESO Structure)	2021 Energy (kWh)	Implied Unit Rate	Current Tariff Rate	$ Difference	% Difference
	[A]=Data	[B]=Data	[C]=[A]/[B]	[D]=Data	[E]=[D]-[C]	[F]=[E]/[D]
ATCO Electric Inc.	< Not Provided >	1,400,729,231				
ENMAX Power Corp.	$ 112,475,630	3,044,093,073	$ 0.03695	0.038763	$ 0.0018	4.7%
EPCOR Distribution & Transmission Inc.	$ 77,126,402	2,316,573,488	$ 0.03329	0.03610	$ 0.0028	7.8%
FortisAlberta Inc.	$ 139,040,000	3,339,937,368	$ 0.04163	0.04394	$ 0.0023	5.3%

The AESO's proposal represents major tariff structure change which cannot be assessed by simple rate class % impact calculations. Particularly for seasonal customers (which the CWSAA's ski hill members all are) it is essential to have the actual transmission tariff flow-through rate structures for impact assessment.

All that is needed here is for the four distribution utilities to make public the calculations which three of them have already completed but not disclosed. The three co-operating distribution utilities (EDTI, EPC and FAI) have all provided the same format of information, which speaks to a degree of helpful coordination for which AESO no doubt deserves the credit.

In particular, the estimated impacts on low / typical / high usage customers could only be calculated if unit rates ($ / kW, $ / kWh) had been calculated. Please provide those unit rates, so that customers can carry out rate impact assessments.

There are at least four possible resolutions to this situation:

[A] The AESO could coordinate the four distribution utilities' voluntary provision of this information, and if full cooperation is not forthcoming then

[B] The AESO could itself carry out these calculations, which would ensure transparency and broad access to consistent estimates. Presumably the AESO would itself have understood, reviewed and confirmed the distribution utilities' calculations, and would have the expertise to carry out these calculations as needed.

[C] Industry participants could individually carry out these calculations, likely with different results depending on assumptions made, which could well waste considerable time in the regulatory process as the varying customer impact calculations would then need to be compared through litigation.

[7] Sources: https://www.enmax.com/ForYourBusinessSite/Documents/2021-07-01-DT-Tariff-Rate-Schedule.pdf
https://www.epcor.com/products-services/power/rates-tariffs-fees/Documents2/sas_april2021.pdf
https://www.fortisalberta.com/docs/default-source/default-document-library/2021-july-rates-options-and-riders.pdf?sfvrsn=7eaf9e1b_4

[D] Any party could presumably make a motion in Proceeding 25175 requesting that the AESO or the distribution utilities be directed to provide the necessary customer level rates, so that consistent impact assessments can be carried out by the industry.

ENDNOTES

[i] **Electric distribution companies' statements re: transmission cost allocation & rates:**

FortisAlberta Inc.

1. Analysis completed by FortisAlberta based on its Transmission Cost Allocation method and Rate Design to DT rate classes as currently approved by the Commission.

2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in FortisAlberta's 2021 Annual PBR rate filing) as summed across all FortisAlberta D-connected PODs .

ENMAX Power Corp.

1. Analysis completed by EPC based on its Transmission Cost Allocation method and rate design to DT rate classes as currently approved by the Commission.

2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in EPC's 2021 Annual PBR rate filing) as summed across all EPC D-connected PODs.

EPCOR Distribution & Transmission Inc.

1. Analysis completed by EPCOR based on its approved System Access Service Cost of Service and Rate Design methodology.

2. Transmission Cost Allocation and Rate Design uses AESO 2019 DTS rates (as presented in AESO Session 5) and the forecast DTS and DT rate class billing determinants (as approved in EPCOR's 2021 Annual PBR rate filing) as summed across all EPCOR Distribution-connected PODs

[ii] **FortisAlberta – Transmission Cost Allocation Summary**

25916_X[]_25916-D01-2021 Fortis 2022 Phase II Distribution Tariff Application_000272

Table 2. Summary of transmission cost allocation for distribution-connected load

AESO tariff billing components (i.e., becomes Fortis's sub-functionalization)	AESO tariff billing determinants	Fortis's classification of transmission charges	Fortis's allocation method
[A]	[B]	[C]	[D]
Bulk system demand charges	Coincident system peak demand	Monthly non-coincident peak demand	Rate class forecast monthly coincident peak demand, based on 3-year average of historical load settlement data
Billing capacity and point of delivery (POD) charges	Per POD billing capacity[11]	Annual non-coincident peak demand	Rate class forecast monthly non-coincident peak demand, based on three-year average of historical load settlement data and ratcheted to 90 per cent (to align with the AESO's per billing capacity charges)
Metered energy charges (including the DTS tariff's Bulk System, Local System, Operating Reserve, and Voltage Control Metered Energy charges)	Metered energy	Metered energy	Rate class forecast metered energy
Other transmission charges (including Demand Under-Frequency Load Shedding Credit and Interchange costs)	Monthly capacity and metered energy	Metered energy	Rate class percentage of total demand transmission services charges

Source: Exhibit 25916-X0001, application, paragraphs 97-103, 108-116, and Exhibit 25916-X0121, Attachment FAI-AUC-2021JAN15-001.01.

	Year	Name:	Medicine H	Calgary	Lloydminst	Rainbow L	High Level	Peace Rive	Grande Pra	High Prairi	Grande Ca	Valleyview	Fox Creek	Fort McMu	Swan Hills	Athabasca	Cold Lake	Hinton/Ed	Drayton Va
		Area:	AREA4	AREA6	AREA13	AREA17	AREA18	AREA19	AREA20	AREA21	AREA22	AREA23	AREA24	AREA25	AREA26	AREA27	AREA28	AREA29	AREA30
Peak Load (MWh)	2015		63.94348	1653.906	145.0023	69.61156	45.10296	157.6169	334.7396	114.3559	48.19733	30.74868	76.68968	694.5233	342.8805	121.8424	251.6992	114.3054	163.1455
Peak Load (MWh)	2016		68.96943	1636.659	140.2134	69.49878	47.5375	130.4368	345.5812	111.4769	45.22227	32.75007	75.58982	873.8996	325.4838	132.9309	233.0021	129.6394	162.1107
Peak Load (MWh)	2017		68.80802	1629.37	137.5997	65.49301	46.61219	125.5065	338.7542	111.4604	48.00795	39.14348	76.58283	794.1298	320.3988	126.7377	233.5622	130.5759	173.7932
Peak Load (MWh)	2018		48.37097	1696.803	137.639	56.69873	46.86759	125.6146	353.0255	107.1863	59.79035	40.6742	80.20666	890.3786	307.334	128.0312	225.7369	129.6758	175.0681
Peak Load (MWh)	2019		47.21455	1578.441	138.5323	48.37712	50.32094	128.1177	361.3192	103.9072	57.18483	38.94484	93.44412	779.3549	295.4065	121.7149	238.3679	130.2731	173.7986
Peak Load (MWh)	2020		49.7788	1622.394	132.4034	59.87292	50.74528	120.4436	381.8461	102.3462	54.86672	38.3502	94.44736	847.8913	291.9129	124.6939	211.8146	132.1583	167.2375
Peak Gen (MWh)	2015		97.8214	1288.167	0	130.9416	0	30.75024	196.0266	0	144.7947	92.596	0	964.9982	93.0549	56.9207	241.8959	0	280.4065
Peak Gen (MWh)	2016		89.1951	1247.913	0	126.0601	0	30.03112	238.3353	4.137	128.7643	63.392	0	996.6152	92.82487	41.2028	240.8149	0	275.2303
Peak Gen (MWh)	2017		97.6573	1353.573	0	47.6125	0	31.3928	245.5517	4.3155	118.9878	88.368	0	1086.119	100.6998	42.2	239.9775	0	282.2297
Peak Gen (MWh)	2018		130.5967	1333.741	0	117.3895	0	40.68276	250.4214	4.3344	117.9013	95.48	0	1200.797	101.1939	45.8833	255.614	0	322.2309
Peak Gen (MWh)	2019		284.7176	1321.907	0	121.6202	0	39.66528	252.325	4.6641	103.1997	95.256	0	1166.929	100.8093	46.1171	239.6451	0	333.3208
Peak Gen (MWh)	2020		325.6112	1370.703	0	116.3934	0	36.20076	247.3649	4.6452	206.724	96.628	0	1051.375	93.87496	50.6635	248.4792	0	333.3154
Peak Load at Times of 12 CP (MWh)	2015		45.7647	1636.738	139.3983	59.25044	43.46525	157.6169	310.877	102.6692	41.17162	30.28665	76.68968	671.5776	280.4787	120.0235	214.6714	106.2265	161.177
Peak Load at Times of 12 CP (MWh)	2016		43.18631	1560.499	140.2134	62.67608	44.87053	129.9404	319.0448	95.35842	40.3083	30.55932	75.58982	846.2836	209.4908	127.4629	214.6654	112.4501	154.3216
Peak Load at Times of 12 CP (MWh)	2017		36.50427	1629.37	126.4344	43.09149	46.61219	124.6066	314.6977	96.97074	45.06371	39.14348	72.37463	723.4084	139.4063	124.3747	167.5433	122.3656	170.5103
Peak Load at Times of 12 CP (MWh)	2018		36.72187	1679.413	137.639	28.9204	45.84397	125.6146	313.8514	79.00044	55.08592	39.73728	79.84122	890.3786	175.4921	128.0312	184.669	121.7764	173.9065
Peak Load at Times of 12 CP (MWh)	2019		35.62934	1577.974	136.4188	27.12631	49.27063	125.9447	326.6432	85.13859	54.26376	38.67228	90.68614	744.127	159.6465	116.0046	138.0616	112.3793	164.0839
Peak Load at Times of 12 CP (MWh)	2020		28.7389	1622.394	129.0923	21.15399	49.82955	114.8276	358.8069	84.53754	46.95456	36.63528	92.16988	742.1294	166.0466	123.6075	204.8846	110.1596	165.4079

Wetaskiwi	Wainwrigh	Fort Saska	Abraham L	Red Deer	Alliance/B	Provost	Caroline	Didsbury	Wabamun	Hanna	Sheerness	Seebe	Strathmor	High River	Brooks	Empress	Stavely	Vauxhall	Fort Macle	Lethbridge	Glenwood	Vegreville	Airdrie
AREA31	AREA32	AREA33	AREA34	AREA35	AREA36	AREA37	AREA38	AREA39	AREA40	AREA42	AREA43	AREA44	AREA45	AREA46	AREA47	AREA48	AREA49	AREA52	AREA53	AREA54	AREA55	AREA56	AREA57
156.5822	122.6297	376.4	2.14475	394.6562	23.56747	127.4611	104.9294	86.051	169.036	177.4953	23.32752	200.2174	98.44896	108.8244	111.1501	219.7221	27.43711	199.1732	36.72291	230.9441	45.10529	100.272	103.6678
158.7599	130.8092	467.0251	2.08001	396.1491	20.46396	120.57	96.62195	86.1258	176.1289	176.709	45.44114	190.8348	92.80352	106.7223	105.9693	229.3962	26.39887	184.7903	40.21292	242.4352	46.2501	101.7321	98.93942
153.3128	136.3348	528.2381	2.20741	393.1514	28.37502	115.5502	100.3971	100.1114	168.3434	224.6325	37.72908	214.4361	94.13195	108.4147	110.2807	226.1663	28.08961	214.305	40.89563	260.2592	48.22902	98.33173	110.2655
148.8783	137.5945	543.2256	2.11038	380.8041	17.9874	114.4014	101.8188	85.05992	166.898	229.3158	39.40534	198.6656	95.7819	107.9879	107.7629	254.0753	26.95587	212.3356	39.97736	252.7059	45.38926	98.81414	111.3615
157.866	135.5515	509.9092	1.69081	369.3578	21.91996	110.6579	93.76501	92.53083	174.318	218.6979	29.13071	216.4957	112.3144	104.5528	99.60115	244.7316	25.62036	181.9533	36.76374	238.7937	45.1419	92.70388	109.7769
148.6596	138.1519	498.434	3.2992	379.8176	19.74715	114.333	94.17582	103.5385	171.9429	215.3129	19.00656	187.7899	114.7785	112.1788	99.01481	223.9066	26.45396	152.1345	37.55331	249.2207	46.47275	96.5979	103.0865
0	0	206.9435	117.6066	344.7556	686.0908	5.032383	2.2843	14.16545	4538.909	227.264	864.2213	173.8544	181.5043	0	0	0	294.72	81.40885	661.1193	42.2571	64.34121	0	0
0	0	210.5144	117.5537	365.0002	638.6969	11.04832	3.8075	12.92291	4554.169	225.792	869.9219	201.2183	190.924	0	0	0	294.144	80.89067	664.7997	40.1823	67.17314	0	0
0	0	194.0571	119.2573	348.1886	671.7523	17.73228	1.2595	14.99826	4585.14	226.576	873.5936	218.3548	186.588	0	0	0	295.616	80.96457	666.4989	41.9702	65.20883	0	0
0	0	215.4436	118.5595	369.9528	692.3959	21.2036	0.5449	15.00191	3746.957	226.732	875.8019	232.7632	181.808	0	0	0	296.576	80.91481	664.6329	40.3514	66.47829	0	0
0	0	231.2264	119.4161	399.1647	649.8971	21.3527	0	14.22412	3147.55	225.616	870.1113	226.5865	189.792	0	0	0	295.8448	80.75682	657.4087	40.402	64.70583	0	0
0	1.270593	250.1655	120.4513	392.7643	540.8895	24.82876	0.7399	16.93844	2976.644	226.88	881.8729	194.6183	188.288	0	0	0	297.928	100.0835	787.5947	40.979	66.47612	0	0
150.4361	117.2069	354.7327	1.994	384.7465	23.06077	126.3355	103.8114	86.051	167.6097	173.7949	21.33888	199.6864	98.0053	107.6289	106.6019	214.847	25.30524	198.5719	33.13123	229.3717	44.95495	86.06758	102.0461
150.7883	125.4752	434.9301	2.01513	390.7256	17.6811	111.3691	94.27895	82.27448	163.0406	174.1208	19.15642	182.1957	82.76345	102.9653	96.54407	224.5385	19.5079	145.2483	31.88559	200.0662	45.15823	97.74965	93.37707
146.9093	135.6505	460.0251	2.08253	393.1514	26.79096	110.3114	100.2239	100.1114	168.2418	224.6325	20.30856	189.7235	88.38899	106.7962	107.2821	221.6065	18.44866	172.107	36.05454	238.8169	47.14466	93.5071	105.8
137.1221	131.0405	536.1028	1.57448	380.3366	15.13116	111.9789	101.8188	85.05992	165.9438	227.3542	18.52684	186.2279	89.66719	107.9879	102.4949	236	21.46112	197.0652	37.04085	252.2277	43.93555	82.33859	109.8964
140.5874	126.0573	406.0879	1.61106	364.2092	14.5746	105.8024	92.98252	84.48378	165.4195	198.9434	19.63268	204.821	98.71496	102.9058	87.9405	237.735	16.82069	165.6036	34.55679	227.8313	44.00021	86.27917	108.3963
143.5708	136.1737	484.7033	1.37353	378.6197	13.25784	112.3911	90.21732	84.56564	171.9429	165.2065	17.48232	182.9923	102.7429	110.4139	88.64553	208.4327	22.55549	126.0784	31.70872	243.4559	42.54473	88.55676	100.9243

Edmonton
AREA60
1870.617
1837.188
1813.685
1883.943
1804.95
1872.881

249.4352
248.3235
244.7228
241.3712
243.0539
244.8264

1867.576
1780.322
1813.685
1883.943
1804.95
1855.76

CAL_HOUR_BEGIN_DATE	CAL_YEAR	Calgary	South	Central	Edmonton	NE
01Jan2016 0:00:00	2016	1034.175337	892.8825	1352.682	1403.83	1089.151
01Jan2016 1:00:00	2016	990.9187039	874.8261	1335.22	1359.066	1082.536
01Jan2016 2:00:00	2016	953.1142162	859.5924	1300.954	1321.157	1061.502
01Jan2016 3:00:00	2016	929.7506165	853.411	1275.436	1296.155	1038.282
01Jan2016 4:00:00	2016	926.8067304	851.0186	1269.675	1282.83	1050.629
01Jan2016 5:00:00	2016	950.3745601	859.3893	1243.231	1277.301	1048.037
01Jan2016 6:00:00	2016	982.8437222	869.8478	1248.08	1313.91	1046.205
01Jan2016 7:00:00	2016	1015.479988	879.9475	1273.434	1373.333	1052.113
01Jan2016 8:00:00	2016	1035.8892	887.0993	1298.315	1399.074	1055.58
01Jan2016 9:00:00	2016	1056.274613	895.0871	1332.694	1406.963	1059.414
01Jan2016 10:00:00	2016	1101.087447	892.9322	1347.188	1454.006	1038.052
01Jan2016 11:00:00	2016	1132.836888	893.6238	1348.386	1488.181	1005.62
01Jan2016 12:00:00	2016	1146.730477	892.2731	1350.576	1500.716	1017.231
01Jan2016 13:00:00	2016	1143.079802	887.9784	1342.702	1488.018	1021.144
01Jan2016 14:00:00	2016	1136.700173	883.303	1324.913	1485.669	1031.397
01Jan2016 15:00:00	2016	1148.014165	891.7763	1345.417	1510.072	1039.364
01Jan2016 16:00:00	2016	1221.280086	917.1673	1382.734	1605.724	1067.156
01Jan2016 17:00:00	2016	1360.783265	968.9471	1435.792	1744.455	1077.023
01Jan2016 18:00:00	2016	1343.290658	968.1015	1424.363	1710.483	1084.16
01Jan2016 19:00:00	2016	1300.725485	955.8818	1416.758	1670.981	1074.764
01Jan2016 20:00:00	2016	1261.527647	940.9523	1387.667	1622.423	1065.008
01Jan2016 21:00:00	2016	1213.084711	931.2568	1383.234	1577.837	1046.757
01Jan2016 22:00:00	2016	1137.349421	907.0218	1368.092	1511.378	1035.592
01Jan2016 23:00:00	2016	1052.771645	889.587	1345.044	1431.564	1036.005
02Jan2016 0:00:00	2016	984.9052032	866.2695	1320.416	1359.974	1009.249
02Jan2016 1:00:00	2016	937.4833993	850.5747	1300.13	1304.142	995.8324
02Jan2016 2:00:00	2016	911.0231788	844.5214	1270.145	1245.418	996.6454
02Jan2016 3:00:00	2016	902.0508499	844.754	1254.798	1235.763	1016.036
02Jan2016 4:00:00	2016	908.2304605	850.6934	1265.088	1253.089	1036.68
02Jan2016 5:00:00	2016	933.8473768	860.2618	1270.684	1276.075	1037.257
02Jan2016 6:00:00	2016	982.2116537	877.0701	1303.723	1317.12	1031.084
02Jan2016 7:00:00	2016	1048.797199	899.5871	1342.491	1396.817	1007.409
02Jan2016 8:00:00	2016	1110.130309	923.2112	1405.646	1479.915	1018.231
02Jan2016 9:00:00	2016	1149.057164	931.4777	1404.925	1511.027	1018.674
02Jan2016 10:00:00	2016	1186.660165	935.7655	1408.709	1558.394	1022.332
02Jan2016 11:00:00	2016	1203.28133	932.987	1400.783	1605.607	1012.151
02Jan2016 12:00:00	2016	1207.621011	927.5341	1393.813	1605.612	994.9806
02Jan2016 13:00:00	2016	1194.033281	918.2772	1384.671	1600.825	1004.598
02Jan2016 14:00:00	2016	1182.805416	913.7279	1377.993	1559.139	1008.209
02Jan2016 15:00:00	2016	1190.453849	919.5175	1379.946	1555.615	1005.925
02Jan2016 16:00:00	2016	1260.913693	949.4951	1430.1	1657.524	1017.919
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02Jan2016 18:00:00	2016	1394.767611	997.3439	1481.696	1817.849	1014.77
02Jan2016 19:00:00	2016	1355.807882	983.4105	1470.898	1773.82	1035.934
02Jan2016 20:00:00	2016	1311.254975	970.0746	1466.749	1702.171	1050.528
02Jan2016 21:00:00	2016	1259.966291	952.5985	1435.822	1628.541	1053.961

02Jan2016 22:00:00	2016	1184.119504	923.5525	1405.928	1549.329	1046.744
02Jan2016 23:00:00	2016	1092.109007	900.8232	1375.192	1476.559	1051.698
03Jan2016 0:00:00	2016	1014.400589	870.323	1347.452	1420.396	1042.325
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03Jan2016 2:00:00	2016	928.6274764	840.4294	1312.612	1330.194	1016.805
03Jan2016 3:00:00	2016	914.4530383	836.0317	1308.574	1318.605	1005.572
03Jan2016 4:00:00	2016	915.8108342	836.5686	1315.111	1350.968	1007.086
03Jan2016 5:00:00	2016	939.1787339	844.0938	1322.878	1370.139	1013.528
03Jan2016 6:00:00	2016	980.802785	858.2911	1343.054	1397.08	1010.634
03Jan2016 7:00:00	2016	1040.201414	883.6479	1356.431	1449.909	1006.889
03Jan2016 8:00:00	2016	1090.496468	901.3467	1356.428	1490.631	1015.294
03Jan2016 9:00:00	2016	1126.169713	907.079	1358.554	1517.86	1001.667
03Jan2016 10:00:00	2016	1169.257161	900.5048	1362.196	1557.236	983.1287
03Jan2016 11:00:00	2016	1201.181173	899.9785	1367.731	1587.188	958.3889
03Jan2016 12:00:00	2016	1213.990123	901.2794	1371.498	1599.149	972.4947
03Jan2016 13:00:00	2016	1209.348512	894.0317	1382.986	1612.464	979.0974
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03Jan2016 16:00:00	2016	1315.794695	935.9024	1449.946	1761.995	1016.632
03Jan2016 17:00:00	2016	1464.407484	993.2763	1523.465	1920.902	1006.522
03Jan2016 18:00:00	2016	1455.168696	996.5416	1518.93	1886.932	1018.915
03Jan2016 19:00:00	2016	1408.008606	982.1572	1489.156	1832.374	1014.107
03Jan2016 20:00:00	2016	1355.055222	966.9615	1443.739	1759.695	1021.883
03Jan2016 21:00:00	2016	1271.16048	939.8418	1431.996	1686.613	1027.361
03Jan2016 22:00:00	2016	1158.416832	900.7196	1376.477	1562.556	1027.879
03Jan2016 23:00:00	2016	1046.257978	870.717	1348.908	1464.956	1011.338
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04Jan2016 1:00:00	2016	933.809399	828.4174	1337.559	1408.318	990.2954
04Jan2016 2:00:00	2016	912.3547938	824.1406	1336.59	1393.876	977.4044
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04Jan2016 5:00:00	2016	1019.022523	848.0868	1345.919	1443.389	992.3478
04Jan2016 6:00:00	2016	1187.720142	885.8792	1358.744	1597.947	1005.809
04Jan2016 7:00:00	2016	1352.392713	943.6209	1421.06	1782.67	1009.603
04Jan2016 8:00:00	2016	1398.985887	970.6343	1466.91	1831.546	1015.411
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04Jan2016 15:00:00	2016	1392.510435	965.8768	1474.176	1856.667	990.9357
04Jan2016 16:00:00	2016	1472.730151	976.8813	1514.862	1947.056	1005.197
04Jan2016 17:00:00	2016	1591.899328	1022.186	1576.365	2056.504	1010.378
04Jan2016 18:00:00	2016	1550.092694	1008.572	1563.045	2010.738	1008.492
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04Jan2016 20:00:00	2016	1430.528426	1006.603	1506.048	1893.815	1009.227

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04Jan2016 22:00:00	2016	1197.862071	926.7483	1410.819	1640.323	988.8118
04Jan2016 23:00:00	2016	1077.492401	894.2319	1363.665	1510.928	967.3556
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05Jan2016 5:00:00	2016	1046.19133	887.4498	1335.024	1428.047	996.9266
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05Jan2016 7:00:00	2016	1384.096528	974.6753	1461.927	1767.839	979.2553
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05Jan2016 9:00:00	2016	1412.587002	994.4985	1511.084	1871.103	968.8444
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05Jan2016 11:00:00	2016	1426.593567	990.4454	1509.556	1892.935	955.8955
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05Jan2016 22:00:00	2016	1232.00959	933.2936	1383.307	1616.625	992.3953
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06Jan2016 5:00:00	2016	1073.6016	897.0038	1370.412	1488.215	987.02
06Jan2016 6:00:00	2016	1242.330899	939.0704	1404.573	1638.569	984.0807
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06Jan2016 14:00:00	2016	1447.849564	975.552	1494.011	1884.942	998.2154
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15Jan2016 15:00:00	2016	1439.951061	1017.747	1534.978	1841.995	1081.997
15Jan2016 16:00:00	2016	1473.331914	1016.123	1565.359	1885.36	1125.155
15Jan2016 17:00:00	2016	1560.835563	1044.664	1593.926	1975.661	1156.062
15Jan2016 18:00:00	2016	1522.728942	1037.867	1575.041	1935.103	1154.49
15Jan2016 19:00:00	2016	1462.455616	1027.696	1550.621	1891.526	1125.464
15Jan2016 20:00:00	2016	1405.251399	1038.87	1567.584	1868.317	1123.575
15Jan2016 21:00:00	2016	1327.380413	1017.881	1545.003	1825.413	1114.011
15Jan2016 22:00:00	2016	1226.605934	988.5331	1501.545	1726.145	1096.472
15Jan2016 23:00:00	2016	1125.338197	956.294	1425.603	1585.42	1091.68
16Jan2016 0:00:00	2016	1047.995019	935.3739	1401.779	1494.491	1088.743
16Jan2016 1:00:00	2016	997.6085805	925.8825	1378.405	1440.234	1087.427
16Jan2016 2:00:00	2016	968.201711	915.3526	1411.16	1440.576	1087.547
16Jan2016 3:00:00	2016	958.2336921	912.2538	1421.104	1428.677	1089.475
16Jan2016 4:00:00	2016	964.843569	914.7733	1422.847	1443.464	1086.326
16Jan2016 5:00:00	2016	993.2698447	925.1594	1418.401	1468.932	1100.544
16Jan2016 6:00:00	2016	1050.122325	939.3621	1446.684	1519.06	1116.691
16Jan2016 7:00:00	2016	1134.214679	968.2845	1482.688	1604.968	1118.349
16Jan2016 8:00:00	2016	1221.561399	998.5358	1476.252	1657.199	1112.812
16Jan2016 9:00:00	2016	1273.408954	1018.127	1518.096	1729.892	1095.602
16Jan2016 10:00:00	2016	1323.245442	1032.408	1523.776	1788.004	1096.218
16Jan2016 11:00:00	2016	1350.641324	1023.647	1535.987	1790.328	1096.417
16Jan2016 12:00:00	2016	1362.463873	997.2521	1542.063	1791.068	1102.831
16Jan2016 13:00:00	2016	1350.685108	1000.285	1522.286	1774.257	1085.129
16Jan2016 14:00:00	2016	1341.67947	998.2589	1498.999	1789.47	1055.415

16Jan2016 15:00:00	2016	1343.392207	1003.022	1513.004	1806.83	1053.809
16Jan2016 16:00:00	2016	1392.944922	1027.534	1554.096	1856.194	1087.993
16Jan2016 17:00:00	2016	1492.27351	1064.986	1627.616	1989.826	1133.196
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16Jan2016 19:00:00	2016	1422.454601	1035.617	1610.259	1912.25	1154.695
16Jan2016 20:00:00	2016	1375.455244	1042.193	1590.725	1846.71	1156.74
16Jan2016 21:00:00	2016	1317.649002	1026.269	1571.273	1795.817	1124.397
16Jan2016 22:00:00	2016	1237.597895	998.988	1548.756	1718.897	1118.061
16Jan2016 23:00:00	2016	1147.460306	965.5636	1499.532	1612.169	1116.093
17Jan2016 0:00:00	2016	1069.878445	939.4144	1477.425	1552.37	1101.143
17Jan2016 1:00:00	2016	1017.132545	924.3535	1464.214	1496.598	1093.727
17Jan2016 2:00:00	2016	984.5413301	916.3094	1455.402	1454.87	1097.26
17Jan2016 3:00:00	2016	971.2445558	913.4864	1444.514	1446.079	1096.805
17Jan2016 4:00:00	2016	974.9958357	915.0822	1443.243	1440.557	1086.238
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17Jan2016 10:00:00	2016	1258.102416	1002.4	1488.072	1737.739	1077.465
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17Jan2016 16:00:00	2016	1397.422925	1017.816	1542.879	1851.874	1099.206
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17Jan2016 18:00:00	2016	1522.387069	1067.687	1579.55	1949.656	1141.142
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17Jan2016 20:00:00	2016	1412.691467	1036.015	1552.489	1860.109	1124.708
17Jan2016 21:00:00	2016	1326.071993	1009.436	1524.652	1785.864	1107.929
17Jan2016 22:00:00	2016	1207.398747	966.3338	1476.876	1652.6	1100.3
17Jan2016 23:00:00	2016	1092.577049	926.7315	1430.745	1521.069	1101.797
18Jan2016 0:00:00	2016	1018.70966	897.5952	1415.58	1466.365	1097.52
18Jan2016 1:00:00	2016	975.0275667	883.4068	1393.153	1424.453	1090.806
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19Jan2016 0:00:00	2016	1002.361127	886.4665	1379.771	1492.496	1074.781
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19Jan2016 2:00:00	2016	943.7353184	874.5761	1366.676	1423.372	1070.239
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19Jan2016 4:00:00	2016	970.3945557	887.105	1351.159	1435.391	1085.384
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19Jan2016 13:00:00	2016	1394.40851	970.3122	1482.191	1918.124	1052.782
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21Jan2016 9:00:00	2016	1417.519554	1015.438	1480.025	1861.656	1032.453
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21Jan2016 11:00:00	2016	1423.049384	1010.693	1481.8	1875.664	1028.406
21Jan2016 12:00:00	2016	1421.981082	998.3362	1476.881	1868.065	1031.813
21Jan2016 13:00:00	2016	1428.041575	994.9185	1468.495	1846.216	1056.106
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21Jan2016 17:00:00	2016	1534.783219	1015.162	1530.254	1973.251	1080.127
21Jan2016 18:00:00	2016	1521.605127	1010.515	1522.032	1958.225	1071.651
21Jan2016 19:00:00	2016	1467.477341	995.7586	1514.321	1928.793	1068.784
21Jan2016 20:00:00	2016	1408.579213	998.3653	1504.051	1906.744	1070.998
21Jan2016 21:00:00	2016	1317.205946	969.7203	1465.321	1820.417	1071.833
21Jan2016 22:00:00	2016	1189.59966	925.8566	1415.117	1690.127	1064.055
21Jan2016 23:00:00	2016	1072.098075	895.3223	1351.609	1551.669	1083.226
22Jan2016 0:00:00	2016	993.1138356	866.537	1325.823	1484.159	1079.671
22Jan2016 1:00:00	2016	946.3079837	852.1477	1307.472	1398.363	1072.897
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22Jan2016 8:00:00	2016	1394.868842	973.4754	1500.247	1827.067	1074.295
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22Jan2016 16:00:00	2016	1378.491914	964.9708	1460.648	1824.731	1121.343
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22Jan2016 19:00:00	2016	1388.608099	977.8629	1491.088	1816.319	1117.104
22Jan2016 20:00:00	2016	1332.503615	959.3386	1459.523	1771.956	1128.497
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23Jan2016 2:00:00	2016	900.8487191	830.6803	1318.349	1348	1104.113
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23Jan2016 4:00:00	2016	891.3121136	827.1283	1300.794	1347.772	1078.722
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23Jan2016 14:00:00	2016	1216.775466	927.6855	1368.062	1618.348	1071.719
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23Jan2016 16:00:00	2016	1261.575554	938.3694	1320.339	1658.495	1053.157
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23Jan2016 20:00:00	2016	1270.262896	953.6711	1405.625	1701.083	1100.061
23Jan2016 21:00:00	2016	1213.148069	934.5221	1398.572	1650.238	1092.321
23Jan2016 22:00:00	2016	1135.163928	907.8433	1371.032	1560.31	1075.33
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24Jan2016 6:00:00	2016	949.0809213	847.7203	1274.207	1362.104	1064.266
24Jan2016 7:00:00	2016	1022.339257	877.7077	1304.615	1429.129	1088.332
24Jan2016 8:00:00	2016	1088.977638	900.2498	1326.977	1471.534	1074.573
24Jan2016 9:00:00	2016	1133.672667	907.826	1328.226	1518.909	1066.733
24Jan2016 10:00:00	2016	1180.219857	926.4837	1355.08	1590.197	1066.09

24Jan2016 11:00:00	2016	1215.18231	931.0056	1363.018	1608.466	1060.001
24Jan2016 12:00:00	2016	1231.362216	930.7219	1358.093	1597.309	1062.31
24Jan2016 13:00:00	2016	1220.804017	927.6099	1349.744	1572.084	1064.186
24Jan2016 14:00:00	2016	1213.655544	929.3522	1343.718	1552.444	1043.192
24Jan2016 15:00:00	2016	1216.315604	935.7634	1345.804	1578.523	1060.643
24Jan2016 16:00:00	2016	1265.313175	953.7681	1373.806	1636.237	1068.315
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24Jan2016 18:00:00	2016	1429.983826	999.3561	1449.869	1823.301	1121.952
24Jan2016 19:00:00	2016	1384.189716	987.0025	1440.828	1778.361	1109.834
24Jan2016 20:00:00	2016	1331.092843	968.1685	1425.207	1726.568	1106.466
24Jan2016 21:00:00	2016	1252.70343	940.5202	1391.387	1655.151	1096.715
24Jan2016 22:00:00	2016	1142.042577	904.5921	1347.775	1535.162	1081.976
24Jan2016 23:00:00	2016	1036.423301	873.3835	1306.641	1439.516	1078.734
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25Jan2016 2:00:00	2016	915.9977154	837.7321	1230.582	1310.45	1090.496
25Jan2016 3:00:00	2016	918.7908674	837.6772	1238.739	1294.381	1081.913
25Jan2016 4:00:00	2016	946.7697538	845.5098	1248.135	1308.528	1079.836
25Jan2016 5:00:00	2016	1033.267738	866.3459	1271.68	1391.878	1085.752
25Jan2016 6:00:00	2016	1208.93454	906.7575	1311.111	1544.857	1089.488
25Jan2016 7:00:00	2016	1372.341642	964.7411	1388.69	1743.472	1082.941
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25Jan2016 10:00:00	2016	1395.162589	985.7807	1407.719	1808.56	1077.41
25Jan2016 11:00:00	2016	1395.201113	975.991	1385.826	1814.579	1077.237
25Jan2016 12:00:00	2016	1392.775828	964.8093	1377.459	1803.7	1066.52
25Jan2016 13:00:00	2016	1388.515847	961.3328	1407.678	1837.029	1057.988
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25Jan2016 15:00:00	2016	1388.751882	944.8664	1396.804	1822.628	1070.773
25Jan2016 16:00:00	2016	1422.323377	963.9767	1445.666	1860.786	1086.414
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25Jan2016 18:00:00	2016	1530.776182	1009.85	1502.169	1974.357	1124.851
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25Jan2016 20:00:00	2016	1416.287851	982.6794	1449.548	1868.268	1115.88
25Jan2016 21:00:00	2016	1317.879656	953.5112	1412.465	1771.317	1109.201
25Jan2016 22:00:00	2016	1187.966365	915.8945	1382.409	1642.033	1102.231
25Jan2016 23:00:00	2016	1071.773926	884.951	1340.318	1525.665	1099.865
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26Jan2016 1:00:00	2016	950.3858663	851.5482	1309.508	1383.492	1101.035
26Jan2016 2:00:00	2016	924.993617	844.4928	1283.048	1346.004	1102.771
26Jan2016 3:00:00	2016	921.9522392	843.3497	1259.13	1347.409	1099.492
26Jan2016 4:00:00	2016	949.3233803	848.258	1283.936	1374.347	1097.497
26Jan2016 5:00:00	2016	1034.39207	865.8702	1308.091	1435.992	1094.145
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26Jan2016 8:00:00	2016	1386.829979	968.891	1419.038	1745.329	1102.605
26Jan2016 9:00:00	2016	1372.947631	966.0794	1434.877	1754.732	1116.738

26Jan2016 10:00:00	2016	1383.635339	962.0209	1426.097	1743.618	1113.273
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26Jan2016 15:00:00	2016	1375.97795	946.9941	1399.703	1786.862	1086.982
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26Jan2016 19:00:00	2016	1449.061817	980.9283	1409.677	1828.533	1136.923
26Jan2016 20:00:00	2016	1383.991419	963.6093	1391.858	1759.898	1144.216
26Jan2016 21:00:00	2016	1285.722828	932.0113	1379.661	1678.729	1139.982
26Jan2016 22:00:00	2016	1155.564973	890.0675	1342.666	1564.321	1110.747
26Jan2016 23:00:00	2016	1034.067047	852.0894	1293.028	1455.798	1094.321
27Jan2016 0:00:00	2016	964.1942644	829.2227	1265.912	1367.83	1077.878
27Jan2016 1:00:00	2016	922.205943	811.9672	1242.025	1320.301	1071.462
27Jan2016 2:00:00	2016	898.5092491	805.5306	1248.725	1279.874	1108.772
27Jan2016 3:00:00	2016	894.7293488	802.7711	1244.961	1268.227	1102.597
27Jan2016 4:00:00	2016	920.901407	806.6651	1250.743	1285.472	1099.481
27Jan2016 5:00:00	2016	1008.788755	831.0573	1271.677	1352.982	1098.679
27Jan2016 6:00:00	2016	1186.770812	874.1892	1324.396	1503.57	1082.597
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27Jan2016 10:00:00	2016	1364.857161	945.7537	1422.394	1747.616	1098.315
27Jan2016 11:00:00	2016	1373.08492	941.3614	1435.845	1774.87	1101.655
27Jan2016 12:00:00	2016	1372.252673	932.9903	1424.179	1764.356	1096.042
27Jan2016 13:00:00	2016	1367.797078	927.8433	1421.03	1747.701	1063.867
27Jan2016 14:00:00	2016	1363.614517	922.2063	1392.589	1704.23	1073.919
27Jan2016 15:00:00	2016	1364.73422	919.5163	1401.393	1686.337	1076.103
27Jan2016 16:00:00	2016	1406.78433	934.2499	1434.153	1729.475	1096.656
27Jan2016 17:00:00	2016	1501.015685	972.7552	1490.986	1848.53	1097.976
27Jan2016 18:00:00	2016	1486.358679	971.0548	1502.174	1836.323	1131.531
27Jan2016 19:00:00	2016	1428.292868	958.648	1493.717	1815.561	1127.578
27Jan2016 20:00:00	2016	1369.297282	939.9981	1478.397	1762.422	1132.198
27Jan2016 21:00:00	2016	1275.316173	910.4229	1442.228	1676.64	1122.858
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27Jan2016 23:00:00	2016	1035.201058	843.7396	1339.446	1458.243	1121.956
28Jan2016 0:00:00	2016	955.6766139	813.7393	1318.183	1376.692	1102.231
28Jan2016 1:00:00	2016	913.7964997	799.8697	1314.289	1339.12	1088.876
28Jan2016 2:00:00	2016	891.5236143	793.1816	1303.267	1314.569	1074.999
28Jan2016 3:00:00	2016	887.9432032	794.7976	1304.605	1305.522	1066.531
28Jan2016 4:00:00	2016	911.2294965	801.4619	1307.218	1314.855	1058.653
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28Jan2016 6:00:00	2016	1173.692387	856.4394	1349.291	1497.631	1065.77
28Jan2016 7:00:00	2016	1334.697156	914.1247	1416.663	1680.625	1083.421
28Jan2016 8:00:00	2016	1368.544101	935.6083	1436.42	1717.216	1104.362

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28Jan2016 14:00:00	2016	1354.488221	919.8189	1417.749	1717.009	1119.507
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28Jan2016 18:00:00	2016	1467.531764	978.0914	1443.941	1802.444	1138.574
28Jan2016 19:00:00	2016	1422.521603	964.0299	1433.436	1759.225	1130.93
28Jan2016 20:00:00	2016	1361.835553	944.6909	1405.178	1709.144	1114.379
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28Jan2016 23:00:00	2016	1031.199239	846.0103	1317.2	1409.607	1098.632
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30Jan2016 20:00:00	2016	1258.915442	915.7427	1372.141	1651.916	1106.008
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30Jan2016 22:00:00	2016	1125.375313	869.8998	1325.809	1524.347	1118.45
30Jan2016 23:00:00	2016	1040.280571	843.9766	1299.034	1451.784	1119.401
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01Feb2016 23:00:00	2016	1059.737929	859.1458	1404.176	1474.821	1078.814
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02Feb2016 1:00:00	2016	949.0669435	827.4517	1383.429	1356.566	1111.045
02Feb2016 2:00:00	2016	930.7421345	824.4328	1366.19	1331.855	1114.652
02Feb2016 3:00:00	2016	928.2823789	826.6841	1363.539	1308.069	1109.28
02Feb2016 4:00:00	2016	956.6449929	835.1492	1353.629	1341.78	1078.214
02Feb2016 5:00:00	2016	1048.660855	856.8458	1391.476	1431.117	1100.596
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02Feb2016 7:00:00	2016	1387.341895	956.8959	1518.455	1788.122	1090.422
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02Feb2016 9:00:00	2016	1398.010933	965.2639	1507.055	1780.501	1073.782
02Feb2016 10:00:00	2016	1407.191459	961.004	1509.811	1776.453	1043.727
02Feb2016 11:00:00	2016	1408.612155	958.2034	1513.36	1817.248	1042.183
02Feb2016 12:00:00	2016	1401.082332	952.1555	1478.089	1797.241	1050.249
02Feb2016 13:00:00	2016	1387.03339	957.4241	1486.254	1783.692	1052.631
02Feb2016 14:00:00	2016	1375.453072	954.3594	1481.723	1782.809	1042.251
02Feb2016 15:00:00	2016	1380.997119	959.8511	1488.022	1787.542	1050.901
02Feb2016 16:00:00	2016	1411.4421	952.5664	1523.045	1801.576	1081.341
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02Feb2016 18:00:00	2016	1518.723163	981.7439	1573.734	1931.898	1083.652
02Feb2016 19:00:00	2016	1473.908164	972.3573	1556.815	1872.754	1084.708
02Feb2016 20:00:00	2016	1417.685995	973.7577	1540.704	1819.201	1085.618
02Feb2016 21:00:00	2016	1320.091854	950.6211	1512.088	1720.902	1086.267
02Feb2016 22:00:00	2016	1190.327312	908.2848	1458.241	1603.283	1079.397
02Feb2016 23:00:00	2016	1074.031235	869.445	1412.249	1493.911	1069.207
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03Feb2016 2:00:00	2016	943.3085847	821.7669	1316.313	1345.573	1031.09
03Feb2016 3:00:00	2016	943.1745384	821.1742	1369.682	1349.147	1065.117
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03Feb2016 13:00:00	2016	1386.17432	926.9726	1519.343	1740.871	1034.03
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04Feb2016 1:00:00	2016	943.5322864	826.0137	1400.453	1388.041	1037.701
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04Feb2016 8:00:00	2016	1405.190107	953.9479	1538.552	1796.332	1067.336
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04Feb2016 21:00:00	2016	1304.682884	931.4642	1492.154	1742.791	1059.047
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10Feb2016 12:00:00	2016	1371.035096	950.1388	1371.238	1708.282	1042.456
10Feb2016 13:00:00	2016	1372.958395	951.3628	1366.566	1698.975	1071.762
10Feb2016 14:00:00	2016	1367.903234	948.5285	1361.531	1697.098	1077.922
10Feb2016 15:00:00	2016	1368.963261	949.3073	1377.711	1707.873	1086.955
10Feb2016 16:00:00	2016	1381.569519	979.7054	1420.957	1760.722	1097.035
10Feb2016 17:00:00	2016	1442.156137	973.2834	1451.125	1831.178	1107.829
10Feb2016 18:00:00	2016	1472.600241	968.4141	1460.841	1839.766	1075.795
10Feb2016 19:00:00	2016	1427.753515	956.2621	1427.355	1795.715	1065.269
10Feb2016 20:00:00	2016	1370.232403	960.3308	1406.081	1725.48	1071.329
10Feb2016 21:00:00	2016	1279.859582	936.4518	1379.392	1636.267	1074.29
10Feb2016 22:00:00	2016	1153.851778	906.8187	1335.492	1523.446	1068.603
10Feb2016 23:00:00	2016	1035.77428	870.5325	1296.351	1408.245	1075.442
11Feb2016 0:00:00	2016	960.0918812	849.2505	1263.354	1333.701	1068.28
11Feb2016 1:00:00	2016	916.4856265	837.888	1251.746	1293.708	1063.361

11Feb2016 2:00:00	2016	891.8933155	834.601	1257.286	1278.882	1075.379
11Feb2016 3:00:00	2016	888.4809613	829.8533	1263.154	1306.427	1067.288
11Feb2016 4:00:00	2016	913.2153372	833.9641	1267.751	1323.963	1087.214
11Feb2016 5:00:00	2016	998.2816317	855.1439	1284.053	1392.451	1072.855
11Feb2016 6:00:00	2016	1160.726627	897.3662	1329.942	1534.082	1053.412
11Feb2016 7:00:00	2016	1304.830711	955.0131	1398.533	1704.076	1045.558
11Feb2016 8:00:00	2016	1332.152844	968.1851	1383.225	1698.438	1051.077
11Feb2016 9:00:00	2016	1346.225982	974.2144	1389.928	1723.334	1064.866
11Feb2016 10:00:00	2016	1354.038175	977.0767	1403.862	1743.003	1039.885
11Feb2016 11:00:00	2016	1359.433601	981.4069	1384.277	1750.693	1027.694
11Feb2016 12:00:00	2016	1355.587298	966.3144	1376.388	1736.302	1026.068
11Feb2016 13:00:00	2016	1354.300018	962.6706	1372.566	1736.01	1030.29
11Feb2016 14:00:00	2016	1344.57491	954.8893	1376.861	1731.245	1068.211
11Feb2016 15:00:00	2016	1337.77458	953.3978	1380.618	1748.115	1079.089
11Feb2016 16:00:00	2016	1342.168544	962.9966	1398.441	1775.026	1074.154
11Feb2016 17:00:00	2016	1396.546122	983.285	1430.881	1844.38	1090.805
11Feb2016 18:00:00	2016	1440.952414	1000.731	1462.34	1904.816	1107.705
11Feb2016 19:00:00	2016	1400.739791	993.2434	1446.652	1863.728	1121.253
11Feb2016 20:00:00	2016	1342.587674	972.8432	1409.729	1817.018	1123.164
11Feb2016 21:00:00	2016	1259.808392	942.0891	1384.357	1718.503	1109.007
11Feb2016 22:00:00	2016	1142.529061	904.1636	1338.612	1595.675	1101.02
11Feb2016 23:00:00	2016	1036.843162	872.1776	1304.357	1485.438	1106.892
12Feb2016 0:00:00	2016	962.1507052	849.4366	1297.943	1408.181	1091.199
12Feb2016 1:00:00	2016	919.0108883	841.1134	1291.702	1363.294	1072.012
12Feb2016 2:00:00	2016	895.7435723	837.4815	1279.971	1332.738	1095.039
12Feb2016 3:00:00	2016	890.3926122	836.6383	1279.248	1327.448	1097.496
12Feb2016 4:00:00	2016	917.5062356	846.3652	1284.979	1344.674	1093.949
12Feb2016 5:00:00	2016	995.4866956	867.0996	1291.948	1389.752	1088.742
12Feb2016 6:00:00	2016	1145.570359	907.8747	1329.484	1524.096	1083.357
12Feb2016 7:00:00	2016	1289.207738	969.158	1414.591	1700.338	1088.568
12Feb2016 8:00:00	2016	1354.063305	990.4608	1423.828	1722.165	1096.627
12Feb2016 9:00:00	2016	1382.854903	998.1454	1437.343	1742.456	1072.072
12Feb2016 10:00:00	2016	1411.218122	1006.027	1453.725	1767.711	1053.528
12Feb2016 11:00:00	2016	1425.425044	999.2678	1454.595	1784.705	1050.574
12Feb2016 12:00:00	2016	1417.305791	988.3882	1468.97	1774.275	1051.367
12Feb2016 13:00:00	2016	1410.605107	983.3848	1463.643	1783.544	1050.596
12Feb2016 14:00:00	2016	1394.31875	969.0526	1449.625	1771.512	1053.979
12Feb2016 15:00:00	2016	1384.75699	958.4327	1435.878	1743.366	1058.808
12Feb2016 16:00:00	2016	1387.028625	962.4311	1437.488	1747.13	1063.804
12Feb2016 17:00:00	2016	1426.189249	974.6996	1451.741	1795.343	1087.635
12Feb2016 18:00:00	2016	1424.500056	991.8994	1472.823	1845.229	1100.182
12Feb2016 19:00:00	2016	1376.549759	977.0898	1456.223	1806.329	1101.991
12Feb2016 20:00:00	2016	1319.698937	959.1203	1433.24	1760.035	1087.104
12Feb2016 21:00:00	2016	1241.592275	939.7468	1384.991	1686.723	1079.422
12Feb2016 22:00:00	2016	1141.797012	906.5819	1355.338	1598.605	1061.751
12Feb2016 23:00:00	2016	1048.91474	874.4357	1294.437	1498.604	1068.048
13Feb2016 0:00:00	2016	973.2169379	853.3193	1265.618	1417.543	1054.001

13Feb2016 1:00:00	2016	929.8001129	837.0733	1251.937	1353.694	1064.856
13Feb2016 2:00:00	2016	902.3803716	823.2861	1238.493	1292.984	1067.134
13Feb2016 3:00:00	2016	885.6791879	821.995	1276.291	1277.988	1070.553
13Feb2016 4:00:00	2016	888.415795	823.7565	1295.638	1275.848	1077.873
13Feb2016 5:00:00	2016	916.5088736	830.4776	1303.471	1297.353	1075.894
13Feb2016 6:00:00	2016	968.837324	854.1188	1315.516	1347.381	1066.825
13Feb2016 7:00:00	2016	1045.284132	876.9648	1331.046	1424.224	1079.833
13Feb2016 8:00:00	2016	1094.487647	897.0927	1335.861	1461.752	1075.95
13Feb2016 9:00:00	2016	1154.452515	917.171	1371.774	1518.092	1068.939
13Feb2016 10:00:00	2016	1187.607193	923.1282	1376.794	1567.799	1058.927
13Feb2016 11:00:00	2016	1202.281295	918.335	1348.516	1572.017	1053.865
13Feb2016 12:00:00	2016	1194.099672	902.0637	1344.144	1552.322	1042.937
13Feb2016 13:00:00	2016	1173.65034	885.8766	1325.891	1555.236	1047.917
13Feb2016 14:00:00	2016	1158.785889	876.217	1263.16	1515.066	1049.866
13Feb2016 15:00:00	2016	1150.823693	877.1233	1279.524	1515.048	1032.495
13Feb2016 16:00:00	2016	1172.635763	887.5982	1310.085	1541.609	1029.099
13Feb2016 17:00:00	2016	1235.420319	912.5091	1349.817	1643.754	1039.638
13Feb2016 18:00:00	2016	1295.037793	942.8727	1403.84	1749.293	1049.65
13Feb2016 19:00:00	2016	1263.108593	936.757	1408.024	1706.968	1057.179
13Feb2016 20:00:00	2016	1220.915237	924.171	1395.211	1679.07	1067.006
13Feb2016 21:00:00	2016	1165.968749	905.1603	1366.985	1623.932	1063.343
13Feb2016 22:00:00	2016	1097.818572	877.997	1341.451	1551.901	1056.395
13Feb2016 23:00:00	2016	1018.290917	849.4831	1317.223	1452.016	1048.75
14Feb2016 0:00:00	2016	946.826272	824.8329	1302.727	1389.463	1037.16
14Feb2016 1:00:00	2016	899.4182807	811.2042	1289.732	1349.74	1039.804
14Feb2016 2:00:00	2016	872.8109662	812.0192	1281.537	1320.868	1049.385
14Feb2016 3:00:00	2016	861.6288761	807.2427	1282.728	1303.778	1037.383
14Feb2016 4:00:00	2016	863.7563793	810.8666	1283.059	1303.141	1032.344
14Feb2016 5:00:00	2016	886.6075535	818.911	1285.333	1315.451	1052.751
14Feb2016 6:00:00	2016	929.493103	837.8044	1278.877	1343.902	1043.419
14Feb2016 7:00:00	2016	991.5667326	849.5604	1284.38	1392.41	1010.855
14Feb2016 8:00:00	2016	1024.756	863.9355	1277.131	1412.103	1000.209
14Feb2016 9:00:00	2016	1075.888237	882.3985	1298.185	1435.96	997.8168
14Feb2016 10:00:00	2016	1113.585588	879.6874	1313.269	1477.415	984.8497
14Feb2016 11:00:00	2016	1131.778415	873.4798	1320.535	1477.25	991.299
14Feb2016 12:00:00	2016	1138.506869	869.7687	1313.413	1505.342	984.5594
14Feb2016 13:00:00	2016	1129.150644	864.3111	1312.285	1504.547	983.2586
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14Feb2016 15:00:00	2016	1132.469316	866.6629	1306.925	1498.029	979.0127
14Feb2016 16:00:00	2016	1175.116243	879.073	1323.967	1520.94	987.6922
14Feb2016 17:00:00	2016	1257.433662	907.8231	1357.385	1610.612	1005.964
14Feb2016 18:00:00	2016	1290.576916	925.9376	1386.553	1673.15	1033.055
14Feb2016 19:00:00	2016	1251.856643	918.0451	1377.892	1635.953	1034.414
14Feb2016 20:00:00	2016	1209.918493	904.8281	1365.166	1593.432	1038.416
14Feb2016 21:00:00	2016	1157.457677	888.6974	1346.564	1563.774	1029.956
14Feb2016 22:00:00	2016	1084.39437	862.9599	1318.856	1481.872	1015.699
14Feb2016 23:00:00	2016	1002.171186	834.2459	1287.257	1388.785	1019.582

15Feb2016 0:00:00	2016	931.6666038	813.4051	1267.42	1336.49	1012.67
15Feb2016 1:00:00	2016	886.3647712	800.1378	1262.994	1295.536	1018.479
15Feb2016 2:00:00	2016	861.9396814	788.5323	1267.367	1276.985	1036.296
15Feb2016 3:00:00	2016	855.0905097	786.6129	1262.225	1257.224	1026.943
15Feb2016 4:00:00	2016	869.2510655	789.205	1259.632	1259.181	1042.22
15Feb2016 5:00:00	2016	906.3682321	800.6463	1257.153	1290.453	1046.6
15Feb2016 6:00:00	2016	967.5905398	825.5413	1261.861	1342.228	1031.072
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15Feb2016 12:00:00	2016	1207.163435	916.1461	1351.795	1586.089	1017.917
15Feb2016 13:00:00	2016	1193.940385	906.4618	1343.122	1569.153	1016.78
15Feb2016 14:00:00	2016	1183.301045	892.8327	1328.669	1550.905	1024.454
15Feb2016 15:00:00	2016	1185.827493	888.4998	1329.074	1561.14	1034.88
15Feb2016 16:00:00	2016	1217.705726	895.0517	1348.467	1591.112	1026.179
15Feb2016 17:00:00	2016	1287.788965	916.1054	1377.573	1632.396	1040.049
15Feb2016 18:00:00	2016	1362.177125	947.2068	1411.582	1708.079	1047.939
15Feb2016 19:00:00	2016	1339.717304	940.1146	1399.346	1675.835	1046.118
15Feb2016 20:00:00	2016	1292.781776	928.4859	1398.974	1648.038	1034.916
15Feb2016 21:00:00	2016	1212.520596	910.4296	1380.059	1576.62	1034.095
15Feb2016 22:00:00	2016	1103.890235	880.5556	1327.727	1470.999	1030.297
15Feb2016 23:00:00	2016	998.0855447	848.2509	1287.666	1364.612	1033.282
16Feb2016 0:00:00	2016	932.7476114	829.5592	1271.484	1290.238	1040.606
16Feb2016 1:00:00	2016	894.665486	817.4228	1267.181	1282.851	1049.233
16Feb2016 2:00:00	2016	875.5929235	817.8562	1265.367	1263.754	1046.871
16Feb2016 3:00:00	2016	876.2193992	815.2734	1261.405	1259.654	1041.134
16Feb2016 4:00:00	2016	905.6505131	822.079	1263.116	1275.906	1041.929
16Feb2016 5:00:00	2016	994.7993039	843.0618	1280.694	1350.259	1055.573
16Feb2016 6:00:00	2016	1170.191003	881.5871	1294.96	1466.952	1050.048
16Feb2016 7:00:00	2016	1319.11206	928.9521	1377.954	1649.804	1046.554
16Feb2016 8:00:00	2016	1323.267878	943.6669	1404.226	1702.679	1014.136
16Feb2016 9:00:00	2016	1335.503713	948.1247	1419.904	1716.97	994.3342
16Feb2016 10:00:00	2016	1357.136674	948.1268	1415.853	1728.158	996.2719
16Feb2016 11:00:00	2016	1361.69182	945.6787	1415.903	1716.696	989.4581
16Feb2016 12:00:00	2016	1361.890931	939.6263	1408.88	1728.535	984.5218
16Feb2016 13:00:00	2016	1361.865884	937.7571	1410.553	1727.672	1010.411
16Feb2016 14:00:00	2016	1353.518058	933.1608	1400.463	1714.619	1010.479
16Feb2016 15:00:00	2016	1348.737837	928.0219	1394.73	1715.287	996.8042
16Feb2016 16:00:00	2016	1367.136856	934.3717	1403.885	1725.269	1018.285
16Feb2016 17:00:00	2016	1400.596652	948.9354	1425.098	1777.777	1031.012
16Feb2016 18:00:00	2016	1448.537943	971.1519	1458.565	1861.047	1033.146
16Feb2016 19:00:00	2016	1414.737419	964.491	1455.562	1835.086	1039.368
16Feb2016 20:00:00	2016	1357.916646	946.0871	1452.593	1781.136	1035.371
16Feb2016 21:00:00	2016	1263.19108	922.1953	1411.192	1671.815	1040.495
16Feb2016 22:00:00	2016	1137.62444	892.1212	1354.706	1573.408	1031.492

16Feb2016 23:00:00	2016	1019.861584	858.9254	1302.193	1456.963	1020.018
17Feb2016 0:00:00	2016	948.9000061	834.906	1281.832	1385.292	1012.195
17Feb2016 1:00:00	2016	908.0129268	826.6446	1275.516	1342.306	1040.375
17Feb2016 2:00:00	2016	888.5277824	826.1227	1272.001	1326.028	1032.199
17Feb2016 3:00:00	2016	883.8890617	827.9449	1269.923	1306.531	1029.257
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17Feb2016 5:00:00	2016	996.5159485	851.5926	1276.281	1398.401	1069.538
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17Feb2016 11:00:00	2016	1377.407752	952.6259	1333.688	1730.292	1037.917
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17Feb2016 13:00:00	2016	1361.580481	944.3008	1321.819	1747.834	1025.157
17Feb2016 14:00:00	2016	1354.102707	935.6353	1325.939	1729.112	1027.111
17Feb2016 15:00:00	2016	1358.751806	943.5159	1370.317	1745.357	1036.662
17Feb2016 16:00:00	2016	1391.424755	960.7567	1414.255	1768.925	1045.71
17Feb2016 17:00:00	2016	1434.009066	974.4407	1430.469	1816.957	1071.607
17Feb2016 18:00:00	2016	1455.878247	993.0486	1429.487	1839.914	1081.912
17Feb2016 19:00:00	2016	1419.199245	981.3589	1416.335	1796.978	1090.649
17Feb2016 20:00:00	2016	1360.62366	966.4594	1398.672	1741.33	1087.158
17Feb2016 21:00:00	2016	1268.889892	937.9845	1365.877	1654.395	1088.417
17Feb2016 22:00:00	2016	1147.827449	902.8838	1328.879	1514.871	1073.542
17Feb2016 23:00:00	2016	1033.686606	865.907	1298.374	1432.128	1080.89
18Feb2016 0:00:00	2016	959.2747741	842.5905	1266.824	1341.889	1086.093
18Feb2016 1:00:00	2016	915.8708524	829.788	1261.762	1312.412	1086.069
18Feb2016 2:00:00	2016	894.6596814	828.0499	1257.922	1303.838	1089.234
18Feb2016 3:00:00	2016	888.9123783	829.0459	1260.162	1291.622	1080.931
18Feb2016 4:00:00	2016	913.4658458	835.0646	1249.739	1307.587	1056.719
18Feb2016 5:00:00	2016	998.8661293	853.3582	1261.673	1383.698	1048.501
18Feb2016 6:00:00	2016	1169.172628	891.5731	1285.235	1501.949	1053.486
18Feb2016 7:00:00	2016	1325.347369	933.0155	1350.332	1690.821	1055.792
18Feb2016 8:00:00	2016	1334.490665	952.5186	1372.025	1700.296	1052.312
18Feb2016 9:00:00	2016	1354.805353	966.5246	1388.39	1717.527	1050.562
18Feb2016 10:00:00	2016	1368.777498	969.9765	1393.219	1762.051	1057.453
18Feb2016 11:00:00	2016	1386.043876	965.4691	1395.046	1764.352	1060.861
18Feb2016 12:00:00	2016	1383.723228	955.3582	1362.018	1734.629	1051.837
18Feb2016 13:00:00	2016	1377.011209	941.8574	1351.557	1762.228	1040.715
18Feb2016 14:00:00	2016	1366.044702	937.6833	1376.921	1773.592	1081.439
18Feb2016 15:00:00	2016	1363.119772	922.3629	1380.889	1786.069	1091.339
18Feb2016 16:00:00	2016	1387.498686	933.563	1393.572	1782.631	1038.626
18Feb2016 17:00:00	2016	1431.874968	956.0173	1400.722	1839.775	1072.853
18Feb2016 18:00:00	2016	1453.750038	971.0081	1423.698	1878.531	1077.471
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18Feb2016 20:00:00	2016	1350.291547	946.6722	1381.429	1750.759	1043.942
18Feb2016 21:00:00	2016	1257.1082	925.1179	1354.187	1668.398	1046.608

18Feb2016 22:00:00	2016	1135.461518	888.8058	1335.325	1552.022	1063.802
18Feb2016 23:00:00	2016	1022.206317	854.8441	1311.587	1456.33	1071.277
19Feb2016 0:00:00	2016	951.5953758	830.3399	1277.235	1396.707	1071.886
19Feb2016 1:00:00	2016	911.2209335	820.8232	1282.175	1348.175	1067.682
19Feb2016 2:00:00	2016	889.5237503	811.7571	1254.115	1305.866	1100.621
19Feb2016 3:00:00	2016	882.5495979	803.5932	1244.016	1309.223	1089.625
19Feb2016 4:00:00	2016	907.3303419	731.8226	1210.267	1323.87	1078.138
19Feb2016 5:00:00	2016	991.1690126	718.1057	1219.379	1418.879	1076.856
19Feb2016 6:00:00	2016	1158.114664	764.8775	1258.508	1559.104	1086.918
19Feb2016 7:00:00	2016	1308.257004	819.4311	1325.478	1691.602	1103.755
19Feb2016 8:00:00	2016	1310.198083	857.134	1333.311	1702.804	1083.152
19Feb2016 9:00:00	2016	1321.008737	872.7504	1345.436	1730.515	1067.203
19Feb2016 10:00:00	2016	1334.555518	877.6698	1345.487	1751.281	1051.938
19Feb2016 11:00:00	2016	1346.072501	880.4842	1362.373	1768.68	1052.119
19Feb2016 12:00:00	2016	1332.907533	878.0336	1358.475	1748.287	1045.462
19Feb2016 13:00:00	2016	1311.416782	875.818	1358.323	1755.708	1041.138
19Feb2016 14:00:00	2016	1332.581083	871.6616	1370.001	1732.512	1027.837
19Feb2016 15:00:00	2016	1326.022172	914.609	1379.357	1698.788	1033.923
19Feb2016 16:00:00	2016	1328.312717	938.0675	1390.935	1717.727	1048.458
19Feb2016 17:00:00	2016	1351.057168	951.3786	1406.092	1731.842	1061.692
19Feb2016 18:00:00	2016	1395.247993	977.5094	1447.99	1803.799	1080.083
19Feb2016 19:00:00	2016	1360.738281	970.3952	1452.979	1800.319	1089.649
19Feb2016 20:00:00	2016	1307.280576	959.951	1458.445	1779.99	1082.031
19Feb2016 21:00:00	2016	1234.768605	939.3313	1458.34	1709.478	1062.877
19Feb2016 22:00:00	2016	1133.423536	908.6141	1425.167	1604.608	1058.654
19Feb2016 23:00:00	2016	1034.434087	878.5769	1387.264	1489.637	1044.741
20Feb2016 0:00:00	2016	959.3503366	854.8634	1375.18	1424.715	1047.32
20Feb2016 1:00:00	2016	912.1042189	840.0233	1355.356	1366.339	1058.209
20Feb2016 2:00:00	2016	886.926258	831.0283	1320.052	1335.491	1086.486
20Feb2016 3:00:00	2016	882.2065039	822.9051	1313.805	1330.753	1062.713
20Feb2016 4:00:00	2016	889.4831336	830.4418	1310.214	1344.656	1078.907
20Feb2016 5:00:00	2016	922.8210648	844.0442	1310.996	1366.644	1086.761
20Feb2016 6:00:00	2016	984.2258682	868.2399	1321.828	1392.727	1084.876
20Feb2016 7:00:00	2016	1069.610029	885.2332	1328.382	1452.4	1077.027
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20Feb2016 9:00:00	2016	1203.57351	932.174	1350.798	1565.424	1023.563
20Feb2016 10:00:00	2016	1237.881653	943.9028	1362.112	1601.88	1012.24
20Feb2016 11:00:00	2016	1252.829375	943.7071	1378.177	1633.78	988.819
20Feb2016 12:00:00	2016	1246.480335	939.0298	1375.678	1634.797	1000.696
20Feb2016 13:00:00	2016	1222.784934	931.9392	1365.486	1631.239	1012.506
20Feb2016 14:00:00	2016	1208.504304	925.6922	1351.049	1604.687	1009.992
20Feb2016 15:00:00	2016	1195.349867	923.2153	1349.771	1604.893	1009.526
20Feb2016 16:00:00	2016	1203.55283	928.9979	1343.708	1635.831	1016.035
20Feb2016 17:00:00	2016	1242.127141	938.0094	1372.341	1689.132	1029.316
20Feb2016 18:00:00	2016	1325.697667	968.17	1407.183	1730.111	1049.728
20Feb2016 19:00:00	2016	1305.197459	962.7367	1404.671	1711.322	1062.09
20Feb2016 20:00:00	2016	1262.486349	948.6527	1414.81	1670.319	1063.711

20Feb2016 21:00:00	2016	1208.33783	928.3039	1394.039	1614.816	1058.279
20Feb2016 22:00:00	2016	1130.696713	902.8545	1363.569	1544.174	1070.099
20Feb2016 23:00:00	2016	1045.03851	871.1848	1339.842	1453.04	1061.062
21Feb2016 0:00:00	2016	971.3481923	846.487	1319.41	1403.779	1058.707
21Feb2016 1:00:00	2016	922.8207455	830.3301	1285.101	1340.864	1057.058
21Feb2016 2:00:00	2016	892.2316989	821.7415	1263.034	1313.719	1052.625
21Feb2016 3:00:00	2016	879.439905	821.5217	1255.127	1299.294	1038.596
21Feb2016 4:00:00	2016	880.4261574	823.2052	1252.035	1288.533	1034.26
21Feb2016 5:00:00	2016	905.5551438	833.4392	1244.998	1284.82	1048.044
21Feb2016 6:00:00	2016	951.6833874	860.2156	1285.982	1308.665	1046.488
21Feb2016 7:00:00	2016	1007.949242	869.0609	1290.896	1342.692	1071.06
21Feb2016 8:00:00	2016	1049.93884	881.5675	1306.842	1397.174	1057.158
21Feb2016 9:00:00	2016	1102.14934	895.1305	1330.05	1423.635	1052.077
21Feb2016 10:00:00	2016	1144.91246	895.1297	1341.276	1458.359	1042.474
21Feb2016 11:00:00	2016	1169.485569	896.9563	1343.987	1484.216	1038.729
21Feb2016 12:00:00	2016	1178.138625	894.2949	1337.684	1518.862	1034.823
21Feb2016 13:00:00	2016	1172.728268	888.4808	1322.155	1525.23	1020.444
21Feb2016 14:00:00	2016	1165.483003	885.358	1313.775	1525.561	1014.482
21Feb2016 15:00:00	2016	1167.759076	884.0432	1327.304	1560.607	1019.186
21Feb2016 16:00:00	2016	1196.401898	895.8934	1344.33	1598.791	1048.409
21Feb2016 17:00:00	2016	1257.828762	921.8011	1370.14	1673.595	1053.396
21Feb2016 18:00:00	2016	1349.657383	962.4636	1430.069	1764.929	1074.811
21Feb2016 19:00:00	2016	1346.10021	961.7884	1431.93	1764.914	1073.584
21Feb2016 20:00:00	2016	1303.310075	943.1074	1422.004	1719.938	1053.865
21Feb2016 21:00:00	2016	1228.920699	915.6628	1410.971	1644.326	1054.786
21Feb2016 22:00:00	2016	1118.657313	885.263	1367.224	1547.452	1050.391
21Feb2016 23:00:00	2016	1016.066413	855.1902	1332.114	1437.993	1034.476
22Feb2016 0:00:00	2016	951.1108056	837.5838	1310.677	1369.703	1033.83
22Feb2016 1:00:00	2016	913.388826	828.2307	1289.136	1330.664	1040.36
22Feb2016 2:00:00	2016	892.3034088	823.3974	1295.425	1305.961	1049.85
22Feb2016 3:00:00	2016	892.9558164	823.9958	1304.044	1306.863	1067.814
22Feb2016 4:00:00	2016	922.0323094	830.6	1314.028	1332.624	1077.351
22Feb2016 5:00:00	2016	1008.44627	849.6831	1325.657	1410.009	1089.602
22Feb2016 6:00:00	2016	1186.128716	898.9027	1371.77	1574.52	1064.07
22Feb2016 7:00:00	2016	1328.455859	943.6823	1426.631	1727.197	1065.052
22Feb2016 8:00:00	2016	1334.071446	952.3385	1437.393	1744.841	1058.592
22Feb2016 9:00:00	2016	1345.805016	958.7334	1435.429	1747.791	1039.789
22Feb2016 10:00:00	2016	1362.108597	959.7411	1427.926	1765.055	1029.964
22Feb2016 11:00:00	2016	1374.708893	961.5818	1419.901	1758.343	1008.129
22Feb2016 12:00:00	2016	1371.264322	959.7646	1402.726	1725.304	1026.767
22Feb2016 13:00:00	2016	1365.446772	963.5728	1390.302	1722.623	1009.015
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22Feb2016 16:00:00	2016	1360.327948	932.9932	1397.093	1710.836	1010.118
22Feb2016 17:00:00	2016	1394.196176	941.3405	1405.993	1735.944	1046.158
22Feb2016 18:00:00	2016	1440.872033	968.4856	1439.964	1797.938	1070.206
22Feb2016 19:00:00	2016	1430.009724	975.0035	1433.085	1771.104	1066.508

22Feb2016 20:00:00	2016	1376.325266	982.9424	1417.75	1724.436	1056.417
22Feb2016 21:00:00	2016	1283.618451	958.4346	1375.524	1637.752	1042.785
22Feb2016 22:00:00	2016	1150.452687	921.0977	1341.55	1493.954	1048.16
22Feb2016 23:00:00	2016	1035.831371	884.6614	1316.309	1438.891	1035.464
23Feb2016 0:00:00	2016	964.986679	861.0778	1298.701	1375.455	1038.247
23Feb2016 1:00:00	2016	926.1544292	854.0372	1281.487	1328.618	1029.058
23Feb2016 2:00:00	2016	906.8797777	851.6721	1272.934	1268.2	1022.305
23Feb2016 3:00:00	2016	903.9608045	850.29	1279.852	1252.039	997.3633
23Feb2016 4:00:00	2016	928.9190436	857.3089	1286.831	1268.327	1004.283
23Feb2016 5:00:00	2016	1019.137764	877.3867	1297.754	1342.148	1031.24
23Feb2016 6:00:00	2016	1196.011686	920.9823	1344.305	1487.73	1034.029
23Feb2016 7:00:00	2016	1342.94742	963.3398	1396.134	1638.313	1018.653
23Feb2016 8:00:00	2016	1355.216497	957.6173	1400.569	1657.728	1017.738
23Feb2016 9:00:00	2016	1372.624099	955.0237	1470.88	1690.968	1009.19
23Feb2016 10:00:00	2016	1389.512598	953.6125	1445.789	1688.515	999.6607
23Feb2016 11:00:00	2016	1398.317631	948.7882	1426.391	1726.287	961.7111
23Feb2016 12:00:00	2016	1379.599945	940.0975	1421.01	1730.601	962.0284
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23Feb2016 16:00:00	2016	1386.876557	931.677	1406.213	1718.346	1001.613
23Feb2016 17:00:00	2016	1420.094319	947.674	1386.605	1735.235	991.7974
23Feb2016 18:00:00	2016	1453.286537	984.533	1419.163	1819.154	1023.155
23Feb2016 19:00:00	2016	1439.805697	993.8149	1421.84	1771.632	1023.978
23Feb2016 20:00:00	2016	1384.774506	978.6739	1418.73	1747.646	1042.078
23Feb2016 21:00:00	2016	1291.182404	953.8194	1399.138	1705.047	1026.054
23Feb2016 22:00:00	2016	1166.253803	922.0945	1360.613	1575.83	1011.279
23Feb2016 23:00:00	2016	1048.418245	889.1245	1311.674	1464.902	1015.613
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24Feb2016 1:00:00	2016	934.2537469	861.1238	1316.882	1325.803	1015.91
24Feb2016 2:00:00	2016	916.1417418	850.4729	1368.779	1311.156	1019.186
24Feb2016 3:00:00	2016	917.0049528	850.239	1344.492	1259.446	1020.704
24Feb2016 4:00:00	2016	944.987161	856.9334	1297.896	1274.4	1001.425
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24Feb2016 6:00:00	2016	1213.84527	914.7324	1268.522	1494.384	973.8601
24Feb2016 7:00:00	2016	1348.847804	961.7603	1322.523	1646.951	983.0718
24Feb2016 8:00:00	2016	1347.683085	965.2803	1358.164	1686.449	1005.486
24Feb2016 9:00:00	2016	1356.935156	962.5325	1366.935	1708.208	1012.923
24Feb2016 10:00:00	2016	1366.925551	956.5744	1379.785	1721.465	1007.254
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24Feb2016 12:00:00	2016	1363.879516	947.7744	1364.624	1726.06	985.4873
24Feb2016 13:00:00	2016	1359.310031	945.3152	1361.635	1726.21	982.3845
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24Feb2016 21:00:00	2016	1277.046325	946.0442	1377.237	1630.149	1010.565
24Feb2016 22:00:00	2016	1149.07639	906.2807	1327.813	1525.023	998.0028
24Feb2016 23:00:00	2016	1030.868609	872.5963	1281.476	1414.269	981.2032
25Feb2016 0:00:00	2016	958.5362075	857.1701	1266.657	1340.038	975.5021
25Feb2016 1:00:00	2016	917.235582	849.663	1254.636	1298.858	973.9437
25Feb2016 2:00:00	2016	897.4395739	844.681	1250.131	1275.213	960.4515
25Feb2016 3:00:00	2016	895.1319427	835.3731	1245.879	1264.949	950.7406
25Feb2016 4:00:00	2016	921.8221978	840.0158	1252.925	1293.159	951.8642
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25Feb2016 6:00:00	2016	1183.940185	904.1385	1328.706	1528.347	945.0064
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25Feb2016 9:00:00	2016	1327.681931	948.4046	1384.988	1703.85	955.1848
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25Feb2016 11:00:00	2016	1342.039203	943.142	1368.421	1725.447	938.2243
25Feb2016 12:00:00	2016	1338.261865	931.2716	1361.588	1713.895	934.2499
25Feb2016 13:00:00	2016	1335.331522	929.5374	1360.761	1708.828	941.0136
25Feb2016 14:00:00	2016	1327.829703	922.6177	1363.014	1698.841	935.1401
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25Feb2016 16:00:00	2016	1331.341445	922.279	1357.113	1686.112	947.9952
25Feb2016 17:00:00	2016	1351.201105	930.2367	1362.382	1703.627	955.9516
25Feb2016 18:00:00	2016	1384.248332	960.3749	1408.245	1776.01	954.4819
25Feb2016 19:00:00	2016	1382.855281	971.905	1437.746	1778.329	956.1444
25Feb2016 20:00:00	2016	1331.265077	961.8688	1425.104	1730.204	969.291
25Feb2016 21:00:00	2016	1242.506783	937.6513	1394.167	1652.17	1000.317
25Feb2016 22:00:00	2016	1121.433261	905.0408	1331.055	1503.694	1001.654
25Feb2016 23:00:00	2016	1009.145999	872.0535	1284.799	1392.886	990.5207
26Feb2016 0:00:00	2016	938.5160165	848.69	1263.59	1316.603	1002.257
26Feb2016 1:00:00	2016	898.6831716	834.7793	1247.703	1267.918	1019.029
26Feb2016 2:00:00	2016	878.5399244	836.9534	1235.561	1242.412	991.7864
26Feb2016 3:00:00	2016	875.4979496	836.4514	1251.726	1233.927	972.8896
26Feb2016 4:00:00	2016	900.8486042	843.3452	1258.028	1243.146	994.9469
26Feb2016 5:00:00	2016	981.3108402	859.4452	1268.307	1305.444	995.926
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26Feb2016 16:00:00	2016	1333.581855	908.8595	1376.017	1637.682	948.0996
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26Feb2016 21:00:00	2016	1209.262163	899.012	1362.151	1572.815	977.8596
26Feb2016 22:00:00	2016	1110.288439	871.2734	1331.411	1470.483	934.1229
26Feb2016 23:00:00	2016	1011.111842	840.6976	1266.948	1396.226	939.4225
27Feb2016 0:00:00	2016	936.4326921	819.0452	1252.468	1309.347	946.6924
27Feb2016 1:00:00	2016	887.5382361	798.0352	1254.099	1261.738	946.1447
27Feb2016 2:00:00	2016	858.3047446	788.7596	1249.212	1222.723	954.6412
27Feb2016 3:00:00	2016	846.967078	787.1498	1251.73	1195.338	951.6192
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27Feb2016 7:00:00	2016	1019.628193	838.6633	1292.633	1320.668	988.6367
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27Feb2016 11:00:00	2016	1207.384254	904.6037	1359.019	1553.002	1022.888
27Feb2016 12:00:00	2016	1222.908452	901.831	1341.338	1517.983	1029.722
27Feb2016 13:00:00	2016	1223.918521	897.3883	1330.737	1511.87	1034.893
27Feb2016 14:00:00	2016	1230.791371	894.4312	1321.445	1534.114	1013.34
27Feb2016 15:00:00	2016	1214.392957	901.1589	1325.696	1539.282	1015.284
27Feb2016 16:00:00	2016	1203.411715	908.4152	1325.861	1541.846	1022.968
27Feb2016 17:00:00	2016	1227.116453	921.0923	1318.571	1549.661	1035.051
27Feb2016 18:00:00	2016	1282.439435	937.7394	1350.072	1616.122	1056.08
27Feb2016 19:00:00	2016	1283.421366	943.0364	1337.361	1611.085	1079.082
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27Feb2016 21:00:00	2016	1185.472485	912.2654	1344.92	1543.708	1046.384
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29Feb2016 8:00:00	2016	1356.641646	981.1786	1478.904	1724.972	1022.624
29Feb2016 9:00:00	2016	1384.495835	989.9599	1479.741	1766.855	1038.776
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29Feb2016 13:00:00	2016	1377.170527	960.9418	1418.262	1742.307	1010.206
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16Mar2016 1:00:00	2016	903.1451391	808.6922	1213.533	1325.266	1022.324
16Mar2016 2:00:00	2016	882.0920073	804.4228	1210.667	1291.674	1028.734
16Mar2016 3:00:00	2016	877.7209903	803.7008	1211.38	1279.798	1034.803
16Mar2016 4:00:00	2016	901.9131321	808.5495	1209.744	1292.624	1028.968
16Mar2016 5:00:00	2016	984.0505155	825.885	1219.246	1353.07	1032.017
16Mar2016 6:00:00	2016	1157.590616	867.8905	1267.165	1503.242	1045.894
16Mar2016 7:00:00	2016	1315.501736	924.6641	1319.993	1678.113	1059.539
16Mar2016 8:00:00	2016	1318.147093	929.0182	1325.409	1703.347	1033.719
16Mar2016 9:00:00	2016	1321.753327	931.8187	1339.265	1720.32	1023.171
16Mar2016 10:00:00	2016	1332.562235	932.3247	1332.263	1741.514	1013.027
16Mar2016 11:00:00	2016	1342.008251	931.4191	1323.984	1752.736	949.0795
16Mar2016 12:00:00	2016	1338.467815	924.8037	1357.299	1739.148	962.72
16Mar2016 13:00:00	2016	1331.378212	923.2301	1357.275	1710.2	957.7266
16Mar2016 14:00:00	2016	1326.866201	916.1745	1321.989	1698.494	919.89
16Mar2016 15:00:00	2016	1328.873594	914.5012	1308.114	1699.002	932.349
16Mar2016 16:00:00	2016	1340.472416	924.21	1313.711	1708.066	939.9084
16Mar2016 17:00:00	2016	1349.549682	927.3211	1300.057	1701.958	959.5519
16Mar2016 18:00:00	2016	1319.976813	917.5209	1287.378	1684.221	967.2958
16Mar2016 19:00:00	2016	1335.037058	927.4869	1322.107	1687.098	992.8095
16Mar2016 20:00:00	2016	1346.306225	946.8515	1350.664	1745.746	1005.43
16Mar2016 21:00:00	2016	1270.596899	928.78	1349.975	1664.569	999.2708
16Mar2016 22:00:00	2016	1151.272383	899.6264	1319.794	1553.245	993.2359
16Mar2016 23:00:00	2016	1033.056245	861.4453	1276.283	1432.352	995.6817
17Mar2016 0:00:00	2016	953.5767963	840.0875	1258.171	1348.894	989.622
17Mar2016 1:00:00	2016	908.6753237	832.0837	1246.587	1304.929	990.7232
17Mar2016 2:00:00	2016	887.5711095	827.4386	1248.165	1306.362	998.4904
17Mar2016 3:00:00	2016	884.7126432	827.2057	1259.475	1285.305	1007.174
17Mar2016 4:00:00	2016	906.9322385	834.8248	1270.16	1325.009	983.4654
17Mar2016 5:00:00	2016	986.1024924	851.71	1260.165	1387.499	988.2993
17Mar2016 6:00:00	2016	1161.03922	896.046	1298.432	1542.778	971.3204
17Mar2016 7:00:00	2016	1316.519307	950.722	1367.115	1719.805	970.4554
17Mar2016 8:00:00	2016	1322.748882	957.1433	1369.995	1734.9	967.1228

17Mar2016 9:00:00	2016	1346.643822	966.501	1384.774	1767.468	965.8303
17Mar2016 10:00:00	2016	1365.891043	962.9127	1383.32	1791.483	959.1424
17Mar2016 11:00:00	2016	1371.313384	961.7846	1383.38	1808.874	961.2622
17Mar2016 12:00:00	2016	1366.095972	956.2104	1369.349	1802.448	951.2633
17Mar2016 13:00:00	2016	1370.462931	955.5029	1381.82	1825.371	946.1606
17Mar2016 14:00:00	2016	1356.692228	957.1207	1392.322	1817.762	941.3256
17Mar2016 15:00:00	2016	1353.16277	953.4224	1418.558	1778.639	948.6734
17Mar2016 16:00:00	2016	1353.337358	967.7056	1429.819	1778.662	966.5205
17Mar2016 17:00:00	2016	1357.612726	971.575	1409.109	1749.425	966.7328
17Mar2016 18:00:00	2016	1317.197936	944.8436	1381.48	1701.667	963.4114
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17Mar2016 20:00:00	2016	1343.689973	962.8587	1399.319	1780.622	983.4224
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17Mar2016 22:00:00	2016	1155.95972	905.7526	1318.858	1588.11	980.4137
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18Mar2016 1:00:00	2016	934.1313985	840.9664	1269.546	1339.417	980.4092
18Mar2016 2:00:00	2016	913.6534152	833.6067	1267.073	1304.741	981.2279
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18Mar2016 4:00:00	2016	930.7744295	834.0172	1268.13	1301.573	996.545
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18Mar2016 6:00:00	2016	1162.217442	895.9943	1327.682	1541.165	1013.111
18Mar2016 7:00:00	2016	1301.09257	938.2988	1384.939	1683.153	993.7767
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18Mar2016 9:00:00	2016	1351.122364	955.8489	1382.04	1740.905	986.7935
18Mar2016 10:00:00	2016	1363.179715	954.0239	1379.374	1744.017	985.6002
18Mar2016 11:00:00	2016	1367.340774	947.264	1387.215	1753.085	970.1237
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18Mar2016 13:00:00	2016	1350.267471	940.827	1362.111	1717.619	924.4942
18Mar2016 14:00:00	2016	1331.664461	932.2604	1350.82	1707.21	908.4458
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18Mar2016 17:00:00	2016	1281.683063	916.0617	1323.659	1632.493	899.3931
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18Mar2016 19:00:00	2016	1233.794417	907.6676	1336.576	1538.85	952.2954
18Mar2016 20:00:00	2016	1288.377649	940.568	1385.427	1624.287	981.6247
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18Mar2016 23:00:00	2016	1055.267695	881.4304	1296.544	1426.034	1006.554
19Mar2016 0:00:00	2016	979.7565257	859.7985	1287.796	1354.428	1022.776
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19Mar2016 2:00:00	2016	900.628067	838.2454	1263.01	1266.72	1018.562
19Mar2016 3:00:00	2016	890.4920972	835.6196	1257.793	1264.091	1028.022
19Mar2016 4:00:00	2016	895.6516808	839.7797	1265.299	1282.36	1018.69
19Mar2016 5:00:00	2016	924.5302527	844.6818	1275.562	1324.911	1025.853
19Mar2016 6:00:00	2016	981.3726706	863.8954	1287.258	1364.282	1028.76
19Mar2016 7:00:00	2016	1051.289697	871.8883	1297.556	1429.889	996.1828

19Mar2016 8:00:00	2016	1107.151366	883.4258	1306.532	1471.416	975.6216
19Mar2016 9:00:00	2016	1176.910454	898.7265	1321.618	1527.974	971.2272
19Mar2016 10:00:00	2016	1205.712714	900.3153	1312.668	1550.212	964.7372
19Mar2016 11:00:00	2016	1213.386833	892.8605	1303.602	1559.701	941.9031
19Mar2016 12:00:00	2016	1211.70896	900.6028	1299.352	1562.815	942.8616
19Mar2016 13:00:00	2016	1188.510437	887.5197	1287.876	1565.306	935.3326
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19Mar2016 18:00:00	2016	1149.184273	875.2267	1305.717	1519.849	969.4095
19Mar2016 19:00:00	2016	1154.379357	882.0059	1304.386	1526.242	971.5027
19Mar2016 20:00:00	2016	1203.578377	905.6793	1341.189	1596.605	976.1972
19Mar2016 21:00:00	2016	1165.10909	896.8591	1339.579	1568.179	977.5137
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20Mar2016 0:00:00	2016	953.2593317	828.5097	1250.408	1326.654	971.619
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20Mar2016 2:00:00	2016	877.6052411	808.6305	1181.679	1225.189	974.1075
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20Mar2016 5:00:00	2016	893.3244917	815.6448	1223.169	1244.017	925.6763
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20Mar2016 9:00:00	2016	1083.606504	880.8046	1276.815	1427.719	944.2681
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20Mar2016 13:00:00	2016	1147.79471	882.4326	1276.582	1496.332	926.132
20Mar2016 14:00:00	2016	1149.765913	875.0865	1268.804	1492.909	961.5877
20Mar2016 15:00:00	2016	1153.369757	872.4599	1269.824	1494.558	969.9667
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20Mar2016 17:00:00	2016	1191.756294	886.8121	1292.576	1541.791	974.3937
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21Mar2016 0:00:00	2016	912.8467005	817.8813	1254.308	1299.9	929.456
21Mar2016 1:00:00	2016	870.2486527	806.684	1228.34	1255.009	926.9526
21Mar2016 2:00:00	2016	852.066477	801.7999	1232.387	1234.667	955.605
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21Mar2016 6:00:00	2016	1122.129701	853.5724	1295.635	1464.006	990.7898

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21Mar2016 9:00:00	2016	1342.878001	937.3712	1398.275	1724.398	932.2717
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21Mar2016 12:00:00	2016	1383.069237	933.32	1426.433	1767.378	900.4833
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21Mar2016 17:00:00	2016	1369.373021	935.8575	1389.434	1761.933	917.7973
21Mar2016 18:00:00	2016	1325.094087	924.4093	1380.165	1724.105	924.5407
21Mar2016 19:00:00	2016	1307.645084	926.4178	1378.019	1717.843	954.545
21Mar2016 20:00:00	2016	1343.862563	942.1991	1409.281	1757.974	970.505
21Mar2016 21:00:00	2016	1275.452567	922.2948	1364.431	1656.253	968.985
21Mar2016 22:00:00	2016	1154.862743	892.3042	1323.265	1551.033	944.832
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22Mar2016 0:00:00	2016	957.5658765	838.8252	1260.276	1366.263	945.3594
22Mar2016 1:00:00	2016	913.324848	827.4771	1255.059	1335.489	943.9075
22Mar2016 2:00:00	2016	889.8461742	825.0259	1250.983	1300.998	934.6979
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22Mar2016 14:00:00	2016	1344.696151	945.5499	1364.343	1719.119	968.7747
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23Mar2016 0:00:00	2016	960.8761792	843.3905	1289.835	1346.431	961.5388
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23Mar2016 14:00:00	2016	1320.865362	884.0266	1354.557	1693.243	920.5595
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24Mar2016 14:00:00	2016	1325.866143	899.082	1356.608	1727.323	937.7019
24Mar2016 15:00:00	2016	1313.589244	890.3622	1338.829	1717.375	929.4628
24Mar2016 16:00:00	2016	1311.64355	898.9287	1363.111	1721.772	957.6795
24Mar2016 17:00:00	2016	1332.212957	906.6971	1360.442	1726.853	976.1177
24Mar2016 18:00:00	2016	1322.475437	895.2993	1313.159	1671.993	978.0721
24Mar2016 19:00:00	2016	1311.610574	902.8436	1318.124	1649.2	971.4495
24Mar2016 20:00:00	2016	1304.337133	912.1556	1358.217	1719.898	1009.88
24Mar2016 21:00:00	2016	1241.770759	895.9858	1340.758	1648.188	1014.423
24Mar2016 22:00:00	2016	1143.131766	869.3217	1302.152	1566.678	1013.478
24Mar2016 23:00:00	2016	1044.107868	839.1351	1252.229	1437.414	1008.944
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25Mar2016 4:00:00	2016	888.5310915	799.7224	1244.678	1251.401	1003.383

25Mar2016 5:00:00	2016	923.1178603	805.0168	1255.841	1275.213	1012.617
25Mar2016 6:00:00	2016	980.2136795	820.873	1272.105	1323.744	1016.547
25Mar2016 7:00:00	2016	1028.572159	839.4594	1286.305	1363.549	994.0557
25Mar2016 8:00:00	2016	1065.664302	857.2619	1299.531	1402.317	976.8755
25Mar2016 9:00:00	2016	1123.641471	879.1328	1314.462	1450.151	974.1533
25Mar2016 10:00:00	2016	1159.385052	890.7592	1324.393	1473.542	965.1845
25Mar2016 11:00:00	2016	1180.029855	892.6726	1323.241	1493.696	959.5114
25Mar2016 12:00:00	2016	1179.484444	885.9549	1314.852	1495.721	939.4117
25Mar2016 13:00:00	2016	1163.917134	876.5373	1298.278	1474.96	957.5882
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26Mar2016 6:00:00	2016	943.0984671	799.8575	1223.654	1265.214	940.0911
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26Mar2016 9:00:00	2016	1106.697085	861.8257	1271.293	1440.969	925.0648
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26Mar2016 14:00:00	2016	1127.05722	848.9884	1255.936	1463.27	944.134
26Mar2016 15:00:00	2016	1120.186079	844.6865	1237.361	1456.123	921.7419
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26Mar2016 22:00:00	2016	1085.547165	835.8297	1291.465	1447.074	999.4049
26Mar2016 23:00:00	2016	1005.41757	811.0744	1259.082	1371.747	981.2092
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27Mar2016 2:00:00	2016	866.5043337	776.7188	1229.705	1227.275	1024.597
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27Mar2016 6:00:00	2016	925.0688121	807.6819	1236.199	1275.902	979.4846
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27Mar2016 8:00:00	2016	1008.323752	834.1918	1201.581	1326.898	929.3259
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27Mar2016 14:00:00	2016	1127.079505	841.78	1245.561	1431.976	942.6685
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27Mar2016 16:00:00	2016	1154.136949	846.2012	1251.322	1442.306	949.2731
27Mar2016 17:00:00	2016	1143.677774	846.2929	1256.882	1447.698	944.867
27Mar2016 18:00:00	2016	1105.179707	835.6207	1260.495	1438.217	956.7041
27Mar2016 19:00:00	2016	1111.143929	842.097	1267.395	1434.023	959.8984
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27Mar2016 21:00:00	2016	1161.53799	863.5772	1310.161	1515.959	951.522
27Mar2016 22:00:00	2016	1081.889898	839.4698	1286.452	1442.124	971.6352
27Mar2016 23:00:00	2016	988.9984223	811.8464	1259.38	1344.667	976.0952
28Mar2016 0:00:00	2016	924.4297222	792.2426	1229.964	1289.977	977.9014
28Mar2016 1:00:00	2016	886.0983298	780.0702	1215.984	1214.37	998.5715
28Mar2016 2:00:00	2016	866.3845224	778.4571	1208.965	1194.37	983.0051
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28Mar2016 4:00:00	2016	884.4976579	783.9588	1192.824	1167.259	956.3413
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28Mar2016 6:00:00	2016	1098.476082	838.4389	1220.059	1328.111	960.6178
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28Mar2016 8:00:00	2016	1263.021112	904.3276	1300.77	1509.524	973.4037
28Mar2016 9:00:00	2016	1310.016869	923.7018	1329.484	1565.917	976.1562
28Mar2016 10:00:00	2016	1336.954036	937.0927	1354.201	1607.722	958.1731
28Mar2016 11:00:00	2016	1359.525861	939.1902	1354.069	1625.809	942.7618
28Mar2016 12:00:00	2016	1361.353135	933.7064	1352.566	1655.238	947.6456
28Mar2016 13:00:00	2016	1356.897787	929.2572	1345.002	1651.818	950.918
28Mar2016 14:00:00	2016	1348.098908	922.7786	1335.538	1637.821	951.3963
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28Mar2016 20:00:00	2016	1316.832789	936.8719	1346.345	1619.443	961.0478
28Mar2016 21:00:00	2016	1259.321834	918.4673	1327.346	1581.037	944.2875
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02Apr2016 6:00:00	2016	919.3106495	800.6687	1128.373	1178.076	951.0018
02Apr2016 7:00:00	2016	960.3665062	819.8522	1157.576	1211.981	941.8208
02Apr2016 8:00:00	2016	1043.877136	846.1069	1200.425	1303.637	926.3421
02Apr2016 9:00:00	2016	1124.209979	863.8844	1229.278	1385.325	926.248
02Apr2016 10:00:00	2016	1178.381181	871.9379	1255.2	1468.392	907.7408
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02Apr2016 12:00:00	2016	1211.913032	854.7009	1214.603	1504.051	886.4109
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02Apr2016 15:00:00	2016	1174.4177	845.6755	1192.527	1468.739	884.9216
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02Apr2016 17:00:00	2016	1177.398499	852.0562	1185.485	1457.582	908.4942
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02Apr2016 20:00:00	2016	1163.365878	857.5045	1185.632	1466.514	904.8088
02Apr2016 21:00:00	2016	1157.198574	856.038	1182.038	1459.17	911.0435
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02Apr2016 23:00:00	2016	993.1300273	793.6403	1075.61	1291.193	905.188
03Apr2016 0:00:00	2016	921.5250933	774.6952	1065.577	1204.376	905.543
03Apr2016 1:00:00	2016	871.8167311	759.573	1067.823	1165.146	905.6018
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03Apr2016 4:00:00	2016	829.3305587	751.2113	1064.313	1118.998	901.6986
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03Apr2016 7:00:00	2016	919.936492	781.5371	1101.539	1191.674	919.8234
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03Apr2016 10:00:00	2016	1118.90249	842.7479	1186.059	1392.87	947.1619
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03Apr2016 13:00:00	2016	1163.856112	835.7833	1179.698	1441.145	945.3824
03Apr2016 14:00:00	2016	1156.8199	829.8776	1175.94	1433.834	939.8183
03Apr2016 15:00:00	2016	1154.426072	827.0537	1174.996	1435.956	944.4578
03Apr2016 16:00:00	2016	1172.73714	833.8428	1183.067	1461.463	944.3166
03Apr2016 17:00:00	2016	1193.841004	839.0077	1190.198	1477.221	951.2026
03Apr2016 18:00:00	2016	1175.006728	832.7197	1184.518	1437.111	957.9264
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03Apr2016 22:00:00	2016	1088.56446	818.926	1178.101	1377.477	968.4611
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06Apr2016 1:00:00	2016	874.2982438	784.3919	1060.25	1186.782	841.9261
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06Apr2016 13:00:00	2016	1355.933686	857.792	1222.926	1636.919	888.7304
06Apr2016 14:00:00	2016	1348.784568	860.4331	1217.786	1626.965	896.0019
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06Apr2016 22:00:00	2016	1120.271346	807.5448	1169.205	1457.68	895.4613
06Apr2016 23:00:00	2016	999.7282682	819.4352	1132.059	1349.673	875.0989
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10Apr2016 19:00:00	2016	1156.262227	863.3229	1198.882	1413.749	906.5393
10Apr2016 20:00:00	2016	1189.697568	882.6232	1230.511	1471.554	923.1407
10Apr2016 21:00:00	2016	1188.416709	889.4645	1238.055	1512.827	936.9482
10Apr2016 22:00:00	2016	1088.169412	861.259	1190.365	1408.1	929.2387
10Apr2016 23:00:00	2016	976.7172302	827.1586	1157.033	1291.738	913.5551
11Apr2016 0:00:00	2016	904.4218852	810.6794	1135.506	1226.338	894.0258
11Apr2016 1:00:00	2016	865.0476435	804.2914	1129.539	1186.658	896.4996
11Apr2016 2:00:00	2016	847.1247953	802.0229	1124.282	1169.763	918.1964
11Apr2016 3:00:00	2016	845.7940924	802.4432	1119.981	1168.986	921.8025
11Apr2016 4:00:00	2016	873.2880541	807.7466	1126.977	1189.01	912.6036
11Apr2016 5:00:00	2016	957.2476324	827.3499	1116.571	1261.541	959.2054
11Apr2016 6:00:00	2016	1122.453145	863.95	1146.889	1368.362	968.692
11Apr2016 7:00:00	2016	1234.598567	902.8588	1209.268	1495.116	950.8383
11Apr2016 8:00:00	2016	1275.294952	923.2299	1260.596	1591.252	948.8377
11Apr2016 9:00:00	2016	1304.429703	896.5135	1259.2	1633.487	959.8728
11Apr2016 10:00:00	2016	1322.104429	889.2749	1258.132	1642.918	953.1494
11Apr2016 11:00:00	2016	1338.818943	880.0802	1218.261	1643.67	944.3407
11Apr2016 12:00:00	2016	1345.832649	875.9611	1210.789	1623.551	941.4146
11Apr2016 13:00:00	2016	1361.154616	875.228	1205.808	1601.164	937.1217
11Apr2016 14:00:00	2016	1363.594729	871.8132	1195.551	1592.826	930.1218
11Apr2016 15:00:00	2016	1363.338312	863.828	1182.47	1583.777	923.1439
11Apr2016 16:00:00	2016	1363.075611	875.4412	1176.591	1589.97	919.668
11Apr2016 17:00:00	2016	1359.339776	882.3804	1210.882	1599.037	935.3483
11Apr2016 18:00:00	2016	1294.953698	877.0635	1209.091	1547.584	927.901
11Apr2016 19:00:00	2016	1249.191186	885.977	1212.112	1527.606	931.6108

11Apr2016 20:00:00	2016	1249.218868	893.2221	1231.433	1565.691	947.2193
11Apr2016 21:00:00	2016	1229.064619	887.8137	1217.467	1549.585	954.8403
11Apr2016 22:00:00	2016	1103.845052	848.9951	1163.931	1422.095	949.0694
11Apr2016 23:00:00	2016	978.3510446	812.6981	1136.576	1302.809	921.3018
12Apr2016 0:00:00	2016	900.7059431	792.8616	1117.122	1196.535	911.5556
12Apr2016 1:00:00	2016	860.4919029	787.1837	1105.55	1158.653	919.0408
12Apr2016 2:00:00	2016	837.6543815	782.9386	1098.546	1133.192	921.0299
12Apr2016 3:00:00	2016	837.8360394	783.0305	1073.354	1125.835	904.953
12Apr2016 4:00:00	2016	862.5156202	791.1843	1084.497	1140.126	924.5105
12Apr2016 5:00:00	2016	947.1711819	806.0762	1117.144	1205.887	962.5661
12Apr2016 6:00:00	2016	1109.902402	837.3631	1152.406	1325.779	953.3143
12Apr2016 7:00:00	2016	1215.950434	872.2525	1201.404	1446.348	922.0895
12Apr2016 8:00:00	2016	1263.206174	885.6692	1252.546	1515.485	929.6615
12Apr2016 9:00:00	2016	1287.668847	860.5789	1265.826	1553.578	938.6317
12Apr2016 10:00:00	2016	1313.14564	816.7448	1270.618	1582.823	926.0408
12Apr2016 11:00:00	2016	1332.352786	841.5874	1275.772	1606.709	963.1476
12Apr2016 12:00:00	2016	1345.807835	854.5845	1267.433	1607.203	960.7854
12Apr2016 13:00:00	2016	1362.252967	847.9225	1261.688	1639.321	947.8871
12Apr2016 14:00:00	2016	1364.340005	849.1404	1245.622	1653.418	953.4815
12Apr2016 15:00:00	2016	1356.769819	847.1034	1245.342	1648.883	936.4552
12Apr2016 16:00:00	2016	1354.308027	848.3645	1245.829	1651.167	928.1074
12Apr2016 17:00:00	2016	1349.329724	852.2892	1249.629	1614.469	922.4125
12Apr2016 18:00:00	2016	1276.367608	851.0543	1236.089	1554.909	925.5501
12Apr2016 19:00:00	2016	1239.734609	872.0449	1220.841	1520.962	936.0781
12Apr2016 20:00:00	2016	1245.685683	878.1293	1231.773	1530.228	942.3705
12Apr2016 21:00:00	2016	1226.930036	872.8398	1229.29	1538.865	958.2242
12Apr2016 22:00:00	2016	1103.527858	835.6048	1182.903	1417.291	956.4752
12Apr2016 23:00:00	2016	979.5390624	801.8799	1145.886	1295.264	948.846
13Apr2016 0:00:00	2016	898.4153366	774.7346	1121.28	1190.333	960.2919
13Apr2016 1:00:00	2016	856.8959162	762.7611	1108.423	1141.786	956.9821
13Apr2016 2:00:00	2016	834.4375261	758.0039	1096.594	1115.825	952.1458
13Apr2016 3:00:00	2016	831.8413357	755.6886	1105.116	1124.605	946.1119
13Apr2016 4:00:00	2016	853.0674861	763.5256	1112.817	1146.883	941.5532
13Apr2016 5:00:00	2016	934.1279218	776.7506	1121.918	1209.832	927.0505
13Apr2016 6:00:00	2016	1105.437578	813.1994	1164.013	1342.486	926.2447
13Apr2016 7:00:00	2016	1222.757726	857.8217	1215.375	1464.988	928.4712
13Apr2016 8:00:00	2016	1257.755597	888.4217	1248.819	1535.666	946.4897
13Apr2016 9:00:00	2016	1286.112891	894.493	1266.632	1573.811	963.1226
13Apr2016 10:00:00	2016	1315.486842	886.4765	1262.762	1601.87	963.5236
13Apr2016 11:00:00	2016	1331.842018	887.5062	1257.594	1622.923	958.3849
13Apr2016 12:00:00	2016	1333.662408	879.434	1237.528	1628.437	948.608
13Apr2016 13:00:00	2016	1344.176008	874.7949	1234.355	1639.556	943.3659
13Apr2016 14:00:00	2016	1356.588679	864.2004	1238.701	1655.022	951.4478
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13Apr2016 16:00:00	2016	1353.378147	846.089	1262.033	1660.478	955.5681
13Apr2016 17:00:00	2016	1338.096871	844.7167	1258.19	1641.317	958.9795
13Apr2016 18:00:00	2016	1270.823728	839.0375	1234.435	1577.222	942.2746

13Apr2016 19:00:00	2016	1240.881659	854.5344	1228.302	1536.444	944.537
13Apr2016 20:00:00	2016	1247.560654	866.7119	1243.174	1547.728	945.8369
13Apr2016 21:00:00	2016	1228.484647	865.5278	1245.117	1564.806	959.5574
13Apr2016 22:00:00	2016	1110.018771	834.2959	1195.532	1435.859	958.2213
13Apr2016 23:00:00	2016	986.8733016	799.9311	1157.314	1321.768	946.7883
14Apr2016 0:00:00	2016	908.088314	776.3698	1136.225	1244.62	968.8604
14Apr2016 1:00:00	2016	872.546747	771.4671	1113.714	1205.68	968.3547
14Apr2016 2:00:00	2016	853.160015	770.2799	1101.683	1180.748	952.4458
14Apr2016 3:00:00	2016	848.2128372	770.4263	1111.099	1175.582	946.0254
14Apr2016 4:00:00	2016	871.2070646	775.8594	1118.373	1180.602	946.6791
14Apr2016 5:00:00	2016	951.1691043	794.499	1126.274	1241.586	969.5552
14Apr2016 6:00:00	2016	1122.013822	832.3037	1157.512	1366.339	935.7688
14Apr2016 7:00:00	2016	1243.687483	872.9735	1221.285	1490.699	929.7311
14Apr2016 8:00:00	2016	1284.319266	892.4338	1259.599	1554.458	928.8707
14Apr2016 9:00:00	2016	1308.392941	904.0135	1273.221	1603.037	932.3375
14Apr2016 10:00:00	2016	1327.434514	906.0647	1280.311	1637.629	929.8091
14Apr2016 11:00:00	2016	1343.989492	902.6347	1278.172	1643.224	925.5006
14Apr2016 12:00:00	2016	1341.648448	898.3362	1266.529	1624.515	925.8021
14Apr2016 13:00:00	2016	1340.211648	900.3176	1253.641	1609.84	903.749
14Apr2016 14:00:00	2016	1335.016833	898.5079	1255.564	1604.132	904.5116
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14Apr2016 19:00:00	2016	1244.595368	905.2502	1225.346	1481.898	934.468
14Apr2016 20:00:00	2016	1257.997799	913.2541	1237.147	1494.343	936.5425
14Apr2016 21:00:00	2016	1221.282682	893.2446	1232.451	1524.438	940.9851
14Apr2016 22:00:00	2016	1105.972853	861.0774	1198.291	1437.633	930.9344
14Apr2016 23:00:00	2016	990.2440594	829.6362	1167.373	1335.106	922.7116
15Apr2016 0:00:00	2016	912.6367462	810.049	1155.448	1245.237	903.6191
15Apr2016 1:00:00	2016	869.7024762	797.6179	1143.284	1204.769	901.0201
15Apr2016 2:00:00	2016	849.0094396	791.2041	1127.632	1183.512	873.5599
15Apr2016 3:00:00	2016	841.258173	787.7829	1123.513	1177.988	885.6828
15Apr2016 4:00:00	2016	863.6513683	787.3116	1131.074	1196.178	911.5892
15Apr2016 5:00:00	2016	941.1550749	803.0056	1130.014	1263.012	945.6217
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15Apr2016 7:00:00	2016	1212.992724	875.6953	1205.347	1487.343	923.6042
15Apr2016 8:00:00	2016	1258.348885	899.8009	1209.536	1546.378	888.5684
15Apr2016 9:00:00	2016	1285.15837	911.3513	1232.82	1589.996	845.9533
15Apr2016 10:00:00	2016	1304.563136	908.2969	1244.762	1614.654	842.6098
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15Apr2016 12:00:00	2016	1321.756359	894.1729	1234.369	1609.273	841.253
15Apr2016 13:00:00	2016	1318.65208	893.3509	1228.566	1592.049	855.9367
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15Apr2016 19:00:00	2016	1162.004844	864.3791	1206.2	1448.32	840.2863
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15Apr2016 23:00:00	2016	986.8922227	818.7158	1157.871	1289.516	866.7191
16Apr2016 0:00:00	2016	909.0256838	794.3655	1139.556	1205.095	863.9934
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16Apr2016 3:00:00	2016	823.2198634	771.5458	1100.921	1152.882	853.228
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16Apr2016 6:00:00	2016	896.1514158	805.1263	1101.616	1185.925	873.3349
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16Apr2016 11:00:00	2016	1169.635389	870.717	1193.395	1482.589	838.3196
16Apr2016 12:00:00	2016	1175.887395	869.3505	1192.6	1476.282	802.3233
16Apr2016 13:00:00	2016	1165.772262	862.9731	1188.752	1484.232	816.992
16Apr2016 14:00:00	2016	1148.422515	855.8882	1172.856	1472.534	815.626
16Apr2016 15:00:00	2016	1143.103196	854.8632	1162.805	1467.64	813.7428
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16Apr2016 19:00:00	2016	1102.86364	827.8899	1117.866	1440.317	788.6198
16Apr2016 20:00:00	2016	1113.088283	836.2395	1127.21	1440.225	808.3392
16Apr2016 21:00:00	2016	1131.333267	846.4493	1149.77	1469.532	817.8276
16Apr2016 22:00:00	2016	1060.784472	824.8347	1134.447	1408.249	883.8915
16Apr2016 23:00:00	2016	970.2496252	798.1713	1108.887	1317.777	870.4098
17Apr2016 0:00:00	2016	895.6995096	776.0889	1087.741	1237.705	875.3564
17Apr2016 1:00:00	2016	848.3087782	765.3689	1087.899	1172.921	872.1453
17Apr2016 2:00:00	2016	821.9599387	756.8798	1097.867	1148.2	875.591
17Apr2016 3:00:00	2016	810.4651321	754.644	1084.062	1134.332	867.4396
17Apr2016 4:00:00	2016	813.563875	758.3464	1084.063	1131.414	862.7955
17Apr2016 5:00:00	2016	833.3687799	766.1175	1097.773	1146.341	880.7362
17Apr2016 6:00:00	2016	855.6151979	774.6856	1099.62	1146.256	882.7547
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17Apr2016 8:00:00	2016	967.5612528	806.3821	1112.164	1281.327	833.9827
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17Apr2016 11:00:00	2016	1138.019179	845.8134	1183.401	1471.789	855.8421
17Apr2016 12:00:00	2016	1153.979927	848.1856	1179.166	1485.939	859.0738
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17Apr2016 14:00:00	2016	1152.420098	844.9919	1205.611	1487.023	879.4362
17Apr2016 15:00:00	2016	1159.171303	848.7519	1207.133	1489.408	876.5968
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17Apr2016 17:00:00	2016	1199.571142	863.0232	1212.655	1508.588	891.3
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17Apr2016 23:00:00	2016	964.6231447	804.4276	1142.59	1308.715	895.4626
18Apr2016 0:00:00	2016	883.1499798	784.7882	1117.001	1223.835	879.0804
18Apr2016 1:00:00	2016	838.3809847	775.4188	1093.161	1165.998	869.9452
18Apr2016 2:00:00	2016	818.0221033	770.4358	1080.358	1153.149	872.8412
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18Apr2016 4:00:00	2016	834.0485762	782.1791	1090.761	1145.559	874.1944
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18Apr2016 10:00:00	2016	1340.232204	876.4339	1249.236	1687.749	872.4758
18Apr2016 11:00:00	2016	1379.404502	879.9708	1264.399	1724.7	876.9958
18Apr2016 12:00:00	2016	1398.306729	862.0421	1265.124	1744.496	880.2523
18Apr2016 13:00:00	2016	1415.757923	861.8609	1263.316	1766.541	892.0384
18Apr2016 14:00:00	2016	1421.609853	853.8364	1270.016	1767.126	893.1426
18Apr2016 15:00:00	2016	1425.3383	858.1922	1283.028	1783.05	881.1621
18Apr2016 16:00:00	2016	1432.185605	865.7469	1295.585	1766.527	885.6297
18Apr2016 17:00:00	2016	1420.088509	859.7999	1294.147	1789.941	895.5051
18Apr2016 18:00:00	2016	1332.371692	864.7123	1270.436	1707.315	902.298
18Apr2016 19:00:00	2016	1280.827653	875.8668	1261.687	1663.795	894.7925
18Apr2016 20:00:00	2016	1268.654858	879.52	1273.98	1646.209	904.2166
18Apr2016 21:00:00	2016	1254.918779	890.1409	1280.532	1652.756	903.3203
18Apr2016 22:00:00	2016	1118.864982	854.9742	1240.857	1523.613	893.2565
18Apr2016 23:00:00	2016	986.6032826	817.5174	1193.82	1393.754	875.8716
19Apr2016 0:00:00	2016	898.6808983	788.999	1165.772	1286.888	875.1365
19Apr2016 1:00:00	2016	851.5137918	779.4868	1147.599	1208.551	866.3015
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19Apr2016 4:00:00	2016	848.5506713	782.5261	1117.654	1130.089	844.7398
19Apr2016 5:00:00	2016	930.9702154	799.0925	1136.437	1193.525	843.934
19Apr2016 6:00:00	2016	1079.636742	832.0641	1139.692	1300.918	869.8404
19Apr2016 7:00:00	2016	1203.453379	873.3814	1187.211	1439.71	863.6783
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19Apr2016 10:00:00	2016	1384.590183	879.1321	1273.926	1627.449	889.8508
19Apr2016 11:00:00	2016	1431.111425	887.8088	1287.464	1658.582	891.5088
19Apr2016 12:00:00	2016	1450.781281	880.7315	1293.059	1675.528	896.6831
19Apr2016 13:00:00	2016	1472.554028	880.0748	1290.037	1700.261	899.2997
19Apr2016 14:00:00	2016	1484.033795	884.251	1293.432	1722.69	887.4223
19Apr2016 15:00:00	2016	1489.718177	888.8768	1292.905	1759.782	881.2805

19Apr2016 16:00:00	2016	1493.475219	899.8877	1299.648	1731.557	901.5298
19Apr2016 17:00:00	2016	1477.926423	896.8413	1284.081	1735.534	889.5953
19Apr2016 18:00:00	2016	1392.608299	886.7651	1259.074	1675.282	882.9467
19Apr2016 19:00:00	2016	1341.806692	920.3008	1247.958	1603.866	880.0343
19Apr2016 20:00:00	2016	1319.361514	917.4544	1259.379	1602.291	875.9043
19Apr2016 21:00:00	2016	1296.427465	912.3338	1273.693	1623.154	886.6765
19Apr2016 22:00:00	2016	1157.432532	867.5585	1221.568	1482.615	872.3391
19Apr2016 23:00:00	2016	1014.09058	826.1647	1178.365	1351.29	880.9415
20Apr2016 0:00:00	2016	920.9263829	805.1061	1146.624	1253.696	879.8547
20Apr2016 1:00:00	2016	872.06291	795.8577	1112.415	1189.603	890.762
20Apr2016 2:00:00	2016	849.5724585	781.739	1104.033	1139.571	892.5222
20Apr2016 3:00:00	2016	842.2897789	778.3878	1090.04	1123.122	891.039
20Apr2016 4:00:00	2016	861.5480791	783.4939	1091.978	1127.033	892.2484
20Apr2016 5:00:00	2016	938.9068635	809.1014	1087.632	1192.891	903.4814
20Apr2016 6:00:00	2016	1085.375908	837.4176	1102.11	1289.814	904.8565
20Apr2016 7:00:00	2016	1201.314525	877.1269	1151.406	1450.766	898.797
20Apr2016 8:00:00	2016	1256.194903	896.2314	1219.993	1531.128	906.471
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20Apr2016 10:00:00	2016	1333.003766	906.2747	1247.996	1618.091	884.8128
20Apr2016 11:00:00	2016	1364.119921	910.1364	1267.454	1637.923	887.7841
20Apr2016 12:00:00	2016	1375.621023	888.2906	1260.031	1651.506	890.053
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20Apr2016 14:00:00	2016	1384.535384	881.6259	1267.36	1665.22	881.5791
20Apr2016 15:00:00	2016	1388.902865	879.978	1255.278	1662.954	882.4795
20Apr2016 16:00:00	2016	1393.180926	887.5878	1261.223	1655.661	881.9919
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20Apr2016 20:00:00	2016	1244.049843	894.1881	1223.701	1494.799	888.3735
20Apr2016 21:00:00	2016	1243.492936	899.8669	1253.197	1533.134	900.2567
20Apr2016 22:00:00	2016	1121.678256	867.6373	1217.688	1429.453	895.442
20Apr2016 23:00:00	2016	988.6148989	828.2152	1166.147	1308.946	902.4839
21Apr2016 0:00:00	2016	899.0658547	805.7458	1149.404	1234.641	870.3112
21Apr2016 1:00:00	2016	853.749344	794.5649	1143.522	1195.923	868.56
21Apr2016 2:00:00	2016	827.5198772	787.3301	1130.524	1175.318	896.3633
21Apr2016 3:00:00	2016	825.6279059	780.2488	1114.112	1189.393	896.1081
21Apr2016 4:00:00	2016	847.4405628	793.6516	1102.924	1212.521	902.2988
21Apr2016 5:00:00	2016	927.2571432	809.6398	1111.024	1270.88	932.4926
21Apr2016 6:00:00	2016	1069.690265	832.4989	1132.61	1376.715	937.89
21Apr2016 7:00:00	2016	1189.993291	873.1045	1203.514	1481.771	900.7228
21Apr2016 8:00:00	2016	1244.366131	896.7085	1260.137	1581.618	889.3903
21Apr2016 9:00:00	2016	1281.022146	911.5952	1290.455	1624.432	883.871
21Apr2016 10:00:00	2016	1306.97749	910.1091	1301.332	1640.305	897.9036
21Apr2016 11:00:00	2016	1336.298252	916.0261	1297.955	1641.425	889.4796
21Apr2016 12:00:00	2016	1361.910572	916.9071	1287.502	1642.883	887.8502
21Apr2016 13:00:00	2016	1388.373366	915.2302	1242.445	1655.306	884.8609
21Apr2016 14:00:00	2016	1401.645008	917.9868	1246.053	1635.529	880.2456

21Apr2016 15:00:00	2016	1410.360681	920.8299	1258.118	1660.146	866.8833
21Apr2016 16:00:00	2016	1423.02394	917.1868	1273.801	1638.439	861.5503
21Apr2016 17:00:00	2016	1416.167384	923.0812	1279.583	1634.947	862.7512
21Apr2016 18:00:00	2016	1338.117784	920.8384	1267.637	1571.767	866.2667
21Apr2016 19:00:00	2016	1281.294116	910.775	1259.327	1510.221	865.983
21Apr2016 20:00:00	2016	1266.263742	910.539	1265.95	1537.724	866.1686
21Apr2016 21:00:00	2016	1256.087015	908.3144	1267.759	1563.377	863.9618
21Apr2016 22:00:00	2016	1123.568392	869.7196	1224.259	1449.16	861.1382
21Apr2016 23:00:00	2016	993.5359368	823.0483	1165.681	1348.399	876.9267
22Apr2016 0:00:00	2016	904.4486492	789.2162	1148.422	1274.268	879.4069
22Apr2016 1:00:00	2016	857.1484099	776.893	1137.712	1228.428	877.167
22Apr2016 2:00:00	2016	834.128634	773.2896	1127.377	1197.601	875.4704
22Apr2016 3:00:00	2016	829.2139635	773.9734	1127.811	1191.852	862.8372
22Apr2016 4:00:00	2016	846.9995417	780.4503	1140.716	1200.913	866.3272
22Apr2016 5:00:00	2016	919.7176308	795.0838	1145.255	1264.751	866.2259
22Apr2016 6:00:00	2016	1059.842943	820.2318	1169.947	1359.544	878.8694
22Apr2016 7:00:00	2016	1177.679594	861.2689	1213.099	1481.027	869.6857
22Apr2016 8:00:00	2016	1254.345888	892.7876	1247.532	1541.03	851.0713
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22Apr2016 10:00:00	2016	1312.788615	907.2448	1301.837	1610.529	835.7718
22Apr2016 11:00:00	2016	1326.528692	905.1983	1267.069	1619.379	836.2209
22Apr2016 12:00:00	2016	1325.28318	898.177	1243.45	1619.465	834.4406
22Apr2016 13:00:00	2016	1320.481606	895.3177	1243.476	1613.966	835.6234
22Apr2016 14:00:00	2016	1309.345616	895.0335	1239.557	1609.598	826.6613
22Apr2016 15:00:00	2016	1303.392073	894.5889	1235.635	1582.712	809.707
22Apr2016 16:00:00	2016	1293.758912	896.5691	1231.229	1594.105	808.7391
22Apr2016 17:00:00	2016	1280.964633	897.6348	1238.231	1575.294	814.88
22Apr2016 18:00:00	2016	1212.92716	885.001	1227.223	1497.543	819.91
22Apr2016 19:00:00	2016	1173.770289	875.1659	1235.94	1465.146	827.48
22Apr2016 20:00:00	2016	1167.466935	882.071	1236.56	1474.411	846.7837
22Apr2016 21:00:00	2016	1175.090064	886.3335	1243.592	1500.412	865.7632
22Apr2016 22:00:00	2016	1092.15194	855.4125	1213.122	1430.355	850.8106
22Apr2016 23:00:00	2016	988.1743012	823.8453	1176.152	1325.276	856.6089
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23Apr2016 1:00:00	2016	854.2095838	785.0423	1137.118	1208.547	859.7228
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23Apr2016 6:00:00	2016	884.0830266	800.5356	1145.602	1216.603	868.2058
23Apr2016 7:00:00	2016	943.0114001	815.8128	1161.015	1272.769	872.7576
23Apr2016 8:00:00	2016	1034.133706	848.6392	1205.764	1359.934	895.8915
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23Apr2016 10:00:00	2016	1158.321229	882.4509	1262.035	1515.813	916.3449
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23Apr2016 20:00:00	2016	1145.597432	865.508	1226.155	1478.293	914.187
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24Apr2016 0:00:00	2016	910.9646726	797.9882	1154.267	1265.305	901.204
24Apr2016 1:00:00	2016	859.9660831	782.4634	1141.401	1214.338	917.4307
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24Apr2016 5:00:00	2016	842.1984853	774.6382	1146.39	1219.936	899.165
24Apr2016 6:00:00	2016	878.2595653	780.0595	1146.458	1224.161	888.8532
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24Apr2016 10:00:00	2016	1125.235863	868.8872	1198.393	1439.126	846.9622
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25Apr2016 6:00:00	2016	1089.591377	837.3307	1221.304	1414.536	855.8128
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25Apr2016 9:00:00	2016	1322.38973	901.9012	1333.138	1668.854	905.7456
25Apr2016 10:00:00	2016	1344.332085	899.2393	1316.564	1695.839	928.6639
25Apr2016 11:00:00	2016	1366.005778	896.0631	1315.394	1690.561	973.1222
25Apr2016 12:00:00	2016	1373.690661	894.5707	1308.805	1667.77	982.2757

25Apr2016 13:00:00	2016	1372.159018	895.3269	1302.477	1664.19	977.5083
25Apr2016 14:00:00	2016	1362.01606	892.3639	1277.972	1652.487	967.2315
25Apr2016 15:00:00	2016	1351.046335	896.1485	1266.444	1658.727	968.7661
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25Apr2016 17:00:00	2016	1350.684355	926.4593	1333.361	1682.476	932.7171
25Apr2016 18:00:00	2016	1293.582584	931.6681	1309.221	1614.4	923.3425
25Apr2016 19:00:00	2016	1260.640764	924.3426	1288.9	1582.537	918.2889
25Apr2016 20:00:00	2016	1244.885856	928.1809	1300.477	1580.402	924.0548
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25Apr2016 22:00:00	2016	1111.886222	884.7205	1243.869	1464.727	933.772
25Apr2016 23:00:00	2016	990.2749132	841.717	1190.31	1342.015	928.0494
26Apr2016 0:00:00	2016	903.0416699	816.0708	1142.722	1256.567	918.6826
26Apr2016 1:00:00	2016	859.4416903	804.2462	1133.726	1195.558	942.6243
26Apr2016 2:00:00	2016	839.2701743	799.2673	1134.618	1171.404	938.3111
26Apr2016 3:00:00	2016	834.9466909	796.6731	1138.607	1155.638	922.7182
26Apr2016 4:00:00	2016	857.7071531	808.5544	1140.217	1152.852	913.6544
26Apr2016 5:00:00	2016	944.4194352	826.4831	1135.418	1216.891	911.1931
26Apr2016 6:00:00	2016	1097.759434	858.0136	1161.24	1307.71	892.6783
26Apr2016 7:00:00	2016	1214.578965	900.0829	1212.122	1449.076	878.3771
26Apr2016 8:00:00	2016	1259.886018	923.1406	1256.717	1553.111	877.5969
26Apr2016 9:00:00	2016	1291.05721	922.6915	1266.629	1589.972	859.593
26Apr2016 10:00:00	2016	1312.146617	888.1671	1264.125	1610.814	853.6289
26Apr2016 11:00:00	2016	1328.397984	885.4459	1266.418	1630.1	840.0711
26Apr2016 12:00:00	2016	1331.364349	878.2785	1269.354	1630.635	857.5331
26Apr2016 13:00:00	2016	1333.656898	877.6192	1273.438	1629.704	864.8749
26Apr2016 14:00:00	2016	1322.312899	886.4209	1280.26	1633.179	859.8283
26Apr2016 15:00:00	2016	1314.768601	881.388	1272.083	1607.974	849.1638
26Apr2016 16:00:00	2016	1316.926845	885.3905	1278.058	1608.361	856.3052
26Apr2016 17:00:00	2016	1311.209963	879.3926	1263.677	1583.641	860.8612
26Apr2016 18:00:00	2016	1244.089734	866.0112	1231.308	1509.636	858.5693
26Apr2016 19:00:00	2016	1204.692448	881.8903	1208.881	1475.36	854.5012
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26Apr2016 21:00:00	2016	1221.022461	894.6728	1230.628	1488.26	896.2928
26Apr2016 22:00:00	2016	1106.933696	861.4836	1190.524	1405.923	894.375
26Apr2016 23:00:00	2016	985.1610974	823.4106	1156.74	1293.342	880.4394
27Apr2016 0:00:00	2016	907.3703331	802.7171	1142.442	1211.287	867.7923
27Apr2016 1:00:00	2016	865.1591734	793.2874	1144.845	1176.835	856.1559
27Apr2016 2:00:00	2016	842.8563125	785.9481	1149.258	1172.778	873.2065
27Apr2016 3:00:00	2016	838.7630031	787.033	1158.467	1174.394	873.4865
27Apr2016 4:00:00	2016	859.6737593	791.5504	1162.567	1185.963	857.4584
27Apr2016 5:00:00	2016	946.5603339	807.6296	1175.179	1251.594	865.7616
27Apr2016 6:00:00	2016	1089.209309	837.1917	1183.713	1319.992	854.5892
27Apr2016 7:00:00	2016	1223.35353	885.7812	1231.085	1441.925	873.1765
27Apr2016 8:00:00	2016	1275.702882	908.8819	1255.541	1522.433	874.5457
27Apr2016 9:00:00	2016	1308.271815	915.7008	1260.824	1559.128	868.5027
27Apr2016 10:00:00	2016	1318.728784	914.9298	1238.411	1570.792	862.4735
27Apr2016 11:00:00	2016	1333.948802	915.6734	1239.36	1598.298	877.8082

27Apr2016 12:00:00	2016	1335.510907	903.7239	1235.877	1601.446	881.25
27Apr2016 13:00:00	2016	1326.282365	906.3612	1238.564	1611.61	867.7249
27Apr2016 14:00:00	2016	1320.041894	908.4182	1248.438	1608.493	858.7806
27Apr2016 15:00:00	2016	1313.619713	909.3813	1239.972	1605.013	864.5434
27Apr2016 16:00:00	2016	1316.701005	915.7938	1238.174	1602.199	858.2672
27Apr2016 17:00:00	2016	1310.269991	904.4507	1231.07	1585.687	869.0619
27Apr2016 18:00:00	2016	1239.722102	891.5362	1217.31	1532.87	880.1619
27Apr2016 19:00:00	2016	1204.507305	890.9394	1212.958	1498.138	895.2209
27Apr2016 20:00:00	2016	1193.527596	899.244	1212.393	1491.733	905.654
27Apr2016 21:00:00	2016	1220.747341	904.9651	1241.312	1535.644	906.3957
27Apr2016 22:00:00	2016	1120.402335	866.8971	1203.065	1445.981	879.8604
27Apr2016 23:00:00	2016	997.2524644	825.2789	1165.704	1318.788	875.0819
28Apr2016 0:00:00	2016	913.3026331	800.8017	1144.539	1228.963	903.658
28Apr2016 1:00:00	2016	869.1821162	791.8397	1130.143	1180.536	910.888
28Apr2016 2:00:00	2016	847.2679102	788.1991	1131.297	1160.255	907.2536
28Apr2016 3:00:00	2016	842.8296001	790.5464	1133.403	1152.813	903.6059
28Apr2016 4:00:00	2016	865.9670952	799.4224	1152.65	1164.573	898.9241
28Apr2016 5:00:00	2016	950.8948722	817.0891	1176.737	1218.675	908.5434
28Apr2016 6:00:00	2016	1104.649925	850.8261	1198.085	1307.619	896.3356
28Apr2016 7:00:00	2016	1237.0134	891.9278	1240.589	1451.902	896.184
28Apr2016 8:00:00	2016	1290.434272	918.3993	1277.492	1535.455	900.56
28Apr2016 9:00:00	2016	1316.086999	924.2227	1312.733	1586.014	893.9382
28Apr2016 10:00:00	2016	1327.790053	925.8289	1321.6	1614.376	893.0301
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28Apr2016 14:00:00	2016	1322.104988	909.1721	1292.113	1620.533	876.3471
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28Apr2016 16:00:00	2016	1312.711434	915.2901	1273.482	1611.146	871.6468
28Apr2016 17:00:00	2016	1301.360284	913.4847	1230.945	1590.994	868.8773
28Apr2016 18:00:00	2016	1242.232369	895.096	1188.109	1526.935	849.2838
28Apr2016 19:00:00	2016	1216.565352	893.434	1207.193	1505.123	842.2732
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28Apr2016 22:00:00	2016	1118.424361	874.7213	1226.841	1416.655	854.6043
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29Apr2016 2:00:00	2016	854.0530812	796.9194	1138.051	1147.067	846.6474
29Apr2016 3:00:00	2016	848.7045876	793.5754	1134.82	1132.017	862.9556
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29Apr2016 16:00:00	2016	1276.871211	921.7802	1270.04	1551.699	931.2934
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06May2016 19:00:00	2016	1223.321445	970.3207	1177.842	1525.167	620.1388
06May2016 20:00:00	2016	1184.121565	959.3881	1167.563	1487.346	612.955
06May2016 21:00:00	2016	1187.972817	962.1366	1181.526	1513.034	612.4881
06May2016 22:00:00	2016	1123.704282	936.1157	1143.439	1471.876	625.3028
06May2016 23:00:00	2016	1012.02342	899.9301	1096.335	1353.523	630.5192
07May2016 0:00:00	2016	919.6605965	876.0239	1069.123	1283.471	611.0855
07May2016 1:00:00	2016	864.2900075	857.566	1061.175	1220.824	613.2217
07May2016 2:00:00	2016	830.2768878	851.5381	1055.54	1172.154	627.264
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07May2016 4:00:00	2016	816.9878639	845.9739	1048.443	1147.709	665.2678
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07May2016 9:00:00	2016	1105.704099	930.7229	1104.303	1400.541	645.7987
07May2016 10:00:00	2016	1172.668524	951.2058	1143.328	1473.506	655.9659
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07May2016 16:00:00	2016	1276.85178	980.8161	1175.374	1649.836	735.6941
07May2016 17:00:00	2016	1286.606853	986.6897	1195.161	1671.933	718.5575
07May2016 18:00:00	2016	1268.32148	984.6103	1198.137	1629.003	717.3039
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08May2016 13:00:00	2016	1141.82535	915.5901	1129.508	1406.761	704.0723
08May2016 14:00:00	2016	1129.398302	917.853	1122.791	1412.606	698.1096
08May2016 15:00:00	2016	1129.776934	922.817	1122.491	1405.138	693.7592
08May2016 16:00:00	2016	1143.75283	927.1089	1128.912	1434.38	696.0327
08May2016 17:00:00	2016	1155.027228	923.1337	1142.581	1454.769	693.2189
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08May2016 22:00:00	2016	1054.867477	869.727	1139.154	1365.824	706.7377
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09May2016 6:00:00	2016	1047.102394	852.5777	1075.202	1238.729	701.4055
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12May2016 12:00:00	2016	1358.629486	943.603	1169.917	1574.895	651.3096
12May2016 13:00:00	2016	1360.652623	942.1695	1176.117	1584.296	642.497
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15May2016 10:00:00	2016	1086.003759	889.2667	1157.081	1390.877	640.9979
15May2016 11:00:00	2016	1116.578502	892.3225	1187.644	1441.682	656.8476
15May2016 12:00:00	2016	1131.309193	896.9263	1181.322	1459.803	674.6064
15May2016 13:00:00	2016	1130.181268	898.3025	1187.589	1466.635	686.9252
15May2016 14:00:00	2016	1127.354069	899.8055	1180.909	1470.923	741.2603
15May2016 15:00:00	2016	1135.004139	904.9874	1188.005	1472.087	742.7482
15May2016 16:00:00	2016	1152.335933	911.3613	1211.808	1513.333	746.1906
15May2016 17:00:00	2016	1175.799951	917.4515	1229.929	1536.977	760.1451
15May2016 18:00:00	2016	1160.933249	911.0152	1254.031	1512.382	762.419
15May2016 19:00:00	2016	1136.4159	907.3492	1296.505	1482.582	765.9078
15May2016 20:00:00	2016	1119.714403	906.2752	1296.65	1474.053	770.549
15May2016 21:00:00	2016	1130.760624	911.1767	1265.295	1468.729	771.9453
15May2016 22:00:00	2016	1081.148482	891.3849	1227.978	1444.234	780.8088
15May2016 23:00:00	2016	964.8199553	859.2924	1167.416	1314.376	786.4656
16May2016 0:00:00	2016	879.5045758	833.4109	1135.126	1214.16	779.493
16May2016 1:00:00	2016	834.8784121	824.0508	1113.127	1154.885	776.2288
16May2016 2:00:00	2016	815.7952113	819.466	1081.37	1096.765	771.3134
16May2016 3:00:00	2016	812.3078364	820.1767	1078.731	1121.9	771.5882
16May2016 4:00:00	2016	836.404389	823.8428	1084.303	1137.734	795.4177
16May2016 5:00:00	2016	903.6502012	832.0769	1099.346	1177.301	796.3933
16May2016 6:00:00	2016	1031.953062	867.7708	1133.479	1289.667	758.6079
16May2016 7:00:00	2016	1179.828835	913.5271	1162.87	1456.837	709.1013
16May2016 8:00:00	2016	1246.472752	940.5234	1203.191	1565.402	703.3475
16May2016 9:00:00	2016	1299.843952	938.1795	1226.854	1639.972	721.489
16May2016 10:00:00	2016	1347.599238	946.9011	1250.595	1690.645	749.8601
16May2016 11:00:00	2016	1378.9595	944.2688	1275.635	1736.208	763.563
16May2016 12:00:00	2016	1395.996836	947.6687	1281.056	1751.068	751.4504
16May2016 13:00:00	2016	1405.051385	951.3968	1281.97	1772.837	744.6097
16May2016 14:00:00	2016	1406.388304	954.7513	1285.31	1795.583	740.1695
16May2016 15:00:00	2016	1408.1264	952.5373	1282.363	1800.96	748.6265
16May2016 16:00:00	2016	1412.34387	947.7033	1288.037	1825.353	743.5608
16May2016 17:00:00	2016	1404.01209	946.6391	1280.921	1826.423	742.3624
16May2016 18:00:00	2016	1319.280131	954.7809	1255.282	1758.703	738.3251
16May2016 19:00:00	2016	1274.547088	945.1152	1239.994	1685.909	726.1922
16May2016 20:00:00	2016	1234.78299	938.5714	1222.163	1650.419	717.9749
16May2016 21:00:00	2016	1206.86024	936.6298	1219.233	1616.852	751.5202
16May2016 22:00:00	2016	1128.93582	914.9509	1194.242	1534.814	737.8151
16May2016 23:00:00	2016	995.0803902	871.6689	1139.188	1373.175	729.2219
17May2016 0:00:00	2016	900.8710325	836.3514	1108.361	1272.96	737.9616
17May2016 1:00:00	2016	851.8918629	821.6986	1095.743	1232.593	734.2684

17May2016 2:00:00	2016	827.6088123	819.4467	1083.666	1203.374	741.6044
17May2016 3:00:00	2016	821.1374868	816.9442	1075.789	1156.172	763.1578
17May2016 4:00:00	2016	841.5627106	818.7053	1072.456	1165.33	758.8859
17May2016 5:00:00	2016	909.4928691	825.5857	1074.001	1215.716	809.5486
17May2016 6:00:00	2016	1042.934745	854.3459	1094.613	1300.933	781.1224
17May2016 7:00:00	2016	1198.070326	910.3472	1155.944	1471.462	777.454
17May2016 8:00:00	2016	1268.150401	936.019	1182.752	1522.996	804.5354
17May2016 9:00:00	2016	1329.732788	946.5681	1200.981	1633.2	792.1092
17May2016 10:00:00	2016	1369.902757	966.6401	1209.631	1692.628	793.427
17May2016 11:00:00	2016	1409.238986	965.9213	1223.583	1726.031	795.6311
17May2016 12:00:00	2016	1425.618604	970.1855	1221.842	1711.298	807.7275
17May2016 13:00:00	2016	1439.763208	963.6521	1228.494	1723.878	804.799
17May2016 14:00:00	2016	1447.321053	969.8815	1221.608	1758.566	810.7941
17May2016 15:00:00	2016	1456.925074	983.6525	1203.885	1759.512	789.4538
17May2016 16:00:00	2016	1458.073075	990.1908	1232.07	1778.918	790.6818
17May2016 17:00:00	2016	1440.804287	982.5122	1237.634	1763.685	815.4881
17May2016 18:00:00	2016	1363.700177	979.8295	1196.409	1703.918	756.0892
17May2016 19:00:00	2016	1308.73137	972.5685	1195.018	1644.253	764.7873
17May2016 20:00:00	2016	1267.367857	961.457	1184.19	1621.049	754.8459
17May2016 21:00:00	2016	1245.682843	963.115	1184.167	1579.87	752.3073
17May2016 22:00:00	2016	1155.641308	939.7825	1177.609	1523.242	737.8815
17May2016 23:00:00	2016	1020.378375	896.1384	1131.019	1350.62	720.4843
18May2016 0:00:00	2016	927.893195	864.5171	1103.758	1244.485	709.6911
18May2016 1:00:00	2016	872.7608495	847.6969	1094.128	1187.328	712.8085
18May2016 2:00:00	2016	838.1467621	838.5825	1083.257	1154.118	704.2189
18May2016 3:00:00	2016	825.666899	834.0773	1077.744	1136.536	690.5898
18May2016 4:00:00	2016	845.2292164	838.5642	1079.317	1130.904	696.3409
18May2016 5:00:00	2016	906.0626749	848.306	1075.732	1155.258	713.7993
18May2016 6:00:00	2016	1034.162669	874.2254	1084.73	1250.505	694.6677
18May2016 7:00:00	2016	1187.520658	929.2505	1139.125	1431.491	722.4467
18May2016 8:00:00	2016	1270.11828	962.7756	1180.171	1539.201	733.7714
18May2016 9:00:00	2016	1344.134461	985.2607	1205.136	1591.611	739.4977
18May2016 10:00:00	2016	1396.957655	1011.324	1217.564	1645.453	743.9579
18May2016 11:00:00	2016	1441.561781	1003.814	1236.799	1693.566	754.337
18May2016 12:00:00	2016	1459.186249	995.8493	1235.009	1722.837	783.5781
18May2016 13:00:00	2016	1481.685381	1005.997	1258.809	1775.746	793.2382
18May2016 14:00:00	2016	1490.616826	1007.702	1261.925	1775.578	798.0715
18May2016 15:00:00	2016	1490.278164	1014.924	1269.023	1765.786	802.8057
18May2016 16:00:00	2016	1476.826059	1021.744	1273.788	1772.189	802.1437
18May2016 17:00:00	2016	1470.767957	1022.074	1269.505	1754.407	804.6784
18May2016 18:00:00	2016	1385.030041	1011.024	1247.625	1664.104	812.6191
18May2016 19:00:00	2016	1318.926519	1000.09	1239.715	1607.584	793.8809
18May2016 20:00:00	2016	1284.475711	994.101	1223.062	1557.199	780.5322
18May2016 21:00:00	2016	1270.538315	1001.401	1221.464	1532.275	783.2181
18May2016 22:00:00	2016	1170.979206	978.5076	1198.313	1482.816	792.6198
18May2016 23:00:00	2016	1029.46248	932.8443	1143.916	1362.462	802.0856
19May2016 0:00:00	2016	933.0081972	899.6065	1099.808	1274.058	781.7743

19May2016 1:00:00	2016	874.4528533	882.076	1069.923	1191.671	774.8349
19May2016 2:00:00	2016	842.5159113	867.7759	1052.959	1186.583	777.2101
19May2016 3:00:00	2016	833.2128784	861.8259	1069.413	1176.419	762.139
19May2016 4:00:00	2016	851.8456502	865.7854	1064.993	1182.22	760.195
19May2016 5:00:00	2016	923.5455028	876.2777	1072.704	1221.106	752.2663
19May2016 6:00:00	2016	1053.211232	901.6907	1096.924	1307.347	741.7755
19May2016 7:00:00	2016	1189.697535	954.1758	1150.884	1448.139	748.5697
19May2016 8:00:00	2016	1249.871981	977.1613	1192.647	1543.735	751.8142
19May2016 9:00:00	2016	1294.971329	971.8781	1219.924	1612.586	768.0341
19May2016 10:00:00	2016	1327.459045	986.7482	1223.648	1644.657	756.3296
19May2016 11:00:00	2016	1355.411812	995.4968	1235.762	1677.838	768.2059
19May2016 12:00:00	2016	1357.774797	988.221	1234.111	1693.018	783.3181
19May2016 13:00:00	2016	1354.202876	985.9323	1236.444	1713.482	802.5715
19May2016 14:00:00	2016	1348.701575	980.3232	1237.841	1732.038	813.4559
19May2016 15:00:00	2016	1337.188336	971.5737	1237.995	1733.113	805.2747
19May2016 16:00:00	2016	1337.279808	985.3684	1256.586	1708.409	797.26
19May2016 17:00:00	2016	1338.570785	980.6749	1254.686	1696.181	816.6849
19May2016 18:00:00	2016	1264.43315	975.3306	1230.444	1636.208	795.0644
19May2016 19:00:00	2016	1224.772308	967.8596	1230.503	1579.764	800.8965
19May2016 20:00:00	2016	1195.260005	961.8871	1223.694	1543.001	802.1782
19May2016 21:00:00	2016	1183.434551	961.5354	1237.458	1530.748	798.3885
19May2016 22:00:00	2016	1106.025783	935.3229	1213.258	1425.111	814.805
19May2016 23:00:00	2016	985.2824618	891.1504	1168.18	1329.452	816.7652
20May2016 0:00:00	2016	904.1777411	857.4348	1125.306	1248.061	817.0844
20May2016 1:00:00	2016	857.4712361	846.3179	1099.651	1185.335	820.6285
20May2016 2:00:00	2016	832.0976864	842.1441	1080.429	1160.448	831.0049
20May2016 3:00:00	2016	825.9683702	840.8175	1069.523	1165.919	821.3013
20May2016 4:00:00	2016	848.0666925	842.0762	1092.679	1161.896	816.5471
20May2016 5:00:00	2016	916.7140167	850.6313	1096.088	1193.555	785.6006
20May2016 6:00:00	2016	1029.998327	870.8316	1112.143	1282.7	768.0073
20May2016 7:00:00	2016	1156.560317	914.1338	1168.204	1464.018	774.5854
20May2016 8:00:00	2016	1238.227522	946.4421	1198.399	1571.831	779.6466
20May2016 9:00:00	2016	1281.239854	961.7455	1218.781	1619.79	793.4203
20May2016 10:00:00	2016	1302.811797	975.6351	1242.261	1637.479	791.7018
20May2016 11:00:00	2016	1303.513003	968.1229	1225.696	1632.734	770.9131
20May2016 12:00:00	2016	1298.298131	952.5083	1240.165	1654.477	773.4467
20May2016 13:00:00	2016	1290.911005	928.3937	1236.646	1648.229	767.2503
20May2016 14:00:00	2016	1274.796739	927.1572	1227.546	1620.511	764.256
20May2016 15:00:00	2016	1262.027002	948.6372	1227.724	1608.494	764.1276
20May2016 16:00:00	2016	1239.514587	953.7492	1223.777	1576.212	758.9312
20May2016 17:00:00	2016	1218.38939	947.0575	1212.738	1560.945	774.865
20May2016 18:00:00	2016	1171.890168	937.0467	1180.213	1507.079	761.5324
20May2016 19:00:00	2016	1143.996291	926.1538	1153.511	1484.923	759.2181
20May2016 20:00:00	2016	1126.754658	923.3219	1166.861	1468.247	762.2165
20May2016 21:00:00	2016	1122.994759	924.4147	1178.036	1477.076	767.6945
20May2016 22:00:00	2016	1064.66881	904.716	1158.491	1432.918	780.3241
20May2016 23:00:00	2016	974.2535825	866.0213	1123.098	1332.18	779.1677

21May2016 0:00:00	2016	904.2032428	844.9949	1096.204	1258.239	773.8015
21May2016 1:00:00	2016	860.4575355	829.3904	1073.849	1189.777	765.9339
21May2016 2:00:00	2016	833.7863961	821.279	1063.662	1163.681	775.9332
21May2016 3:00:00	2016	822.5720134	816.6623	1061.842	1149.236	780.6161
21May2016 4:00:00	2016	822.0152684	818.3266	1061.832	1156.012	778.1088
21May2016 5:00:00	2016	843.7421569	821.1318	1060.541	1151.307	765.975
21May2016 6:00:00	2016	868.5839567	825.8496	1049.234	1152.52	732.7736
21May2016 7:00:00	2016	920.4342861	849.3975	1074.993	1212.733	731.4356
21May2016 8:00:00	2016	1005.557435	882.6086	1126.653	1320.963	721.58
21May2016 9:00:00	2016	1080.482365	910.8509	1172.95	1403.795	722.6918
21May2016 10:00:00	2016	1120.352964	920.5424	1193.482	1469.844	704.6351
21May2016 11:00:00	2016	1129.384817	918.895	1207.176	1497.038	701.3506
21May2016 12:00:00	2016	1128.741541	909.51	1204.305	1511.623	711.1946
21May2016 13:00:00	2016	1119.270026	898.8773	1199.905	1499.738	717.2061
21May2016 14:00:00	2016	1109.348243	900.4402	1196.703	1489.391	730.6885
21May2016 15:00:00	2016	1106.744076	898.755	1191.495	1475.112	740.2923
21May2016 16:00:00	2016	1109.851125	901.9966	1194.714	1457.223	729.6226
21May2016 17:00:00	2016	1116.711481	905.3705	1195.294	1459.312	746.727
21May2016 18:00:00	2016	1105.72114	897.918	1184.029	1432.378	743.7937
21May2016 19:00:00	2016	1087.279257	886.4542	1166.171	1408.09	742.3238
21May2016 20:00:00	2016	1072.701898	882.4787	1156.509	1402.839	762.8983
21May2016 21:00:00	2016	1077.04762	887.8436	1129.818	1369.436	769.4013
21May2016 22:00:00	2016	1032.056262	868.4577	1116.892	1369.831	739.1758
21May2016 23:00:00	2016	954.6467007	836.8573	1087.337	1287.073	719.015
22May2016 0:00:00	2016	884.9702886	812.5782	1096.322	1248.599	718.2749
22May2016 1:00:00	2016	843.4369002	797.001	1103.539	1211.657	731.9933
22May2016 2:00:00	2016	816.8136531	790.78	1100.254	1165.194	728.7513
22May2016 3:00:00	2016	806.6891272	786.0457	1092.428	1155.343	735.8082
22May2016 4:00:00	2016	808.689186	782.4178	1093.617	1120.111	737.2159
22May2016 5:00:00	2016	827.0782428	784.3468	1090.307	1134.918	741.5984
22May2016 6:00:00	2016	844.3775869	787.553	1082.007	1171.631	708.0246
22May2016 7:00:00	2016	889.3148249	806.8058	1087.454	1218.712	726.6758
22May2016 8:00:00	2016	962.6538093	827.4077	1111.07	1267.165	724.407
22May2016 9:00:00	2016	1032.769701	845.5223	1138.85	1326.91	734.1733
22May2016 10:00:00	2016	1086.871566	858.2631	1156.62	1398.687	736.2442
22May2016 11:00:00	2016	1118.088151	861.8314	1159.907	1443.014	738.2816
22May2016 12:00:00	2016	1131.812834	866.7425	1165.754	1462.721	742.4026
22May2016 13:00:00	2016	1120.012129	868.519	1177.601	1471.722	749.6439
22May2016 14:00:00	2016	1109.143254	868.0158	1177.241	1468.778	761.1273
22May2016 15:00:00	2016	1115.788079	872.3994	1175.103	1470.195	797.3247
22May2016 16:00:00	2016	1132.571906	880.5806	1194.919	1497.069	760.4216
22May2016 17:00:00	2016	1140.104982	880.5278	1202.424	1492.959	762.0032
22May2016 18:00:00	2016	1112.146335	870.8677	1184.628	1452.972	783.6416
22May2016 19:00:00	2016	1085.664526	861.1454	1194.554	1419.504	788.5362
22May2016 20:00:00	2016	1069.585986	858.9487	1188.412	1417.149	791.3274
22May2016 21:00:00	2016	1077.020396	863.4506	1208.891	1432.894	783.3004
22May2016 22:00:00	2016	1044.069527	846.7475	1195.578	1391.969	798.5947

22May2016 23:00:00	2016	963.6495979	817.9193	1157.537	1301.406	798.8641
23May2016 0:00:00	2016	894.3499215	794.9745	1138.954	1230.95	777.3571
23May2016 1:00:00	2016	852.4670592	782.8058	1114.036	1175.617	776.1555
23May2016 2:00:00	2016	827.0767028	777.7773	1093.768	1123.121	776.6781
23May2016 3:00:00	2016	817.4499548	775.155	1091.862	1111.804	769.9963
23May2016 4:00:00	2016	821.9987457	777.3909	1086.212	1109.686	774.081
23May2016 5:00:00	2016	847.5621701	781.3205	1074.177	1113.119	764.388
23May2016 6:00:00	2016	869.7997548	786.9744	1070.466	1125.013	763.3171
23May2016 7:00:00	2016	916.140732	810.1005	1075.869	1171.808	751.8454
23May2016 8:00:00	2016	981.7930021	842.099	1110.463	1240.175	765.1394
23May2016 9:00:00	2016	1057.974058	867.7971	1154.368	1325.5	773.1501
23May2016 10:00:00	2016	1124.63377	887.8537	1181.405	1401.25	758.7231
23May2016 11:00:00	2016	1153.714653	890.86	1198.578	1445.676	765.0517
23May2016 12:00:00	2016	1160.647694	888.7231	1209.173	1457.022	757.0001
23May2016 13:00:00	2016	1167.235966	884.3169	1188.665	1447.075	755.2738
23May2016 14:00:00	2016	1174.266581	879.5693	1169.744	1446.637	754.058
23May2016 15:00:00	2016	1176.340619	880.3681	1174.405	1449.982	749.575
23May2016 16:00:00	2016	1202.836831	888.3649	1194.246	1476.212	744.4071
23May2016 17:00:00	2016	1231.410946	892.8469	1201.064	1494.482	751.1568
23May2016 18:00:00	2016	1208.06311	883.9817	1181.675	1466.417	745.1831
23May2016 19:00:00	2016	1173.670938	876.1087	1186.689	1437.319	741.9991
23May2016 20:00:00	2016	1154.229373	871.4949	1173.178	1415.382	754.5114
23May2016 21:00:00	2016	1146.967133	867.8557	1166.336	1396.865	757.7652
23May2016 22:00:00	2016	1064.539613	843.5207	1146.228	1352.743	769.4121
23May2016 23:00:00	2016	955.0824868	807.8939	1097.028	1237.859	772.59
24May2016 0:00:00	2016	881.0825899	781.4033	1068.53	1154.93	768.0602
24May2016 1:00:00	2016	842.7676698	771.2879	1055.861	1104.054	772.0294
24May2016 2:00:00	2016	822.9306671	768.7683	1055.056	1087.863	761.7616
24May2016 3:00:00	2016	818.1958721	770.0661	1052.547	1079.605	765.4745
24May2016 4:00:00	2016	842.0717644	777.8477	1041.601	1083.845	766.2093
24May2016 5:00:00	2016	908.9299249	789.7714	1040.489	1125.666	761.2164
24May2016 6:00:00	2016	1040.450648	820.0255	1081.782	1238.672	753.3673
24May2016 7:00:00	2016	1183.008128	870.3449	1155.877	1415.576	750.8925
24May2016 8:00:00	2016	1239.221831	899.7572	1199.932	1519.554	752.2986
24May2016 9:00:00	2016	1281.015279	913.7272	1211.935	1571.823	767.027
24May2016 10:00:00	2016	1313.618246	926.2861	1228.221	1599.701	766.2192
24May2016 11:00:00	2016	1338.90257	929.2201	1226.569	1625.924	773.7709
24May2016 12:00:00	2016	1346.930337	929.7529	1229.649	1624.494	778.8289
24May2016 13:00:00	2016	1353.873744	937.5972	1251.793	1631.317	790.3773
24May2016 14:00:00	2016	1355.499976	932.3829	1253.085	1629.913	797.7572
24May2016 15:00:00	2016	1357.598464	943.3757	1245.847	1638.407	797.5987
24May2016 16:00:00	2016	1365.067543	954.3444	1243.63	1638.42	798.4455
24May2016 17:00:00	2016	1358.44032	948.0319	1231.881	1624.431	800.1924
24May2016 18:00:00	2016	1282.491357	933.5241	1211.122	1549.791	785.6689
24May2016 19:00:00	2016	1238.163179	926.6518	1186.148	1516.962	780.3957
24May2016 20:00:00	2016	1204.921919	915.2107	1174.142	1499.862	778.1883
24May2016 21:00:00	2016	1172.451798	911.1734	1165.438	1462.408	774.277

24May2016 22:00:00	2016	1121.049397	899.4385	1160.667	1421.036	766.7302
24May2016 23:00:00	2016	997.0302623	861.3072	1113.674	1318.761	770.3585
25May2016 0:00:00	2016	905.6599771	831.9538	1092.956	1218.432	764.1931
25May2016 1:00:00	2016	853.6128742	818.9554	1082.658	1151.995	764.6992
25May2016 2:00:00	2016	828.6588214	813.1542	1070.091	1120.151	760.1711
25May2016 3:00:00	2016	825.713788	814.1442	1058.406	1110.337	759.1185
25May2016 4:00:00	2016	847.9028743	820.9497	1063.393	1112.372	749.4707
25May2016 5:00:00	2016	905.2308056	824.9705	1072.189	1124.851	752.773
25May2016 6:00:00	2016	1038.781709	854.4713	1101.386	1235.54	743.7065
25May2016 7:00:00	2016	1185.462747	902.2137	1155.178	1410.103	735.7487
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25May2016 9:00:00	2016	1310.272033	937.9099	1226.669	1578.196	803.3646
25May2016 10:00:00	2016	1350.465272	959.9989	1239.608	1628.82	810.5329
25May2016 11:00:00	2016	1376.834598	975.0035	1231.576	1651.279	811.4489
25May2016 12:00:00	2016	1396.688723	959.7528	1224.498	1652.259	822.7861
25May2016 13:00:00	2016	1411.953444	961.6009	1238.021	1668.579	816.0126
25May2016 14:00:00	2016	1419.209505	960.4776	1256.555	1681.254	815.912
25May2016 15:00:00	2016	1428.178587	969.0039	1278.414	1695.21	833.2084
25May2016 16:00:00	2016	1434.895854	977.2211	1281.647	1703.403	844.0954
25May2016 17:00:00	2016	1408.407045	969.4943	1226.617	1670.551	832.8249
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25May2016 19:00:00	2016	1271.238196	945.9094	1218.028	1535.936	800.6561
25May2016 20:00:00	2016	1254.640593	935.0076	1201.546	1488.98	790.5811
25May2016 21:00:00	2016	1223.049236	932.2506	1190.76	1466.983	782.9211
25May2016 22:00:00	2016	1127.031328	913.7099	1192.525	1435.965	790.7972
25May2016 23:00:00	2016	1002.260375	872.0241	1173.335	1328.423	794.1131
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26May2016 1:00:00	2016	864.0397582	821.2776	1128.234	1168.903	782.9012
26May2016 2:00:00	2016	838.5096703	815.6049	1112.588	1188.507	774.1413
26May2016 3:00:00	2016	829.5143349	813.2355	1099.097	1183.832	745.1454
26May2016 4:00:00	2016	850.1635269	813.4421	1107.073	1188.41	729.0803
26May2016 5:00:00	2016	906.8703737	825.9061	1124.415	1213.552	748.5025
26May2016 6:00:00	2016	1037.748937	856.292	1142.313	1308.072	736.4047
26May2016 7:00:00	2016	1189.398082	910.6864	1186.675	1474.359	736.0424
26May2016 8:00:00	2016	1260.127877	942.2815	1209.395	1556.681	736.7853
26May2016 9:00:00	2016	1319.097467	951.3777	1201.205	1605.351	733.4664
26May2016 10:00:00	2016	1347.975687	959.6982	1239.01	1679.228	732.7461
26May2016 11:00:00	2016	1378.171071	962.9708	1260.017	1719.864	733.5376
26May2016 12:00:00	2016	1399.575831	950.8113	1287.769	1737.487	742.1607
26May2016 13:00:00	2016	1411.115845	947.9372	1306.8	1744.769	746.0944
26May2016 14:00:00	2016	1395.07262	940.3217	1310.336	1743.063	757.1914
26May2016 15:00:00	2016	1401.894829	932.8541	1302.022	1729.026	755.1628
26May2016 16:00:00	2016	1408.387829	935.6798	1273.142	1696.397	747.2174
26May2016 17:00:00	2016	1400.592296	928.6914	1267.534	1657.516	754.3769
26May2016 18:00:00	2016	1317.226021	913.6444	1248.332	1581.042	748.3462
26May2016 19:00:00	2016	1250.233408	900.8935	1229.802	1539.818	744.9299
26May2016 20:00:00	2016	1204.491798	888.6565	1222.206	1521.125	736.3699

26May2016 21:00:00	2016	1176.101056	877.3792	1212.195	1518.764	741.0085
26May2016 22:00:00	2016	1119.831857	859.3896	1163.967	1470.121	774.6059
26May2016 23:00:00	2016	1000.726438	820.1494	1104.248	1330.298	781.1017
27May2016 0:00:00	2016	913.7319767	795.2389	1072.752	1232.446	771.4551
27May2016 1:00:00	2016	861.9919582	783.7978	1077.601	1169.967	770.7702
27May2016 2:00:00	2016	837.2008992	777.8686	1094.384	1131.438	767.3089
27May2016 3:00:00	2016	830.8561747	777.9094	1092.61	1132.445	770.3574
27May2016 4:00:00	2016	849.0121386	780.6146	1088.795	1122.363	766.292
27May2016 5:00:00	2016	907.7915913	783.3807	1086.464	1171.336	767.1409
27May2016 6:00:00	2016	1036.794713	812.2822	1124.754	1302.956	733.3212
27May2016 7:00:00	2016	1186.344481	862.4616	1189.71	1471.808	727.5675
27May2016 8:00:00	2016	1254.49066	899.0481	1223.823	1552.846	734.308
27May2016 9:00:00	2016	1297.666057	914.8251	1240.334	1604.935	730.6552
27May2016 10:00:00	2016	1318.047241	929.3318	1248.924	1622.149	741.5381
27May2016 11:00:00	2016	1328.0905	931.439	1259.511	1630.481	742.8454
27May2016 12:00:00	2016	1323.838105	930.4681	1261.209	1632.683	751.3347
27May2016 13:00:00	2016	1337.253775	933.0202	1254.3	1635.495	752.6929
27May2016 14:00:00	2016	1332.401389	931.6526	1265.356	1640.572	757.8874
27May2016 15:00:00	2016	1304.331147	924.2136	1262.183	1630.282	764.2364
27May2016 16:00:00	2016	1292.948572	917.9534	1262.122	1622.191	767.7153
27May2016 17:00:00	2016	1275.433423	913.1851	1250.79	1588.84	761.5126
27May2016 18:00:00	2016	1200.539135	897.9223	1224.022	1534.372	744.0989
27May2016 19:00:00	2016	1149.984195	885.2113	1210.908	1497.931	725.7553
27May2016 20:00:00	2016	1117.46193	881.1692	1207.789	1471.265	732.7895
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27May2016 22:00:00	2016	1081.200899	875.9807	1174.877	1410.894	746.9632
27May2016 23:00:00	2016	984.2684454	841.0519	1150.678	1347.51	751.0117
28May2016 0:00:00	2016	898.2029739	814.5086	1129.188	1268.985	745.4479
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28May2016 2:00:00	2016	812.9434025	792.2675	1104.606	1161.348	761.9558
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28May2016 5:00:00	2016	810.1672272	794.7127	1071.671	1105.427	767.2988
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28May2016 7:00:00	2016	904.9456107	822.6013	1091.747	1197.6	747.7868
28May2016 8:00:00	2016	995.8216869	848.3245	1136.699	1295.911	749.8058
28May2016 9:00:00	2016	1068.134027	864.4464	1174.501	1392.559	738.9377
28May2016 10:00:00	2016	1115.429505	870.5492	1170.323	1438.374	743.1306
28May2016 11:00:00	2016	1143.454439	872.5153	1177.305	1464.577	742.2739
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28May2016 13:00:00	2016	1145.759342	870.226	1177.133	1452.049	767.0585
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28May2016 18:00:00	2016	1109.518712	861.6073	1190.335	1468.096	767.1712
28May2016 19:00:00	2016	1078.475069	850.9749	1182.785	1421.697	770.902

28May2016 20:00:00	2016	1050.973162	841.3455	1203.511	1419.35	774.5203
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28May2016 22:00:00	2016	1045.850553	852.3632	1216.191	1387.882	802.2105
28May2016 23:00:00	2016	963.9842257	824.2912	1177.046	1300.135	828.0833
29May2016 0:00:00	2016	885.8222752	796.5478	1131.144	1192.678	830.3608
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29May2016 3:00:00	2016	790.0929726	771.416	1142.576	1135.462	825.7371
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29May2016 6:00:00	2016	799.5379916	769.5837	1113.528	1109.335	815.1509
29May2016 7:00:00	2016	860.9971668	789.7914	1137.291	1165.709	790.0528
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30May2016 18:00:00	2016	1266.450227	882.4421	1263.222	1570.305	783.6682

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30May2016 23:00:00	2016	977.4692308	808.7812	1199.607	1323.582	806.8814
31May2016 0:00:00	2016	890.3677552	785.7537	1158.842	1242.04	811.2784
31May2016 1:00:00	2016	841.6009422	768.9639	1142.403	1207.609	817.0589
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01Jun2016 16:00:00	2016	1397.433857	908.8463	1287.71	1758.152	796.1641
01Jun2016 17:00:00	2016	1397.590448	908.5528	1280.711	1724.71	789.3674

01Jun2016 18:00:00	2016	1316.860233	916.9407	1267.045	1649.092	794.0516
01Jun2016 19:00:00	2016	1266.115478	911.483	1275.614	1612.261	784.686
01Jun2016 20:00:00	2016	1215.86119	901.7425	1273.432	1577.781	778.6139
01Jun2016 21:00:00	2016	1165.692602	893.2592	1264.003	1521.729	772.4617
01Jun2016 22:00:00	2016	1124.831493	882.2687	1248.365	1467.24	778.6148
01Jun2016 23:00:00	2016	1001.624885	839.4232	1205.13	1351.601	796.2877
02Jun2016 0:00:00	2016	908.4838721	806.2613	1168.695	1247.022	795.0984
02Jun2016 1:00:00	2016	855.1808112	793.0342	1161.324	1194.319	779.7945
02Jun2016 2:00:00	2016	827.5742536	785.2585	1164.831	1159.26	783.7716
02Jun2016 3:00:00	2016	816.8004919	781.0134	1158.25	1138.867	791.4767
02Jun2016 4:00:00	2016	836.6867642	782.7936	1136.05	1121.36	802.0237
02Jun2016 5:00:00	2016	892.7063407	786.7479	1152.947	1147.836	807.8107
02Jun2016 6:00:00	2016	1025.927278	811.5621	1193.663	1283.538	805.2166
02Jun2016 7:00:00	2016	1175.061228	864.4097	1248.743	1454.287	764.1941
02Jun2016 8:00:00	2016	1254.308531	898.5379	1283.947	1565.356	780.6191
02Jun2016 9:00:00	2016	1318.59521	914.0355	1269.972	1600.117	798.5812
02Jun2016 10:00:00	2016	1360.880678	917.9599	1277.277	1663.406	803.771
02Jun2016 11:00:00	2016	1394.796248	935.5887	1301.783	1726.788	800.1952
02Jun2016 12:00:00	2016	1413.287385	921.9852	1333.523	1769.682	809.7193
02Jun2016 13:00:00	2016	1429.572717	918.1303	1344.599	1791.097	838.7893
02Jun2016 14:00:00	2016	1438.043346	911.1458	1345.688	1797.232	845.3375
02Jun2016 15:00:00	2016	1438.645548	914.8946	1344.347	1800.313	845.2424
02Jun2016 16:00:00	2016	1419.066931	919.7613	1348.979	1798.563	841.7611
02Jun2016 17:00:00	2016	1402.004029	936.8884	1320.164	1754.515	856.6623
02Jun2016 18:00:00	2016	1323.924337	927.0658	1284.349	1668.623	840.7017
02Jun2016 19:00:00	2016	1276.424084	909.6357	1263.89	1634.784	834.1273
02Jun2016 20:00:00	2016	1231.096513	900.4213	1258.857	1579.422	832.9782
02Jun2016 21:00:00	2016	1180.804475	890.6794	1236.901	1517.424	831.4362
02Jun2016 22:00:00	2016	1136.577297	879.9221	1209.965	1470.245	840.3394
02Jun2016 23:00:00	2016	1011.613773	842.8376	1197.606	1365.04	834.5903
03Jun2016 0:00:00	2016	914.0086695	813.1722	1170.7	1262.557	811.2185
03Jun2016 1:00:00	2016	861.2450393	800.7973	1154.544	1207.966	801.0671
03Jun2016 2:00:00	2016	832.2807104	792.5682	1200.019	1193.264	799.2144
03Jun2016 3:00:00	2016	819.9290277	787.2876	1156.118	1186.532	795.6428
03Jun2016 4:00:00	2016	838.2402965	788.7446	1134.077	1189.457	788.7284
03Jun2016 5:00:00	2016	878.7841126	789.3017	1125.64	1189.965	786.2048
03Jun2016 6:00:00	2016	1003.358721	816.452	1149.783	1305.58	788.4251
03Jun2016 7:00:00	2016	1158.003893	869.8022	1204.804	1486.779	784.0375
03Jun2016 8:00:00	2016	1248.047619	900.8209	1258.584	1579.743	801.9452
03Jun2016 9:00:00	2016	1319.281509	920.6224	1290.096	1645.991	784.2789
03Jun2016 10:00:00	2016	1369.134035	938.1631	1298.063	1681.142	778.6223
03Jun2016 11:00:00	2016	1394.488953	953.3569	1313.357	1724.761	779.6227
03Jun2016 12:00:00	2016	1410.469591	958.4876	1314.912	1705.701	788.1044
03Jun2016 13:00:00	2016	1426.959586	958.8978	1319.42	1744.463	789.3162
03Jun2016 14:00:00	2016	1431.335562	951.7555	1310.78	1707.548	802.6501
03Jun2016 15:00:00	2016	1432.308256	954.3852	1310.75	1714.568	792.4026
03Jun2016 16:00:00	2016	1430.290573	957.533	1324.633	1684.864	794.8918

03Jun2016 17:00:00	2016	1415.997466	956.3617	1305.977	1660.167	787.0196
03Jun2016 18:00:00	2016	1344.905436	955.8216	1291.532	1619.866	784.6499
03Jun2016 19:00:00	2016	1299.37872	944.5468	1261.232	1595.928	796.4091
03Jun2016 20:00:00	2016	1247.41344	933.6448	1260.071	1554.285	794.0949
03Jun2016 21:00:00	2016	1192.629909	924.1125	1261.672	1537.769	795.7648
03Jun2016 22:00:00	2016	1159.636887	915.3111	1273.634	1537.39	800.7694
03Jun2016 23:00:00	2016	1050.553682	878.9954	1245.032	1448.031	801.6348
04Jun2016 0:00:00	2016	954.8680127	847.1866	1206.868	1337.265	800.4508
04Jun2016 1:00:00	2016	889.3821986	829.0878	1185.832	1274.214	786.27
04Jun2016 2:00:00	2016	848.127793	819.5046	1167.345	1231.496	798.2504
04Jun2016 3:00:00	2016	826.7222657	810.0734	1156.92	1196.975	788.9848
04Jun2016 4:00:00	2016	823.6682061	807.3055	1140.829	1191.405	790.4306
04Jun2016 5:00:00	2016	809.9819354	797.3884	1091.83	1155.913	780.988
04Jun2016 6:00:00	2016	844.82844	807.1695	1090.558	1171.681	773.3032
04Jun2016 7:00:00	2016	936.5472326	839.9973	1119.236	1262.153	775.8519
04Jun2016 8:00:00	2016	1054.145967	885.3122	1178.59	1408.781	786.2566
04Jun2016 9:00:00	2016	1155.704674	913.5909	1209.367	1519.641	784.7209
04Jun2016 10:00:00	2016	1224.386622	931.5461	1221.684	1563.403	793.1418
04Jun2016 11:00:00	2016	1264.711912	941.4313	1215.803	1558.56	799.2764
04Jun2016 12:00:00	2016	1285.560744	945.955	1232.263	1580.051	787.9067
04Jun2016 13:00:00	2016	1290.218832	948.8425	1214.193	1566.146	776.6971
04Jun2016 14:00:00	2016	1294.423648	945.5267	1211.731	1569.039	791.4044
04Jun2016 15:00:00	2016	1299.671235	963.1403	1215.552	1594.313	783.8438
04Jun2016 16:00:00	2016	1306.411206	952.9033	1223.746	1605.438	785.8793
04Jun2016 17:00:00	2016	1297.480956	950.104	1226.214	1616.852	795.3782
04Jun2016 18:00:00	2016	1268.541868	930.6421	1217.265	1617.851	804.6091
04Jun2016 19:00:00	2016	1246.710448	920.8164	1205.203	1584.225	801.0562
04Jun2016 20:00:00	2016	1211.427114	906.035	1191.919	1523.029	798.1385
04Jun2016 21:00:00	2016	1169.551841	888.221	1166.921	1484.11	795.1291
04Jun2016 22:00:00	2016	1161.139429	877.2763	1164.508	1453.2	800.7803
04Jun2016 23:00:00	2016	1067.173755	837.4697	1125.893	1376.806	801.8332
05Jun2016 0:00:00	2016	970.2340227	799.8307	1109.681	1299.699	790.8567
05Jun2016 1:00:00	2016	904.6582153	780.3373	1099.851	1238.662	782.9729
05Jun2016 2:00:00	2016	858.3213064	766.2862	1084.263	1200.14	793.2765
05Jun2016 3:00:00	2016	832.5146906	758.6181	1081.809	1165.677	794.4726
05Jun2016 4:00:00	2016	825.9177345	754.6907	1064.647	1166.207	790.243
05Jun2016 5:00:00	2016	806.8543054	742.6838	1041.012	1127.57	782.4442
05Jun2016 6:00:00	2016	827.0716839	746.8661	1033.469	1144.751	772.3764
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05Jun2016 10:00:00	2016	1164.558998	843.8341	1186.347	1499.474	796.4788
05Jun2016 11:00:00	2016	1212.018443	864.1779	1209.021	1560.602	796.3243
05Jun2016 12:00:00	2016	1242.834131	877.4411	1214.254	1580.879	800.5518
05Jun2016 13:00:00	2016	1253.737316	880.5731	1216.766	1582.77	806.2
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05Jun2016 15:00:00	2016	1282.382063	902.0152	1222.709	1618.174	815.561

05Jun2016 16:00:00	2016	1309.048784	916.7055	1242.345	1662.216	829.7554
05Jun2016 17:00:00	2016	1331.571596	929.1939	1259.125	1688.195	850.5758
05Jun2016 18:00:00	2016	1321.552568	927.6469	1265.033	1673.674	856.6762
05Jun2016 19:00:00	2016	1301.657539	921.6122	1257.66	1644.346	855.6331
05Jun2016 20:00:00	2016	1272.321188	909.7499	1252.025	1625.7	862.9414
05Jun2016 21:00:00	2016	1230.90893	888.8017	1230.105	1577.778	845.4219
05Jun2016 22:00:00	2016	1192.714904	868.2712	1221.091	1518.95	855.6362
05Jun2016 23:00:00	2016	1065.935696	815.6579	1176.956	1405.741	848.1709
06Jun2016 0:00:00	2016	958.9931363	782.9341	1134.877	1307.864	828.408
06Jun2016 1:00:00	2016	899.2335608	766.3329	1108.987	1239.299	820.0635
06Jun2016 2:00:00	2016	867.9275318	757.0135	1088.411	1202.312	823.2516
06Jun2016 3:00:00	2016	857.9007015	752.8854	1051.871	1170.843	818.279
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06Jun2016 6:00:00	2016	1065.642102	786.5849	1065.046	1325.247	796.1736
06Jun2016 7:00:00	2016	1240.281151	830.8291	1147.736	1520.057	781.9559
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06Jun2016 10:00:00	2016	1480.283397	937.6223	1293.565	1812.032	798.3517
06Jun2016 11:00:00	2016	1536.138374	931.4675	1309.431	1869.494	810.831
06Jun2016 12:00:00	2016	1581.758811	942.5333	1318.638	1886.141	843.1868
06Jun2016 13:00:00	2016	1612.59149	955.0544	1313.305	1916.953	855.3108
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06Jun2016 16:00:00	2016	1658.941198	1006.587	1340.072	1958.642	861.7415
06Jun2016 17:00:00	2016	1659.439239	1020.696	1296.991	1950.651	840.3716
06Jun2016 18:00:00	2016	1579.407944	1025.811	1264.85	1911.445	842.9807
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06Jun2016 20:00:00	2016	1481.723395	1035.649	1239.385	1778.956	854.9734
06Jun2016 21:00:00	2016	1408.063934	1010.002	1221.334	1720.653	835.9171
06Jun2016 22:00:00	2016	1329.64678	980.4569	1206.977	1626.958	822.862
06Jun2016 23:00:00	2016	1182.750652	925.021	1161.263	1495.882	797.6775
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07Jun2016 1:00:00	2016	999.6333488	856.7169	1100.531	1323.649	806.5646
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07Jun2016 14:00:00	2016	1695.213928	1036.092	1314.5	1964.243	831.5879

07Jun2016 15:00:00	2016	1710.139899	1044.609	1320	1959.501	841.934
07Jun2016 16:00:00	2016	1722.525116	1063.968	1340.497	1965.706	832.5301
07Jun2016 17:00:00	2016	1710.250863	1065.166	1328.96	1974.293	816.2633
07Jun2016 18:00:00	2016	1630.66921	1069.428	1297.478	1916.501	819.5753
07Jun2016 19:00:00	2016	1577.190199	1055.104	1292.481	1837.442	812.775
07Jun2016 20:00:00	2016	1511.961514	1059.966	1259.783	1791.063	816.8403
07Jun2016 21:00:00	2016	1426.981059	1038.302	1228.011	1740.112	804.2116
07Jun2016 22:00:00	2016	1345.281938	1007.177	1222.311	1672.995	789.8307
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08Jun2016 1:00:00	2016	1002.760986	874.8539	1104.201	1320.411	787.2064
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08Jun2016 11:00:00	2016	1513.121412	1048.987	1282.962	1825.156	760.3624
08Jun2016 12:00:00	2016	1556.032091	1062.182	1298.529	1851.358	774.95
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08Jun2016 15:00:00	2016	1579.019856	1070.541	1312.535	1874.051	782.032
08Jun2016 16:00:00	2016	1612.230056	1065.661	1313.588	1881.801	790.9911
08Jun2016 17:00:00	2016	1596.15743	1057.715	1292.926	1868.638	796.6913
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08Jun2016 19:00:00	2016	1441.072193	1012.703	1214.247	1725.027	789.6154
08Jun2016 20:00:00	2016	1370.754204	994.9211	1209.861	1672.868	790.5822
08Jun2016 21:00:00	2016	1318.980027	967.3541	1203.539	1642.086	785.526
08Jun2016 22:00:00	2016	1250.196024	938.6944	1197.568	1583.188	804.925
08Jun2016 23:00:00	2016	1112.321812	891.7761	1157.874	1453.717	791.2976
09Jun2016 0:00:00	2016	1002.435103	862.3591	1113.605	1348.036	775.3047
09Jun2016 1:00:00	2016	939.6149639	849.0415	1121.428	1290.143	787.4355
09Jun2016 2:00:00	2016	903.0420416	840.2794	1119.362	1254.539	779.8009
09Jun2016 3:00:00	2016	889.0194546	832.438	1109.286	1238.181	780.0682
09Jun2016 4:00:00	2016	906.8117887	826.0059	1106.216	1236.642	768.5772
09Jun2016 5:00:00	2016	948.9138599	826.5476	1086.036	1265.028	767.7515
09Jun2016 6:00:00	2016	1084.070469	855.6884	1125.745	1367.133	764.9599
09Jun2016 7:00:00	2016	1255.625373	913.3099	1199.172	1538.152	776.7693
09Jun2016 8:00:00	2016	1356.123552	951.6653	1244.291	1611.046	792.5453
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09Jun2016 13:00:00	2016	1517.511088	1007.232	1345.849	1748.17	797.3405

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09Jun2016 16:00:00	2016	1526.903266	1022.551	1289.104	1756.655	812.52
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09Jun2016 18:00:00	2016	1432.59821	1006.167	1187.417	1659.736	803.1366
09Jun2016 19:00:00	2016	1367.182773	988.7253	1176.109	1592.376	806.3007
09Jun2016 20:00:00	2016	1305.083581	971.084	1189.261	1570.665	802.5629
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09Jun2016 22:00:00	2016	1189.040789	932.2772	1168.607	1465.803	792.7842
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10Jun2016 3:00:00	2016	860.2518716	821.4936	1063.555	1147.62	817.6069
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10Jun2016 7:00:00	2016	1177.624075	888.5342	1152.007	1441.615	775.2639
10Jun2016 8:00:00	2016	1248.617688	910.7523	1189.11	1519.863	814.3155
10Jun2016 9:00:00	2016	1286.86775	918.7127	1214.676	1584.125	827.4163
10Jun2016 10:00:00	2016	1310.898728	933.6823	1228.699	1644.202	814.2392
10Jun2016 11:00:00	2016	1323.241479	943.0911	1238.589	1658.696	829.2676
10Jun2016 12:00:00	2016	1327.644892	943.9818	1237.711	1676.952	830.2832
10Jun2016 13:00:00	2016	1331.164307	949.9033	1228.907	1705.82	827.3905
10Jun2016 14:00:00	2016	1327.427002	951.191	1227.938	1686.862	844.3283
10Jun2016 15:00:00	2016	1322.406023	955.1996	1232.284	1715.209	838.4139
10Jun2016 16:00:00	2016	1316.576813	963.8262	1250.824	1701.233	849.7093
10Jun2016 17:00:00	2016	1295.367236	961.8722	1235.315	1640.671	846.965
10Jun2016 18:00:00	2016	1237.900622	939.6407	1213.736	1608.831	834.7806
10Jun2016 19:00:00	2016	1189.931801	918.007	1196.943	1575.474	826.5891
10Jun2016 20:00:00	2016	1153.522529	905.3266	1187.471	1531.768	809.3642
10Jun2016 21:00:00	2016	1129.740394	891.6779	1180.556	1504.027	780.7751
10Jun2016 22:00:00	2016	1078.805857	858.658	1178.303	1483.886	786.7258
10Jun2016 23:00:00	2016	986.6636226	823.3161	1157.598	1411.722	803.9965
11Jun2016 0:00:00	2016	906.3176829	799.3359	1125.976	1318.112	772.7339
11Jun2016 1:00:00	2016	855.4999812	792.2766	1111.233	1259.892	759.4457
11Jun2016 2:00:00	2016	825.8326189	786.0253	1094.853	1227.222	750.2096
11Jun2016 3:00:00	2016	812.6464761	784.8857	1086.996	1198.076	749.2753
11Jun2016 4:00:00	2016	809.2716811	782.7669	1072.401	1190.07	760.839
11Jun2016 5:00:00	2016	816.8042745	774.803	1068.867	1191.795	740.8995
11Jun2016 6:00:00	2016	832.3208744	767.0008	1080.794	1204.611	736.298
11Jun2016 7:00:00	2016	907.6641922	792.3489	1102.797	1268.619	738.4079
11Jun2016 8:00:00	2016	1007.059541	835.1725	1133.548	1359.518	750.6156
11Jun2016 9:00:00	2016	1096.212996	876.58	1169.897	1436.008	748.3222
11Jun2016 10:00:00	2016	1149.684595	886.1018	1190.893	1481.331	761.3499
11Jun2016 11:00:00	2016	1179.900233	897.9253	1206.233	1509.368	773.8259
11Jun2016 12:00:00	2016	1184.873655	899.0224	1208.48	1514.194	783.2939

11Jun2016 13:00:00	2016	1171.303415	897.8399	1206.051	1481.661	784.6515
11Jun2016 14:00:00	2016	1162.598324	895.3822	1183.678	1491.679	799.5692
11Jun2016 15:00:00	2016	1157.023185	890.5595	1181.945	1533.983	788.7887
11Jun2016 16:00:00	2016	1156.369705	894.5554	1195.764	1541.951	800.1934
11Jun2016 17:00:00	2016	1151.825574	897.9709	1204.041	1516.091	796.904
11Jun2016 18:00:00	2016	1126.108747	888.9498	1191.702	1448.73	802.6721
11Jun2016 19:00:00	2016	1092.661976	870.7154	1180.626	1428	800.9411
11Jun2016 20:00:00	2016	1059.148484	864.155	1177.115	1424.299	803.3537
11Jun2016 21:00:00	2016	1039.024475	854.9117	1161.503	1407.286	816.7848
11Jun2016 22:00:00	2016	1038.925184	859.5014	1182.472	1405.16	812.961
11Jun2016 23:00:00	2016	970.5098589	838.2995	1164.193	1299.41	803.9545
12Jun2016 0:00:00	2016	890.0256989	810.6063	1135.743	1225.867	800.6223
12Jun2016 1:00:00	2016	837.5211669	792.1137	1117.6	1191.383	799.9566
12Jun2016 2:00:00	2016	807.9455048	783.5803	1108.322	1170.376	790.971
12Jun2016 3:00:00	2016	793.0767259	778.0804	1105.391	1155.612	793.393
12Jun2016 4:00:00	2016	789.7152059	776.8137	1102.898	1141.946	798.8557
12Jun2016 5:00:00	2016	770.5622701	768.2214	1083.033	1121.955	779.6959
12Jun2016 6:00:00	2016	791.2204614	773.088	1091.842	1128.705	753.1491
12Jun2016 7:00:00	2016	853.9789963	793.2996	1177.003	1195.608	757.0695
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12Jun2016 9:00:00	2016	1027.21449	840.6692	1171.388	1354.834	788.8823
12Jun2016 10:00:00	2016	1087.363586	872.1132	1183.894	1401.486	790.5095
12Jun2016 11:00:00	2016	1126.52746	896.9433	1198.335	1451.643	796.0776
12Jun2016 12:00:00	2016	1151.260151	901.1012	1205.03	1484.947	795.6678
12Jun2016 13:00:00	2016	1157.111241	902.0372	1206.566	1477.875	796.9778
12Jun2016 14:00:00	2016	1163.071886	902.0062	1203.923	1489.266	793.9371
12Jun2016 15:00:00	2016	1170.822204	898.1452	1174.696	1516.426	782.6304
12Jun2016 16:00:00	2016	1187.986627	918.6498	1194.322	1552.331	786.4774
12Jun2016 17:00:00	2016	1207.320288	938.3715	1207.189	1556.07	787.4317
12Jun2016 18:00:00	2016	1191.189024	935.2166	1212.811	1527.443	795.4563
12Jun2016 19:00:00	2016	1170.002342	927.9418	1206.355	1519.704	795.8717
12Jun2016 20:00:00	2016	1141.582922	917.6144	1204.237	1504.237	785.7598
12Jun2016 21:00:00	2016	1110.28102	905.2862	1203.309	1471.84	793.6146
12Jun2016 22:00:00	2016	1082.187184	897.6594	1198.004	1440.315	789.131
12Jun2016 23:00:00	2016	979.077962	867.5235	1162.419	1354.825	777.9295
13Jun2016 0:00:00	2016	888.4067339	837.8842	1121.994	1255.819	748.5839
13Jun2016 1:00:00	2016	837.193659	823.4128	1113.538	1194.237	766.7982
13Jun2016 2:00:00	2016	810.0557841	819.0345	1104.588	1171.096	766.9382
13Jun2016 3:00:00	2016	809.4082028	817.4552	1099.34	1167.305	745.472
13Jun2016 4:00:00	2016	829.4676503	822.8228	1096.017	1132.231	733.1324
13Jun2016 5:00:00	2016	871.2511473	828.6033	1073.308	1172.203	714.9075
13Jun2016 6:00:00	2016	1006.046752	866.9495	1106.247	1306.451	722.0143
13Jun2016 7:00:00	2016	1164.356669	926.4107	1168.261	1487.229	728.0635
13Jun2016 8:00:00	2016	1251.923333	962.2969	1228.977	1580.694	749.3817
13Jun2016 9:00:00	2016	1321.801578	986.1491	1256.802	1664.838	761.217
13Jun2016 10:00:00	2016	1374.32894	1005.082	1266.102	1683.679	769.314
13Jun2016 11:00:00	2016	1407.917576	1009.841	1284.163	1719.116	769.7564

13Jun2016 12:00:00	2016	1424.415191	1009.205	1289.672	1743.941	782.016
13Jun2016 13:00:00	2016	1426.309526	1009.847	1290.889	1736.821	789.7894
13Jun2016 14:00:00	2016	1425.239998	1017.109	1300.356	1745.386	805.6353
13Jun2016 15:00:00	2016	1431.867736	1026.164	1305.933	1748.709	805.5038
13Jun2016 16:00:00	2016	1442.501888	1038.76	1300.431	1771.006	807.1131
13Jun2016 17:00:00	2016	1437.473143	1046.633	1277.649	1766.449	813.3979
13Jun2016 18:00:00	2016	1345.050879	1030.567	1245.163	1683.935	812.6449
13Jun2016 19:00:00	2016	1290.901677	1016.788	1218.65	1657.498	791.8528
13Jun2016 20:00:00	2016	1236.95369	1010.016	1201.766	1611.853	791.9729
13Jun2016 21:00:00	2016	1177.284013	999.8549	1188.508	1562.119	773.2568
13Jun2016 22:00:00	2016	1127.275126	984.0051	1173.166	1499.715	774.1761
13Jun2016 23:00:00	2016	1009.441498	940.6624	1131.58	1392.089	786.4836
14Jun2016 0:00:00	2016	918.2007662	909.9276	1096.593	1281.045	781.4845
14Jun2016 1:00:00	2016	867.0254213	892.8551	1085.814	1245.905	767.322
14Jun2016 2:00:00	2016	834.4569069	882.5773	1076.856	1192.422	769.1044
14Jun2016 3:00:00	2016	829.0568329	880.8445	1079.826	1188.272	759.3948
14Jun2016 4:00:00	2016	847.1133896	884.5017	1073.678	1169.678	749.5449
14Jun2016 5:00:00	2016	901.2078412	889.5911	1063.783	1184.23	731.1319
14Jun2016 6:00:00	2016	1028.028556	914.2878	1093.319	1287.918	730.3123
14Jun2016 7:00:00	2016	1169.810708	966.3603	1156.707	1482.668	731.9162
14Jun2016 8:00:00	2016	1234.869259	992.997	1194.054	1567.696	761.2515
14Jun2016 9:00:00	2016	1282.659153	1010.181	1226.476	1627.38	776.6454
14Jun2016 10:00:00	2016	1320.030352	1025.097	1278.279	1697.722	779.4316
14Jun2016 11:00:00	2016	1340.547239	1031.315	1264.204	1729.862	800.9052
14Jun2016 12:00:00	2016	1346.784042	1031.112	1262.292	1746.374	829.3401
14Jun2016 13:00:00	2016	1349.125088	1028.147	1267.563	1775.635	821.0446
14Jun2016 14:00:00	2016	1349.282607	1027.303	1250.721	1768.812	820.8204
14Jun2016 15:00:00	2016	1349.310804	1026.841	1239.759	1760.131	826.5582
14Jun2016 16:00:00	2016	1352.99645	1026.206	1263.385	1749.141	807.0867
14Jun2016 17:00:00	2016	1350.572367	1022.474	1259.267	1714.778	809.7883
14Jun2016 18:00:00	2016	1279.535185	1013.487	1223.935	1639.261	799.048
14Jun2016 19:00:00	2016	1219.263949	1002.263	1208.794	1602.327	788.2016
14Jun2016 20:00:00	2016	1176.956143	989.1945	1211.686	1566.288	783.8719
14Jun2016 21:00:00	2016	1125.244973	971.4175	1199.262	1496.644	769.3917
14Jun2016 22:00:00	2016	1084.442606	976.0397	1185.948	1451.667	787.5515
14Jun2016 23:00:00	2016	980.1454625	938.7297	1136.295	1355.761	782.0256
15Jun2016 0:00:00	2016	894.2020445	912.7695	1107.172	1259.055	771.0568
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15Jun2016 3:00:00	2016	820.9212346	893.4755	1069.713	1164.607	758.2005
15Jun2016 4:00:00	2016	838.2892332	893.8304	1053.557	1166.244	775.3392
15Jun2016 5:00:00	2016	880.2067373	896.0678	1050.639	1198.748	770.9532
15Jun2016 6:00:00	2016	1014.285944	926.4147	1086.715	1294.368	776.8338
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15Jun2016 8:00:00	2016	1230.277324	997.7956	1123.783	1501.727	796.0423
15Jun2016 9:00:00	2016	1276.97197	1013.478	1139.765	1554.972	795.3313
15Jun2016 10:00:00	2016	1308.018548	1019.938	1151.272	1602.727	788.3257

15Jun2016 11:00:00	2016	1335.722836	1027.369	1161.43	1641.475	797.4032
15Jun2016 12:00:00	2016	1344.984259	1027.902	1153.553	1650.567	793.827
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15Jun2016 14:00:00	2016	1352.705714	1032.952	1143.224	1659.019	782.6902
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15Jun2016 16:00:00	2016	1358.194483	1042.03	1160.131	1680.433	780.0648
15Jun2016 17:00:00	2016	1350.29133	1039.428	1164.602	1664.616	773.4915
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16Jun2016 1:00:00	2016	850.3699445	915.8154	1097.577	1226.062	747.681
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16Jun2016 3:00:00	2016	819.6043108	904.2698	1090.566	1210.845	740.1546
16Jun2016 4:00:00	2016	837.3709618	907.3217	1094.452	1200.508	739.4952
16Jun2016 5:00:00	2016	894.2394374	902.3385	1085.305	1179.019	740.9323
16Jun2016 6:00:00	2016	1025.18745	924.7735	1113.924	1306.105	731.7615
16Jun2016 7:00:00	2016	1175.249102	974.1117	1177.629	1463.085	735.0306
16Jun2016 8:00:00	2016	1234.619721	1003.816	1226.085	1553.774	757.218
16Jun2016 9:00:00	2016	1268.879075	1017.972	1244.793	1610.627	768.6313
16Jun2016 10:00:00	2016	1305.232765	1026.599	1255.112	1668.6	783.022
16Jun2016 11:00:00	2016	1338.526898	1034.457	1248.359	1710.171	785.6038
16Jun2016 12:00:00	2016	1350.473717	1036.39	1251.615	1695.629	807.1186
16Jun2016 13:00:00	2016	1352.874443	1040.775	1250.088	1726.954	808.4773
16Jun2016 14:00:00	2016	1357.377808	1042.801	1255.586	1706.237	800.1641
16Jun2016 15:00:00	2016	1354.931377	1042.616	1254.296	1701.182	811.9286
16Jun2016 16:00:00	2016	1342.838386	1046.982	1263.3	1670.94	808.2843
16Jun2016 17:00:00	2016	1324.070851	1038.953	1259.718	1652.253	802.819
16Jun2016 18:00:00	2016	1252.480345	1019.035	1248.063	1601.837	812.576
16Jun2016 19:00:00	2016	1206.672844	1006.731	1238.542	1545.357	815.3278
16Jun2016 20:00:00	2016	1171.358391	998.8388	1230.589	1539.379	820.0003
16Jun2016 21:00:00	2016	1130.990142	988.9773	1208.303	1484.456	799.9505
16Jun2016 22:00:00	2016	1093.980221	981.9981	1200.829	1441.758	789.1459
16Jun2016 23:00:00	2016	985.7277807	942.9014	1163.075	1370.438	777.638
17Jun2016 0:00:00	2016	897.4253296	917.1057	1132.349	1288.084	769.3852
17Jun2016 1:00:00	2016	848.0081504	904.7243	1111.028	1236.243	773.5227
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17Jun2016 3:00:00	2016	818.1281402	888.2073	1105.629	1198.277	779.7398
17Jun2016 4:00:00	2016	833.0467479	886.8017	1088.075	1209.272	789.5785
17Jun2016 5:00:00	2016	870.2816653	888.97	1082.964	1221.563	780.7201
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17Jun2016 7:00:00	2016	1146.770197	962.2057	1138.391	1474.709	790.0712
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17Jun2016 10:00:00	2016	1330.665453	1026.706	1220.832	1664.371	796.1816
17Jun2016 11:00:00	2016	1356.930717	1035.06	1244.882	1679.556	806.313
17Jun2016 12:00:00	2016	1366.276463	1032.341	1244.868	1674.663	817.5249
17Jun2016 13:00:00	2016	1374.965672	1032.874	1240.474	1665.326	814.4369
17Jun2016 14:00:00	2016	1371.759893	1032.311	1247.032	1656.767	811.6482
17Jun2016 15:00:00	2016	1365.329298	1039.473	1237.581	1661.171	807.9164
17Jun2016 16:00:00	2016	1355.451363	1042.402	1225.989	1665.493	796.7646
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17Jun2016 18:00:00	2016	1266.805978	1030.72	1195.579	1598.955	808.5731
17Jun2016 19:00:00	2016	1221.042776	1016.576	1176.471	1557.525	798.0945
17Jun2016 20:00:00	2016	1176.185007	1008.843	1176.725	1519.454	799.3482
17Jun2016 21:00:00	2016	1126.116177	997.6088	1165.931	1482.116	801.7679
17Jun2016 22:00:00	2016	1096.789761	997.6543	1172.624	1471.091	803.8792
17Jun2016 23:00:00	2016	1007.838821	973.9034	1161.252	1400.935	800.8408
18Jun2016 0:00:00	2016	917.1231947	943.9279	1130.085	1294.613	801.8518
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18Jun2016 2:00:00	2016	820.981351	914.8632	1104.125	1202.966	788.1255
18Jun2016 3:00:00	2016	806.4299216	906.9626	1094.412	1186.338	780.1516
18Jun2016 4:00:00	2016	801.5054611	903.2905	1085.535	1180.042	767.6538
18Jun2016 5:00:00	2016	789.5367009	897.7266	1055.592	1144.14	754.3588
18Jun2016 6:00:00	2016	817.9000519	906.6497	1057.804	1156.807	752.3675
18Jun2016 7:00:00	2016	896.5485535	935.5681	1070.106	1228.267	765.9897
18Jun2016 8:00:00	2016	998.1167252	966.6754	1108.293	1343.426	773.8321
18Jun2016 9:00:00	2016	1080.752291	987.7515	1145.772	1441.128	781.1653
18Jun2016 10:00:00	2016	1134.931456	1000.091	1164.556	1498.474	785.2584
18Jun2016 11:00:00	2016	1169.442172	1008.552	1180.271	1548.389	788.1369
18Jun2016 12:00:00	2016	1185.502268	1013.073	1195.616	1576.086	802.1643
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18Jun2016 14:00:00	2016	1170.411856	1023.13	1185.642	1556.451	826.7262
18Jun2016 15:00:00	2016	1165.179722	1023.645	1191.511	1551.71	835.7035
18Jun2016 16:00:00	2016	1162.839866	1025.777	1186.507	1548.117	820.0606
18Jun2016 17:00:00	2016	1162.054009	1019.186	1192.309	1556.937	827.5998
18Jun2016 18:00:00	2016	1134.76157	1011.68	1175.381	1511.07	818.2728
18Jun2016 19:00:00	2016	1105.6669	1005.754	1168.237	1483.744	815.9221
18Jun2016 20:00:00	2016	1072.866566	994.5892	1172.526	1460.618	832.3006
18Jun2016 21:00:00	2016	1052.579006	989.0278	1172.533	1442.818	816.5072
18Jun2016 22:00:00	2016	1043.011405	980.7237	1180.755	1451.593	819.9551
18Jun2016 23:00:00	2016	971.5557248	948.0527	1153.91	1403.181	814.4413
19Jun2016 0:00:00	2016	893.244917	917.503	1111.229	1309.788	814.1183
19Jun2016 1:00:00	2016	841.7071827	898.8641	1090.531	1248.974	805.6956
19Jun2016 2:00:00	2016	809.4467726	891.4551	1075.559	1207.929	803.9183
19Jun2016 3:00:00	2016	795.0097398	887.6666	1074.404	1194.781	786.2996
19Jun2016 4:00:00	2016	792.1572898	888.0719	1086.711	1161.166	775.7766
19Jun2016 5:00:00	2016	796.9772523	883.2192	1065.203	1109.577	772.8257
19Jun2016 6:00:00	2016	803.9370225	886.7418	1051.52	1119.252	791.4572
19Jun2016 7:00:00	2016	851.9383695	900.9847	1070.474	1199.394	789.7792
19Jun2016 8:00:00	2016	934.0579342	923.6687	1111.47	1305.218	799.51

19Jun2016 9:00:00	2016	1015.053384	942.6907	1140.03	1399.627	808.0888
19Jun2016 10:00:00	2016	1073.92406	956.0789	1156.015	1467.135	809.7879
19Jun2016 11:00:00	2016	1122.027474	956.6162	1165.925	1509.169	820.8887
19Jun2016 12:00:00	2016	1146.197115	963.9346	1174.125	1534.53	821.785
19Jun2016 13:00:00	2016	1160.100846	963.6737	1183.101	1530.054	827.9459
19Jun2016 14:00:00	2016	1166.73981	971.7224	1182.136	1547.288	817.2142
19Jun2016 15:00:00	2016	1183.394897	978.6851	1180.724	1559.91	823.4655
19Jun2016 16:00:00	2016	1208.477747	989.1363	1196.744	1580.321	832.7981
19Jun2016 17:00:00	2016	1218.953671	996.6684	1209.391	1605.28	839.5055
19Jun2016 18:00:00	2016	1191.108698	990.0408	1201.949	1565.689	828.7652
19Jun2016 19:00:00	2016	1173.424481	981.8798	1201.4	1534.267	829.4746
19Jun2016 20:00:00	2016	1148.347228	969.7145	1199.021	1507.777	824.0596
19Jun2016 21:00:00	2016	1124.128001	960.1062	1180.786	1503.765	824.8379
19Jun2016 22:00:00	2016	1099.466629	953.9377	1173.28	1472.046	828.1639
19Jun2016 23:00:00	2016	994.5509516	922.1803	1142.309	1384.696	845.335
20Jun2016 0:00:00	2016	901.7821777	897.6131	1144.291	1293.534	824.4008
20Jun2016 1:00:00	2016	847.4443526	883.0115	1143.334	1223.739	820.4056
20Jun2016 2:00:00	2016	821.9888213	877.6168	1134.486	1207.912	816.7873
20Jun2016 3:00:00	2016	816.1806867	872.264	1123.813	1215.87	812.0537
20Jun2016 4:00:00	2016	834.3509294	875.6423	1131.172	1208.214	808.2736
20Jun2016 5:00:00	2016	875.2832347	876.4433	1121.87	1210.267	808.0728
20Jun2016 6:00:00	2016	1013.684128	906.2241	1152.299	1332.544	798.0561
20Jun2016 7:00:00	2016	1173.91612	958.5264	1219.173	1529.638	810.1692
20Jun2016 8:00:00	2016	1264.390841	1003.409	1271.114	1638.589	832.8462
20Jun2016 9:00:00	2016	1344.293339	1035.382	1304.32	1730.54	824.4382
20Jun2016 10:00:00	2016	1407.251975	1057.315	1314.014	1804.006	827.6127
20Jun2016 11:00:00	2016	1448.216933	1070.733	1321.398	1840.297	821.9037
20Jun2016 12:00:00	2016	1466.57935	1076.314	1316.847	1868.05	850.2966
20Jun2016 13:00:00	2016	1478.351614	1083.569	1335.397	1904.009	852.3664
20Jun2016 14:00:00	2016	1491.575423	1088.807	1327.354	1905.695	867.5067
20Jun2016 15:00:00	2016	1503.972774	1058.38	1338.159	1918.282	863.0953
20Jun2016 16:00:00	2016	1509.06346	1065.144	1354.225	1919.711	872.1063
20Jun2016 17:00:00	2016	1506.723227	1069.941	1352.51	1906.193	870.9703
20Jun2016 18:00:00	2016	1430.332499	1077.422	1331.796	1838.609	880.7076
20Jun2016 19:00:00	2016	1378.206515	1098.776	1310.622	1804.355	867.9468
20Jun2016 20:00:00	2016	1331.154352	1087.772	1283.666	1747.761	890.128
20Jun2016 21:00:00	2016	1265.45877	1063.168	1253.059	1672.422	875.2632
20Jun2016 22:00:00	2016	1201.235124	1043.624	1227.456	1617.199	859.9619
20Jun2016 23:00:00	2016	1069.33152	996.1334	1168.087	1479.65	866.2213
21Jun2016 0:00:00	2016	963.3054746	959.4683	1121.173	1353.191	844.5665
21Jun2016 1:00:00	2016	904.9034166	932.3906	1089.837	1286.402	834.4027
21Jun2016 2:00:00	2016	870.9677869	918.5069	1078.879	1251.4	835.9149
21Jun2016 3:00:00	2016	855.5497225	913.4528	1071.839	1228.625	822.4817
21Jun2016 4:00:00	2016	869.210166	915.3813	1051.036	1228.94	812.2434
21Jun2016 5:00:00	2016	910.1618709	916.3431	1053.368	1249.336	818.0667
21Jun2016 6:00:00	2016	1037.683361	942.4618	1072.488	1348.591	812.1396
21Jun2016 7:00:00	2016	1199.778556	995.8578	1142.552	1517.855	803.3081

21Jun2016 8:00:00	2016	1296.550787	1042.753	1202.819	1620.146	854.1819
21Jun2016 9:00:00	2016	1370.030931	1068.252	1232.67	1688.825	889.3393
21Jun2016 10:00:00	2016	1425.664037	1084.277	1251.214	1737.813	881.1666
21Jun2016 11:00:00	2016	1464.935013	1092.394	1267.304	1774.309	896.1094
21Jun2016 12:00:00	2016	1471.29634	1086.016	1273.033	1796.988	908.174
21Jun2016 13:00:00	2016	1474.276014	1091.478	1274.915	1832.044	907.3059
21Jun2016 14:00:00	2016	1466.547884	1110.32	1275.608	1848.973	902.6896
21Jun2016 15:00:00	2016	1453.172093	1125.976	1272.403	1820.193	933.5445
21Jun2016 16:00:00	2016	1459.623224	1127.082	1260.18	1810.064	932.1308
21Jun2016 17:00:00	2016	1427.408116	1108.278	1248.649	1784.679	952.0664
21Jun2016 18:00:00	2016	1342.468479	1083.115	1230.467	1698.062	943.5613
21Jun2016 19:00:00	2016	1295.462477	1068.393	1197.139	1621.89	921.9386
21Jun2016 20:00:00	2016	1252.460902	1055.431	1192.634	1566.526	952.0612
21Jun2016 21:00:00	2016	1222.123276	1039.284	1173.194	1500.799	942.8767
21Jun2016 22:00:00	2016	1146.300664	1025.365	1161.716	1455.729	924.7174
21Jun2016 23:00:00	2016	1021.831779	987.796	1120.529	1360.21	926.0737
22Jun2016 0:00:00	2016	931.6995345	955.4898	1093.288	1285.681	902.6318
22Jun2016 1:00:00	2016	879.3825718	938.2864	1081.676	1244.855	875.6332
22Jun2016 2:00:00	2016	852.049689	930.3488	1081.285	1214.114	864.2342
22Jun2016 3:00:00	2016	839.9571904	925.6111	1070.464	1199.014	873.677
22Jun2016 4:00:00	2016	856.5456038	926.019	1072.198	1201.934	863.931
22Jun2016 5:00:00	2016	898.6660809	925.9297	1070.449	1220.757	860.0977
22Jun2016 6:00:00	2016	1033.052318	955.773	1094.437	1328.419	840.8895
22Jun2016 7:00:00	2016	1195.264892	1012.797	1172.433	1501.966	845.6901
22Jun2016 8:00:00	2016	1288.152335	1052.125	1245.947	1632.395	855.072
22Jun2016 9:00:00	2016	1360.566031	1076.168	1276.698	1725.56	835.4055
22Jun2016 10:00:00	2016	1410.250162	1084.371	1298.192	1793.118	855.72
22Jun2016 11:00:00	2016	1451.640964	1102.743	1305.886	1819.192	853.2389
22Jun2016 12:00:00	2016	1479.052864	1106.083	1308.52	1833.11	878.538
22Jun2016 13:00:00	2016	1496.307058	1095.3	1316.527	1856.119	882.986
22Jun2016 14:00:00	2016	1498.60893	1071.61	1318.351	1867.362	893.7459
22Jun2016 15:00:00	2016	1497.775051	1082.159	1315.166	1876.799	879.4867
22Jun2016 16:00:00	2016	1491.906001	1090.884	1329.999	1892.692	883.1127
22Jun2016 17:00:00	2016	1455.453213	1091.679	1321.66	1874.873	924.6209
22Jun2016 18:00:00	2016	1365.589688	1096.708	1289.891	1817.938	929.8319
22Jun2016 19:00:00	2016	1328.05364	1121.115	1281.207	1745.378	905.5779
22Jun2016 20:00:00	2016	1290.206353	1108.678	1258.78	1665.681	898.2961
22Jun2016 21:00:00	2016	1235.778449	1082.09	1239.23	1584.456	888.7543
22Jun2016 22:00:00	2016	1178.0945	1067.031	1217.116	1521.386	896.5091
22Jun2016 23:00:00	2016	1056.550491	1027.588	1182.471	1419.626	909.4117
23Jun2016 0:00:00	2016	954.7228752	989.6349	1147.24	1318.626	901.6145
23Jun2016 1:00:00	2016	897.1198208	961.3102	1116.004	1238.34	892.5689
23Jun2016 2:00:00	2016	863.9692999	952.0069	1104.17	1226.521	860.0492
23Jun2016 3:00:00	2016	851.6158904	946.6971	1114.51	1209.388	875.6817
23Jun2016 4:00:00	2016	865.1432956	945.511	1120.929	1204.319	868.0329
23Jun2016 5:00:00	2016	908.0500753	946.0116	1086.623	1208.466	873.4623
23Jun2016 6:00:00	2016	1043.229581	970.8237	1109.099	1336.401	883.6239

23Jun2016 7:00:00	2016	1204.09413	1035.198	1172.174	1510.339	890.7466
23Jun2016 8:00:00	2016	1290.939081	1084.241	1224.992	1618.239	919.3405
23Jun2016 9:00:00	2016	1357.401338	1097.689	1279.279	1701.332	937.7469
23Jun2016 10:00:00	2016	1408.810937	1118.885	1283.806	1753.797	940.9048
23Jun2016 11:00:00	2016	1447.934049	1135.182	1295.532	1789.482	940.6484
23Jun2016 12:00:00	2016	1461.644497	1138.442	1319.827	1825.211	892.4897
23Jun2016 13:00:00	2016	1484.132026	1097.364	1333.413	1858.964	927.4693
23Jun2016 14:00:00	2016	1491.223315	1094.525	1334.058	1871.013	941.7722
23Jun2016 15:00:00	2016	1491.014537	1116.642	1329.279	1889.626	972.3443
23Jun2016 16:00:00	2016	1477.232445	1121.67	1310.65	1859.231	956.2891
23Jun2016 17:00:00	2016	1456.060143	1109.897	1283.085	1833.016	945.4855
23Jun2016 18:00:00	2016	1385.702297	1104.969	1269.767	1787.972	964.9804
23Jun2016 19:00:00	2016	1326.580049	1126.596	1242.27	1721.399	944.0171
23Jun2016 20:00:00	2016	1287.451903	1104.771	1209.332	1641.976	920.3307
23Jun2016 21:00:00	2016	1230.636564	1071.838	1177.236	1578.709	917.2619
23Jun2016 22:00:00	2016	1170.652241	1051.56	1147.952	1497.149	922.5144
23Jun2016 23:00:00	2016	1049.233882	1012.485	1132.299	1397.952	923.4243
24Jun2016 0:00:00	2016	948.6640923	969.4534	1117.739	1306.195	915.1358
24Jun2016 1:00:00	2016	891.1954405	947.4081	1121.724	1253.607	928.8503
24Jun2016 2:00:00	2016	858.7822227	932.2217	1123.562	1246.622	919.2206
24Jun2016 3:00:00	2016	844.511846	923.9319	1119.322	1207.78	918.8331
24Jun2016 4:00:00	2016	856.3824751	919.1349	1111.579	1229.839	876.7446
24Jun2016 5:00:00	2016	895.2172979	922.0837	1082.998	1203.737	828.9299
24Jun2016 6:00:00	2016	1020.823507	949.2414	1084.769	1329.31	788.4474
24Jun2016 7:00:00	2016	1170.321374	1006.05	1153.908	1499.032	786.8112
24Jun2016 8:00:00	2016	1269.006312	1053.556	1218.115	1637.745	838.7032
24Jun2016 9:00:00	2016	1345.098002	1073.91	1252.788	1704.684	854.5989
24Jun2016 10:00:00	2016	1394.258644	1083.254	1279.666	1768.365	853.0831
24Jun2016 11:00:00	2016	1417.067061	1096.009	1280.123	1791.177	844.7525
24Jun2016 12:00:00	2016	1419.508651	1096.769	1267.393	1789.509	880.3898
24Jun2016 13:00:00	2016	1424.328667	1091.089	1280.496	1798.814	900.5262
24Jun2016 14:00:00	2016	1395.055154	1088.982	1275.103	1790.245	889.524
24Jun2016 15:00:00	2016	1367.030002	1086.975	1265.819	1739.314	885.7174
24Jun2016 16:00:00	2016	1344.092088	1086.655	1264.025	1722.095	856.1992
24Jun2016 17:00:00	2016	1315.981219	1070.112	1252.613	1685.974	877.4578
24Jun2016 18:00:00	2016	1261.599265	1049.452	1211.732	1618.296	877.3509
24Jun2016 19:00:00	2016	1210.005102	1038.074	1173.055	1560.405	887.713
24Jun2016 20:00:00	2016	1164.983999	1029.294	1165.669	1510.434	876.9209
24Jun2016 21:00:00	2016	1134.161013	1024.413	1165.008	1466.722	861.6535
24Jun2016 22:00:00	2016	1074.930029	1008.413	1174.416	1426.882	867.938
24Jun2016 23:00:00	2016	975.4840888	971.8233	1158.485	1353.638	899.4426
25Jun2016 0:00:00	2016	898.4921232	889.8871	1120.503	1267.211	878.2683
25Jun2016 1:00:00	2016	847.3110314	862.4754	1077.033	1207.846	868.1094
25Jun2016 2:00:00	2016	819.8781905	852.9234	1074.279	1201.41	876.793
25Jun2016 3:00:00	2016	809.6431184	853.7871	1083.826	1190.348	867.8747
25Jun2016 4:00:00	2016	808.7654474	857.3078	1069.627	1161.628	855.8126
25Jun2016 5:00:00	2016	819.3989971	856.7281	1055.74	1160.708	850.3641

25Jun2016 6:00:00	2016	842.2228504	860.8922	1059.764	1177.414	841.2743
25Jun2016 7:00:00	2016	909.2846721	885.2561	1088.436	1259.14	846.5136
25Jun2016 8:00:00	2016	998.6200573	918.9446	1129.987	1371.897	869.647
25Jun2016 9:00:00	2016	1079.446928	946.2612	1186.042	1483.262	861.4502
25Jun2016 10:00:00	2016	1135.507315	959.1688	1213.888	1535.204	850.2977
25Jun2016 11:00:00	2016	1174.765429	966.293	1228.003	1578.684	830.5321
25Jun2016 12:00:00	2016	1191.304872	967.7641	1219.544	1568.896	859.8793
25Jun2016 13:00:00	2016	1194.107658	964.4284	1215.772	1580.584	860.984
25Jun2016 14:00:00	2016	1185.850018	958.8358	1218.865	1554.783	848.8312
25Jun2016 15:00:00	2016	1167.552006	960.5704	1223.163	1576.386	867.2711
25Jun2016 16:00:00	2016	1166.436138	965.0082	1225.171	1589.135	922.5028
25Jun2016 17:00:00	2016	1178.255115	965.563	1224.587	1606.146	935.6476
25Jun2016 18:00:00	2016	1142.074456	959.7066	1203.619	1556.043	927.5791
25Jun2016 19:00:00	2016	1106.910791	947.6678	1189.818	1499.283	931.4755
25Jun2016 20:00:00	2016	1075.976413	936.5829	1179.603	1465.843	923.8358
25Jun2016 21:00:00	2016	1071.91683	931.1947	1170.833	1440.888	884.306
25Jun2016 22:00:00	2016	1054.866129	928.5793	1188.041	1478.496	879.9819
25Jun2016 23:00:00	2016	975.5556424	899.9037	1172.613	1397.983	886.355
26Jun2016 0:00:00	2016	898.7876021	870.5983	1145.15	1300.759	895.2887
26Jun2016 1:00:00	2016	847.4275038	849.5191	1123.374	1263.855	886.0676
26Jun2016 2:00:00	2016	816.9958743	833.3362	1118.25	1232.79	863.4458
26Jun2016 3:00:00	2016	803.3342799	829.2086	1075.092	1187.706	829.5559
26Jun2016 4:00:00	2016	797.5616331	827.714	1070.675	1177.511	812.8796
26Jun2016 5:00:00	2016	798.7535809	822.5717	1047.993	1130.14	817.6495
26Jun2016 6:00:00	2016	812.1052468	819.6327	1025.121	1118.169	801.1652
26Jun2016 7:00:00	2016	867.3877962	839.7409	1080.835	1187.834	827.9932
26Jun2016 8:00:00	2016	944.9703196	868.277	1134.006	1294.523	851.0453
26Jun2016 9:00:00	2016	1024.284783	894.0994	1168.53	1393.454	870.3591
26Jun2016 10:00:00	2016	1083.535196	915.5716	1205.561	1464.101	887.6081
26Jun2016 11:00:00	2016	1118.42393	927.2511	1229.172	1543.275	905.4168
26Jun2016 12:00:00	2016	1144.019735	928.3921	1237.573	1600.692	922.166
26Jun2016 13:00:00	2016	1159.10692	924.6493	1238.754	1593.738	908.8862
26Jun2016 14:00:00	2016	1166.757893	925.3134	1234.797	1616.816	900.6332
26Jun2016 15:00:00	2016	1181.31367	927.9289	1247.243	1624.775	879.179
26Jun2016 16:00:00	2016	1209.369314	940.7476	1223.048	1649.361	892.5551
26Jun2016 17:00:00	2016	1235.172925	950.5555	1230.426	1689.927	893.3189
26Jun2016 18:00:00	2016	1220.998779	952.7271	1254.562	1645.751	877.6659
26Jun2016 19:00:00	2016	1197.910485	951.2292	1229.753	1606.383	885.2027
26Jun2016 20:00:00	2016	1173.833584	945.9611	1224.65	1610.498	881.7713
26Jun2016 21:00:00	2016	1144.146721	932.3181	1217.462	1583.273	879.3244
26Jun2016 22:00:00	2016	1115.833827	922.2681	1215.734	1549.867	890.0699
26Jun2016 23:00:00	2016	1015.01288	888.3207	1184.69	1450.424	882.8233
27Jun2016 0:00:00	2016	916.8182895	857.1851	1141.907	1340.188	897.002
27Jun2016 1:00:00	2016	859.2148101	837.9419	1137.398	1289.506	874.6855
27Jun2016 2:00:00	2016	831.0036376	826.7771	1125.067	1238.901	884.6672
27Jun2016 3:00:00	2016	820.5036035	819.5814	1116.67	1212.805	862.5996
27Jun2016 4:00:00	2016	838.3220866	820.6819	1112.672	1202.104	855.6478

27Jun2016 5:00:00	2016	882.5288665	821.537	1101.249	1187.662	823.9759
27Jun2016 6:00:00	2016	1011.481563	850.3578	1133.682	1301.662	800.9236
27Jun2016 7:00:00	2016	1165.104112	902.7874	1189.29	1472.056	831.4461
27Jun2016 8:00:00	2016	1265.195647	946.1561	1250.669	1607.772	884.3051
27Jun2016 9:00:00	2016	1355.361272	982.8372	1264.567	1695.564	880.7179
27Jun2016 10:00:00	2016	1421.089493	1018.054	1298.588	1808.428	879.1168
27Jun2016 11:00:00	2016	1470.706983	1045.425	1316.685	1865.698	907.2473
27Jun2016 12:00:00	2016	1497.626565	1008.68	1315.085	1903.325	940.4087
27Jun2016 13:00:00	2016	1514.197547	1015.461	1325.799	1928.474	977.7289
27Jun2016 14:00:00	2016	1517.50724	1024.395	1331.281	1942.816	963.3997
27Jun2016 15:00:00	2016	1526.376118	1031.184	1334.057	1952.154	976.8025
27Jun2016 16:00:00	2016	1534.907223	1040.119	1330.392	1926.996	962.8694
27Jun2016 17:00:00	2016	1529.665763	1040.41	1321.842	1893.091	972.0436
27Jun2016 18:00:00	2016	1445.699154	1044.267	1300.519	1836.176	966.0129
27Jun2016 19:00:00	2016	1381.055126	1054.346	1285.273	1813.212	982.5636
27Jun2016 20:00:00	2016	1324.762961	1045.335	1269.539	1771.302	968.6459
27Jun2016 21:00:00	2016	1266.39984	1017.884	1239.886	1697.575	973.0434
27Jun2016 22:00:00	2016	1204.672811	997.0772	1226.098	1625.606	963.9579
27Jun2016 23:00:00	2016	1079.573559	951.9838	1190.512	1536.049	968.0992
28Jun2016 0:00:00	2016	976.2704623	915.142	1144.06	1414.497	905.1267
28Jun2016 1:00:00	2016	912.3039555	894.5209	1120.087	1339.433	870.1243
28Jun2016 2:00:00	2016	879.4223219	880.9074	1102.263	1299.657	863.2156
28Jun2016 3:00:00	2016	865.1107954	869.3318	1083.12	1267.924	845.3029
28Jun2016 4:00:00	2016	880.3623854	869.8854	1060.826	1246.878	848.1035
28Jun2016 5:00:00	2016	927.6990741	869.409	1043.369	1246.041	833.5682
28Jun2016 6:00:00	2016	1058.068139	887.6332	1077.102	1366.526	830.8965
28Jun2016 7:00:00	2016	1219.139336	935.8998	1152.409	1566.876	846.6064
28Jun2016 8:00:00	2016	1307.572226	977.9535	1239.752	1698.336	900.302
28Jun2016 9:00:00	2016	1371.052546	1008.772	1278.329	1790.494	917.1404
28Jun2016 10:00:00	2016	1436.968916	1022.721	1302.165	1866.866	944.1458
28Jun2016 11:00:00	2016	1486.79151	1017.699	1327.104	1924.942	953.4317
28Jun2016 12:00:00	2016	1514.842817	995.9563	1335.754	1962.266	979.851
28Jun2016 13:00:00	2016	1536.332661	1002.825	1348.391	1989.85	982.1954
28Jun2016 14:00:00	2016	1536.734153	1015.851	1354.562	1973.269	995.4154
28Jun2016 15:00:00	2016	1524.036814	1028.809	1338.663	1928.817	963.5558
28Jun2016 16:00:00	2016	1477.481608	1043.807	1319.479	1909.432	942.4002
28Jun2016 17:00:00	2016	1456.617122	1043.779	1343.615	1884.786	970.8332
28Jun2016 18:00:00	2016	1389.669239	1050.545	1309.905	1811.272	948.036
28Jun2016 19:00:00	2016	1339.358574	1032.721	1296.835	1781.417	941.3875
28Jun2016 20:00:00	2016	1297.439294	992.7949	1274.679	1725.692	935.396
28Jun2016 21:00:00	2016	1246.194863	980.2933	1248.155	1658.589	917.0738
28Jun2016 22:00:00	2016	1189.998197	964.699	1247.192	1609.042	916.6477
28Jun2016 23:00:00	2016	1071.938281	918.223	1211.636	1506.656	934.8543
29Jun2016 0:00:00	2016	967.6105043	885.8321	1176.855	1392.772	918.3965
29Jun2016 1:00:00	2016	902.8905264	870.051	1154.235	1326.185	886.1281
29Jun2016 2:00:00	2016	867.4005267	861.5234	1135.724	1281.803	897.3817
29Jun2016 3:00:00	2016	854.3356123	856.2465	1116.93	1259.74	884.1636

29Jun2016 4:00:00	2016	866.6853792	854.1039	1117.091	1251.502	882.0832
29Jun2016 5:00:00	2016	909.9503602	851.8982	1099.309	1247.295	862.5465
29Jun2016 6:00:00	2016	1034.119306	873.806	1134.916	1375.767	855.5224
29Jun2016 7:00:00	2016	1188.020241	921.3075	1207.685	1582.465	874.1355
29Jun2016 8:00:00	2016	1301.706354	971.677	1269.284	1737.654	891.3283
29Jun2016 9:00:00	2016	1389.201243	1013.214	1296.199	1841.428	906.3475
29Jun2016 10:00:00	2016	1458.452923	1036.575	1317.357	1923.718	906.6454
29Jun2016 11:00:00	2016	1502.088623	1028.419	1338.945	1971.299	912.0245
29Jun2016 12:00:00	2016	1528.36319	1027.361	1362.895	1988.854	951.8642
29Jun2016 13:00:00	2016	1546.780879	1033.806	1379.262	1981.996	988.6577
29Jun2016 14:00:00	2016	1556.563226	1043.57	1409.129	1944.855	984.2418
29Jun2016 15:00:00	2016	1565.087758	1053.83	1409.9	1894.148	986.8409
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29Jun2016 17:00:00	2016	1539.805221	1054.38	1374.186	1907.347	991.9042
29Jun2016 18:00:00	2016	1448.837255	1052.836	1345.106	1862.45	959.8907
29Jun2016 19:00:00	2016	1406.876586	1071.874	1316.345	1797.237	974.9926
29Jun2016 20:00:00	2016	1360.643302	1054.273	1288.611	1738.713	996.9907
29Jun2016 21:00:00	2016	1297.691999	1034.999	1256.194	1676.036	989.726
29Jun2016 22:00:00	2016	1240.987379	1019.807	1245.24	1633.452	978.2548
29Jun2016 23:00:00	2016	1123.472779	972.5573	1198.113	1529.142	970.0342
30Jun2016 0:00:00	2016	1013.17169	929.7185	1148.961	1407.44	949.1315
30Jun2016 1:00:00	2016	945.301512	904.3136	1138.751	1343.9	934.2489
30Jun2016 2:00:00	2016	906.2897366	891.9149	1120.582	1298.095	938.4617
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30Jun2016 4:00:00	2016	901.4395627	887.8261	1112.041	1284.396	927.5794
30Jun2016 5:00:00	2016	945.4793525	890.9747	1091.967	1314.261	886.4408
30Jun2016 6:00:00	2016	1070.534235	913.6099	1127.185	1410.887	872.7694
30Jun2016 7:00:00	2016	1222.298563	962.9014	1209.289	1587.787	882.3168
30Jun2016 8:00:00	2016	1318.478221	1008.308	1266.997	1659.441	889.6375
30Jun2016 9:00:00	2016	1377.617177	1042.891	1289.497	1754.969	896.3367
30Jun2016 10:00:00	2016	1425.529781	1071.46	1303.709	1807.116	901.0619
30Jun2016 11:00:00	2016	1446.811312	1073.183	1312.252	1886.994	918.0774
30Jun2016 12:00:00	2016	1451.528517	1056.892	1324.243	1912.624	940.6338
30Jun2016 13:00:00	2016	1492.906829	1063.231	1323.734	1913.876	939.8412
30Jun2016 14:00:00	2016	1490.962838	1068.219	1333.119	1888.309	952.7745
30Jun2016 15:00:00	2016	1426.96529	1060.981	1324.614	1833.052	929.4723
30Jun2016 16:00:00	2016	1409.223265	1033.485	1319.255	1776.857	947.0514
30Jun2016 17:00:00	2016	1399.816978	998.3327	1305.334	1756.016	952.2849
30Jun2016 18:00:00	2016	1333.782538	976.6434	1271.024	1704.685	950.5605
30Jun2016 19:00:00	2016	1278.270786	951.611	1250.018	1649.358	935.3583
30Jun2016 20:00:00	2016	1223.352942	946.6831	1249.643	1599.119	937.3052
30Jun2016 21:00:00	2016	1166.739348	940.8021	1221.286	1571.812	940.305
30Jun2016 22:00:00	2016	1131.322766	939.1031	1211.331	1564.502	939.2463
30Jun2016 23:00:00	2016	1040.413565	900.6981	1167.075	1449.335	948.5001
01Jul2016 0:00:00	2016	947.3196281	860.8965	1154.723	1346.044	935.5024
01Jul2016 1:00:00	2016	886.0034925	846.9018	1147.734	1284.2	928.8145
01Jul2016 2:00:00	2016	850.9857608	833.7151	1145.592	1262.457	916.1033

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01Jul2016 5:00:00	2016	838.9640325	829.0327	1110.296	1189.555	897.1556
01Jul2016 6:00:00	2016	865.1470465	833.392	1101.716	1188.658	884.0519
01Jul2016 7:00:00	2016	930.034722	859.4505	1112.753	1263.205	881.8837
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01Jul2016 10:00:00	2016	1157.783075	941.0717	1229.692	1546.647	915.1318
01Jul2016 11:00:00	2016	1197.035849	952.0146	1244.858	1601.627	922.2471
01Jul2016 12:00:00	2016	1220.552471	961.0765	1252.132	1609.517	937.387
01Jul2016 13:00:00	2016	1227.649505	966.9554	1262.015	1630.905	946.4928
01Jul2016 14:00:00	2016	1225.267782	974.0062	1254.449	1652.284	950.1629
01Jul2016 15:00:00	2016	1240.170781	988.2048	1273.788	1651.181	952.6575
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01Jul2016 19:00:00	2016	1154.662942	965.2005	1223.059	1597.072	981.926
01Jul2016 20:00:00	2016	1123.811399	950.3054	1222.212	1550.425	977.8354
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01Jul2016 23:00:00	2016	1027.230029	910.9573	1201.177	1454.952	964.3949
02Jul2016 0:00:00	2016	963.8304506	890.6868	1155.774	1358.725	933.061
02Jul2016 1:00:00	2016	906.4447599	860.5675	1141.128	1284.523	922.4222
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02Jul2016 3:00:00	2016	831.377278	826.92	1123.588	1228.674	905.6642
02Jul2016 4:00:00	2016	822.219198	821.4691	1109.563	1211.784	897.6754
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02Jul2016 10:00:00	2016	1171.476994	944.2542	1254.221	1546.929	889.3861
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02Jul2016 15:00:00	2016	1219.131938	1002.806	1293.31	1678.687	939.9573
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02Jul2016 18:00:00	2016	1202.883303	1007.644	1271.705	1637.035	935.5409
02Jul2016 19:00:00	2016	1176.926019	984.6498	1247.621	1594.334	935.7448
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02Jul2016 23:00:00	2016	1030.897472	926.9419	1214.579	1493.369	921.5763
03Jul2016 0:00:00	2016	949.2928345	887.1208	1192.782	1399.67	902.6176
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03Jul2016 18:00:00	2016	1230.290763	1002.434	1257.04	1669.914	935.7718
03Jul2016 19:00:00	2016	1182.768279	988.1458	1237.632	1630.238	936.1297
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03Jul2016 21:00:00	2016	1121.348399	957.2336	1203.603	1487.536	935.2763
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04Jul2016 12:00:00	2016	1441.95578	1029.814	1351.319	1842.06	860.9767
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04Jul2016 14:00:00	2016	1411.590958	1026.259	1352.097	1860.015	885.611
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05Jul2016 20:00:00	2016	1162.561755	1012.84	1246.533	1612.436	977.7289
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05Jul2016 22:00:00	2016	1101.825695	993.5128	1229.974	1566.808	965.4906
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06Jul2016 1:00:00	2016	856.980243	910.7065	1152.568	1324.316	941.5849
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06Jul2016 4:00:00	2016	840.8018524	905.3645	1121.818	1251.507	909.4032
06Jul2016 5:00:00	2016	893.5462849	908.0136	1113.84	1263.746	895.77
06Jul2016 6:00:00	2016	1009.729446	929.3589	1128.808	1338.619	908.5676
06Jul2016 7:00:00	2016	1135.791395	974.2241	1186.773	1472.342	910.7277
06Jul2016 8:00:00	2016	1217.393814	1009.016	1240.454	1576.328	916.0112
06Jul2016 9:00:00	2016	1270.259139	1030.012	1262.228	1616.787	919.1946
06Jul2016 10:00:00	2016	1314.565129	1038.95	1283.342	1654.846	891.4497
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06Jul2016 12:00:00	2016	1376.213961	1048.599	1316.977	1718.134	919.5822
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06Jul2016 14:00:00	2016	1371.092507	1054.615	1309.546	1766.164	906.8326
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06Jul2016 18:00:00	2016	1264.916763	1041.572	1218.968	1690.691	897.7679
06Jul2016 19:00:00	2016	1223.885627	1026.256	1267.634	1653.706	906.2141
06Jul2016 20:00:00	2016	1183.368238	1013.017	1264.075	1618.631	920.8789
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14Jul2016 19:00:00	2016	1248.666945	955.0526	1267.082	1705.478	993.1732

14Jul2016 20:00:00	2016	1202.555139	947.6917	1271.386	1660.139	980.7726
14Jul2016 21:00:00	2016	1183.944614	958.9128	1275.965	1588.058	960.1783
14Jul2016 22:00:00	2016	1141.00677	957.6593	1276.006	1572.746	974.1643
14Jul2016 23:00:00	2016	1031.437229	922.2534	1229.269	1452.461	983.5625
15Jul2016 0:00:00	2016	945.2909008	875.6252	1192.234	1360.57	983.6104
15Jul2016 1:00:00	2016	888.3415887	847.3006	1170.231	1307.412	979.4594
15Jul2016 2:00:00	2016	853.73119	840.2702	1158.73	1268.278	978.2294
15Jul2016 3:00:00	2016	840.4652298	836.3171	1145.044	1246.923	971.8659
15Jul2016 4:00:00	2016	853.7141964	839.5327	1144.493	1240.576	977.5435
15Jul2016 5:00:00	2016	913.9104996	843.6944	1125.015	1242.185	993.2768
15Jul2016 6:00:00	2016	1022.617674	859.482	1125.529	1313.665	965.9355
15Jul2016 7:00:00	2016	1130.9099	898.6011	1183.433	1479.938	955.8532
15Jul2016 8:00:00	2016	1221.836827	931.1091	1229.216	1609.548	956.1434
15Jul2016 9:00:00	2016	1283.129048	978.9628	1241.345	1686.947	928.5457
15Jul2016 10:00:00	2016	1322.550885	997.2599	1257.242	1745.31	945.5397
15Jul2016 11:00:00	2016	1367.034219	995.7364	1267.69	1762.244	961.1225
15Jul2016 12:00:00	2016	1381.721843	983.2565	1267.855	1766.785	977.5175
15Jul2016 13:00:00	2016	1360.150997	984.5139	1275.353	1795.777	1001.412
15Jul2016 14:00:00	2016	1324.178789	985.005	1288.731	1756.485	1006.848
15Jul2016 15:00:00	2016	1311.511671	984.6298	1306.878	1710.213	1047.084
15Jul2016 16:00:00	2016	1299.58344	974.1198	1295.555	1689.529	1036.564
15Jul2016 17:00:00	2016	1300.965724	956.694	1280.598	1662.242	1053.894
15Jul2016 18:00:00	2016	1230.7028	927.2261	1256.341	1599.876	1045.677
15Jul2016 19:00:00	2016	1188.960535	919.9505	1240.106	1558.318	1028.98
15Jul2016 20:00:00	2016	1166.303319	903.4889	1276.395	1533.965	1028.798
15Jul2016 21:00:00	2016	1140.002653	892.0413	1258.097	1491.926	1007.292
15Jul2016 22:00:00	2016	1070.314838	878.9448	1264.659	1484.666	1016.307
15Jul2016 23:00:00	2016	981.8458722	849.814	1233.307	1403.286	1025.144
16Jul2016 0:00:00	2016	909.0911941	826.887	1206.573	1311.382	1012.859
16Jul2016 1:00:00	2016	858.9582611	811.9274	1191.749	1280.627	1001.26
16Jul2016 2:00:00	2016	826.0845866	802.2061	1183.025	1245.457	989.0196
16Jul2016 3:00:00	2016	809.7500402	798.2608	1184.617	1220.373	981.2403
16Jul2016 4:00:00	2016	809.1872596	795.4682	1183.011	1218.469	973.5415
16Jul2016 5:00:00	2016	825.6759759	799.3082	1168.428	1194.747	961.0598
16Jul2016 6:00:00	2016	841.4276148	795.8571	1169.961	1209.767	957.8025
16Jul2016 7:00:00	2016	901.081176	816.4902	1195.014	1300.328	958.0464
16Jul2016 8:00:00	2016	982.1755105	846.1086	1239.299	1393.991	962.0301
16Jul2016 9:00:00	2016	1066.552826	876.2661	1283.801	1521.659	983.046
16Jul2016 10:00:00	2016	1127.217474	890.9662	1315.986	1579.703	1008.348
16Jul2016 11:00:00	2016	1152.743759	906.7098	1326.282	1619.386	1014.283
16Jul2016 12:00:00	2016	1160.120095	901.5842	1317.541	1646.973	1020.347
16Jul2016 13:00:00	2016	1151.890137	897.29	1295.035	1639.443	986.1962
16Jul2016 14:00:00	2016	1148.587265	890.9298	1242.136	1627.578	971.1045
16Jul2016 15:00:00	2016	1145.539211	895.8037	1237.453	1635.753	977.6218
16Jul2016 16:00:00	2016	1147.904045	897.0479	1242.537	1600.404	995.6575
16Jul2016 17:00:00	2016	1148.446468	896.1056	1250.459	1596.224	999.4152
16Jul2016 18:00:00	2016	1120.918622	890.7116	1234.816	1601.048	986.7595

16Jul2016 19:00:00	2016	1093.11974	879.5543	1226.578	1558.115	973.6066
16Jul2016 20:00:00	2016	1063.164561	870.659	1206.646	1514.042	970.936
16Jul2016 21:00:00	2016	1060.599992	872.2052	1204.94	1480.41	959.1305
16Jul2016 22:00:00	2016	1052.937205	869.2896	1212.137	1487.13	968.8659
16Jul2016 23:00:00	2016	975.3762203	841.0452	1178.934	1412.412	961.2304
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17Jul2016 1:00:00	2016	855.5534434	801.9901	1131.909	1266.55	937.8439
17Jul2016 2:00:00	2016	822.1782023	792.6712	1117.267	1228.302	920.6357
17Jul2016 3:00:00	2016	803.2060508	788.4765	1107.959	1175.864	908.931
17Jul2016 4:00:00	2016	799.8012115	787.5188	1104.53	1152.142	902.2671
17Jul2016 5:00:00	2016	800.7690234	784.0526	1094.309	1109.471	897.1824
17Jul2016 6:00:00	2016	801.9784025	786.9586	1091.864	1099.27	889.4556
17Jul2016 7:00:00	2016	859.1119751	804.4729	1111.825	1165.453	902.2777
17Jul2016 8:00:00	2016	944.4231476	832.4154	1161.171	1256.783	931.5926
17Jul2016 9:00:00	2016	1021.581995	848.9214	1193.853	1370.069	941.4171
17Jul2016 10:00:00	2016	1092.383545	869.3125	1217.812	1469.956	945.2817
17Jul2016 11:00:00	2016	1135.483867	878.1516	1233.926	1533.924	939.0327
17Jul2016 12:00:00	2016	1158.272772	883.9148	1246.995	1552.828	957.1146
17Jul2016 13:00:00	2016	1165.386674	888.7215	1246.879	1561.516	993.6162
17Jul2016 14:00:00	2016	1163.94771	895.063	1247.355	1543.441	991.0722
17Jul2016 15:00:00	2016	1169.04652	902.8136	1254.218	1551.833	986.0726
17Jul2016 16:00:00	2016	1191.590441	918.0697	1266.962	1571.26	997.5129
17Jul2016 17:00:00	2016	1207.081234	923.6666	1275.913	1581.974	1009.506
17Jul2016 18:00:00	2016	1170.532835	920.9389	1242.457	1544.489	997.6559
17Jul2016 19:00:00	2016	1122.982266	897.3264	1227.461	1514.732	1000.819
17Jul2016 20:00:00	2016	1090.401505	890.4272	1238.416	1501.197	1025.636
17Jul2016 21:00:00	2016	1075.263074	881.3789	1240.528	1484.492	1013.324
17Jul2016 22:00:00	2016	1052.872496	872.0041	1228.777	1469.624	1016.601
17Jul2016 23:00:00	2016	960.0053244	837.6061	1186.546	1362.859	1022.444
18Jul2016 0:00:00	2016	886.1801869	811.5733	1158.062	1270.865	985.2136
18Jul2016 1:00:00	2016	839.0786129	798.4656	1140.873	1215.453	975.379
18Jul2016 2:00:00	2016	814.252199	794.0698	1134.187	1193.588	960.5255
18Jul2016 3:00:00	2016	807.3400853	793.9003	1131.87	1207.664	943.4211
18Jul2016 4:00:00	2016	825.4222087	798.4818	1138.2	1224.986	934.7958
18Jul2016 5:00:00	2016	882.3054299	805.7948	1124.925	1246.498	932.9511
18Jul2016 6:00:00	2016	987.5490431	829.9987	1148.276	1339.224	948.3966
18Jul2016 7:00:00	2016	1126.218326	873.9466	1210.417	1501.561	948.2078
18Jul2016 8:00:00	2016	1215.274411	908.1157	1267.997	1633.092	951.8823
18Jul2016 9:00:00	2016	1287.549855	931.5332	1305.651	1730.039	965.5213
18Jul2016 10:00:00	2016	1346.734494	950.2929	1343.37	1799.563	976.6177
18Jul2016 11:00:00	2016	1389.422796	962.3574	1365.912	1840.595	991.3956
18Jul2016 12:00:00	2016	1420.384252	940.515	1366.256	1842.674	993.498
18Jul2016 13:00:00	2016	1430.961837	922.9772	1367.817	1853.671	998.7667
18Jul2016 14:00:00	2016	1434.889782	923.7539	1358.119	1868.762	1014.936
18Jul2016 15:00:00	2016	1444.799705	938.1282	1339.315	1877.805	1013.081
18Jul2016 16:00:00	2016	1446.941947	950.5493	1340.773	1872.419	1037.002
18Jul2016 17:00:00	2016	1436.971614	951.5081	1320.602	1858.007	1026.507

18Jul2016 18:00:00	2016	1356.293227	951.8057	1241.613	1784.702	1022.515
18Jul2016 19:00:00	2016	1299.172458	961.3431	1218.936	1734.843	1002.539
18Jul2016 20:00:00	2016	1238.822342	939.0864	1205.432	1680.171	993.0327
18Jul2016 21:00:00	2016	1193.140904	888.8222	1242.067	1641.146	979.3627
18Jul2016 22:00:00	2016	1120.865387	833.9939	1218.85	1597.832	964.01
18Jul2016 23:00:00	2016	1001.14287	802.2374	1189.684	1478.438	979.3864
19Jul2016 0:00:00	2016	913.8311065	791.1397	1158.637	1384.022	966.9835
19Jul2016 1:00:00	2016	862.2999575	782.8675	1149.629	1319.724	963.7408
19Jul2016 2:00:00	2016	833.7953054	779.4147	1142.948	1284.664	958.4305
19Jul2016 3:00:00	2016	824.8423298	779.0229	1133.497	1266.86	958.8699
19Jul2016 4:00:00	2016	845.4276283	778.5174	1130.716	1266.233	955.0527
19Jul2016 5:00:00	2016	904.1944203	780.3265	1118.797	1290.41	940.5601
19Jul2016 6:00:00	2016	1019.016541	797.4755	1134.451	1374.983	936.175
19Jul2016 7:00:00	2016	1162.889368	820.491	1181.255	1547.658	944.8475
19Jul2016 8:00:00	2016	1262.520729	845.58	1240.363	1689.444	946.6382
19Jul2016 9:00:00	2016	1335.139992	875.8991	1267.201	1763.912	959.4891
19Jul2016 10:00:00	2016	1396.405437	895.3806	1287.232	1833.34	1004.874
19Jul2016 11:00:00	2016	1436.256734	900.2017	1306.558	1887.009	1037.166
19Jul2016 12:00:00	2016	1460.190162	881.4191	1316.16	1924.214	1044.188
19Jul2016 13:00:00	2016	1474.257449	879.8154	1319.479	1942.651	1043.752
19Jul2016 14:00:00	2016	1481.425264	877.3339	1286.924	1966.581	1043.707
19Jul2016 15:00:00	2016	1492.521382	880.8026	1311.187	1960.998	1013.766
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19Jul2016 17:00:00	2016	1488.876528	909.4841	1279.223	1951.992	997.1651
19Jul2016 18:00:00	2016	1411.591261	909.1232	1259.115	1902.273	1008.73
19Jul2016 19:00:00	2016	1352.782368	936.8006	1244.12	1843.079	1000.993
19Jul2016 20:00:00	2016	1299.647553	918.3851	1272.389	1789.877	998.3784
19Jul2016 21:00:00	2016	1243.290091	894.8411	1257.187	1760.133	994.9964
19Jul2016 22:00:00	2016	1194.908928	876.4098	1247.829	1702.642	1009.734
19Jul2016 23:00:00	2016	1063.102148	834.7384	1208.828	1579.878	994.8863
20Jul2016 0:00:00	2016	961.7199261	799.3967	1165.072	1476.958	986.31
20Jul2016 1:00:00	2016	898.1039702	779.4395	1132.02	1387.617	985.9855
20Jul2016 2:00:00	2016	861.7373204	770.2703	1116.567	1345.181	962.0474
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20Jul2016 4:00:00	2016	863.3704303	769.1963	1096.005	1313.23	970.5805
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20Jul2016 19:00:00	2016	1362.54999	945.6598	1260.019	1690.535	968.3618
20Jul2016 20:00:00	2016	1301.361907	928.1528	1242.881	1658.805	966.9782
20Jul2016 21:00:00	2016	1237.172531	910.0786	1247.701	1635.177	940.5443
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20Jul2016 23:00:00	2016	1054.98307	849.4787	1216.361	1502.93	944.5589
21Jul2016 0:00:00	2016	952.1016856	814.1225	1162.013	1391.39	966.9699
21Jul2016 1:00:00	2016	889.2316655	792.9512	1136.502	1321.737	948.7528
21Jul2016 2:00:00	2016	854.6536228	781.7184	1118.819	1284.291	940.7928
21Jul2016 3:00:00	2016	837.8730302	777.0522	1092.111	1251.652	934.4448
21Jul2016 4:00:00	2016	853.5335171	776.4211	1091.571	1245.466	921.7351
21Jul2016 5:00:00	2016	911.9091315	780.5322	1096.384	1294.289	909.021
21Jul2016 6:00:00	2016	1019.586775	799.5095	1105.615	1361.576	889.9361
21Jul2016 7:00:00	2016	1164.370571	846.3325	1163.443	1486.436	882.7967
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21Jul2016 9:00:00	2016	1357.45702	916.6837	1264.691	1671.702	876.1479
21Jul2016 10:00:00	2016	1415.640593	931.9948	1292.682	1741.069	881.6102
21Jul2016 11:00:00	2016	1462.387385	951.007	1322.424	1775.593	892.1297
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21Jul2016 13:00:00	2016	1509.119234	929.7103	1305.213	1864.131	954.2739
21Jul2016 14:00:00	2016	1518.856001	939.6617	1306.249	1871.581	965.3747
21Jul2016 15:00:00	2016	1533.848091	957.0986	1352.308	1869.435	950.8841
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21Jul2016 17:00:00	2016	1526.024133	975.5387	1335.653	1857.37	992.2463
21Jul2016 18:00:00	2016	1453.481496	1001.563	1314.989	1795.131	977.3845
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21Jul2016 22:00:00	2016	1227.335737	942.7168	1257.523	1577.326	950.2142
21Jul2016 23:00:00	2016	1093.508354	888.2664	1229.003	1488.14	966.3148
22Jul2016 0:00:00	2016	986.0830397	847.0907	1192.842	1397.811	953.958
22Jul2016 1:00:00	2016	918.3517774	819.5483	1168.359	1339.123	956.075
22Jul2016 2:00:00	2016	879.4254055	803.0862	1148.45	1295.417	959.8894
22Jul2016 3:00:00	2016	860.5724301	796.5592	1126.649	1261.53	952.1715
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22Jul2016 12:00:00	2016	1447.929214	973.8563	1343.588	1832.755	1008.308
22Jul2016 13:00:00	2016	1451.343405	975.8309	1347.227	1862.794	1016.614
22Jul2016 14:00:00	2016	1432.005132	972.9886	1357.42	1887.401	1002.386
22Jul2016 15:00:00	2016	1408.637354	976.9376	1317.626	1892.996	1000.386

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22Jul2016 19:00:00	2016	1202.373763	940.6017	1255.475	1770.839	965.2653
22Jul2016 20:00:00	2016	1162.163047	935.4483	1284.68	1720.424	989.5849
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23Jul2016 0:00:00	2016	932.3153279	856.7113	1154.009	1431.258	962.5059
23Jul2016 1:00:00	2016	875.2031126	833.9627	1130.293	1343.66	952.5734
23Jul2016 2:00:00	2016	841.3825046	824.1187	1128.864	1287.706	951.9663
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23Jul2016 5:00:00	2016	824.2779478	829.9364	1109.658	1233.368	918.558
23Jul2016 6:00:00	2016	840.4869998	829.2085	1085.147	1218.852	925.9466
23Jul2016 7:00:00	2016	921.1896242	853.0597	1112.574	1310.66	932.6279
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23Jul2016 9:00:00	2016	1114.461198	915.7485	1202.32	1507.193	990.3418
23Jul2016 10:00:00	2016	1183.081813	933.0732	1230.121	1581.15	1012.924
23Jul2016 11:00:00	2016	1226.255239	947.9666	1258.238	1602.458	1019.267
23Jul2016 12:00:00	2016	1242.68355	959.447	1270.736	1602.488	1023.965
23Jul2016 13:00:00	2016	1237.639348	955.0445	1241.727	1615.777	1019.958
23Jul2016 14:00:00	2016	1226.070167	958.0329	1233.62	1597.994	1026.58
23Jul2016 15:00:00	2016	1230.6209	965.5879	1244.948	1596.28	1014.029
23Jul2016 16:00:00	2016	1233.792763	979.259	1273.381	1616.771	1006.352
23Jul2016 17:00:00	2016	1232.981076	987.4071	1274.698	1617.152	1010.454
23Jul2016 18:00:00	2016	1197.022486	981.3098	1255.9	1621.935	1011.277
23Jul2016 19:00:00	2016	1155.465593	959.5132	1269.83	1574.11	1008.621
23Jul2016 20:00:00	2016	1126.219175	933.8627	1258.275	1543.228	1007.066
23Jul2016 21:00:00	2016	1101.560095	922.0108	1263.905	1532.468	1007.476
23Jul2016 22:00:00	2016	1086.887271	913.3925	1268.641	1525.675	1009.211
23Jul2016 23:00:00	2016	1004.73737	880.2111	1228.756	1463.039	1007.26
24Jul2016 0:00:00	2016	926.3769673	846.032	1198.717	1374.374	989.472
24Jul2016 1:00:00	2016	866.5040915	823.1108	1179.28	1291.003	978.8286
24Jul2016 2:00:00	2016	827.3200409	813.1951	1166.646	1266.212	963.8261
24Jul2016 3:00:00	2016	805.0920902	807.1926	1145.62	1199.007	984.7053
24Jul2016 4:00:00	2016	796.6143029	803.3614	1136.412	1201.439	955.0561
24Jul2016 5:00:00	2016	798.0982624	800.4466	1121.696	1162.454	941.1738
24Jul2016 6:00:00	2016	798.6670306	799.2466	1105.473	1150.506	942.995
24Jul2016 7:00:00	2016	858.7055777	818.2032	1129.839	1230.17	934.005
24Jul2016 8:00:00	2016	947.9272663	848.6347	1181.759	1337.666	937.0831
24Jul2016 9:00:00	2016	1040.194218	881.4432	1229.361	1449.002	926.065
24Jul2016 10:00:00	2016	1118.87742	906.0087	1259.226	1541.72	956.2927
24Jul2016 11:00:00	2016	1171.796785	925.4241	1288.841	1606.372	990.6936
24Jul2016 12:00:00	2016	1200.669702	938.0475	1295.867	1641.726	986.8643
24Jul2016 13:00:00	2016	1217.134299	938.217	1284.217	1673.764	986.1423
24Jul2016 14:00:00	2016	1227.876573	956.7668	1295.668	1700.223	995.3075

24Jul2016 15:00:00	2016	1249.073661	972.2435	1325.347	1706.007	997.5529
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24Jul2016 17:00:00	2016	1300.577867	1008.554	1319.647	1752.621	970.8021
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24Jul2016 19:00:00	2016	1248.216512	1005.136	1319.022	1690.718	969.5499
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24Jul2016 22:00:00	2016	1171.120498	946.3535	1277.776	1625.435	999.4195
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25Jul2016 3:00:00	2016	854.558461	829.1377	1176.362	1313.182	974.6116
25Jul2016 4:00:00	2016	874.0317607	829.4084	1169.834	1288.424	972.5335
25Jul2016 5:00:00	2016	936.2583017	833.014	1169.002	1327.513	967.8675
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25Jul2016 9:00:00	2016	1376.632532	998.0414	1354.239	1724.467	984.8959
25Jul2016 10:00:00	2016	1437.279233	1028.114	1376.065	1833.012	996.2342
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25Jul2016 18:00:00	2016	1421.873369	1064.371	1372.304	1876.406	1024.023
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25Jul2016 20:00:00	2016	1284.660267	1035.514	1342.109	1814.197	1038.742
25Jul2016 21:00:00	2016	1235.616695	1039.758	1316.001	1730.296	1012.982
25Jul2016 22:00:00	2016	1181.758373	1003.669	1296.939	1696.474	1050.006
25Jul2016 23:00:00	2016	1057.262718	935.6967	1241.203	1560.197	1051.937
26Jul2016 0:00:00	2016	959.3098102	903.9905	1202.108	1443.074	1041.177
26Jul2016 1:00:00	2016	903.0561927	885.974	1178.096	1372.26	1021.511
26Jul2016 2:00:00	2016	870.2304179	873.2228	1152.869	1330.491	1019.032
26Jul2016 3:00:00	2016	858.0454382	863.1656	1151.348	1327.755	1008.247
26Jul2016 4:00:00	2016	875.9715562	865.0708	1159.455	1312.048	1018.485
26Jul2016 5:00:00	2016	942.1853999	867.3202	1144.565	1309.222	1015.046
26Jul2016 6:00:00	2016	1044.116237	885.3929	1155.107	1384.682	1018.815
26Jul2016 7:00:00	2016	1172.713176	935.8933	1211.301	1546.889	1012.642
26Jul2016 8:00:00	2016	1273.045634	986.9364	1273.688	1679.399	1027.792
26Jul2016 9:00:00	2016	1357.850015	1023.781	1322.353	1783.179	1049.511
26Jul2016 10:00:00	2016	1424.496847	1059.18	1343.716	1877.096	1022.461
26Jul2016 11:00:00	2016	1480.781065	1080.448	1365.395	1942.586	1026.615
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26Jul2016 14:00:00	2016	1545.59503	1075.555	1392.575	2013.668	1057.03
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26Jul2016 16:00:00	2016	1534.088454	1030.684	1401.749	1994.483	1082.013
26Jul2016 17:00:00	2016	1504.813275	1009.72	1394.061	1976.203	1085.197
26Jul2016 18:00:00	2016	1412.564773	989.6108	1349.007	1933.833	1070.953
26Jul2016 19:00:00	2016	1360.717628	974.3083	1343.791	1883.898	1065.389
26Jul2016 20:00:00	2016	1308.914077	998.9734	1326.612	1844.187	1062.174
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26Jul2016 22:00:00	2016	1197.29398	978.4606	1286.935	1731.309	1012.303
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27Jul2016 1:00:00	2016	921.7959675	887.8374	1138.968	1430.004	977.2516
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27Jul2016 3:00:00	2016	872.3766354	869.6609	1131.673	1303.855	946.6353
27Jul2016 4:00:00	2016	889.1593952	871.8818	1133.017	1300.663	959.2532
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27Jul2016 6:00:00	2016	1058.861822	890.2194	1150.796	1417.997	953.6605
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27Jul2016 8:00:00	2016	1307.504665	964.2337	1226.517	1740.511	990.8396
27Jul2016 9:00:00	2016	1384.029944	984.6453	1263.329	1827.275	965.5878
27Jul2016 10:00:00	2016	1430.451826	999.3329	1303.556	1932.795	967.0946
27Jul2016 11:00:00	2016	1480.274743	1015.536	1334.866	2001.422	986.6457
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27Jul2016 15:00:00	2016	1549.973102	1029.91	1374.734	1859.85	998.0591
27Jul2016 16:00:00	2016	1541.640039	1039.506	1385.104	1882.355	997.8877
27Jul2016 17:00:00	2016	1523.278985	1044.004	1383.818	1899.79	1009.998
27Jul2016 18:00:00	2016	1418.340409	1079.436	1346.289	1847.463	1014.152
27Jul2016 19:00:00	2016	1359.225522	1056.656	1321.483	1824.685	1007.515
27Jul2016 20:00:00	2016	1309.578807	1034.526	1308.886	1767.65	1026.165
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28Jul2016 0:00:00	2016	972.9447389	915.1315	1203.103	1481.213	977.1208
28Jul2016 1:00:00	2016	913.1908616	893.7679	1179.569	1400.868	966.589
28Jul2016 2:00:00	2016	876.8473838	878.3617	1167.785	1371.249	963.9151
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28Jul2016 4:00:00	2016	875.5162964	874.2632	1158.822	1330.98	939.8394
28Jul2016 5:00:00	2016	938.5520002	881.0742	1161.305	1383.354	946.1439
28Jul2016 6:00:00	2016	1037.320084	894.5291	1170.374	1441.674	945.8178
28Jul2016 7:00:00	2016	1165.181132	933.5936	1229.269	1568.092	949.6737
28Jul2016 8:00:00	2016	1270.204346	980.4627	1295.642	1671.089	954.8223
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28Jul2016 10:00:00	2016	1426.704895	1016.569	1330.783	1828.026	940.7671
28Jul2016 11:00:00	2016	1484.124116	1036.523	1341.111	1858.964	951.8155
28Jul2016 12:00:00	2016	1520.569392	1045.722	1343.284	1871.039	962.8398

28Jul2016 13:00:00	2016	1536.341629	1059.802	1332.53	1923.502	976.2768
28Jul2016 14:00:00	2016	1544.528265	1069.627	1325.915	1964.492	975.5662
28Jul2016 15:00:00	2016	1555.725778	1043.565	1354.496	2027.777	977.5348
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28Jul2016 18:00:00	2016	1454.577882	1052.836	1324.367	1892.561	1030.538
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29Jul2016 9:00:00	2016	1339.83446	1009.146	1270.804	1728.73	965.1629
29Jul2016 10:00:00	2016	1408.586635	1031.058	1301.449	1847.824	977.122
29Jul2016 11:00:00	2016	1452.023729	1047.959	1330.749	1925.414	988.2108
29Jul2016 12:00:00	2016	1476.80017	1054.506	1340.017	1957.675	1002.027
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29Jul2016 14:00:00	2016	1499.875809	1039.09	1357.537	2006.285	1019.82
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29Jul2016 16:00:00	2016	1494.550259	1035.112	1362.411	1983.501	1024.371
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29Jul2016 18:00:00	2016	1396.380482	1057.253	1323.117	1899.379	1022.084
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29Jul2016 20:00:00	2016	1276.824346	1004.96	1303.526	1783.079	1038.627
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31Jul2016 9:00:00	2016	971.781	862.69	1175.024	1342.051	903.712
31Jul2016 10:00:00	2016	1017.648421	884.1906	1193.037	1402.55	911.3165
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31Jul2016 19:00:00	2016	1084.880752	905.8372	1217.609	1426.162	940.2665
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31Jul2016 22:00:00	2016	1000.26608	873.797	1200.184	1370.077	973.5866
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01Aug2016 0:00:00	2016	860.3885978	818.004	1122.198	1216.723	957.5544
01Aug2016 1:00:00	2016	813.574859	799.0391	1101.414	1172.786	948.7707
01Aug2016 2:00:00	2016	787.7658663	784.6597	1087.679	1140.672	958.4971
01Aug2016 3:00:00	2016	777.3003253	776.3304	1065.025	1132.01	951.0105
01Aug2016 4:00:00	2016	784.1315062	774.1038	1092.716	1159.723	940.5569
01Aug2016 5:00:00	2016	811.1750566	778.9673	1097.586	1176.404	934.5694
01Aug2016 6:00:00	2016	825.1243974	785.3775	1099.467	1161.344	908.5062
01Aug2016 7:00:00	2016	873.2797826	808.8562	1128.044	1208.812	919.5393
01Aug2016 8:00:00	2016	939.9833062	839.9737	1170.357	1298.428	946.1611
01Aug2016 9:00:00	2016	1019.694243	866.8566	1212.513	1383.621	963.5578
01Aug2016 10:00:00	2016	1094.222994	893.4678	1238.416	1475.253	952.0257

01Aug2016 11:00:00	2016	1143.000409	907.9333	1242.49	1513.666	949.988
01Aug2016 12:00:00	2016	1170.802426	917.2675	1245.374	1543.795	940.0489
01Aug2016 13:00:00	2016	1178.087454	919.6319	1265.575	1561.115	923.2321
01Aug2016 14:00:00	2016	1180.388054	919.1341	1262.575	1563.38	911.5445
01Aug2016 15:00:00	2016	1196.784706	929.7381	1279.035	1592.727	896.2977
01Aug2016 16:00:00	2016	1228.16902	942.749	1292.843	1628.53	903.8834
01Aug2016 17:00:00	2016	1253.971702	958.3431	1301.496	1651.29	901.7058
01Aug2016 18:00:00	2016	1222.346788	956.7678	1284.186	1634.548	877.7388
01Aug2016 19:00:00	2016	1191.9846	948.6788	1274.463	1595.195	874.1674
01Aug2016 20:00:00	2016	1152.270662	934.6145	1259.013	1554.31	900.8358
01Aug2016 21:00:00	2016	1136.493423	923.1449	1201.485	1494.946	913.3512
01Aug2016 22:00:00	2016	1088.671285	902.4808	1179.396	1452.343	911.866
01Aug2016 23:00:00	2016	982.533847	859.791	1187.641	1369.453	903.1698
02Aug2016 0:00:00	2016	899.0512666	827.1252	1158.863	1276.391	885.0135
02Aug2016 1:00:00	2016	843.2923341	813.2363	1142.465	1220.281	889.5757
02Aug2016 2:00:00	2016	816.6865445	806.2523	1138.5	1193.443	889.1458
02Aug2016 3:00:00	2016	806.0877792	802.9867	1134.506	1180.942	877.2206
02Aug2016 4:00:00	2016	825.373308	803.076	1133.307	1186.607	873.1894
02Aug2016 5:00:00	2016	891.8292154	814.8595	1134.238	1223.624	855.7754
02Aug2016 6:00:00	2016	986.6310543	831.3729	1146.055	1284.539	876.8373
02Aug2016 7:00:00	2016	1110.183557	865.9695	1204.887	1433.322	899.6108
02Aug2016 8:00:00	2016	1206.683603	909.4601	1259.951	1566.621	915.8942
02Aug2016 9:00:00	2016	1288.985324	941.5951	1293.164	1660.905	912.0416
02Aug2016 10:00:00	2016	1355.787757	964.0749	1310.28	1743.439	894.7558
02Aug2016 11:00:00	2016	1400.306694	980.1074	1324.693	1791.175	891.0049
02Aug2016 12:00:00	2016	1431.420216	972.6206	1342.632	1823.91	873.1024
02Aug2016 13:00:00	2016	1452.146297	973.6165	1347.868	1856.307	866.8483
02Aug2016 14:00:00	2016	1467.775565	981.5776	1342.297	1878.577	870.5931
02Aug2016 15:00:00	2016	1482.769279	986.9227	1325.435	1905.165	889.2257
02Aug2016 16:00:00	2016	1482.555235	1001.916	1336.699	1918.716	906.9401
02Aug2016 17:00:00	2016	1461.722646	1006.12	1321.512	1901.958	945.5549
02Aug2016 18:00:00	2016	1378.535151	995.6248	1297.757	1841.646	970.3146
02Aug2016 19:00:00	2016	1311.722603	999.2623	1278.953	1773.952	957.4101
02Aug2016 20:00:00	2016	1275.123902	982.519	1300.109	1758.926	933.9294
02Aug2016 21:00:00	2016	1223.590011	972.1732	1313.627	1735.867	905.5097
02Aug2016 22:00:00	2016	1114.354339	944.2068	1274.032	1673.791	912.1838
02Aug2016 23:00:00	2016	987.8367285	899.3732	1229.662	1535.724	901.0453
03Aug2016 0:00:00	2016	904.2578264	858.2357	1173.749	1420.907	871.4061
03Aug2016 1:00:00	2016	853.5922183	837.1371	1159.325	1360.103	855.4344
03Aug2016 2:00:00	2016	825.5584607	822.1204	1157.219	1330.527	888.2564
03Aug2016 3:00:00	2016	815.2801571	813.2836	1140.503	1320.569	891.4687
03Aug2016 4:00:00	2016	832.5273057	818.7737	1141.701	1316.486	861.3919
03Aug2016 5:00:00	2016	901.262237	830.7121	1155.745	1344.628	855.1483
03Aug2016 6:00:00	2016	1023.126916	850.3245	1162.062	1421.472	869.1565
03Aug2016 7:00:00	2016	1144.219337	888.8902	1212.862	1556.731	887.1656
03Aug2016 8:00:00	2016	1217.904231	921.8207	1266.712	1645.556	939.1478
03Aug2016 9:00:00	2016	1266.666812	927.9029	1259.998	1677.351	942.0307

03Aug2016 10:00:00	2016	1303.849807	941.7234	1272.897	1709.336	927.4673
03Aug2016 11:00:00	2016	1318.769912	953.6418	1334.284	1782.967	927.5084
03Aug2016 12:00:00	2016	1325.527145	952.0893	1341.358	1815.94	897.1944
03Aug2016 13:00:00	2016	1326.299736	947.6038	1343.686	1837.194	905.3161
03Aug2016 14:00:00	2016	1327.965427	935.0511	1340.486	1829.584	919.389
03Aug2016 15:00:00	2016	1336.578822	931.9156	1347.514	1827.059	929.1005
03Aug2016 16:00:00	2016	1331.550977	935.2325	1333.029	1815.674	949.3263
03Aug2016 17:00:00	2016	1322.306769	934.4892	1315.179	1794.638	963.6096
03Aug2016 18:00:00	2016	1250.680851	920.1913	1272.288	1733.451	982.1445
03Aug2016 19:00:00	2016	1209.126435	907.672	1245.3	1714.783	965.0614
03Aug2016 20:00:00	2016	1170.378664	903.1384	1237.27	1675.741	967.0907
03Aug2016 21:00:00	2016	1155.075082	909.4968	1257.256	1655.112	956.8651
03Aug2016 22:00:00	2016	1096.765472	893.2814	1263.254	1620.225	957.5321
03Aug2016 23:00:00	2016	985.5292102	848.1689	1220.639	1492.373	938.0779
04Aug2016 0:00:00	2016	901.4717523	818.5306	1189.873	1392.483	919.3169
04Aug2016 1:00:00	2016	848.0322482	803.285	1170.921	1335.777	908.4727
04Aug2016 2:00:00	2016	819.4825161	795.3566	1158.675	1301.297	904.6161
04Aug2016 3:00:00	2016	810.8588452	783.6434	1150.291	1274.566	932.5234
04Aug2016 4:00:00	2016	829.594877	784.7472	1146.671	1255.401	935.9569
04Aug2016 5:00:00	2016	898.0196011	793.2968	1150.92	1304.69	916.7457
04Aug2016 6:00:00	2016	999.9532285	807.0228	1156.508	1370.278	918.0971
04Aug2016 7:00:00	2016	1117.590778	843.6744	1202.912	1496.054	933.8757
04Aug2016 8:00:00	2016	1201.330759	879.5076	1252.075	1603.133	941.2902
04Aug2016 9:00:00	2016	1282.737494	901.5792	1295.465	1671.09	938.8441
04Aug2016 10:00:00	2016	1345.939909	923.1867	1317.459	1735.183	933.1271
04Aug2016 11:00:00	2016	1389.721055	950.6896	1328.251	1790.353	944.4867
04Aug2016 12:00:00	2016	1409.997795	954.6674	1309.724	1855.379	944.5888
04Aug2016 13:00:00	2016	1428.637977	950.6765	1318.346	1888.917	963.1354
04Aug2016 14:00:00	2016	1431.074411	952.3119	1338.705	1887.532	977.6214
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04Aug2016 16:00:00	2016	1430.836281	967.3099	1356.032	1930.615	958.4468
04Aug2016 17:00:00	2016	1425.093688	970.765	1354.235	1923.634	941.6986
04Aug2016 18:00:00	2016	1352.482608	962.5998	1337.792	1845.779	909.8951
04Aug2016 19:00:00	2016	1298.65236	969.5531	1322.225	1817.068	898.8977
04Aug2016 20:00:00	2016	1242.482293	951.4642	1311.339	1755.5	915.513
04Aug2016 21:00:00	2016	1220.92673	944.1	1316.232	1701.653	959.2403
04Aug2016 22:00:00	2016	1150.227583	926.02	1305.377	1644.425	965.4104
04Aug2016 23:00:00	2016	1033.404852	878.1977	1263.748	1510.154	924.0919
05Aug2016 0:00:00	2016	941.2413637	841.8096	1231.041	1413.23	914.5438
05Aug2016 1:00:00	2016	883.3530259	815.8786	1181.012	1369.455	890.5135
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05Aug2016 3:00:00	2016	838.4565088	806.7459	1172.13	1290.668	909.067
05Aug2016 4:00:00	2016	854.8013451	807.7482	1171.917	1289.794	890.0591
05Aug2016 5:00:00	2016	930.7964934	816.1142	1166.131	1337.309	847.7938
05Aug2016 6:00:00	2016	1025.436928	827.8915	1164.297	1391.424	836.6601
05Aug2016 7:00:00	2016	1137.743726	870.0931	1216.341	1531.374	856.628
05Aug2016 8:00:00	2016	1224.982527	907.3016	1272.417	1663.053	870.2602

05Aug2016 9:00:00	2016	1310.75822	938.4682	1292.866	1767.457	879.7896
05Aug2016 10:00:00	2016	1368.833526	968.5337	1318.191	1848.902	865.4683
05Aug2016 11:00:00	2016	1404.016509	967.192	1335.415	1885.461	888.247
05Aug2016 12:00:00	2016	1429.681378	964.8668	1337.786	1898.511	884.981
05Aug2016 13:00:00	2016	1447.812338	971.4549	1345.13	1894.619	911.0748
05Aug2016 14:00:00	2016	1451.339843	974.1741	1355.45	1912.299	923.592
05Aug2016 15:00:00	2016	1458.237866	974.5767	1362.108	1899.412	982.6125
05Aug2016 16:00:00	2016	1451.09075	972.5398	1361.244	1901.153	982.5699
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05Aug2016 18:00:00	2016	1353.162902	965.94	1303.667	1802.498	973.0213
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06Aug2016 18:00:00	2016	1142.185603	913.8386	1273.489	1645.392	1045.562
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06Aug2016 20:00:00	2016	1106.944051	900.8763	1245.708	1571.192	1003.301
06Aug2016 21:00:00	2016	1098.165402	901.6918	1254.562	1565.299	977.6197
06Aug2016 22:00:00	2016	1034.989568	881.7054	1244.943	1550.752	956.557
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07Aug2016 5:00:00	2016	811.997713	786.964	1135.664	1247.112	914.5811
07Aug2016 6:00:00	2016	824.8517921	786.7106	1134.642	1251.608	920.0222
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07Aug2016 15:00:00	2016	1198.267854	913.8158	1299.017	1618.7	944.5816
07Aug2016 16:00:00	2016	1224.553118	927.1096	1294.034	1658.75	932.187
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08Aug2016 17:00:00	2016	1404.112341	944.2777	1308.462	1879.467	956.7607
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08Aug2016 21:00:00	2016	1215.071753	929.1514	1275.382	1677.344	937.577
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08Aug2016 23:00:00	2016	1008.690208	848.3163	1202.395	1461.263	926.2513
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09Aug2016 15:00:00	2016	1467.954799	932.7327	1299.588	1850.031	957.7201
09Aug2016 16:00:00	2016	1450.317568	939.85	1304.962	1855.788	944.702
09Aug2016 17:00:00	2016	1426.354484	939.0243	1313.598	1847.594	918.9688
09Aug2016 18:00:00	2016	1351.086271	921.9277	1271.385	1780.703	934.4732
09Aug2016 19:00:00	2016	1294.693743	905.4473	1270.81	1731.509	940.2545
09Aug2016 20:00:00	2016	1232.827058	889.1857	1252.719	1675.703	930.8448
09Aug2016 21:00:00	2016	1216.23755	886.5491	1217.328	1675.679	926.6862
09Aug2016 22:00:00	2016	1125.860693	858.0555	1192.783	1600.893	929.6812
09Aug2016 23:00:00	2016	1003.864906	816.6358	1161.854	1456.337	929.9806
10Aug2016 0:00:00	2016	918.0463519	784.425	1152.681	1384.992	890.9809
10Aug2016 1:00:00	2016	862.7580285	764.4127	1134.829	1287.64	871.0208
10Aug2016 2:00:00	2016	835.1423486	757.8413	1135.2	1260.706	874.4644
10Aug2016 3:00:00	2016	827.2527339	756.1002	1128.133	1219.581	885.4645
10Aug2016 4:00:00	2016	846.2189061	752.185	1118.107	1251.079	889.0772
10Aug2016 5:00:00	2016	917.6767735	763.4737	1119.118	1322.908	878.8434
10Aug2016 6:00:00	2016	1039.979897	783.3808	1125.337	1378.897	879.5928
10Aug2016 7:00:00	2016	1150.430725	825.737	1167.235	1525.475	870.1632
10Aug2016 8:00:00	2016	1226.452906	856.3012	1210.096	1585.055	881.5732
10Aug2016 9:00:00	2016	1290.553903	878.4709	1251.966	1658.196	884.496
10Aug2016 10:00:00	2016	1334.530419	894.5918	1283.815	1709.829	898.6064
10Aug2016 11:00:00	2016	1356.673807	908.3	1316.576	1771.919	933.7402
10Aug2016 12:00:00	2016	1370.277104	910.2438	1327.251	1804.768	945.114
10Aug2016 13:00:00	2016	1382.313994	908.8788	1334.401	1861.311	950.0065
10Aug2016 14:00:00	2016	1358.066321	921.0202	1327.795	1893.086	972.3043
10Aug2016 15:00:00	2016	1348.167485	935.7501	1327.665	1899.789	1017.125
10Aug2016 16:00:00	2016	1347.886101	939.4351	1345.01	1897.919	1020.976
10Aug2016 17:00:00	2016	1353.374149	937.6063	1333.669	1893.02	975.5125
10Aug2016 18:00:00	2016	1275.561789	922.0543	1272.29	1810.99	967.6616
10Aug2016 19:00:00	2016	1215.114942	909.6237	1270.171	1754.502	951.3246
10Aug2016 20:00:00	2016	1184.117291	899.9701	1260.475	1699.541	944.6348
10Aug2016 21:00:00	2016	1183.822644	901.596	1264.632	1707.873	940.6562
10Aug2016 22:00:00	2016	1098.905307	872.733	1241.905	1622.376	970.5786
10Aug2016 23:00:00	2016	984.1972921	833.4754	1206.095	1498.006	993.4894
11Aug2016 0:00:00	2016	904.1842409	807.8323	1166.561	1381.376	955.1405
11Aug2016 1:00:00	2016	852.3074798	798.1947	1159.526	1320.139	975.8721
11Aug2016 2:00:00	2016	824.7941807	785.5768	1159.367	1266.521	969.3757
11Aug2016 3:00:00	2016	817.9938741	778.0508	1165.709	1270.4	963.0478
11Aug2016 4:00:00	2016	834.6372916	778.7052	1172.372	1268.195	951.809
11Aug2016 5:00:00	2016	908.9810006	791.6339	1180.063	1318.977	943.2697

11Aug2016 6:00:00	2016	1034.442606	810.9722	1186.083	1348.238	924.2378
11Aug2016 7:00:00	2016	1145.144857	851.8143	1237.279	1510.529	927.797
11Aug2016 8:00:00	2016	1225.473715	881.8296	1282.331	1648.267	917.0784
11Aug2016 9:00:00	2016	1285.585067	906.6277	1305.569	1743.899	921.5466
11Aug2016 10:00:00	2016	1334.254023	921.8259	1304.026	1818.487	920.8053
11Aug2016 11:00:00	2016	1372.809483	934.1053	1336.571	1858.183	918.8697
11Aug2016 12:00:00	2016	1404.817227	933.691	1355.519	1906.41	936.6653
11Aug2016 13:00:00	2016	1424.529604	904.8116	1366.113	1921.483	947.5722
11Aug2016 14:00:00	2016	1423.468336	911.0756	1346.974	1913.545	958.0274
11Aug2016 15:00:00	2016	1416.140251	899.9039	1361.942	1926.238	971.5212
11Aug2016 16:00:00	2016	1418.46102	896.5162	1351.128	1915.027	975.5041
11Aug2016 17:00:00	2016	1407.327533	896.8874	1345.229	1873.981	971.8577
11Aug2016 18:00:00	2016	1311.79327	905.8582	1322.816	1797.539	958.317
11Aug2016 19:00:00	2016	1261.114973	923.7038	1300.466	1731.634	951.2881
11Aug2016 20:00:00	2016	1225.770845	908.2919	1282.619	1669.097	961.7405
11Aug2016 21:00:00	2016	1213.10347	904.0865	1294.836	1649.43	965.2896
11Aug2016 22:00:00	2016	1118.538077	873.9772	1267.34	1594.862	955.7818
11Aug2016 23:00:00	2016	1000.189738	830.7056	1212.212	1467.984	947.7351
12Aug2016 0:00:00	2016	916.367272	801.2682	1172.407	1367.264	928.8271
12Aug2016 1:00:00	2016	864.8579965	786.9568	1151.112	1315.193	919.839
12Aug2016 2:00:00	2016	835.1271912	779.0712	1140.62	1282.808	917.0155
12Aug2016 3:00:00	2016	825.9451463	775.8128	1140.917	1252.707	918.3317
12Aug2016 4:00:00	2016	842.2215319	784.6532	1140	1245.444	913.7821
12Aug2016 5:00:00	2016	906.1087891	799.5762	1136.756	1297.947	926.2679
12Aug2016 6:00:00	2016	1011.169509	816.3383	1145.028	1347.392	916.28
12Aug2016 7:00:00	2016	1122.66384	856.9635	1200.634	1491.432	895.3387
12Aug2016 8:00:00	2016	1207.222176	893.4771	1263.36	1609.941	887.1923
12Aug2016 9:00:00	2016	1278.863293	921.1352	1306.02	1720.299	911.9117
12Aug2016 10:00:00	2016	1332.416148	938.7972	1340.097	1789.48	928.658
12Aug2016 11:00:00	2016	1376.895528	948.1606	1351.349	1839.902	944.6087
12Aug2016 12:00:00	2016	1400.361553	945.7117	1357.132	1862.738	966.8361
12Aug2016 13:00:00	2016	1404.743733	927.1664	1361.794	1878.738	962.0394
12Aug2016 14:00:00	2016	1372.193374	914.2007	1361.279	1893.612	952.3384
12Aug2016 15:00:00	2016	1371.226122	916.2488	1361.322	1886.879	963.1836
12Aug2016 16:00:00	2016	1378.585771	921.1374	1369.387	1852.556	962.5649
12Aug2016 17:00:00	2016	1365.04039	928.1436	1352.081	1797.467	964.5448
12Aug2016 18:00:00	2016	1295.40395	942.787	1322.769	1729.757	967.17
12Aug2016 19:00:00	2016	1239.212084	929.6669	1305.291	1667.849	985.0566
12Aug2016 20:00:00	2016	1194.908527	914.8724	1285.506	1613.852	980.8711
12Aug2016 21:00:00	2016	1184.827207	923.3939	1294.617	1602.593	958.917
12Aug2016 22:00:00	2016	1110.930616	903.065	1273.566	1537.22	933.4195
12Aug2016 23:00:00	2016	1005.406911	861.6428	1232.624	1421.097	907.7639
13Aug2016 0:00:00	2016	922.1098752	835.5897	1203.598	1329.345	890.0876
13Aug2016 1:00:00	2016	863.4879668	812.2131	1174.946	1254.898	898.5353
13Aug2016 2:00:00	2016	825.5561744	793.858	1163.573	1249.988	890.9968
13Aug2016 3:00:00	2016	808.0412519	789.7554	1155.863	1234.133	878.7541
13Aug2016 4:00:00	2016	805.6273255	787.202	1152.817	1225.279	869.0505

13Aug2016 5:00:00	2016	824.5525462	791.0327	1155.933	1218.24	874.2275
13Aug2016 6:00:00	2016	839.3018634	790.0587	1144.176	1207.498	844.3351
13Aug2016 7:00:00	2016	895.0874461	811.6811	1156.791	1277.306	827.4135
13Aug2016 8:00:00	2016	992.1739368	846.2541	1204.11	1399.253	818.84
13Aug2016 9:00:00	2016	1087.831756	876.75	1251.07	1499.252	833.7949
13Aug2016 10:00:00	2016	1160.506436	899.1865	1288.925	1591.429	848.0439
13Aug2016 11:00:00	2016	1209.752281	912.1315	1313.825	1677.951	876.5479
13Aug2016 12:00:00	2016	1242.020062	921.2241	1321.905	1714.471	933.0073
13Aug2016 13:00:00	2016	1248.219385	915.0717	1328.83	1755.11	932.9007
13Aug2016 14:00:00	2016	1244.757517	921.5331	1332.365	1763.088	948.5401
13Aug2016 15:00:00	2016	1244.673214	933.9072	1338.17	1763.828	948.1374
13Aug2016 16:00:00	2016	1235.773413	941.114	1350.665	1794.873	946.4029
13Aug2016 17:00:00	2016	1226.847067	943.4231	1352.281	1782.719	945.3487
13Aug2016 18:00:00	2016	1193.261165	937.0878	1336.655	1752.901	938.7126
13Aug2016 19:00:00	2016	1159.073648	932.6436	1338.057	1700.701	938.4934
13Aug2016 20:00:00	2016	1133.67381	929.2922	1325.585	1659.95	925.9671
13Aug2016 21:00:00	2016	1148.997277	940.1728	1315.605	1639.808	910.7324
13Aug2016 22:00:00	2016	1091.690206	902.9778	1247.163	1593.135	907.4736
13Aug2016 23:00:00	2016	997.6655344	863.0666	1215.083	1517.73	920.1514
14Aug2016 0:00:00	2016	912.3332612	832.0043	1201.9	1407.601	919.1439
14Aug2016 1:00:00	2016	852.8898486	817.0827	1188.14	1345.555	875.5523
14Aug2016 2:00:00	2016	817.3232233	801.9461	1171.58	1302.09	864.3898
14Aug2016 3:00:00	2016	798.0402452	790.3505	1173.812	1267.266	893.4428
14Aug2016 4:00:00	2016	793.5951873	788.061	1160.746	1237.927	890.242
14Aug2016 5:00:00	2016	809.0439661	792.4464	1151.518	1243.703	883.2769
14Aug2016 6:00:00	2016	813.3565729	790.2418	1133.819	1224.715	908.8976
14Aug2016 7:00:00	2016	850.8366862	801.9341	1146.548	1260.007	890.1684
14Aug2016 8:00:00	2016	927.8207136	830.9575	1185.895	1352.958	883.0375
14Aug2016 9:00:00	2016	1022.602591	864.8599	1224.223	1463.962	902.2936
14Aug2016 10:00:00	2016	1104.993277	893.1086	1263.155	1540.286	915.1503
14Aug2016 11:00:00	2016	1167.379629	910.399	1289.959	1628.294	904.2041
14Aug2016 12:00:00	2016	1209.060307	923.3299	1316.786	1712.735	920.1383
14Aug2016 13:00:00	2016	1231.932099	932.4029	1317.346	1717.248	935.134
14Aug2016 14:00:00	2016	1245.815905	941.7406	1301.67	1742.253	953.5687
14Aug2016 15:00:00	2016	1264.213961	951.1254	1312.284	1763.305	934.0834
14Aug2016 16:00:00	2016	1276.460077	954.8725	1320.671	1801.62	935.4257
14Aug2016 17:00:00	2016	1276.012227	949.7476	1329.415	1825.51	923.3996
14Aug2016 18:00:00	2016	1225.660489	933.8754	1314.505	1788.902	906.1031
14Aug2016 19:00:00	2016	1177.970339	909.8066	1304.818	1738.029	897.9758
14Aug2016 20:00:00	2016	1169.611456	900.2683	1291.509	1687.76	897.4078
14Aug2016 21:00:00	2016	1184.982777	889.2213	1298.552	1695.351	892.1928
14Aug2016 22:00:00	2016	1098.350985	848.4422	1256.333	1606.908	884.0747
14Aug2016 23:00:00	2016	986.9273939	809.2903	1206.775	1472.17	881.8428
15Aug2016 0:00:00	2016	904.7019994	777.7131	1171.048	1374.078	858.4491
15Aug2016 1:00:00	2016	852.403332	757.8065	1134.849	1317.829	846.8044
15Aug2016 2:00:00	2016	825.2352753	743.3289	1115.536	1294.141	841.5611
15Aug2016 3:00:00	2016	815.2584707	743.4641	1130.016	1289.185	848.3408

15Aug2016 4:00:00	2016	836.4348731	755.0593	1147.614	1298.99	848.349
15Aug2016 5:00:00	2016	909.2471746	771.8543	1143.649	1309.421	853.5362
15Aug2016 6:00:00	2016	1025.657466	796.7336	1150.831	1368.568	840.2227
15Aug2016 7:00:00	2016	1144.349926	834.7376	1203.3	1514.107	811.4415
15Aug2016 8:00:00	2016	1244.990372	878.776	1259.143	1659.751	811.1178
15Aug2016 9:00:00	2016	1336.573921	913.0072	1301.202	1772.663	840.8237
15Aug2016 10:00:00	2016	1399.846624	922.1359	1323.292	1843.271	855.7567
15Aug2016 11:00:00	2016	1451.456636	936.0952	1328.833	1906.361	858.2154
15Aug2016 12:00:00	2016	1484.111334	942.1639	1346.78	1947.611	874.902
15Aug2016 13:00:00	2016	1506.267324	959.6068	1357.826	1975.256	883.0805
15Aug2016 14:00:00	2016	1521.394296	964.4559	1345.164	1969.101	881.0146
15Aug2016 15:00:00	2016	1532.206669	976.7581	1326.179	1969.952	886.7002
15Aug2016 16:00:00	2016	1536.371594	990.0618	1330.269	1961.441	891.7661
15Aug2016 17:00:00	2016	1531.771245	1002.633	1346.544	1957.39	896.483
15Aug2016 18:00:00	2016	1449.769939	997.3523	1344.88	1908.76	895.557
15Aug2016 19:00:00	2016	1388.941095	1015.637	1333.582	1867.105	887.3879
15Aug2016 20:00:00	2016	1334.094945	991.7271	1320.684	1808.218	889.3068
15Aug2016 21:00:00	2016	1316.030643	986.4464	1326.294	1793.294	895.133
15Aug2016 22:00:00	2016	1199.02441	944.0951	1278.661	1694.596	886.758
15Aug2016 23:00:00	2016	1061.953693	894.8862	1242.568	1547.356	885.2239
16Aug2016 0:00:00	2016	964.3662792	855.5713	1204.638	1425.942	871.9861
16Aug2016 1:00:00	2016	902.7362096	830.6745	1170.459	1326.672	871.8191
16Aug2016 2:00:00	2016	867.4927145	816.7899	1157.726	1303.27	865.9792
16Aug2016 3:00:00	2016	851.4905062	812.7986	1150.675	1284.376	861.4474
16Aug2016 4:00:00	2016	868.4655722	817.0393	1124.332	1278.557	850.4482
16Aug2016 5:00:00	2016	939.0596976	825.3257	1111.147	1331.768	855.5463
16Aug2016 6:00:00	2016	1049.629248	843.1986	1150.955	1430.873	860.6038
16Aug2016 7:00:00	2016	1161.03129	884.2718	1219.632	1583.127	877.1505
16Aug2016 8:00:00	2016	1253.370543	921.0468	1257.78	1728.11	906.0701
16Aug2016 9:00:00	2016	1342.952368	955.4059	1299.059	1831.248	912.2912
16Aug2016 10:00:00	2016	1421.70104	972.6255	1321.569	1920.865	910.9261
16Aug2016 11:00:00	2016	1487.121671	956.916	1345.321	1992.087	928.4933
16Aug2016 12:00:00	2016	1529.738798	962.33	1379.85	2000.171	958.6962
16Aug2016 13:00:00	2016	1563.992847	975.5289	1395.005	2004.649	981.3833
16Aug2016 14:00:00	2016	1584.018761	979.8706	1402.679	2008.125	1005.685
16Aug2016 15:00:00	2016	1600.876548	996.3016	1401.566	2021.12	1021.508
16Aug2016 16:00:00	2016	1604.43346	1010.85	1365.377	2021.808	1014.315
16Aug2016 17:00:00	2016	1599.184846	1004.491	1378.657	1952.328	995.9223
16Aug2016 18:00:00	2016	1508.275474	987.49	1403.545	1820.196	993.1251
16Aug2016 19:00:00	2016	1448.356908	1000.306	1380.972	1775.7	979.731
16Aug2016 20:00:00	2016	1393.906328	985.9961	1373.414	1741.751	929.68
16Aug2016 21:00:00	2016	1358.439282	996.5267	1385.498	1739.459	909.363
16Aug2016 22:00:00	2016	1226.980877	958.6445	1333.87	1648.707	897.0927
16Aug2016 23:00:00	2016	1081.327025	907.66	1293.458	1518.511	893.3565
17Aug2016 0:00:00	2016	984.0622769	864.8487	1244.43	1419.638	873.8057
17Aug2016 1:00:00	2016	924.495541	843.1268	1198.117	1348.131	859.656
17Aug2016 2:00:00	2016	890.0497866	827.2013	1181.944	1304.957	843.2332

17Aug2016 3:00:00	2016	876.0012537	822.1182	1164.844	1277.895	839.6696
17Aug2016 4:00:00	2016	891.1459207	825.297	1162.107	1283.151	862.4916
17Aug2016 5:00:00	2016	966.0584738	840.9899	1159.624	1332.642	850.3417
17Aug2016 6:00:00	2016	1104.276089	859.1076	1170.394	1412.227	843.7993
17Aug2016 7:00:00	2016	1208.029297	900.6693	1232.583	1506.429	840.1917
17Aug2016 8:00:00	2016	1278.554782	936.9709	1276.397	1619.324	830.1408
17Aug2016 9:00:00	2016	1328.35817	950.0344	1320.021	1688.748	839.1527
17Aug2016 10:00:00	2016	1363.330138	957.1621	1314.624	1759.238	860.8257
17Aug2016 11:00:00	2016	1385.241136	977.3301	1305.787	1792.376	869.7011
17Aug2016 12:00:00	2016	1405.758827	982.8723	1313.457	1830.543	882.7245
17Aug2016 13:00:00	2016	1424.054413	985.7977	1336.433	1861.231	884.768
17Aug2016 14:00:00	2016	1444.973886	984.4797	1336.633	1876.796	857.5116
17Aug2016 15:00:00	2016	1450.790572	992.7775	1333.114	1875.91	864.0217
17Aug2016 16:00:00	2016	1439.055457	982.221	1297.801	1862.007	883.2001
17Aug2016 17:00:00	2016	1418.655521	974.7565	1297.408	1842.41	906.3459
17Aug2016 18:00:00	2016	1334.414936	959.1537	1266.208	1775.442	913.8921
17Aug2016 19:00:00	2016	1286.999563	949.237	1260.134	1712.874	913.4647
17Aug2016 20:00:00	2016	1274.855963	951.5064	1245.466	1669.947	916.3519
17Aug2016 21:00:00	2016	1237.215645	951.1018	1244.331	1648.528	932.296
17Aug2016 22:00:00	2016	1129.872756	911.3785	1203.788	1540.848	933.7024
17Aug2016 23:00:00	2016	1011.240784	866.3747	1169.699	1410.601	926.2396
18Aug2016 0:00:00	2016	930.6936952	832.7663	1152.744	1314.818	908.849
18Aug2016 1:00:00	2016	881.261339	815.8416	1128.477	1266.761	881.9391
18Aug2016 2:00:00	2016	851.6081724	805.8646	1121.774	1252.883	902.6926
18Aug2016 3:00:00	2016	840.0843659	800.6126	1116.545	1233.337	901.6271
18Aug2016 4:00:00	2016	857.3185918	802.8156	1114.126	1229.3	911.409
18Aug2016 5:00:00	2016	931.3503455	813.9261	1113.632	1285.093	908.7426
18Aug2016 6:00:00	2016	1059.276164	833.816	1124.55	1350.184	904.1196
18Aug2016 7:00:00	2016	1171.118097	865.6087	1168.822	1468.267	897.923
18Aug2016 8:00:00	2016	1241.979207	899.1001	1219.263	1586.969	916.2161
18Aug2016 9:00:00	2016	1289.660136	919.906	1248.916	1636.876	918.9009
18Aug2016 10:00:00	2016	1326.19473	932.0922	1265.685	1730.66	924
18Aug2016 11:00:00	2016	1346.291332	939.597	1271.767	1788.27	934.8801
18Aug2016 12:00:00	2016	1353.016229	936.4735	1280.686	1804.097	937.2246
18Aug2016 13:00:00	2016	1350.828541	941.5391	1303.616	1807.975	939.8397
18Aug2016 14:00:00	2016	1346.692808	942.1682	1310.516	1805.48	933.0784
18Aug2016 15:00:00	2016	1342.073843	941.3311	1318.039	1806.982	942.3601
18Aug2016 16:00:00	2016	1346.036965	942.7686	1309.517	1795.648	966.6944
18Aug2016 17:00:00	2016	1336.68916	933.7395	1297.984	1775.776	979.1948
18Aug2016 18:00:00	2016	1274.301876	922.3026	1278.808	1725.611	979.9341
18Aug2016 19:00:00	2016	1225.385277	908.4447	1263.233	1655.332	973.7014
18Aug2016 20:00:00	2016	1192.953511	898.944	1249.171	1614.586	962.0795
18Aug2016 21:00:00	2016	1189.453432	908.915	1271.17	1619.148	969.0545
18Aug2016 22:00:00	2016	1091.138433	880.4038	1252.272	1538.877	943.956
18Aug2016 23:00:00	2016	976.5779053	845.7922	1200.542	1434.496	935.6712
19Aug2016 0:00:00	2016	894.8373587	823.7792	1155.449	1335.013	917.2122
19Aug2016 1:00:00	2016	842.8313021	809.9126	1132.042	1277.938	908.46

19Aug2016 2:00:00	2016	817.0235383	809.024	1131.045	1231.495	901.6292
19Aug2016 3:00:00	2016	807.1632448	806.9694	1120.483	1220.967	915.43
19Aug2016 4:00:00	2016	825.3678631	815.447	1118.487	1227.912	929.3072
19Aug2016 5:00:00	2016	890.7371873	829.2101	1140.595	1288.945	956.4121
19Aug2016 6:00:00	2016	994.0952526	847.0989	1162.878	1346.267	941.8936
19Aug2016 7:00:00	2016	1092.771161	883.3575	1187.986	1433.216	920.7749
19Aug2016 8:00:00	2016	1175.127442	919.1736	1234.934	1503.487	911.7323
19Aug2016 9:00:00	2016	1246.26655	944.8646	1277.516	1595.894	917.0036
19Aug2016 10:00:00	2016	1302.723529	956.0284	1304.744	1691.167	914.4804
19Aug2016 11:00:00	2016	1346.000142	966.3702	1317.677	1744.706	924.7039
19Aug2016 12:00:00	2016	1367.652993	969.1666	1325.849	1737.071	932.2796
19Aug2016 13:00:00	2016	1375.932887	970.3989	1334.799	1776.156	926.6199
19Aug2016 14:00:00	2016	1377.165246	973.2308	1338.444	1772.491	927.1003
19Aug2016 15:00:00	2016	1375.498158	966.3585	1341.939	1767.544	936.4194
19Aug2016 16:00:00	2016	1364.831927	961.5696	1342.748	1768.223	957.1983
19Aug2016 17:00:00	2016	1354.174033	948.5607	1326.551	1764.772	971.9537
19Aug2016 18:00:00	2016	1276.76538	936.2141	1312.846	1726.841	942.4518
19Aug2016 19:00:00	2016	1219.806725	907.1474	1301.474	1668.17	939.5735
19Aug2016 20:00:00	2016	1181.251259	895.3	1294.312	1645.702	946.8061
19Aug2016 21:00:00	2016	1176.107135	900.4354	1297.791	1659.902	943.3524
19Aug2016 22:00:00	2016	1087.827411	869.9211	1260.261	1551.193	928.1013
19Aug2016 23:00:00	2016	986.7909766	829.1875	1213.853	1434.906	907.1631
20Aug2016 0:00:00	2016	901.6642782	800.4795	1176.419	1352.318	903.6043
20Aug2016 1:00:00	2016	845.735948	786.0967	1131.069	1288.216	895.1402
20Aug2016 2:00:00	2016	811.3430891	775.5131	1121.587	1239.5	919.4854
20Aug2016 3:00:00	2016	796.1815448	772.7984	1129.125	1211.787	919.6838
20Aug2016 4:00:00	2016	796.5573739	776.239	1123.005	1185.651	924.2012
20Aug2016 5:00:00	2016	820.5948054	773.8893	1126.089	1222.192	940.6017
20Aug2016 6:00:00	2016	844.122966	783.4802	1130.088	1217.259	943.7649
20Aug2016 7:00:00	2016	886.0691747	802.3332	1179.908	1267.29	921.4089
20Aug2016 8:00:00	2016	977.4037015	828.441	1194.254	1354.481	917.4134
20Aug2016 9:00:00	2016	1065.450316	859.8932	1248.599	1471.043	925.6938
20Aug2016 10:00:00	2016	1142.111619	888.733	1283.219	1552.002	950.5127
20Aug2016 11:00:00	2016	1194.632106	917.8685	1282.993	1592.902	961.059
20Aug2016 12:00:00	2016	1227.104389	936.4076	1293.306	1610.548	978.5147
20Aug2016 13:00:00	2016	1237.162608	949.3342	1305.96	1609.134	984.5343
20Aug2016 14:00:00	2016	1242.648321	957.7015	1312.414	1637.887	979.5413
20Aug2016 15:00:00	2016	1257.547264	971.6579	1319.866	1665.112	991.2277
20Aug2016 16:00:00	2016	1267.277749	979.143	1332.781	1683.496	997.4059
20Aug2016 17:00:00	2016	1265.837587	987.7964	1335.013	1656.386	1000.009
20Aug2016 18:00:00	2016	1225.668956	983.8023	1310.077	1606.768	981.8077
20Aug2016 19:00:00	2016	1178.597165	965.1929	1292.606	1561.307	961.6575
20Aug2016 20:00:00	2016	1148.396495	949.0589	1285.804	1547.058	947.8237
20Aug2016 21:00:00	2016	1155.951887	951.0734	1301.425	1603.481	962.0554
20Aug2016 22:00:00	2016	1089.159351	919.2036	1268.787	1551.711	961.003
20Aug2016 23:00:00	2016	1004.006316	880.1166	1228.428	1454.387	946.9465
21Aug2016 0:00:00	2016	921.200255	844.1109	1191.162	1366.436	954.7934

21Aug2016 1:00:00	2016	866.1951643	815.5407	1145.411	1305.284	941.0279
21Aug2016 2:00:00	2016	827.5482494	803.3398	1137.758	1272.429	936.6327
21Aug2016 3:00:00	2016	810.5377595	797.8975	1139.357	1238.074	937.7169
21Aug2016 4:00:00	2016	806.2231045	792.6818	1134.682	1237.462	940.001
21Aug2016 5:00:00	2016	822.6747182	791.599	1101.7	1228.7	938.4195
21Aug2016 6:00:00	2016	835.9895772	795.2752	1109.363	1232.705	923.7325
21Aug2016 7:00:00	2016	861.4046761	809.2414	1126.501	1253.92	911.7583
21Aug2016 8:00:00	2016	934.2733879	842.0511	1171.54	1345.406	923.2292
21Aug2016 9:00:00	2016	1023.919671	872.8687	1204.433	1443.191	929.8887
21Aug2016 10:00:00	2016	1102.074554	894.4873	1225.159	1509.18	934.8603
21Aug2016 11:00:00	2016	1162.504818	918.8892	1252.378	1581.935	935.4667
21Aug2016 12:00:00	2016	1207.627766	935.6143	1269.709	1613.164	930.6604
21Aug2016 13:00:00	2016	1242.479605	948.4443	1281.945	1623.953	936.1374
21Aug2016 14:00:00	2016	1265.112879	962.5583	1291.232	1641.633	938.4779
21Aug2016 15:00:00	2016	1297.624871	976.1246	1301.224	1652.01	945.9009
21Aug2016 16:00:00	2016	1337.649403	992.9799	1317.578	1659.237	950.7267
21Aug2016 17:00:00	2016	1350.985334	996.5294	1299.245	1683.937	962.2009
21Aug2016 18:00:00	2016	1324.024586	989.2315	1278.533	1647.991	960.079
21Aug2016 19:00:00	2016	1278.000033	967.1476	1282.407	1646.078	961.6371
21Aug2016 20:00:00	2016	1252.437853	945.1339	1294.901	1610.992	967.9984
21Aug2016 21:00:00	2016	1263.314366	941.7999	1315.046	1654.042	978.4185
21Aug2016 22:00:00	2016	1160.373391	896.2533	1246.989	1528.872	966.8708
21Aug2016 23:00:00	2016	1039.995271	845.6762	1203.433	1405.544	936.0286
22Aug2016 0:00:00	2016	948.1127877	813.8662	1191.213	1326.064	921.682
22Aug2016 1:00:00	2016	890.3326709	796.5247	1200.634	1265.148	910.4852
22Aug2016 2:00:00	2016	858.0988347	779.8781	1191.333	1217.353	928.6053
22Aug2016 3:00:00	2016	844.6652471	773.9378	1182.242	1247.382	945.0013
22Aug2016 4:00:00	2016	865.3036048	777.7795	1185.966	1243.307	945.095
22Aug2016 5:00:00	2016	933.6771141	788.5698	1196.167	1300.932	950.8904
22Aug2016 6:00:00	2016	1064.145291	811.2765	1233.248	1439.976	955.5353
22Aug2016 7:00:00	2016	1160.61748	848.2664	1278.913	1541.22	936.3432
22Aug2016 8:00:00	2016	1219.890687	888.577	1322.823	1658.191	943.141
22Aug2016 9:00:00	2016	1282.929861	923.7891	1335.493	1721.009	965.1419
22Aug2016 10:00:00	2016	1344.851692	938.9066	1350.584	1759.053	974.1856
22Aug2016 11:00:00	2016	1398.67499	956.9845	1360.887	1797.468	993.2713
22Aug2016 12:00:00	2016	1405.87841	960.7204	1336.261	1755.95	1001.491
22Aug2016 13:00:00	2016	1395.233266	960.7116	1339.021	1773.178	994.6328
22Aug2016 14:00:00	2016	1364.953679	965.2012	1346.702	1753.695	1001.339
22Aug2016 15:00:00	2016	1353.218994	963.5979	1334.324	1753.441	993.3408
22Aug2016 16:00:00	2016	1344.400884	970.1698	1336.293	1746.884	997.7242
22Aug2016 17:00:00	2016	1339.160892	970.4663	1343.976	1727.752	1009.924
22Aug2016 18:00:00	2016	1266.277212	947.6809	1331.321	1667.091	1005.823
22Aug2016 19:00:00	2016	1210.563987	925.9807	1306.721	1623.947	999.5739
22Aug2016 20:00:00	2016	1199.870105	917.658	1263.424	1632.659	1007.949
22Aug2016 21:00:00	2016	1174.04126	911.1486	1253.716	1626.134	990.1052
22Aug2016 22:00:00	2016	1058.845123	873.7374	1207.093	1510.002	978.2998
22Aug2016 23:00:00	2016	951.801545	836.6393	1167.18	1402.908	977.1601

23Aug2016 0:00:00	2016	878.046905	809.8103	1147.91	1315.424	979.0342
23Aug2016 1:00:00	2016	834.3517674	799.7496	1145.632	1272.951	968.5006
23Aug2016 2:00:00	2016	812.8596088	790.8617	1133.004	1236.87	963.7536
23Aug2016 3:00:00	2016	807.1221946	785.9952	1129.213	1219.718	964.9428
23Aug2016 4:00:00	2016	828.6646367	786.167	1125.327	1196.269	960.8879
23Aug2016 5:00:00	2016	902.9216825	794.8428	1135.48	1290.895	963.4189
23Aug2016 6:00:00	2016	1042.776248	821.7844	1161.424	1398.689	971.481
23Aug2016 7:00:00	2016	1150.355568	857.2645	1214.794	1530.775	958.2736
23Aug2016 8:00:00	2016	1221.223371	885.8297	1248.926	1626.032	964.4258
23Aug2016 9:00:00	2016	1269.715104	909.9886	1256.477	1699.824	953.7044
23Aug2016 10:00:00	2016	1307.27374	921.5732	1283.013	1741.415	952.5942
23Aug2016 11:00:00	2016	1329.82506	930.6444	1298.73	1755.657	973.0094
23Aug2016 12:00:00	2016	1337.459559	935.2432	1292.812	1792.363	984.0767
23Aug2016 13:00:00	2016	1337.243344	941.984	1290.936	1794.469	974.6794
23Aug2016 14:00:00	2016	1338.054048	943.9999	1289.103	1760.887	971.0687
23Aug2016 15:00:00	2016	1331.871803	938.3291	1276.688	1771.972	996.5793
23Aug2016 16:00:00	2016	1326.577231	943.5315	1272.222	1748.141	984.8791
23Aug2016 17:00:00	2016	1331.728461	945.0688	1293.425	1713.133	998.8344
23Aug2016 18:00:00	2016	1261.276455	933.0845	1273.094	1663.155	1002.944
23Aug2016 19:00:00	2016	1205.935333	925.519	1264.55	1594.977	986.6099
23Aug2016 20:00:00	2016	1192.884895	927.2481	1269.36	1569.999	986.2528
23Aug2016 21:00:00	2016	1178.251254	924.256	1276.625	1585.222	1000.116
23Aug2016 22:00:00	2016	1070.28341	888.3738	1233.233	1475.195	1001.676
23Aug2016 23:00:00	2016	958.6880312	848.718	1158.379	1361.626	983.8309
24Aug2016 0:00:00	2016	885.474113	825.0564	1140.343	1273.461	986.4315
24Aug2016 1:00:00	2016	839.952317	809.3131	1137.21	1205.775	991.6078
24Aug2016 2:00:00	2016	816.0455414	805.7466	1139.138	1194.225	1005.187
24Aug2016 3:00:00	2016	808.3820367	803.3442	1148.526	1170.046	989.4813
24Aug2016 4:00:00	2016	829.7141547	805.3663	1156.745	1196.56	981.699
24Aug2016 5:00:00	2016	903.3333863	818.4352	1154.118	1260.194	982.3249
24Aug2016 6:00:00	2016	1034.07628	841.5313	1178.143	1343.723	975.2905
24Aug2016 7:00:00	2016	1130.154857	865.7728	1180.447	1438.791	966.8809
24Aug2016 8:00:00	2016	1203.94911	895.6785	1203.266	1524.646	949.4578
24Aug2016 9:00:00	2016	1267.124148	921.5899	1221.893	1602.662	936.3157
24Aug2016 10:00:00	2016	1319.697028	936.5819	1254.641	1672.058	940.0114
24Aug2016 11:00:00	2016	1353.559213	943.3143	1275.427	1719.826	937.5887
24Aug2016 12:00:00	2016	1366.471084	951.8821	1284.984	1741.566	930.521
24Aug2016 13:00:00	2016	1376.710263	954.334	1291.562	1758.864	939.7729
24Aug2016 14:00:00	2016	1377.364281	954.9498	1309.935	1776.363	961.1014
24Aug2016 15:00:00	2016	1378.823709	954.2171	1315.402	1779.909	965.1139
24Aug2016 16:00:00	2016	1378.547236	957.6597	1309.955	1767.395	953.5375
24Aug2016 17:00:00	2016	1374.373104	957.99	1304.846	1741.077	950.3315
24Aug2016 18:00:00	2016	1296.552	945.5449	1277.155	1688.219	975.3344
24Aug2016 19:00:00	2016	1233.20689	938.5265	1264.634	1650.179	987.7835
24Aug2016 20:00:00	2016	1210.137907	933.7635	1262.377	1625.458	989.5511
24Aug2016 21:00:00	2016	1206.900891	938.1298	1269.773	1601.131	979.5964
24Aug2016 22:00:00	2016	1098.823224	903.6474	1235.132	1519.91	980.8299

24Aug2016 23:00:00	2016	979.5887615	862.2939	1196.47	1411.723	967.0176
25Aug2016 0:00:00	2016	896.0259328	832.3637	1136.405	1319.467	971.9548
25Aug2016 1:00:00	2016	845.7350134	816.9879	1102.354	1225.57	959.7002
25Aug2016 2:00:00	2016	818.2816124	811.0431	1108.024	1185.286	947.5575
25Aug2016 3:00:00	2016	808.4349073	806.319	1110.72	1158.675	945.4797
25Aug2016 4:00:00	2016	830.7216012	811.3032	1115.815	1184.312	936.2342
25Aug2016 5:00:00	2016	904.984662	825.5526	1126.162	1242.681	947.6995
25Aug2016 6:00:00	2016	1044.031763	851.4176	1163.534	1347.408	923.7201
25Aug2016 7:00:00	2016	1150.520622	884.0044	1194.737	1445.754	921.1727
25Aug2016 8:00:00	2016	1219.969439	918.1212	1254.467	1562.997	924.0497
25Aug2016 9:00:00	2016	1275.62876	939.3699	1297.531	1654.178	934.054
25Aug2016 10:00:00	2016	1314.379881	947.9776	1322.103	1710.127	941.3346
25Aug2016 11:00:00	2016	1339.265572	946.8082	1336.642	1732.913	943.8376
25Aug2016 12:00:00	2016	1360.604525	949.8457	1338.546	1762.138	916.6262
25Aug2016 13:00:00	2016	1350.658684	950.5504	1349.491	1788.99	923.1519
25Aug2016 14:00:00	2016	1352.382096	957.1263	1353.062	1798.628	924.4282
25Aug2016 15:00:00	2016	1365.315722	956.2243	1350.873	1767.991	929.6621
25Aug2016 16:00:00	2016	1343.13497	954.1149	1349.345	1748.067	941.2429
25Aug2016 17:00:00	2016	1314.006174	943.4817	1338.482	1748.262	949.1
25Aug2016 18:00:00	2016	1250.808172	925.9253	1315.723	1682.8	969.5089
25Aug2016 19:00:00	2016	1206.970617	913.5202	1296.374	1644.131	965.3699
25Aug2016 20:00:00	2016	1193.379555	916.6329	1296.161	1617.676	966.8314
25Aug2016 21:00:00	2016	1183.773566	917.2372	1292.369	1628.676	984.9706
25Aug2016 22:00:00	2016	1077.484928	881.0541	1245.282	1507.09	980.8119
25Aug2016 23:00:00	2016	970.0416364	843.3357	1201.152	1386.874	963.3648
26Aug2016 0:00:00	2016	889.5944478	823.0819	1178.205	1311.199	967.9867
26Aug2016 1:00:00	2016	841.3789798	810.0928	1171.956	1257.283	972.9884
26Aug2016 2:00:00	2016	816.8213175	801.2171	1163.426	1207.323	973.5772
26Aug2016 3:00:00	2016	806.1794351	798.0388	1157.882	1215.113	958.1417
26Aug2016 4:00:00	2016	824.0124593	803.7769	1159.117	1196.014	989.7568
26Aug2016 5:00:00	2016	891.0589133	816.3413	1166.849	1255.798	1016.425
26Aug2016 6:00:00	2016	1007.534388	839.7706	1187.663	1311.165	1015.246
26Aug2016 7:00:00	2016	1100.295029	867.7167	1225.523	1419.895	1024.072
26Aug2016 8:00:00	2016	1181.122312	897.8137	1261.257	1522.897	999.4777
26Aug2016 9:00:00	2016	1246.795903	924.125	1276.508	1589.069	958.8058
26Aug2016 10:00:00	2016	1303.700758	937.893	1281.492	1664.427	950.8679
26Aug2016 11:00:00	2016	1340.066677	949.5256	1299.795	1730.828	949.0252
26Aug2016 12:00:00	2016	1357.327704	957.1372	1306.638	1752.344	953.8427
26Aug2016 13:00:00	2016	1370.467326	960.1819	1296.95	1768.761	965.1829
26Aug2016 14:00:00	2016	1372.560614	956.178	1310.315	1756.308	992.4909
26Aug2016 15:00:00	2016	1369.351299	972.6684	1326.883	1761.945	974.9661
26Aug2016 16:00:00	2016	1365.375927	972.8657	1331.777	1750.083	975.3634
26Aug2016 17:00:00	2016	1349.069593	966.1594	1343.529	1719.679	1000.915
26Aug2016 18:00:00	2016	1264.184482	953.8865	1380.047	1651.454	1004.755
26Aug2016 19:00:00	2016	1204.377629	936.4493	1363.655	1623.96	1018.016
26Aug2016 20:00:00	2016	1202.735237	934.9469	1371.745	1640.524	1036.808
26Aug2016 21:00:00	2016	1178.366232	934.2249	1374.075	1599.141	1045.609

26Aug2016 22:00:00	2016	1084.728637	899.7094	1333.975	1516.184	1040.373
26Aug2016 23:00:00	2016	986.5289681	859.0439	1282.782	1408.642	1027.564
27Aug2016 0:00:00	2016	908.2940945	832.8591	1246.839	1309.822	1021.714
27Aug2016 1:00:00	2016	854.7075075	822.5906	1233.549	1247.029	1008.672
27Aug2016 2:00:00	2016	821.1972108	811.5671	1218.841	1196.899	1002.786
27Aug2016 3:00:00	2016	805.9023899	805.6869	1213.11	1196.109	1005.366
27Aug2016 4:00:00	2016	804.8169114	805.2202	1212.723	1175.336	1008.487
27Aug2016 5:00:00	2016	826.5390627	811.0348	1211.864	1202.388	1016.131
27Aug2016 6:00:00	2016	859.2712674	818.0496	1215.587	1219.368	990.4448
27Aug2016 7:00:00	2016	901.4614043	832.9299	1226.248	1248.411	998.6844
27Aug2016 8:00:00	2016	997.1146535	868.1994	1250.459	1347.558	1006.182
27Aug2016 9:00:00	2016	1086.4548	902.3158	1287.652	1429.669	960.9943
27Aug2016 10:00:00	2016	1143.38268	925.3371	1304.844	1504.377	947.7829
27Aug2016 11:00:00	2016	1175.911073	938.6213	1325.655	1522.025	963.7453
27Aug2016 12:00:00	2016	1188.508638	942.0994	1342.616	1543.809	981.852
27Aug2016 13:00:00	2016	1191.338843	937.1767	1347.584	1552.565	993.1461
27Aug2016 14:00:00	2016	1195.808306	943.2297	1355.109	1547.45	983.3945
27Aug2016 15:00:00	2016	1193.062122	942.5913	1359.468	1554.294	959.1904
27Aug2016 16:00:00	2016	1192.624735	946.3965	1368.893	1540.826	1000.867
27Aug2016 17:00:00	2016	1191.316096	948.5957	1373.871	1574.777	1013.298
27Aug2016 18:00:00	2016	1140.975939	940.1183	1359.016	1522.065	1004.413
27Aug2016 19:00:00	2016	1091.479389	926.4063	1338.303	1497.783	996.168
27Aug2016 20:00:00	2016	1107.549173	926.4409	1349.557	1520.259	969.4053
27Aug2016 21:00:00	2016	1089.778666	924.1809	1348.34	1508.773	952.1342
27Aug2016 22:00:00	2016	1023.776675	894.485	1303.818	1441.676	940.4263
27Aug2016 23:00:00	2016	945.901661	856.8553	1265.015	1350.478	919.2725
28Aug2016 0:00:00	2016	876.3474374	838.1508	1214.373	1241.488	918.2551
28Aug2016 1:00:00	2016	828.4612821	821.0674	1220.04	1204.321	918.3409
28Aug2016 2:00:00	2016	799.3391788	809.6046	1190.181	1160.796	916.0098
28Aug2016 3:00:00	2016	782.6886572	804.0829	1207.459	1130.5	916.871
28Aug2016 4:00:00	2016	779.8455537	797.3747	1206.444	1124.002	966.0599
28Aug2016 5:00:00	2016	795.2766513	796.8788	1186.969	1151.712	953.8776
28Aug2016 6:00:00	2016	823.4445894	805.748	1180.381	1172.011	927.1287
28Aug2016 7:00:00	2016	849.8354192	814.6421	1182.667	1217.124	939.4054
28Aug2016 8:00:00	2016	917.4652015	839.2548	1246.244	1277.285	978.058
28Aug2016 9:00:00	2016	992.0616692	865.2124	1294.743	1375.952	995.1611
28Aug2016 10:00:00	2016	1044.728729	876.688	1315.754	1431.739	991.2681
28Aug2016 11:00:00	2016	1076.878844	885.1488	1329.554	1459.402	971.0305
28Aug2016 12:00:00	2016	1094.522122	886.5396	1337.602	1491.984	965.3244
28Aug2016 13:00:00	2016	1097.478596	887.8831	1319.493	1493.243	952.9653
28Aug2016 14:00:00	2016	1096.518483	888.7854	1321.488	1487.467	941.7335
28Aug2016 15:00:00	2016	1104.675907	890.3097	1310.772	1494.018	928.0894
28Aug2016 16:00:00	2016	1124.569654	897.8373	1306.866	1506.107	935.4264
28Aug2016 17:00:00	2016	1144.392352	910.6003	1314.176	1504.872	971.4362
28Aug2016 18:00:00	2016	1129.283933	910.5124	1293.038	1473.461	966.3888
28Aug2016 19:00:00	2016	1109.695534	901.4189	1284.65	1443.808	987.8673
28Aug2016 20:00:00	2016	1123.383271	906.9114	1316.491	1461.83	1037.174

28Aug2016 21:00:00	2016	1121.78324	905.9594	1324.947	1496.09	1055.942
28Aug2016 22:00:00	2016	1030.04728	875.6439	1267.722	1406.289	1036.303
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29Aug2016 0:00:00	2016	858.8102888	812.44	1212.363	1224.377	1045.451
29Aug2016 1:00:00	2016	816.40728	801.2133	1210.49	1197.174	1037.68
29Aug2016 2:00:00	2016	794.2719273	798.1951	1208.736	1172.121	1045.093
29Aug2016 3:00:00	2016	788.1470666	802.9999	1228.356	1151.338	1032.936
29Aug2016 4:00:00	2016	811.198659	806.5882	1231.216	1175.024	1045.299
29Aug2016 5:00:00	2016	885.5271748	825.6216	1222.897	1239.514	1039.121
29Aug2016 6:00:00	2016	1021.42724	852.1599	1244.813	1338.593	1034.659
29Aug2016 7:00:00	2016	1117.48177	886.5768	1281.352	1444.532	1026.909
29Aug2016 8:00:00	2016	1196.532261	919.8248	1323.687	1552.156	1030.943
29Aug2016 9:00:00	2016	1258.678061	948.9595	1340.251	1619.405	1008.92
29Aug2016 10:00:00	2016	1296.449655	966.2408	1368.574	1656.338	1012.554
29Aug2016 11:00:00	2016	1327.03528	971.4168	1396.417	1675.421	956.8791
29Aug2016 12:00:00	2016	1368.637345	978.0553	1396.154	1696.633	953.2099
29Aug2016 13:00:00	2016	1403.605985	988.5138	1393.339	1749.211	940.4884
29Aug2016 14:00:00	2016	1416.252684	989.3384	1396.404	1731.949	949.5804
29Aug2016 15:00:00	2016	1412.840398	995.5363	1400.862	1732.696	947.6261
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29Aug2016 17:00:00	2016	1418.882144	996.0981	1357.219	1688.14	946.0551
29Aug2016 18:00:00	2016	1343.036489	981.1795	1332.392	1629.576	979.676
29Aug2016 19:00:00	2016	1291.585934	964.5845	1310.918	1593.016	995.1141
29Aug2016 20:00:00	2016	1298.423179	965.515	1308.672	1598.757	1014.662
29Aug2016 21:00:00	2016	1243.553096	955.8052	1333.569	1611.909	1019.1
29Aug2016 22:00:00	2016	1110.520187	903.1697	1296.473	1505.767	1013.388
29Aug2016 23:00:00	2016	990.831937	840.9138	1247.596	1388.205	1008.951
30Aug2016 0:00:00	2016	907.0112058	799.4988	1213.607	1327.331	979.1011
30Aug2016 1:00:00	2016	856.4624179	790.1667	1197.56	1267.629	992.7212
30Aug2016 2:00:00	2016	830.7283307	784.5869	1192.204	1214.067	1000.096
30Aug2016 3:00:00	2016	819.608861	788.9715	1195.241	1219.812	990.8466
30Aug2016 4:00:00	2016	839.1059449	799.3955	1174.591	1224.157	989.6499
30Aug2016 5:00:00	2016	912.9655503	807.8382	1170.061	1289.558	991.4534
30Aug2016 6:00:00	2016	1055.667746	838.282	1197.525	1389.559	983.5447
30Aug2016 7:00:00	2016	1158.449933	867.2152	1221.971	1483.28	997.7747
30Aug2016 8:00:00	2016	1241.471926	895.0232	1254.544	1560.193	1002.906
30Aug2016 9:00:00	2016	1309.520776	925.5644	1286.762	1648.593	999.2507
30Aug2016 10:00:00	2016	1374.744952	949.2524	1311.848	1707.334	970.94
30Aug2016 11:00:00	2016	1427.265659	972.8862	1326.171	1754.837	967.7685
30Aug2016 12:00:00	2016	1462.998692	989.1563	1336.313	1772.586	968.8589
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30Aug2016 14:00:00	2016	1517.430984	1020.983	1363.133	1828.459	988.1308
30Aug2016 15:00:00	2016	1537.517298	1034.491	1369.597	1834.557	1028.01
30Aug2016 16:00:00	2016	1549.371585	1049.711	1370.7	1836.177	1029.036
30Aug2016 17:00:00	2016	1529.766045	1051.056	1359.497	1832.62	1018.195
30Aug2016 18:00:00	2016	1430.323526	1030.881	1337.577	1778.613	1004.251
30Aug2016 19:00:00	2016	1366.165295	1013.091	1318.159	1726.867	1041.62

30Aug2016 20:00:00	2016	1360.858673	1011.254	1327.488	1713.665	1047.276
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30Aug2016 22:00:00	2016	1189.833119	946.5106	1264.248	1535.156	1035.605
30Aug2016 23:00:00	2016	1059.340385	900.7172	1218.667	1397.247	1005.68
31Aug2016 0:00:00	2016	967.321634	868.189	1181.904	1295.704	1012.626
31Aug2016 1:00:00	2016	909.5332551	845.4199	1161.398	1240.448	1017.415
31Aug2016 2:00:00	2016	878.3679773	835.9369	1152.126	1208.712	1019.691
31Aug2016 3:00:00	2016	864.8404178	828.5345	1143.037	1194.009	1021.499
31Aug2016 4:00:00	2016	884.8823649	832.0602	1143.771	1186.311	1035.102
31Aug2016 5:00:00	2016	956.1949305	842.582	1179.355	1250.027	1015.227
31Aug2016 6:00:00	2016	1104.244297	874.2347	1231.971	1412.52	1003.498
31Aug2016 7:00:00	2016	1203.054219	902.6143	1274.263	1536.001	1033.899
31Aug2016 8:00:00	2016	1274.514597	935.8547	1311.203	1596.852	1027.774
31Aug2016 9:00:00	2016	1348.268072	968.1074	1323.083	1665.28	1015.221
31Aug2016 10:00:00	2016	1414.572006	1003.62	1282.724	1746.964	1003.16
31Aug2016 11:00:00	2016	1473.308394	1019.522	1299.918	1819.069	1006.736
31Aug2016 12:00:00	2016	1519.479889	1044.576	1318.057	1853.251	991.7887
31Aug2016 13:00:00	2016	1544.770633	1037.242	1332.79	1868.27	984.5817
31Aug2016 14:00:00	2016	1560.95276	1030.493	1343.995	1888.418	982.2197
31Aug2016 15:00:00	2016	1583.833833	1031.822	1344.934	1901.736	991.4335
31Aug2016 16:00:00	2016	1573.427415	1014.909	1350.403	1896.927	1009.275
31Aug2016 17:00:00	2016	1554.339693	1019.302	1340.07	1873.604	1032.667
31Aug2016 18:00:00	2016	1452.765248	1027.544	1315.552	1807.245	1034.031
31Aug2016 19:00:00	2016	1371.922941	1022.104	1303.097	1771.479	986.7708
31Aug2016 20:00:00	2016	1348.90859	1016.12	1304.229	1788.917	1008.122
31Aug2016 21:00:00	2016	1304.828195	1001.034	1298.298	1760.609	1026.141
31Aug2016 22:00:00	2016	1171.569547	951.2437	1247.395	1621.962	1024.864
31Aug2016 23:00:00	2016	1041.322896	904.2229	1186.482	1483.967	1010.151
01Sep2016 0:00:00	2016	953.0831433	865.6957	1143.133	1359.111	990.7727
01Sep2016 1:00:00	2016	898.997611	843.9564	1123.049	1299.811	991.0765
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01Sep2016 3:00:00	2016	854.592903	822.2071	1103.891	1231.368	978.3019
01Sep2016 4:00:00	2016	868.4217332	824.3422	1094.7	1232.438	965.9642
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01Sep2016 7:00:00	2016	1202.707863	896.4297	1182.717	1564.3	987.0417
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01Sep2016 9:00:00	2016	1351.335357	964.1141	1275.316	1707.71	949.1099
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01Sep2016 18:00:00	2016	1416.685023	965.7805	1318.963	1719.292	984.8053

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01Sep2016 22:00:00	2016	1160.780379	919.2074	1257.03	1553.715	993.7695
01Sep2016 23:00:00	2016	1034.943019	872.8979	1215.837	1437.149	980.8827
02Sep2016 0:00:00	2016	944.1113535	843.7267	1154.212	1321.529	979.1819
02Sep2016 1:00:00	2016	889.8372881	823.0786	1116.867	1285.257	965.8344
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02Sep2016 9:00:00	2016	1286.207324	921.2169	1290.601	1649.877	961.3145
02Sep2016 10:00:00	2016	1322.804064	936.6457	1270.658	1681.085	932.2839
02Sep2016 11:00:00	2016	1343.991727	942.1076	1283.181	1705.218	892.4249
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02Sep2016 13:00:00	2016	1350.712738	945.4543	1323.874	1699.716	926.3007
02Sep2016 14:00:00	2016	1337.467023	939.7001	1313.144	1672.302	911.2706
02Sep2016 15:00:00	2016	1310.748552	932.6894	1313.089	1643.275	901.9179
02Sep2016 16:00:00	2016	1294.505906	930.535	1315.614	1649.425	914.4101
02Sep2016 17:00:00	2016	1260.476383	927.5306	1297.37	1629.787	921.3273
02Sep2016 18:00:00	2016	1200.317335	917.4235	1281.998	1587.871	916.8754
02Sep2016 19:00:00	2016	1158.150473	912.897	1255.311	1519.772	931.8228
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02Sep2016 21:00:00	2016	1141.593184	921.0058	1290.994	1504.45	928.5894
02Sep2016 22:00:00	2016	1053.942164	893.3704	1250.695	1437.605	915.3376
02Sep2016 23:00:00	2016	959.4859845	862.5811	1215.565	1334.414	915.139
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03Sep2016 2:00:00	2016	811.5590122	817.5574	1166.621	1216.705	907.3433
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03Sep2016 5:00:00	2016	820.3516075	820.7151	1166.365	1202.174	887.9984
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03Sep2016 7:00:00	2016	889.8554364	841.9745	1155.957	1236.702	887.5621
03Sep2016 8:00:00	2016	964.9978655	867.2192	1213.939	1340.486	906.1058
03Sep2016 9:00:00	2016	1037.731016	886.9489	1233.754	1378.395	925.0413
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03Sep2016 12:00:00	2016	1128.342894	915.0455	1254.31	1434.488	979.38
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03Sep2016 16:00:00	2016	1124.434335	917.69	1255.065	1430.596	978.1033
03Sep2016 17:00:00	2016	1131.723671	922.8042	1244.737	1437.978	955.0018

03Sep2016 18:00:00	2016	1104.830378	912.6883	1229.79	1436.172	931.4322
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03Sep2016 20:00:00	2016	1095.819168	911.8609	1271.213	1484.252	952.7763
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03Sep2016 22:00:00	2016	1007.903902	883.3374	1229.773	1393.076	937.0838
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04Sep2016 6:00:00	2016	829.4781098	818.8315	1146.198	1140.981	937.3535
04Sep2016 7:00:00	2016	862.9344001	833.549	1149.438	1147.494	930.524
04Sep2016 8:00:00	2016	915.2551169	856.7169	1174.818	1214.946	938.656
04Sep2016 9:00:00	2016	981.5363407	870.7626	1196.956	1283.699	941.5242
04Sep2016 10:00:00	2016	1035.004308	890.2892	1199.242	1331.181	930.4457
04Sep2016 11:00:00	2016	1058.206745	898.9198	1218.598	1360.454	956.6597
04Sep2016 12:00:00	2016	1067.873064	899.1901	1239.291	1391.675	985.3831
04Sep2016 13:00:00	2016	1062.214463	898.0107	1245.106	1401.198	993.5583
04Sep2016 14:00:00	2016	1056.216938	881.2067	1230.2	1399.358	969.9834
04Sep2016 15:00:00	2016	1059.276105	888.8102	1239.57	1399.008	978.3319
04Sep2016 16:00:00	2016	1072.808863	892.1027	1225.689	1417.633	949.266
04Sep2016 17:00:00	2016	1084.316938	897.9923	1226.954	1445.242	925.7405
04Sep2016 18:00:00	2016	1066.252711	891.8506	1228.669	1430.178	915.6379
04Sep2016 19:00:00	2016	1047.796421	878.3229	1234.32	1418.075	921.6494
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04Sep2016 21:00:00	2016	1071.461351	885.4498	1274.668	1442.667	941.8441
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05Sep2016 0:00:00	2016	856.0322828	815.1267	1180.708	1219.9	953.4348
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05Sep2016 6:00:00	2016	870.161434	810.0904	1141.286	1164.555	927.1834
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12Sep2016 23:00:00	2016	958.5834889	852.2127	1165.49	1328.455	928.0701
13Sep2016 0:00:00	2016	882.7334287	827.5922	1144.681	1228.031	920.8415
13Sep2016 1:00:00	2016	840.594239	808.7907	1139.137	1179.092	914.6473
13Sep2016 2:00:00	2016	823.6997556	798.372	1143.294	1188.572	915.121
13Sep2016 3:00:00	2016	819.7224606	798.774	1142.913	1179.34	927.4741
13Sep2016 4:00:00	2016	840.6351804	805.5873	1148.937	1195.165	931.8558
13Sep2016 5:00:00	2016	923.8145544	821.353	1166.725	1270.354	927.0442
13Sep2016 6:00:00	2016	1099.323168	860.0026	1213.48	1410.559	905.077
13Sep2016 7:00:00	2016	1215.79229	896.7745	1251.565	1519.011	910.4337
13Sep2016 8:00:00	2016	1250.404318	910.3632	1270.345	1574.132	900.4585
13Sep2016 9:00:00	2016	1276.266059	904.7536	1278.508	1613.796	906.1535
13Sep2016 10:00:00	2016	1300.510648	899.5654	1258.282	1649.02	905.0947
13Sep2016 11:00:00	2016	1331.485933	907.4125	1283.52	1713.813	905.9288
13Sep2016 12:00:00	2016	1349.995277	910.6499	1285.491	1716.187	905.2239

13Sep2016 13:00:00	2016	1362.335891	911.6855	1282.182	1760.571	910.8705
13Sep2016 14:00:00	2016	1363.565037	912.4832	1292.51	1740.475	911.3499
13Sep2016 15:00:00	2016	1377.706992	918.9267	1294.698	1775.374	897.4647
13Sep2016 16:00:00	2016	1385.855523	932.2809	1308.208	1767.785	915.6309
13Sep2016 17:00:00	2016	1388.027517	932.5816	1303.138	1754.961	918.566
13Sep2016 18:00:00	2016	1318.551885	918.5709	1247.531	1680.385	915.1355
13Sep2016 19:00:00	2016	1278.288382	912.9099	1254.329	1655.329	925.9692
13Sep2016 20:00:00	2016	1301.290048	933.543	1297.546	1697.145	951.6311
13Sep2016 21:00:00	2016	1225.011553	913.2435	1267.729	1613.314	938.1317
13Sep2016 22:00:00	2016	1087.832598	871.7207	1213.116	1462.006	919.8492
13Sep2016 23:00:00	2016	963.7257139	835.2889	1169.256	1330.753	920.5131
14Sep2016 0:00:00	2016	884.844163	810.998	1149.322	1261.685	924.7749
14Sep2016 1:00:00	2016	838.5649496	799.6581	1138.913	1228.157	923.5399
14Sep2016 2:00:00	2016	818.7268445	784.3701	1134.857	1174.998	928.5268
14Sep2016 3:00:00	2016	815.8395694	785.7058	1131.293	1161.437	913.0157
14Sep2016 4:00:00	2016	839.9088217	792.8132	1116.362	1166.626	941.7191
14Sep2016 5:00:00	2016	921.7712173	812.3839	1135.334	1229.092	945.9964
14Sep2016 6:00:00	2016	1094.229644	853.5208	1164.745	1369.427	955.4557
14Sep2016 7:00:00	2016	1213.139197	895.519	1205.237	1483.666	951.9098
14Sep2016 8:00:00	2016	1243.054838	912.4665	1222.855	1543.853	960.4694
14Sep2016 9:00:00	2016	1286.118665	923.2786	1268.459	1636.098	937.7902
14Sep2016 10:00:00	2016	1338.495334	934.5816	1289.488	1684.843	930.5312
14Sep2016 11:00:00	2016	1386.38568	943.267	1311.544	1738.239	923.8425
14Sep2016 12:00:00	2016	1407.78738	945.1762	1300.868	1744.259	926.123
14Sep2016 13:00:00	2016	1427.022339	953.9586	1304.897	1754.892	943.1558
14Sep2016 14:00:00	2016	1440.534233	955.2133	1302.587	1783.576	943.8258
14Sep2016 15:00:00	2016	1454.657562	939.9526	1317.316	1808.47	951.0871
14Sep2016 16:00:00	2016	1465.664738	945.7822	1317.991	1813.445	947.5776
14Sep2016 17:00:00	2016	1458.425312	973.495	1305.415	1784.501	947.3123
14Sep2016 18:00:00	2016	1372.976288	963.1201	1291.958	1713.027	942.6237
14Sep2016 19:00:00	2016	1333.731361	944.8865	1286.085	1688.369	946.6647
14Sep2016 20:00:00	2016	1347.001786	943.8529	1326.606	1729.822	983.6095
14Sep2016 21:00:00	2016	1251.181805	911.3264	1288.319	1635.241	971.8553
14Sep2016 22:00:00	2016	1112.636063	885.093	1255.649	1536.925	946.5734
14Sep2016 23:00:00	2016	983.6328306	842.1663	1220.541	1418.696	925.6629
15Sep2016 0:00:00	2016	898.788518	812.5068	1182.872	1309.331	897.3869
15Sep2016 1:00:00	2016	847.8994715	802.3985	1150.841	1274.034	902.7618
15Sep2016 2:00:00	2016	824.8594034	798.2079	1138.148	1239.387	879.2032
15Sep2016 3:00:00	2016	816.0278151	795.6653	1148.764	1213.416	866.3904
15Sep2016 4:00:00	2016	838.0133914	801.8673	1155.254	1224.795	865.1543
15Sep2016 5:00:00	2016	916.9442719	818.7708	1182.932	1308.706	870.8137
15Sep2016 6:00:00	2016	1090.64849	856.9826	1207.987	1420.724	885.3023
15Sep2016 7:00:00	2016	1221.849354	895.6279	1234.851	1548.846	879.0203
15Sep2016 8:00:00	2016	1260.721253	913.711	1266.659	1611.417	835.9829
15Sep2016 9:00:00	2016	1300.567605	928.4623	1291.852	1679.974	828.6396
15Sep2016 10:00:00	2016	1351.070873	944.1291	1301.083	1740.554	826.4448
15Sep2016 11:00:00	2016	1388.59857	952.6964	1295.879	1790.322	826.2079

15Sep2016 12:00:00	2016	1412.394614	945.183	1296.917	1815.371	821.6113
15Sep2016 13:00:00	2016	1434.211544	956.5963	1306.734	1839.258	827.4932
15Sep2016 14:00:00	2016	1452.714554	960.5903	1319.584	1841.547	860.8633
15Sep2016 15:00:00	2016	1462.971557	950.062	1325.473	1856.665	873.1308
15Sep2016 16:00:00	2016	1467.841936	945.5332	1347.824	1855.948	887.8521
15Sep2016 17:00:00	2016	1453.575229	944.7439	1367.82	1837.621	904.4698
15Sep2016 18:00:00	2016	1374.706824	950.7536	1332.985	1767.473	912.1568
15Sep2016 19:00:00	2016	1332.371026	944.8729	1319.52	1716.502	904.4433
15Sep2016 20:00:00	2016	1348.355816	958.2931	1333.085	1735.514	924.8369
15Sep2016 21:00:00	2016	1252.160202	937.8599	1314.511	1675.163	916.3636
15Sep2016 22:00:00	2016	1113.730403	897.6407	1249.979	1502.415	900.6811
15Sep2016 23:00:00	2016	986.8896556	852.7685	1195.002	1379.841	896.8182
16Sep2016 0:00:00	2016	904.3289375	829.4885	1171.795	1281.445	885.6673
16Sep2016 1:00:00	2016	852.660217	815.4892	1162.028	1260.38	886.1922
16Sep2016 2:00:00	2016	827.7193126	793.0127	1161.108	1255.708	876.9167
16Sep2016 3:00:00	2016	815.8764055	792.9979	1158.625	1246.305	876.0246
16Sep2016 4:00:00	2016	832.3135398	796.6251	1158.272	1244.998	881.8317
16Sep2016 5:00:00	2016	903.6039957	809.7503	1168.984	1312.716	888.2277
16Sep2016 6:00:00	2016	1060.867039	845.9884	1194.084	1443.747	897.5249
16Sep2016 7:00:00	2016	1175.824606	885.5949	1213.869	1552.323	890.6791
16Sep2016 8:00:00	2016	1226.704813	908.7847	1256.402	1620.825	895.7755
16Sep2016 9:00:00	2016	1282.688091	928.3061	1298.457	1676.576	895.8087
16Sep2016 10:00:00	2016	1339.044984	944.4775	1310.382	1735.164	899.0259
16Sep2016 11:00:00	2016	1385.272905	950.233	1297.321	1800.174	895.6979
16Sep2016 12:00:00	2016	1407.219102	938.6183	1304.419	1832.44	875.0143
16Sep2016 13:00:00	2016	1422.261314	929.9297	1315.668	1858.391	874.9228
16Sep2016 14:00:00	2016	1438.497939	930.1093	1344.683	1866.337	870.7328
16Sep2016 15:00:00	2016	1449.578938	939.5432	1364.023	1855.469	863.3958
16Sep2016 16:00:00	2016	1444.592123	938.4687	1369.41	1824.658	875.8826
16Sep2016 17:00:00	2016	1427.140087	937.6339	1360.977	1791.347	914.3692
16Sep2016 18:00:00	2016	1340.346557	930.3598	1334.786	1726.935	914.3928
16Sep2016 19:00:00	2016	1293.677436	933.7241	1308.232	1675.995	910.4021
16Sep2016 20:00:00	2016	1289.461553	941.0442	1311.217	1687.594	931.7419
16Sep2016 21:00:00	2016	1207.926506	918.1408	1281.704	1594.769	935.8153
16Sep2016 22:00:00	2016	1101.264338	889.7496	1237.456	1503.26	924.3412
16Sep2016 23:00:00	2016	997.2009595	851.8365	1193.943	1425.215	903.7725
17Sep2016 0:00:00	2016	917.6744824	820.6547	1162.758	1310.466	890.3088
17Sep2016 1:00:00	2016	863.4422264	810.3356	1150.45	1256.194	892.5564
17Sep2016 2:00:00	2016	832.2111341	802.3459	1137.01	1231.191	899.3609
17Sep2016 3:00:00	2016	816.6780489	794.7278	1126.13	1208.837	894.1644
17Sep2016 4:00:00	2016	816.9002459	793.8548	1129.557	1206.043	892.2721
17Sep2016 5:00:00	2016	844.35454	802.9275	1151.336	1233.948	900.3003
17Sep2016 6:00:00	2016	899.5414197	820.1605	1169	1273.286	885.7213
17Sep2016 7:00:00	2016	962.6035774	840.1552	1179.592	1333.532	864.0776
17Sep2016 8:00:00	2016	1037.135876	867.565	1207.157	1392.426	855.2823
17Sep2016 9:00:00	2016	1117.634475	894.5873	1244.521	1484.6	859.0235
17Sep2016 10:00:00	2016	1176.556925	903.9756	1267.972	1550.016	870.4366

17Sep2016 11:00:00	2016	1216.456069	913.6879	1282.853	1610.392	884.418
17Sep2016 12:00:00	2016	1223.988974	909.8721	1280.253	1605.059	885.2817
17Sep2016 13:00:00	2016	1205.606944	910.6564	1279.641	1599.612	888.1657
17Sep2016 14:00:00	2016	1184.080135	909.812	1280.022	1592.858	893.7519
17Sep2016 15:00:00	2016	1179.233834	913.8817	1284.437	1598.84	898.0811
17Sep2016 16:00:00	2016	1187.415913	921.5257	1289.134	1620.74	904.9663
17Sep2016 17:00:00	2016	1190.816853	923.3918	1287.966	1569.3	914.6223
17Sep2016 18:00:00	2016	1156.023556	909.9659	1271.149	1526.462	915.616
17Sep2016 19:00:00	2016	1134.31811	909.2855	1263.784	1536.795	921.282
17Sep2016 20:00:00	2016	1167.311743	920.5463	1283.103	1596.271	929.5123
17Sep2016 21:00:00	2016	1117.220719	907.7918	1263.71	1535.848	913.2245
17Sep2016 22:00:00	2016	1037.757547	880.8241	1224.125	1460.347	897.5131
17Sep2016 23:00:00	2016	949.6536645	847.5484	1199.587	1377.402	885.7863
18Sep2016 0:00:00	2016	881.5459703	820.272	1176.212	1300.608	873.3559
18Sep2016 1:00:00	2016	831.8067161	804.9395	1165.13	1247.182	870.9459
18Sep2016 2:00:00	2016	803.5472129	793.7568	1153.432	1207.079	883.5244
18Sep2016 3:00:00	2016	788.0702961	790.3054	1141.14	1192.212	894.7873
18Sep2016 4:00:00	2016	787.6527157	783.3593	1139.464	1162.367	898.8556
18Sep2016 5:00:00	2016	805.8146832	787.7952	1152.325	1188.497	897.5358
18Sep2016 6:00:00	2016	846.6529656	800.023	1152.807	1234.044	900.6097
18Sep2016 7:00:00	2016	879.9515088	808.7093	1148.24	1252.196	885.4358
18Sep2016 8:00:00	2016	947.4770819	829.0542	1161.897	1287.837	871.5236
18Sep2016 9:00:00	2016	1024.337535	849.6933	1198.484	1372.043	869.0085
18Sep2016 10:00:00	2016	1082.750889	860.9771	1218.939	1446.429	862.5535
18Sep2016 11:00:00	2016	1122.391558	871.8244	1226.321	1455.632	866.3997
18Sep2016 12:00:00	2016	1148.740022	875.933	1236.881	1508.982	872.1275
18Sep2016 13:00:00	2016	1153.310292	874.8777	1242.497	1498.017	895.4497
18Sep2016 14:00:00	2016	1155.17032	877.9155	1241.649	1503.401	893.4219
18Sep2016 15:00:00	2016	1167.655888	885.1616	1237.055	1522.11	894.8234
18Sep2016 16:00:00	2016	1191.78659	893.961	1234.107	1545.091	909.6134
18Sep2016 17:00:00	2016	1209.028558	894.8647	1255.838	1566.235	920.6478
18Sep2016 18:00:00	2016	1180.682568	887.655	1245.207	1528.241	919.9566
18Sep2016 19:00:00	2016	1175.063853	889.498	1256.046	1538.407	924.6018
18Sep2016 20:00:00	2016	1211.023626	920.9135	1285.507	1603.4	934.6505
18Sep2016 21:00:00	2016	1149.785595	907.8399	1261.329	1555.184	928.0488
18Sep2016 22:00:00	2016	1038.13091	869.8192	1213.005	1440.147	915.4089
18Sep2016 23:00:00	2016	924.9931403	836.0033	1165.563	1327.797	906.4415
19Sep2016 0:00:00	2016	853.818953	813.934	1133.143	1239.768	898.6907
19Sep2016 1:00:00	2016	816.0240004	803.9446	1104.558	1187.312	903.0599
19Sep2016 2:00:00	2016	798.1606492	797.3426	1119.544	1177.227	901.0554
19Sep2016 3:00:00	2016	795.6967226	799.8596	1111.724	1180.254	896.3219
19Sep2016 4:00:00	2016	820.3157009	806.4737	1115.922	1195.529	874.562
19Sep2016 5:00:00	2016	900.5343267	821.4095	1139.61	1246.774	878.7502
19Sep2016 6:00:00	2016	1075.192513	864.172	1192.064	1401.895	890.568
19Sep2016 7:00:00	2016	1210.351223	912.2396	1229.374	1521.415	891.8803
19Sep2016 8:00:00	2016	1243.843535	931.9376	1265.617	1575.349	886.7954
19Sep2016 9:00:00	2016	1279.433178	940.0656	1298.161	1642.648	871.7672

19Sep2016 10:00:00	2016	1307.400102	937.2033	1299.6	1688.393	880.0016
19Sep2016 11:00:00	2016	1338.112359	931.8869	1259.154	1694.227	861.5718
19Sep2016 12:00:00	2016	1357.58923	928.2375	1253.63	1693.939	864.7959
19Sep2016 13:00:00	2016	1363.891202	929.1203	1264.942	1702.405	884.8371
19Sep2016 14:00:00	2016	1362.264529	922.922	1261.104	1698.35	890.4093
19Sep2016 15:00:00	2016	1360.719711	929.878	1288.036	1735.423	871.7803
19Sep2016 16:00:00	2016	1363.92924	941.9837	1314.534	1743.491	875.4542
19Sep2016 17:00:00	2016	1364.062927	943.6627	1312.779	1709.741	880.338
19Sep2016 18:00:00	2016	1292.263109	931.5121	1299.403	1676.049	876.9726
19Sep2016 19:00:00	2016	1279.418621	932.1661	1305.405	1672.288	887.8777
19Sep2016 20:00:00	2016	1288.655773	946.9006	1335.409	1714.258	912.1228
19Sep2016 21:00:00	2016	1199.228471	921.4902	1305.492	1627.067	901.4729
19Sep2016 22:00:00	2016	1068.510607	879.5036	1255.66	1504.503	877.6411
19Sep2016 23:00:00	2016	946.6166897	842.2461	1216.176	1355.816	870.3132
20Sep2016 0:00:00	2016	870.8290646	813.1557	1195.346	1298.807	906.1796
20Sep2016 1:00:00	2016	827.3254331	801.2039	1183.855	1258.171	910.6511
20Sep2016 2:00:00	2016	811.9723243	795.8414	1174.525	1217.129	918.552
20Sep2016 3:00:00	2016	806.4167855	791.0353	1159.372	1210.748	911.7718
20Sep2016 4:00:00	2016	828.7664439	788.9562	1144.375	1210.488	922.3006
20Sep2016 5:00:00	2016	910.1804411	793.3645	1116.274	1265.38	920.2876
20Sep2016 6:00:00	2016	1084.362598	832.9661	1163.165	1410.697	930.6923
20Sep2016 7:00:00	2016	1231.561016	878.1799	1213.949	1522.389	916.0108
20Sep2016 8:00:00	2016	1263.939946	877.4774	1227.273	1589.236	899.9779
20Sep2016 9:00:00	2016	1300.432645	883.8431	1219.436	1617.021	875.2459
20Sep2016 10:00:00	2016	1333.035385	888.0942	1221.44	1625.467	882.216
20Sep2016 11:00:00	2016	1347.463707	888.4786	1218.52	1665.072	876.5701
20Sep2016 12:00:00	2016	1352.197776	884.3484	1229.881	1692.689	876.3582
20Sep2016 13:00:00	2016	1354.067183	894.8844	1227.857	1682.199	879.1016
20Sep2016 14:00:00	2016	1347.228025	893.9057	1223.027	1704.018	877.4369
20Sep2016 15:00:00	2016	1346.022556	890.7367	1224.774	1717.78	880.5695
20Sep2016 16:00:00	2016	1356.554483	901.2842	1239.099	1704.257	886.0941
20Sep2016 17:00:00	2016	1354.057089	895.0291	1238.056	1686.361	895.8389
20Sep2016 18:00:00	2016	1298.470615	876.06	1240.729	1617.069	926.5731
20Sep2016 19:00:00	2016	1293.813123	892.0833	1264.294	1613.214	964.9385
20Sep2016 20:00:00	2016	1297.930542	906.4194	1268.781	1662.243	977.3488
20Sep2016 21:00:00	2016	1209.383558	884.8764	1219.452	1578.218	961.1066
20Sep2016 22:00:00	2016	1083.326776	846.4909	1165.46	1420.49	957.6461
20Sep2016 23:00:00	2016	967.9901189	806.7506	1110.715	1293.325	954.1866
21Sep2016 0:00:00	2016	889.717627	783.3408	1091.128	1218.38	953.2279
21Sep2016 1:00:00	2016	844.0830416	774.6746	1079.236	1174.876	923.2988
21Sep2016 2:00:00	2016	824.5943306	766.7492	1094.188	1161.06	932.0601
21Sep2016 3:00:00	2016	819.4628377	765.3066	1107.858	1168.077	917.4707
21Sep2016 4:00:00	2016	840.892391	771.5685	1124.782	1180.09	905.9931
21Sep2016 5:00:00	2016	925.556375	789.7508	1150.817	1254.388	899.6079
21Sep2016 6:00:00	2016	1101.945309	834.1383	1196.886	1419.012	920.249
21Sep2016 7:00:00	2016	1233.518526	883.5174	1221.185	1546.246	909.5095
21Sep2016 8:00:00	2016	1252.100306	900.0767	1168.411	1572.305	895.9662

21Sep2016 9:00:00	2016	1280.631896	908.9472	1191.19	1589.033	914.1853
21Sep2016 10:00:00	2016	1297.325554	917.091	1202.739	1617.162	902.3161
21Sep2016 11:00:00	2016	1320.590954	916.2559	1195.915	1639.32	891.388
21Sep2016 12:00:00	2016	1323.532541	922.6272	1202.377	1646.978	879.3268
21Sep2016 13:00:00	2016	1330.998154	927.5652	1214.926	1662.553	883.4885
21Sep2016 14:00:00	2016	1326.449213	924.8686	1206.614	1664.171	891.9405
21Sep2016 15:00:00	2016	1318.144302	927.0242	1203.552	1655.468	888.1737
21Sep2016 16:00:00	2016	1326.901641	939.2195	1206.644	1664.577	914.5021
21Sep2016 17:00:00	2016	1329.310904	938.2762	1199.953	1651.068	929.9239
21Sep2016 18:00:00	2016	1275.093752	927.5073	1183.76	1591.634	908.1294
21Sep2016 19:00:00	2016	1275.265864	934.5168	1176.384	1601.723	902.9577
21Sep2016 20:00:00	2016	1281.358343	941.0431	1224.202	1639.717	934.2706
21Sep2016 21:00:00	2016	1197.712981	904.2801	1210.153	1560.088	923.2847
21Sep2016 22:00:00	2016	1069.86343	871.6126	1185.266	1456.576	909.7067
21Sep2016 23:00:00	2016	960.3814611	834.8211	1162.187	1319.632	915.912
22Sep2016 0:00:00	2016	891.7553663	814.5283	1146.807	1256.264	912.1865
22Sep2016 1:00:00	2016	852.0623512	791.347	1119.337	1214.745	944.6612
22Sep2016 2:00:00	2016	827.1628386	784.3787	1101.653	1179.802	938.9928
22Sep2016 3:00:00	2016	819.563779	774.9931	1113.091	1172.349	938.5675
22Sep2016 4:00:00	2016	842.0996786	778.967	1081.626	1178.706	922.2069
22Sep2016 5:00:00	2016	923.6732979	795.0409	1087.523	1239.377	911.318
22Sep2016 6:00:00	2016	1095.897278	834.4558	1152.404	1422.615	934.4646
22Sep2016 7:00:00	2016	1242.392	881.2554	1166.466	1552.642	936.4757
22Sep2016 8:00:00	2016	1270.06594	893.7076	1172.95	1591.651	925.6359
22Sep2016 9:00:00	2016	1297.099787	902.3063	1167.709	1617.525	890.6048
22Sep2016 10:00:00	2016	1320.957174	922.1265	1218.084	1647.721	901.3137
22Sep2016 11:00:00	2016	1336.632953	928.1993	1246.392	1684.316	897.6036
22Sep2016 12:00:00	2016	1333.024436	926.6115	1242.747	1690.932	918.2993
22Sep2016 13:00:00	2016	1333.002824	921.3442	1258.618	1677.912	930.0256
22Sep2016 14:00:00	2016	1321.577889	921.868	1247.59	1680.529	923.4867
22Sep2016 15:00:00	2016	1314.608638	911.532	1239.06	1661.126	899.5093
22Sep2016 16:00:00	2016	1331.362939	929.0166	1256.816	1666.52	909.1336
22Sep2016 17:00:00	2016	1340.188273	935.8698	1253.058	1674.311	912.9364
22Sep2016 18:00:00	2016	1309.510723	925.9268	1240.296	1638.472	920.1851
22Sep2016 19:00:00	2016	1313.025578	926.8063	1273.276	1657.087	944.9238
22Sep2016 20:00:00	2016	1293.311222	924.7465	1300.997	1691.881	965.525
22Sep2016 21:00:00	2016	1207.540219	900.2896	1266.271	1612.025	950.0509
22Sep2016 22:00:00	2016	1087.2844	855.3411	1220.589	1465.434	954.3192
22Sep2016 23:00:00	2016	972.0411427	813.6355	1173.75	1345.947	968.8556
23Sep2016 0:00:00	2016	898.3139827	794.3858	1170.892	1274.371	965.1948
23Sep2016 1:00:00	2016	853.7102816	783.2515	1150.897	1232.876	934.1455
23Sep2016 2:00:00	2016	830.3773983	773.434	1141.473	1187.781	916.8106
23Sep2016 3:00:00	2016	824.6768178	775.4309	1136.764	1175.687	915.4929
23Sep2016 4:00:00	2016	844.999518	784.8972	1132.685	1192.19	914.8328
23Sep2016 5:00:00	2016	921.589103	799.5593	1140.777	1260.321	939.6912
23Sep2016 6:00:00	2016	1079.926636	834.2463	1172.808	1417.816	963.8129
23Sep2016 7:00:00	2016	1226.018809	879.3772	1236.906	1573.594	955.069

23Sep2016 8:00:00	2016	1267.981461	902.254	1266.754	1608.51	961.7035
23Sep2016 9:00:00	2016	1291.968379	908.1297	1279.681	1648.239	964.3163
23Sep2016 10:00:00	2016	1306.927075	905.6527	1283.598	1675.348	972.4284
23Sep2016 11:00:00	2016	1313.116845	902.4469	1290.265	1695.439	977.3359
23Sep2016 12:00:00	2016	1319.258857	896.0243	1284.773	1671.265	969.4064
23Sep2016 13:00:00	2016	1324.751688	892.1699	1284.214	1679.134	987.2143
23Sep2016 14:00:00	2016	1326.96113	888.8078	1294.76	1678.535	996.8624
23Sep2016 15:00:00	2016	1326.505656	888.2038	1300.94	1685.02	988.4221
23Sep2016 16:00:00	2016	1320.783339	889.5812	1313.124	1644.474	978.9665
23Sep2016 17:00:00	2016	1303.214977	882.3438	1303.379	1637.39	1002.651
23Sep2016 18:00:00	2016	1234.668562	865.7074	1271.695	1547.229	1021.477
23Sep2016 19:00:00	2016	1227.619534	866.0212	1273.644	1539.476	1041.434
23Sep2016 20:00:00	2016	1238.166025	885.0285	1291.188	1604.367	1044.757
23Sep2016 21:00:00	2016	1168.314721	878.1929	1271.421	1529.964	1058.648
23Sep2016 22:00:00	2016	1069.991164	849.9036	1238.484	1437.123	1049.884
23Sep2016 23:00:00	2016	970.5047055	817.4763	1200.997	1336.565	1014.35
24Sep2016 0:00:00	2016	892.497198	792.4869	1182.282	1238.974	1009.331
24Sep2016 1:00:00	2016	845.2480916	780.2185	1166.301	1212.683	994.4009
24Sep2016 2:00:00	2016	817.2632959	773.0381	1149.255	1174.352	1007.611
24Sep2016 3:00:00	2016	804.234882	759.6353	1139.77	1165.974	1032.592
24Sep2016 4:00:00	2016	806.800069	759.4283	1149.86	1191.126	1024.882
24Sep2016 5:00:00	2016	831.5019414	763.792	1154.746	1221.925	1036.8
24Sep2016 6:00:00	2016	888.2264571	781.3418	1168.325	1263.853	1026.894
24Sep2016 7:00:00	2016	961.3045742	805.0038	1180.502	1314.316	1016.243
24Sep2016 8:00:00	2016	1034.478841	831.8173	1198.946	1365.305	1011.073
24Sep2016 9:00:00	2016	1116.732134	853.2179	1226.424	1442.883	1022.582
24Sep2016 10:00:00	2016	1156.255726	863.5269	1243.585	1479.502	1003.722
24Sep2016 11:00:00	2016	1174.49503	866.6414	1246.04	1513.959	1038.712
24Sep2016 12:00:00	2016	1181.182264	857.8145	1221.138	1524.217	1041.593
24Sep2016 13:00:00	2016	1170.367369	854.5535	1219.445	1518.673	1041.625
24Sep2016 14:00:00	2016	1160.641848	856.0301	1222.249	1532.599	1029.179
24Sep2016 15:00:00	2016	1160.222578	854.751	1249.042	1515.458	1008.373
24Sep2016 16:00:00	2016	1164.444601	851.6912	1258.494	1540.985	1015.439
24Sep2016 17:00:00	2016	1160.597855	856.6277	1259.643	1548.71	1026.421
24Sep2016 18:00:00	2016	1138.104092	846.4733	1247.3	1500.984	1015.425
24Sep2016 19:00:00	2016	1143.05911	858.9457	1266.681	1535.33	990.4419
24Sep2016 20:00:00	2016	1164.213341	873.5275	1288.929	1553.005	993.222
24Sep2016 21:00:00	2016	1111.044709	853.9153	1267.563	1500.456	961.6129
24Sep2016 22:00:00	2016	1035.143148	830.4575	1231.134	1406.139	958.778
24Sep2016 23:00:00	2016	947.1016161	798.4662	1187.125	1330.996	950.8907
25Sep2016 0:00:00	2016	874.7237428	780.0361	1160.24	1234.069	958.2571
25Sep2016 1:00:00	2016	828.6162797	772.3158	1139.144	1179.601	932.8695
25Sep2016 2:00:00	2016	801.2590556	765.9665	1136.555	1138.852	928.7931
25Sep2016 3:00:00	2016	789.5051052	762.9489	1138.216	1136.191	898.8262
25Sep2016 4:00:00	2016	790.7424155	766.3834	1137.608	1142.926	892.3804
25Sep2016 5:00:00	2016	816.4227594	774.2269	1148.029	1178.174	915.717
25Sep2016 6:00:00	2016	861.4177826	789.4607	1165.581	1218.419	928.7791

25Sep2016 7:00:00	2016	912.3706145	802.7406	1174.37	1266.906	907.0413
25Sep2016 8:00:00	2016	967.6467804	821.5346	1190.726	1314.17	904.4721
25Sep2016 9:00:00	2016	1032.203426	833.5407	1213.67	1385.423	914.982
25Sep2016 10:00:00	2016	1080.254361	836.1506	1229.78	1441.84	918.8401
25Sep2016 11:00:00	2016	1116.530472	837.558	1240.019	1487.816	894.027
25Sep2016 12:00:00	2016	1138.194555	843.4751	1245.264	1486.027	902.1182
25Sep2016 13:00:00	2016	1146.307861	842.0322	1224.042	1472.273	899.3872
25Sep2016 14:00:00	2016	1151.409595	837.745	1235.166	1472.739	901.6736
25Sep2016 15:00:00	2016	1163.439997	840.8483	1246.821	1483.925	913.2288
25Sep2016 16:00:00	2016	1193.72379	849.8972	1259.126	1526.949	911.1083
25Sep2016 17:00:00	2016	1219.349794	860.6405	1271.127	1571.164	904.8045
25Sep2016 18:00:00	2016	1198.155038	857.2718	1267.912	1545.755	900.5583
25Sep2016 19:00:00	2016	1211.234752	860.6186	1291.528	1588.452	961.6129
25Sep2016 20:00:00	2016	1231.270277	871.6446	1321.05	1629.421	980.7002
25Sep2016 21:00:00	2016	1160.45673	849.6755	1284.563	1552.727	966.2424
25Sep2016 22:00:00	2016	1046.620439	813.1641	1244.286	1441.853	956.223
25Sep2016 23:00:00	2016	939.1180373	776.4589	1205.192	1326.825	967.2507
26Sep2016 0:00:00	2016	866.2964493	754.0978	1181.669	1247.835	959.6644
26Sep2016 1:00:00	2016	823.4018182	746.5906	1167.083	1202.745	962.1757
26Sep2016 2:00:00	2016	804.7455879	743.2803	1164.894	1180.109	960.8082
26Sep2016 3:00:00	2016	803.3724521	740.0285	1160.494	1177.014	926.1195
26Sep2016 4:00:00	2016	825.3647721	743.886	1158.64	1197.427	909.0992
26Sep2016 5:00:00	2016	908.8409354	760.9727	1167.439	1261.607	919.3564
26Sep2016 6:00:00	2016	1088.864841	802.7146	1219.121	1408.826	916.9111
26Sep2016 7:00:00	2016	1234.675118	834.0446	1280.563	1559.235	918.6355
26Sep2016 8:00:00	2016	1266.397552	851.6895	1307.375	1607.859	912.3453
26Sep2016 9:00:00	2016	1299.90716	866.4358	1340.604	1655.096	919.1146
26Sep2016 10:00:00	2016	1340.560878	878.4397	1363.633	1693.404	923.1968
26Sep2016 11:00:00	2016	1370.544958	870.66	1354.865	1747.005	913.5108
26Sep2016 12:00:00	2016	1386.358005	870.1487	1349.613	1808.208	911.7768
26Sep2016 13:00:00	2016	1406.831446	884.1782	1351.86	1781.621	914.7834
26Sep2016 14:00:00	2016	1414.327435	901.3665	1349.046	1825.471	921.6138
26Sep2016 15:00:00	2016	1427.876939	899.4867	1342.458	1804.421	929.7432
26Sep2016 16:00:00	2016	1448.051423	889.6209	1347.79	1814.273	949.0285
26Sep2016 17:00:00	2016	1444.922595	883.5155	1332.926	1773.551	959.5092
26Sep2016 18:00:00	2016	1367.730788	894.265	1310.44	1694.96	944.2538
26Sep2016 19:00:00	2016	1353.814493	898.088	1315.807	1697.48	964.8623
26Sep2016 20:00:00	2016	1347.754917	899.2491	1313.45	1710.903	1002.144
26Sep2016 21:00:00	2016	1250.81707	871.9476	1267.338	1665.802	975.571
26Sep2016 22:00:00	2016	1115.961471	830.0403	1210.359	1545.408	963.03
26Sep2016 23:00:00	2016	992.6138734	799.6336	1174.375	1417.088	935.2876
27Sep2016 0:00:00	2016	912.9671116	783.0593	1168.664	1327.739	897.7285
27Sep2016 1:00:00	2016	866.5644437	771.8684	1162.976	1282.28	920.5468
27Sep2016 2:00:00	2016	840.6774612	764.0574	1158.618	1253.772	938.3239
27Sep2016 3:00:00	2016	830.6281214	760.0537	1157.787	1240.712	900.8292
27Sep2016 4:00:00	2016	851.4282975	760.6918	1165.899	1240.945	897.5944
27Sep2016 5:00:00	2016	934.6872589	780.7098	1181.739	1288.024	920.9305

27Sep2016 6:00:00	2016	1111.886944	824.4636	1229.974	1438.199	918.9608
27Sep2016 7:00:00	2016	1258.677352	869.4466	1277.475	1579.434	900.7335
27Sep2016 8:00:00	2016	1283.783636	881.1076	1276.732	1604.319	892.4587
27Sep2016 9:00:00	2016	1310.228202	895.2304	1290.471	1637.51	900.206
27Sep2016 10:00:00	2016	1339.195032	912.7097	1290.535	1653.5	887.7489
27Sep2016 11:00:00	2016	1355.024191	922.3888	1298.348	1670.451	868.3834
27Sep2016 12:00:00	2016	1355.355071	926.336	1324.902	1720.104	870.825
27Sep2016 13:00:00	2016	1355.703949	933.3666	1327.17	1722.07	878.8671
27Sep2016 14:00:00	2016	1347.512012	943.2191	1310.158	1703.952	885.3116
27Sep2016 15:00:00	2016	1334.713715	941.0412	1302.078	1694.428	891.2813
27Sep2016 16:00:00	2016	1343.258184	951.8215	1288.649	1715.41	875.9967
27Sep2016 17:00:00	2016	1348.374983	962.3231	1279.309	1706.37	870.5986
27Sep2016 18:00:00	2016	1295.028198	958.6793	1266.703	1675.625	860.7795
27Sep2016 19:00:00	2016	1310.50398	962.6637	1275.394	1687.989	888.4559
27Sep2016 20:00:00	2016	1296.422552	953.1497	1291.138	1695.052	923.5674
27Sep2016 21:00:00	2016	1207.609997	921.8334	1289.696	1623.435	944.9324
27Sep2016 22:00:00	2016	1083.423448	880.2957	1254.868	1494.005	936.777
27Sep2016 23:00:00	2016	968.8982362	842.3506	1228.119	1366.697	945.513
28Sep2016 0:00:00	2016	895.4659673	817.5142	1202.682	1295.626	948.4733
28Sep2016 1:00:00	2016	850.5030752	801.9986	1184.43	1262.243	944.6698
28Sep2016 2:00:00	2016	831.4677055	794.3869	1180.325	1222.946	942.802
28Sep2016 3:00:00	2016	823.7285172	792.4224	1181.18	1201.358	903.2011
28Sep2016 4:00:00	2016	844.1709961	796.7668	1185.138	1210.18	906.5325
28Sep2016 5:00:00	2016	926.3830077	812.2967	1196.697	1267.015	947.0951
28Sep2016 6:00:00	2016	1107.038428	854.7316	1243.632	1422.56	939.3807
28Sep2016 7:00:00	2016	1265.718192	908.8135	1309.171	1584.711	921.5785
28Sep2016 8:00:00	2016	1283.703054	917.4717	1323.4	1605.871	945.7992
28Sep2016 9:00:00	2016	1306.799748	923.9789	1316.838	1632.226	950.8191
28Sep2016 10:00:00	2016	1328.197943	926.7862	1324.962	1652.436	907.2226
28Sep2016 11:00:00	2016	1333.894257	922.4684	1325.599	1661.473	892.7732
28Sep2016 12:00:00	2016	1332.565167	918.8687	1340.436	1679.938	890.0889
28Sep2016 13:00:00	2016	1338.138989	925.1957	1316.202	1688.094	893.9328
28Sep2016 14:00:00	2016	1332.365751	933.081	1312.365	1683.482	857.1615
28Sep2016 15:00:00	2016	1331.142681	937.5492	1298.977	1671.92	862.2445
28Sep2016 16:00:00	2016	1346.976849	943.0423	1310.727	1678.514	876.7328
28Sep2016 17:00:00	2016	1349.359191	941.4166	1297.796	1665.39	896.388
28Sep2016 18:00:00	2016	1282.013216	932.2506	1291.723	1616.761	900.6576
28Sep2016 19:00:00	2016	1294.465652	945.4526	1311.344	1652.151	916.1105
28Sep2016 20:00:00	2016	1300.439603	949.4636	1332.064	1667.665	924.2797
28Sep2016 21:00:00	2016	1216.301966	922.5516	1320.425	1577.882	925.3793
28Sep2016 22:00:00	2016	1087.819092	884.2593	1253.628	1458.193	905.1724
28Sep2016 23:00:00	2016	970.5137913	846.0007	1216.992	1355.09	902.7458
29Sep2016 0:00:00	2016	894.3135625	820.0763	1187.572	1273.789	897.3698
29Sep2016 1:00:00	2016	849.8095707	809.1114	1171.51	1210.279	907.2162
29Sep2016 2:00:00	2016	829.0412272	801.6356	1162.843	1174.332	904.439
29Sep2016 3:00:00	2016	825.3439621	799.9997	1144.949	1172.738	892.5787
29Sep2016 4:00:00	2016	847.1235529	813.7452	1163.324	1189.6	917.7512

29Sep2016 5:00:00	2016	928.0576303	828.6348	1170.465	1306.021	921.7464
29Sep2016 6:00:00	2016	1103.377477	864.4204	1198.712	1447.224	935.8205
29Sep2016 7:00:00	2016	1249.623495	909.8454	1235.247	1580.213	931.9434
29Sep2016 8:00:00	2016	1262.280547	928.1217	1273.238	1612.623	943.7478
29Sep2016 9:00:00	2016	1286.119451	937.9817	1319.169	1632.039	955.2461
29Sep2016 10:00:00	2016	1310.258099	945.4992	1321.206	1658.609	947.1706
29Sep2016 11:00:00	2016	1327.542148	949.4947	1325.247	1702.38	928.9403
29Sep2016 12:00:00	2016	1328.550755	945.1574	1322.776	1705.454	908.8983
29Sep2016 13:00:00	2016	1332.576956	945.981	1320.649	1715.314	907.6557
29Sep2016 14:00:00	2016	1327.405622	946.4896	1296.201	1697.747	933.9712
29Sep2016 15:00:00	2016	1339.858371	944.8338	1279.323	1712.875	929.7163
29Sep2016 16:00:00	2016	1352.067874	948.3498	1284.67	1713.918	927.5587
29Sep2016 17:00:00	2016	1343.107506	941.8499	1289.49	1734.034	924.0945
29Sep2016 18:00:00	2016	1285.481809	943.6592	1295.909	1710.942	931.0368
29Sep2016 19:00:00	2016	1310.451666	960.9124	1305.672	1763.161	963.4541
29Sep2016 20:00:00	2016	1298.252529	963.1089	1293.767	1726.08	976.3796
29Sep2016 21:00:00	2016	1210.038417	940.5166	1271.63	1637.541	955.8901
29Sep2016 22:00:00	2016	1081.509489	895.7611	1223.275	1513.95	930.4657
29Sep2016 23:00:00	2016	967.295862	860.457	1176.733	1397.294	888.7205
30Sep2016 0:00:00	2016	892.1365007	839.7674	1151.007	1313.851	880.4776
30Sep2016 1:00:00	2016	847.8697122	827.5984	1148.573	1275.877	861.5347
30Sep2016 2:00:00	2016	825.7956035	819.4773	1139.128	1235.347	859.0746
30Sep2016 3:00:00	2016	820.4320505	815.1872	1131.793	1230.162	866.2779
30Sep2016 4:00:00	2016	842.9880513	820.9862	1128.374	1223.649	872.8276
30Sep2016 5:00:00	2016	922.417561	835.9596	1139.27	1281.532	880.1255
30Sep2016 6:00:00	2016	1085.463939	865.9352	1178.357	1445.361	897.2934
30Sep2016 7:00:00	2016	1249.820048	915.9206	1243.203	1599.156	919.6392
30Sep2016 8:00:00	2016	1284.124593	940.7669	1274.997	1640.253	889.1906
30Sep2016 9:00:00	2016	1304.500754	942.1767	1300.375	1675.949	882.5631
30Sep2016 10:00:00	2016	1316.853743	944.167	1309.267	1698.755	877.9153
30Sep2016 11:00:00	2016	1324.017198	941.1576	1319.737	1720.391	868.0993
30Sep2016 12:00:00	2016	1324.647671	939.1487	1319.768	1697.672	857.6077
30Sep2016 13:00:00	2016	1338.316301	937.0854	1317.684	1706.713	859.6968
30Sep2016 14:00:00	2016	1335.766003	943.7215	1320.963	1712.977	859.7792
30Sep2016 15:00:00	2016	1333.417851	949.573	1299.791	1710.119	859.6597
30Sep2016 16:00:00	2016	1333.303635	956.133	1309.946	1693.077	864.8325
30Sep2016 17:00:00	2016	1316.112497	947.6261	1310.184	1703.269	889.4821
30Sep2016 18:00:00	2016	1250.688253	933.0235	1281.747	1666.431	896.4122
30Sep2016 19:00:00	2016	1260.337052	946.5209	1283.76	1692.461	905.2183
30Sep2016 20:00:00	2016	1238.288685	943.1465	1278.739	1654.387	915.2833
30Sep2016 21:00:00	2016	1165.765257	917.6871	1252.985	1583.064	891.7115
30Sep2016 22:00:00	2016	1071.340142	886.2148	1223.52	1475.574	882.3326
30Sep2016 23:00:00	2016	972.164572	863.1149	1197.826	1372.51	865.2057
01Oct2016 0:00:00	2016	897.0019536	842.5086	1175.82	1305.595	856.4626
01Oct2016 1:00:00	2016	847.4280685	824.2866	1151.886	1259.84	853.6965
01Oct2016 2:00:00	2016	818.6382394	813.0656	1149.448	1198.282	856.4345
01Oct2016 3:00:00	2016	804.9211644	811.7492	1126.722	1214.17	862.5036

01Oct2016 4:00:00	2016	806.1636108	809.1192	1126.051	1190.94	880.3113
01Oct2016 5:00:00	2016	832.7280856	808.0486	1140.257	1228.755	871.8954
01Oct2016 6:00:00	2016	886.4035502	824.5984	1150.681	1280.707	879.6448
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01Oct2016 8:00:00	2016	1053.577926	892.9365	1192.186	1424.331	898.3284
01Oct2016 9:00:00	2016	1143.518433	923.4224	1203.847	1478.577	881.286
01Oct2016 10:00:00	2016	1192.301603	941.8738	1267.006	1546.47	895.4871
01Oct2016 11:00:00	2016	1221.406226	946.0174	1265.962	1572.558	897.9246
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01Oct2016 14:00:00	2016	1170.524018	928.0563	1220.361	1546.1	921.4188
01Oct2016 15:00:00	2016	1161.992173	914.2062	1210.914	1545.146	931.8819
01Oct2016 16:00:00	2016	1167.503596	916.0525	1246.276	1578.44	926.2998
01Oct2016 17:00:00	2016	1170.946852	913.3015	1267.906	1599.004	929.8504
01Oct2016 18:00:00	2016	1144.440345	907.1118	1221.094	1565.515	941.3856
01Oct2016 19:00:00	2016	1174.492037	918.6083	1235.928	1581.758	958.2006
01Oct2016 20:00:00	2016	1171.054681	921.6794	1245.925	1528.154	959.699
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01Oct2016 22:00:00	2016	1044.712154	879.1959	1250.38	1458.802	936.3131
01Oct2016 23:00:00	2016	962.2368289	843.5387	1215.458	1356.616	931.1268
02Oct2016 0:00:00	2016	893.2497682	817.8737	1181.975	1316.4	919.3616
02Oct2016 1:00:00	2016	842.0197719	806.111	1160.604	1262.908	924.2102
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02Oct2016 5:00:00	2016	824.837126	810.1068	1134.053	1206.545	909.9647
02Oct2016 6:00:00	2016	869.3104373	823.5277	1141.559	1215.179	917.8394
02Oct2016 7:00:00	2016	921.7771589	841.3105	1161.672	1280.591	917.6185
02Oct2016 8:00:00	2016	975.4329952	849.3077	1207.577	1307.482	898.0756
02Oct2016 9:00:00	2016	1043.933665	846.01	1233.828	1410.137	913.4549
02Oct2016 10:00:00	2016	1093.579116	849.438	1255.348	1464.262	902.6617
02Oct2016 11:00:00	2016	1122.807939	851.4774	1279.755	1496.798	914.566
02Oct2016 12:00:00	2016	1136.005654	865.7321	1287.325	1523.534	934.2754
02Oct2016 13:00:00	2016	1137.359232	866.2014	1275.213	1493.868	943.0505
02Oct2016 14:00:00	2016	1131.629646	869.5596	1273.774	1503.339	927.7718
02Oct2016 15:00:00	2016	1140.48267	870.4639	1280.154	1532.295	927.0242
02Oct2016 16:00:00	2016	1160.823868	880.4519	1285.689	1540.645	925.573
02Oct2016 17:00:00	2016	1184.31585	882.79	1282.739	1554.628	940.9982
02Oct2016 18:00:00	2016	1178.356168	892.0025	1276.784	1566.137	959.8802
02Oct2016 19:00:00	2016	1217.838287	910.1817	1278.045	1595.527	983.2181
02Oct2016 20:00:00	2016	1213.65355	910.3332	1281.932	1603.075	979.1947
02Oct2016 21:00:00	2016	1140.443204	883.8257	1259.533	1524.131	966.7267
02Oct2016 22:00:00	2016	1032.128393	851.2938	1207.714	1401.489	964.4334
02Oct2016 23:00:00	2016	925.7280382	817.0933	1166.94	1321.68	997.1354
03Oct2016 0:00:00	2016	858.2807537	804.1126	1151.794	1218.031	1011.194
03Oct2016 1:00:00	2016	818.8484768	793.1065	1121.351	1196.648	996.2629
03Oct2016 2:00:00	2016	803.630828	792.7516	1109.929	1160.452	995.1322

03Oct2016 3:00:00	2016	801.0592344	795.1659	1107.354	1163.757	992.1732
03Oct2016 4:00:00	2016	830.253406	804.5521	1119.927	1177.519	994.8332
03Oct2016 5:00:00	2016	920.1488686	825.0908	1129.856	1277.198	992.7947
03Oct2016 6:00:00	2016	1097.257971	873.0106	1190.597	1434.967	1010.958
03Oct2016 7:00:00	2016	1260.256485	906.698	1295.288	1582.957	1026.341
03Oct2016 8:00:00	2016	1271.470545	903.082	1319.239	1622.696	1016.299
03Oct2016 9:00:00	2016	1288.239917	907.7622	1323.682	1648.336	997.2295
03Oct2016 10:00:00	2016	1308.049617	927.2696	1321.088	1670.764	994.2349
03Oct2016 11:00:00	2016	1323.13469	938.84	1335.832	1671.945	1000.91
03Oct2016 12:00:00	2016	1331.607994	945.8856	1339.213	1670.071	997.092
03Oct2016 13:00:00	2016	1342.707933	939.9525	1342.056	1672.631	988.5931
03Oct2016 14:00:00	2016	1342.062992	940.3362	1341.568	1667.65	983.9207
03Oct2016 15:00:00	2016	1337.348203	944.1154	1318.39	1685.608	971.5346
03Oct2016 16:00:00	2016	1340.340489	951.5651	1311.843	1667.976	979.7244
03Oct2016 17:00:00	2016	1343.784561	943.9439	1282.401	1659.433	981.63
03Oct2016 18:00:00	2016	1296.836485	934.0485	1271.852	1609.35	1000.572
03Oct2016 19:00:00	2016	1322.293767	949.5428	1308.579	1700.569	1016.776
03Oct2016 20:00:00	2016	1302.874007	945.0147	1315.714	1705.497	1029.455
03Oct2016 21:00:00	2016	1210.97329	916.5682	1301.64	1627.191	1027.94
03Oct2016 22:00:00	2016	1081.925235	874.1526	1251.788	1512.492	1026.073
03Oct2016 23:00:00	2016	966.6021192	842.2013	1201.472	1398.546	1011.343
04Oct2016 0:00:00	2016	888.9732559	821.1954	1185.031	1322.55	999.334
04Oct2016 1:00:00	2016	845.8169029	811.5392	1173.602	1265.403	1004.34
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04Oct2016 3:00:00	2016	818.949056	807.7033	1160.596	1213.313	985.9027
04Oct2016 4:00:00	2016	845.65602	811.7716	1147.014	1225.297	990.3985
04Oct2016 5:00:00	2016	933.7424137	830.1147	1137.94	1265.64	993.1397
04Oct2016 6:00:00	2016	1119.749544	871.3956	1186.732	1412.061	1021.142
04Oct2016 7:00:00	2016	1280.56192	912.0739	1260.923	1590.486	1038.394
04Oct2016 8:00:00	2016	1288.491251	901.3507	1276.046	1610.712	1133.952
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04Oct2016 11:00:00	2016	1329.371213	898.5067	1287.287	1676.132	1012.417
04Oct2016 12:00:00	2016	1327.47001	906.3027	1299.983	1677.494	1004.216
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04Oct2016 16:00:00	2016	1332.699403	931.2324	1308.924	1666.592	1025.247
04Oct2016 17:00:00	2016	1334.154894	935.3106	1295.946	1655.413	1031.559
04Oct2016 18:00:00	2016	1315.290385	949.4959	1287.701	1625.7	1043.2
04Oct2016 19:00:00	2016	1345.362095	974.6599	1315.326	1678.743	1057.149
04Oct2016 20:00:00	2016	1311.84638	963.0229	1310.421	1648.142	1067.439
04Oct2016 21:00:00	2016	1225.781146	933.886	1287.724	1563.877	1066.018
04Oct2016 22:00:00	2016	1100.198229	894.5357	1243.853	1465.914	1070.645
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05Oct2016 0:00:00	2016	908.7299966	832.0205	1178.822	1282.442	1035.937
05Oct2016 1:00:00	2016	861.8352416	820.6851	1166.047	1241.784	1021.222

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06Oct2016 1:00:00	2016	880.5106188	830.1431	1141.962	1299.782	1054.887
06Oct2016 2:00:00	2016	859.5296721	824.9867	1143.059	1279.931	1066.558
06Oct2016 3:00:00	2016	853.8890838	822.1374	1156.093	1256.949	1061.913
06Oct2016 4:00:00	2016	875.0038346	830.5509	1183.808	1277.558	1065.097
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06Oct2016 11:00:00	2016	1330.264633	947.8861	1315.784	1663.809	1086.903
06Oct2016 12:00:00	2016	1319.798843	945.1462	1323.455	1648.229	1065.316
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06Oct2016 17:00:00	2016	1310.774334	918.7278	1309.577	1657.557	1085.972
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06Oct2016 19:00:00	2016	1336.226857	929.1193	1354.114	1729.171	1115.274
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07Oct2016 5:00:00	2016	949.5538228	850.6587	1214.736	1352.788	1112.584
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07Oct2016 7:00:00	2016	1251.969059	938.5927	1301.357	1661.676	1112.991
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07Oct2016 20:00:00	2016	1288.333546	940.9392	1282.96	1649.45	970.7231
07Oct2016 21:00:00	2016	1212.76895	956.5464	1253.219	1575.487	987.7019
07Oct2016 22:00:00	2016	1116.227768	920.0579	1202.851	1496.302	978.7406
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08Oct2016 0:00:00	2016	943.5964599	862.9656	1159.992	1338.707	963.5836
08Oct2016 1:00:00	2016	893.8020169	845.0435	1149.727	1268.985	969.6078
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08Oct2016 3:00:00	2016	851.5502638	836.9936	1192.214	1239.154	1021.564
08Oct2016 4:00:00	2016	853.5043487	836.4876	1187.88	1261.024	1062.542
08Oct2016 5:00:00	2016	878.8301044	844.8825	1193.023	1256.201	1109.294
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08Oct2016 9:00:00	2016	1163.941572	946.3007	1293.869	1517.639	1115.459
08Oct2016 10:00:00	2016	1213.510345	943.5222	1313.566	1546.895	1086.56
08Oct2016 11:00:00	2016	1239.254257	961.6118	1319.685	1604.741	1052.024
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08Oct2016 17:00:00	2016	1239.446078	933.5515	1311.418	1658.918	1017.944
08Oct2016 18:00:00	2016	1238.807699	938.6271	1328.914	1647.79	1039.369
08Oct2016 19:00:00	2016	1232.307937	950.3484	1348.927	1686.17	1050.08
08Oct2016 20:00:00	2016	1193.611195	938.6698	1340.379	1646.813	1092.059
08Oct2016 21:00:00	2016	1138.751625	920.8285	1320.855	1577.241	1097.645
08Oct2016 22:00:00	2016	1064.766086	891.4811	1271.366	1503.106	1101.631
08Oct2016 23:00:00	2016	985.9863046	861.4161	1230.072	1418.695	1090.16

09Oct2016 0:00:00	2016	919.0054308	831.5477	1203.748	1344.042	1126.777
09Oct2016 1:00:00	2016	874.1116368	819.521	1194.155	1286.452	1109.412
09Oct2016 2:00:00	2016	844.6189402	812.1954	1184.143	1264.478	1110.403
09Oct2016 3:00:00	2016	833.1686701	812.9756	1177.322	1241.44	1106.904
09Oct2016 4:00:00	2016	837.2359169	815.3205	1194.308	1242.184	1101.475
09Oct2016 5:00:00	2016	858.2175788	819.5089	1210.238	1267.524	1092.039
09Oct2016 6:00:00	2016	902.0705259	839.9062	1227.335	1302.034	1081.9
09Oct2016 7:00:00	2016	970.046725	862.5844	1234.757	1345.757	1102.873
09Oct2016 8:00:00	2016	1030.341885	895.352	1243.058	1392.657	1099.821
09Oct2016 9:00:00	2016	1097.334339	918.5466	1273.216	1467.795	1107.47
09Oct2016 10:00:00	2016	1141.634864	938.4662	1299.964	1519.133	1119.68
09Oct2016 11:00:00	2016	1169.447985	945.5887	1309.459	1561.924	1121.153
09Oct2016 12:00:00	2016	1190.323291	935.7457	1311.807	1555.849	1125.309
09Oct2016 13:00:00	2016	1200.046457	933.4521	1300.284	1557.261	1130.807
09Oct2016 14:00:00	2016	1199.234526	932.8995	1293.151	1546.106	1137.516
09Oct2016 15:00:00	2016	1205.019843	935.5774	1274.831	1533.006	1164.351
09Oct2016 16:00:00	2016	1204.254589	941.4509	1270.323	1530.247	1170.634
09Oct2016 17:00:00	2016	1184.389168	941.4651	1267.824	1511.193	1166.052
09Oct2016 18:00:00	2016	1157.784174	937.0608	1267.351	1494.929	1147.049
09Oct2016 19:00:00	2016	1182.540581	948.0244	1307.731	1582.535	1148.522
09Oct2016 20:00:00	2016	1163.118962	939.9716	1303.356	1555.535	1155.174
09Oct2016 21:00:00	2016	1131.500707	927.2289	1289.269	1532.137	1154.877
09Oct2016 22:00:00	2016	1066.4511	897.027	1254.46	1456.169	1162.772
09Oct2016 23:00:00	2016	984.9855811	867.7053	1227.612	1360.835	1164.075
10Oct2016 0:00:00	2016	914.2171678	848.7316	1217.459	1313.463	1150.852
10Oct2016 1:00:00	2016	870.8479102	835.1544	1209.933	1294.337	1147.383
10Oct2016 2:00:00	2016	846.7796939	835.4501	1196.589	1264.867	1152.169
10Oct2016 3:00:00	2016	836.0514222	838.273	1201.986	1239.408	1153.281
10Oct2016 4:00:00	2016	845.0381741	841.6791	1211.778	1259.968	1121.789
10Oct2016 5:00:00	2016	880.0447473	854.095	1211.19	1280.647	1137.018
10Oct2016 6:00:00	2016	931.8299132	876.2459	1231.462	1324.118	1119.225
10Oct2016 7:00:00	2016	990.2215144	902.5758	1258.158	1375.339	1117.416
10Oct2016 8:00:00	2016	1039.114337	924.4369	1275.24	1425.965	1121.08
10Oct2016 9:00:00	2016	1110.214122	935.8977	1308.247	1489.39	1114.344
10Oct2016 10:00:00	2016	1179.392044	953.4255	1334.763	1589.023	1112.869
10Oct2016 11:00:00	2016	1225.876679	970.0015	1346.81	1637.619	1120.963
10Oct2016 12:00:00	2016	1248.65902	971.053	1338.688	1641.51	1132.888
10Oct2016 13:00:00	2016	1243.602698	965.2358	1332.456	1646.674	1125.246
10Oct2016 14:00:00	2016	1234.202987	958.4833	1329.905	1629.755	1131.393
10Oct2016 15:00:00	2016	1233.819954	957.0079	1329.691	1622.441	1121.035
10Oct2016 16:00:00	2016	1249.142697	959.1666	1330.1	1655.014	1127.685
10Oct2016 17:00:00	2016	1266.101972	963.5669	1335.055	1670.617	1111.354
10Oct2016 18:00:00	2016	1273.825317	963.4718	1339.664	1669.023	1133.839
10Oct2016 19:00:00	2016	1303.303205	982.0425	1353.748	1712.722	1152.926
10Oct2016 20:00:00	2016	1271.151312	977.5508	1333.563	1656.431	1174.563
10Oct2016 21:00:00	2016	1196.843318	953.0808	1299.788	1584.308	1169.661
10Oct2016 22:00:00	2016	1088.578309	918.0419	1248.603	1471.958	1153.574

10Oct2016 23:00:00	2016	985.3582806	884.3764	1204.983	1367.471	1141.533
11Oct2016 0:00:00	2016	924.0111622	874.6052	1190.101	1292.906	1129.915
11Oct2016 1:00:00	2016	883.701468	867.6182	1163.28	1258.376	1110.682
11Oct2016 2:00:00	2016	863.2567274	859.2203	1171.943	1238.3	1102.521
11Oct2016 3:00:00	2016	865.1264818	851.7529	1177.147	1220.993	1107.732
11Oct2016 4:00:00	2016	884.1797717	855.0634	1177.963	1234.423	1110.571
11Oct2016 5:00:00	2016	965.2306054	877.235	1208.745	1308.251	1112.204
11Oct2016 6:00:00	2016	1139.378167	918.9995	1269.806	1460.105	1122.565
11Oct2016 7:00:00	2016	1302.03214	973.249	1326.059	1629.18	1138.306
11Oct2016 8:00:00	2016	1316.249004	970.354	1260.524	1666.021	1136.909
11Oct2016 9:00:00	2016	1326.619122	974.0329	1257.717	1677.334	1137.358
11Oct2016 10:00:00	2016	1341.755819	973.1605	1248.11	1677.903	1140.528
11Oct2016 11:00:00	2016	1356.765349	969.3331	1250.702	1687.392	1127.836
11Oct2016 12:00:00	2016	1351.715854	962.2402	1243.164	1686.765	1088.958
11Oct2016 13:00:00	2016	1341.059578	957.5951	1255.04	1693.061	1097.59
11Oct2016 14:00:00	2016	1334.893885	957.8639	1241.631	1681.776	1069.948
11Oct2016 15:00:00	2016	1328.784801	954.4621	1251.723	1650.229	1105.238
11Oct2016 16:00:00	2016	1333.823957	931.0278	1286.241	1651.288	1094.446
11Oct2016 17:00:00	2016	1340.806747	931.705	1291.04	1642.891	1070.632
11Oct2016 18:00:00	2016	1323.828751	931.6057	1304.734	1641.31	1083.904
11Oct2016 19:00:00	2016	1377.968484	947.8777	1345.845	1729.887	1112.784
11Oct2016 20:00:00	2016	1348.909898	937.4406	1335.283	1721.869	1092.702
11Oct2016 21:00:00	2016	1262.638168	958.6395	1288.342	1645.438	1051.022
11Oct2016 22:00:00	2016	1133.911081	919.8135	1226.583	1515.038	1050.892
11Oct2016 23:00:00	2016	1014.228636	895.1556	1186.052	1403.673	1027.202
12Oct2016 0:00:00	2016	940.1231717	870.7464	1190.908	1320.777	1006.441
12Oct2016 1:00:00	2016	898.8312817	860.5665	1186.9	1279.986	975.8434
12Oct2016 2:00:00	2016	881.2210349	857.5818	1179.833	1258.072	965.5223
12Oct2016 3:00:00	2016	878.6741422	849.9475	1182.178	1272.99	957.0677
12Oct2016 4:00:00	2016	900.0707164	859.2439	1201.742	1282.526	976.2784
12Oct2016 5:00:00	2016	980.4851955	883.0218	1218.158	1365.221	1002.054
12Oct2016 6:00:00	2016	1156.370075	931.2701	1265.152	1519.427	1001.096
12Oct2016 7:00:00	2016	1318.511583	974.013	1335.015	1683.995	1019.662
12Oct2016 8:00:00	2016	1322.743333	965.5955	1333.49	1691.597	1002.821
12Oct2016 9:00:00	2016	1327.380294	961.6766	1324.736	1703.803	978.7623
12Oct2016 10:00:00	2016	1338.506323	958.1935	1321.973	1708.562	974.6595
12Oct2016 11:00:00	2016	1342.113774	953.5621	1321.466	1704.977	961.9453
12Oct2016 12:00:00	2016	1337.065387	946.6066	1328.515	1692.615	980.6433
12Oct2016 13:00:00	2016	1334.909739	945.3175	1326.368	1688.233	995.0322
12Oct2016 14:00:00	2016	1327.769814	950.489	1310.782	1698.874	989.4802
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12Oct2016 16:00:00	2016	1328.704023	921.2318	1325.395	1697.191	1027.422
12Oct2016 17:00:00	2016	1333.335544	917.0961	1333.743	1690.708	1026.402
12Oct2016 18:00:00	2016	1308.226094	922.0783	1338.142	1691.969	1043.659
12Oct2016 19:00:00	2016	1359.897955	953.615	1374.754	1771.44	1062.996
12Oct2016 20:00:00	2016	1328.078279	948.4294	1371.663	1750.483	1079.668
12Oct2016 21:00:00	2016	1243.659213	959.7196	1343.837	1670.843	1057.418

12Oct2016 22:00:00	2016	1122.979383	930.1938	1299.253	1542.714	1064.271
12Oct2016 23:00:00	2016	1010.933507	905.7388	1203.456	1389.095	1047.807
13Oct2016 0:00:00	2016	932.4861669	875.5681	1190.31	1330.437	1055.968
13Oct2016 1:00:00	2016	891.79699	865.7119	1193.204	1289.498	1029.436
13Oct2016 2:00:00	2016	873.6065584	864.4116	1187.742	1263.589	1038.658
13Oct2016 3:00:00	2016	870.5887094	865.5689	1193.885	1246.074	1046.405
13Oct2016 4:00:00	2016	893.3968641	871.2744	1183.276	1257.789	1050.497
13Oct2016 5:00:00	2016	974.1835573	890.2307	1191.544	1314.787	1042.691
13Oct2016 6:00:00	2016	1149.155914	936.1805	1245.096	1482.793	1052.341
13Oct2016 7:00:00	2016	1310.253833	971.1315	1310.067	1655.408	1064.291
13Oct2016 8:00:00	2016	1329.308753	970.7847	1307.662	1691.983	1050.846
13Oct2016 9:00:00	2016	1353.777636	984.0743	1331.357	1725.408	1025.981
13Oct2016 10:00:00	2016	1367.810191	985.5289	1336.343	1738.497	1014.695
13Oct2016 11:00:00	2016	1379.28694	985.7001	1328.44	1758.48	1017.734
13Oct2016 12:00:00	2016	1364.46454	974.2793	1331.34	1747.54	1026.474
13Oct2016 13:00:00	2016	1344.540692	967.7029	1329.242	1754.927	1044.345
13Oct2016 14:00:00	2016	1337.084151	962.887	1326.136	1749.404	1056.201
13Oct2016 15:00:00	2016	1332.445885	952.8494	1332.553	1758.265	1019.336
13Oct2016 16:00:00	2016	1337.636325	924.6057	1343.308	1759.41	1040.787
13Oct2016 17:00:00	2016	1334.277003	924.668	1332.417	1745.054	1047.318
13Oct2016 18:00:00	2016	1321.995153	918.31	1326.069	1717.697	1051.365
13Oct2016 19:00:00	2016	1362.273919	926.7271	1349.323	1749.431	1073.594
13Oct2016 20:00:00	2016	1322.395195	903.9449	1323.966	1710.619	1086.215
13Oct2016 21:00:00	2016	1233.484209	925.7499	1288.222	1620.493	1074.161
13Oct2016 22:00:00	2016	1114.993611	886.1756	1244.613	1499.022	1069.665
13Oct2016 23:00:00	2016	1001.753048	854.2918	1212.689	1392.116	1070.961
14Oct2016 0:00:00	2016	930.800915	846.092	1198.883	1322.578	1062.156
14Oct2016 1:00:00	2016	890.4713143	838.5647	1195.767	1288.028	1048.585
14Oct2016 2:00:00	2016	869.2345636	834.6308	1190.466	1258.189	1052.146
14Oct2016 3:00:00	2016	863.2163044	837.066	1187.927	1245.45	1051.147
14Oct2016 4:00:00	2016	883.5865202	838.2812	1184.977	1260.381	1057.291
14Oct2016 5:00:00	2016	963.9751631	841.4283	1190.918	1329.524	1068.597
14Oct2016 6:00:00	2016	1130.295074	877.4122	1250.427	1506.054	1069.802
14Oct2016 7:00:00	2016	1295.795378	939.2796	1320.238	1674.6	1085.014
14Oct2016 8:00:00	2016	1343.388393	945.8169	1358.154	1735.349	1078.198
14Oct2016 9:00:00	2016	1356.488947	934.9823	1364.1	1749.568	1062.036
14Oct2016 10:00:00	2016	1381.62598	923.608	1367.913	1778.489	1058.414
14Oct2016 11:00:00	2016	1382.804836	913.0807	1368.052	1772.022	1029.51
14Oct2016 12:00:00	2016	1371.13089	911.1891	1374.475	1750.7	1025.963
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14Oct2016 15:00:00	2016	1312.047213	886.8545	1350.579	1704.872	1051.578
14Oct2016 16:00:00	2016	1308.970101	890.6032	1365.211	1699.362	1055.029
14Oct2016 17:00:00	2016	1302.89257	892.9213	1348.439	1710.878	1053.881
14Oct2016 18:00:00	2016	1293.744419	896.8622	1340.53	1714.242	1070.64
14Oct2016 19:00:00	2016	1323.003687	917.2224	1374.615	1785.635	1084.463
14Oct2016 20:00:00	2016	1285.167749	938.5833	1364.37	1730.081	1085.022

14Oct2016 21:00:00	2016	1217.258163	929.1463	1337.23	1660.828	1073.326
14Oct2016 22:00:00	2016	1122.586307	897.1015	1297.198	1548.35	1083.143
14Oct2016 23:00:00	2016	1024.925658	859.2978	1256.428	1463.413	1064.658
15Oct2016 0:00:00	2016	947.137013	831.4819	1216.654	1332.917	1042.768
15Oct2016 1:00:00	2016	893.782137	808.6567	1198.343	1293.843	1044.42
15Oct2016 2:00:00	2016	865.1652693	818.6875	1186.497	1257.674	1051.074
15Oct2016 3:00:00	2016	852.6188135	816.6394	1178.685	1238.997	1032.635
15Oct2016 4:00:00	2016	856.674353	823.699	1194.618	1239.821	1045.657
15Oct2016 5:00:00	2016	884.7929576	834.5372	1199.828	1256.101	1066.446
15Oct2016 6:00:00	2016	946.730372	856.6844	1209.787	1319.236	1071.386
15Oct2016 7:00:00	2016	1033.549516	888.5571	1239.252	1405.5	1061.178
15Oct2016 8:00:00	2016	1111.346136	915.7322	1263.716	1460.406	1070.579
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15Oct2016 10:00:00	2016	1203.211347	919.871	1337.548	1585.255	1073.854
15Oct2016 11:00:00	2016	1211.167358	921.4591	1341.931	1595.322	1086.691
15Oct2016 12:00:00	2016	1205.733902	918.988	1345.171	1621.129	1049.311
15Oct2016 13:00:00	2016	1186.94628	914.2064	1347.804	1621.605	1019.274
15Oct2016 14:00:00	2016	1166.876449	909.1032	1340.782	1596.163	1021.786
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15Oct2016 16:00:00	2016	1158.877858	919.0599	1363.603	1616.572	1027.502
15Oct2016 17:00:00	2016	1172.278476	929.515	1379.637	1648.538	1046.619
15Oct2016 18:00:00	2016	1203.52419	943.1238	1390.013	1673.672	1056.177
15Oct2016 19:00:00	2016	1243.682465	955.3697	1379.464	1689.249	1079.2
15Oct2016 20:00:00	2016	1214.972859	943.1585	1319.107	1627.445	1083.003
15Oct2016 21:00:00	2016	1163.88941	924.2314	1286.592	1574.299	1061.86
15Oct2016 22:00:00	2016	1090.145721	902.6644	1291.904	1514.081	1051.085
15Oct2016 23:00:00	2016	1006.116512	867.1851	1260.014	1448.341	1038.373
16Oct2016 0:00:00	2016	929.9934066	845.9785	1241.288	1370.542	1037.052
16Oct2016 1:00:00	2016	879.7686874	830.0382	1219.076	1314.481	1029.996
16Oct2016 2:00:00	2016	851.2110854	827.011	1209.311	1266.559	1033.784
16Oct2016 3:00:00	2016	837.5337224	825.1518	1209.404	1268.328	1048.569
16Oct2016 4:00:00	2016	837.605143	824.7022	1195.036	1247.271	1036.645
16Oct2016 5:00:00	2016	859.9231946	831.4001	1195.721	1280.801	1026.775
16Oct2016 6:00:00	2016	906.7189156	843.5011	1211.947	1317.23	1049.658
16Oct2016 7:00:00	2016	975.2243616	868.352	1243.657	1362.297	1035.402
16Oct2016 8:00:00	2016	1029.12845	885.4813	1253.038	1410.622	1031.054
16Oct2016 9:00:00	2016	1088.875328	889.0064	1270.313	1464.973	995.5394
16Oct2016 10:00:00	2016	1126.395199	878.309	1283.792	1519.849	1009.561
16Oct2016 11:00:00	2016	1154.91918	878.9183	1292.812	1561.876	1010.809
16Oct2016 12:00:00	2016	1173.222293	878.8647	1315.169	1605.7	1008.182
16Oct2016 13:00:00	2016	1171.81879	878.1043	1331.412	1606.421	1022.533
16Oct2016 14:00:00	2016	1165.721045	877.3434	1323.525	1607.418	1024.819
16Oct2016 15:00:00	2016	1173.960976	877.4166	1317.648	1611.196	1008.018
16Oct2016 16:00:00	2016	1217.332726	895.7876	1334.765	1638.518	1009.358
16Oct2016 17:00:00	2016	1261.634947	908.7563	1352.842	1660.943	987.9133
16Oct2016 18:00:00	2016	1264.957692	915.9793	1352.682	1691.004	1020.982
16Oct2016 19:00:00	2016	1288.336775	940.6198	1360.563	1708.374	1050.532

16Oct2016 20:00:00	2016	1246.364967	921.7139	1351.873	1665.444	1050.097
16Oct2016 21:00:00	2016	1170.476661	904.8677	1321.498	1596.613	1033.741
16Oct2016 22:00:00	2016	1065.060485	873.5163	1279.243	1488.021	1017.009
16Oct2016 23:00:00	2016	962.2925397	844.0502	1236.089	1381.283	999.118
17Oct2016 0:00:00	2016	896.4727872	828.5649	1229.633	1322.104	990.3514
17Oct2016 1:00:00	2016	858.5379511	819.5829	1222.819	1285.453	1004.892
17Oct2016 2:00:00	2016	846.7546133	818.2027	1210.819	1254.399	1010.681
17Oct2016 3:00:00	2016	843.8466507	824.4169	1205.15	1231.129	1007.636
17Oct2016 4:00:00	2016	869.6600942	829.4946	1220.959	1263.208	1012.437
17Oct2016 5:00:00	2016	954.2555799	844.3737	1239.702	1337.77	1017.294
17Oct2016 6:00:00	2016	1138.264335	891.4426	1285.735	1470.023	1016.998
17Oct2016 7:00:00	2016	1306.759208	940.7518	1363.215	1644.046	1023.614
17Oct2016 8:00:00	2016	1336.647547	943.2257	1377.338	1683.243	1005.779
17Oct2016 9:00:00	2016	1357.114307	945.6498	1376.64	1691.204	1014.658
17Oct2016 10:00:00	2016	1372.660496	937.9449	1370.444	1707.033	1024.833
17Oct2016 11:00:00	2016	1385.617434	927.0081	1399.043	1728.179	995.8936
17Oct2016 12:00:00	2016	1381.29256	920.9309	1394.66	1731.917	992.4726
17Oct2016 13:00:00	2016	1373.022597	912.9076	1400.708	1753.735	979.8446
17Oct2016 14:00:00	2016	1364.115813	913.9307	1402.94	1761.535	973.7159
17Oct2016 15:00:00	2016	1370.484878	917.7893	1415.198	1772.511	972.0382
17Oct2016 16:00:00	2016	1412.126207	913.0845	1425.868	1798.829	981.6454
17Oct2016 17:00:00	2016	1451.078178	918.1371	1427.34	1810.151	998.5685
17Oct2016 18:00:00	2016	1436.480636	932.848	1442.831	1808.903	1019.276
17Oct2016 19:00:00	2016	1410.361835	927.3075	1454.214	1822.096	1028.728
17Oct2016 20:00:00	2016	1353.255445	915.5115	1414.749	1777.542	1018.602
17Oct2016 21:00:00	2016	1260.417769	934.9447	1377.636	1678.551	1013.386
17Oct2016 22:00:00	2016	1131.758409	905.9111	1319.485	1534.038	1011.072
17Oct2016 23:00:00	2016	1014.78726	869.0343	1275.295	1411.367	1009.709
18Oct2016 0:00:00	2016	939.9982572	841.2276	1246.798	1337.315	1004.75
18Oct2016 1:00:00	2016	896.412276	830.2616	1218.681	1281.949	994.1123
18Oct2016 2:00:00	2016	876.1203918	829.7178	1233.289	1273.116	1007.127
18Oct2016 3:00:00	2016	870.5970672	826.8187	1231.533	1261.074	1004.913
18Oct2016 4:00:00	2016	893.7717654	833.5873	1237.178	1280.158	989.8217
18Oct2016 5:00:00	2016	976.381924	848.6768	1215.348	1362.445	1006.174
18Oct2016 6:00:00	2016	1155.304183	884.0241	1254.996	1508.727	1011.446
18Oct2016 7:00:00	2016	1326.51347	941.834	1323.769	1668.699	1021.643
18Oct2016 8:00:00	2016	1360.732878	955.858	1344.444	1690.819	1011.566
18Oct2016 9:00:00	2016	1365.620851	955.7389	1335.017	1706.052	990.4911
18Oct2016 10:00:00	2016	1377.119628	960.3333	1342.326	1723.579	1000.234
18Oct2016 11:00:00	2016	1387.381892	957.7723	1348.957	1745.761	988.4022
18Oct2016 12:00:00	2016	1385.108738	950.3091	1357.112	1726.201	982.6376
18Oct2016 13:00:00	2016	1380.181901	898.3086	1365.455	1734.074	987.0975
18Oct2016 14:00:00	2016	1371.598733	892.4259	1367.203	1734.888	1025.129
18Oct2016 15:00:00	2016	1376.969453	893.955	1372.176	1738.109	1035.297
18Oct2016 16:00:00	2016	1398.523195	906.6118	1383.968	1754.545	1058.129
18Oct2016 17:00:00	2016	1410.786633	882.3109	1382.017	1773.164	1059.98
18Oct2016 18:00:00	2016	1403.663701	868.7751	1382.838	1763.967	1061.937

18Oct2016 19:00:00	2016	1404.280985	870.351	1397.611	1768.886	1069.478
18Oct2016 20:00:00	2016	1352.190808	881.4945	1383.323	1718.44	1070.705
18Oct2016 21:00:00	2016	1257.72062	887.4383	1349.475	1638.645	1064.598
18Oct2016 22:00:00	2016	1131.795527	847.1682	1302.4	1507.783	1021.963
18Oct2016 23:00:00	2016	1016.80555	820.4297	1258.754	1403.031	1008.746
19Oct2016 0:00:00	2016	942.0799756	812.0108	1246.201	1308.844	1008.019
19Oct2016 1:00:00	2016	898.236429	802.3313	1232.759	1267.303	1021.756
19Oct2016 2:00:00	2016	875.1362854	793.1158	1226.792	1237.828	1018.837
19Oct2016 3:00:00	2016	870.9359563	776.7337	1229.622	1227.493	1018.113
19Oct2016 4:00:00	2016	895.0796688	777.2573	1215.817	1214.064	1016.359
19Oct2016 5:00:00	2016	980.9313757	792.4007	1234.254	1286.908	1025.9
19Oct2016 6:00:00	2016	1158.410527	836.3604	1289.028	1441.164	1034.498
19Oct2016 7:00:00	2016	1322.102325	877.1001	1357.778	1627.75	1049.072
19Oct2016 8:00:00	2016	1335.35203	880.1863	1360.265	1653.739	1037.739
19Oct2016 9:00:00	2016	1337.208773	876.1984	1347.483	1658.484	1023.737
19Oct2016 10:00:00	2016	1345.719034	871.3612	1321.062	1673.916	1033.886
19Oct2016 11:00:00	2016	1347.131073	867.0761	1316.111	1684.089	1023.734
19Oct2016 12:00:00	2016	1347.096464	858.4772	1300.632	1672.154	1025.808
19Oct2016 13:00:00	2016	1350.735668	853.4791	1290.1	1648.832	1021.951
19Oct2016 14:00:00	2016	1345.535842	846.4227	1287.356	1642.791	1036.652
19Oct2016 15:00:00	2016	1343.945591	848.0333	1326.397	1652.309	1043.985
19Oct2016 16:00:00	2016	1352.558165	858.7975	1341.942	1649.965	1028.444
19Oct2016 17:00:00	2016	1353.953896	862.0865	1348.505	1639.397	1014.052
19Oct2016 18:00:00	2016	1339.211258	873.3197	1372.312	1685.422	1019.827
19Oct2016 19:00:00	2016	1365.984658	896.829	1396.877	1731.059	1060.354
19Oct2016 20:00:00	2016	1320.9795	911.1774	1373.371	1693.653	1057.917
19Oct2016 21:00:00	2016	1243.628191	896.7976	1337.622	1613.434	1053.794
19Oct2016 22:00:00	2016	1121.460856	863.1235	1281.302	1487.147	1041.277
19Oct2016 23:00:00	2016	1006.533714	829.1582	1244.234	1373.766	1041.306
20Oct2016 0:00:00	2016	936.0131311	809.8337	1227.417	1291.566	1039.13
20Oct2016 1:00:00	2016	892.8886085	804.7058	1215.624	1247.558	1021.98
20Oct2016 2:00:00	2016	871.6736472	799.8712	1227.212	1222.341	1015.146
20Oct2016 3:00:00	2016	868.389756	800.6829	1225.508	1210.762	1028.58
20Oct2016 4:00:00	2016	890.849486	805.901	1222.405	1223.541	1036.9
20Oct2016 5:00:00	2016	974.0518851	825.7822	1222.597	1300.934	1034.874
20Oct2016 6:00:00	2016	1148.598584	873.3035	1273.402	1461.023	1039.988
20Oct2016 7:00:00	2016	1316.292386	927.726	1339.35	1635.217	1030.015
20Oct2016 8:00:00	2016	1332.728031	926.8426	1316.873	1657.636	1031.075
20Oct2016 9:00:00	2016	1333.489675	931.0359	1322.9	1665.756	1032.536
20Oct2016 10:00:00	2016	1346.550936	937.8452	1318.875	1675.343	1005.252
20Oct2016 11:00:00	2016	1360.211785	935.9774	1310.378	1677.631	986.1305
20Oct2016 12:00:00	2016	1348.125672	929.6219	1316.807	1675.74	980.5437
20Oct2016 13:00:00	2016	1340.017328	926.9806	1315.649	1682.407	987.0714
20Oct2016 14:00:00	2016	1335.672172	920.9485	1305.371	1652.663	997.3757
20Oct2016 15:00:00	2016	1338.172502	919.645	1293.553	1634.867	999.4477
20Oct2016 16:00:00	2016	1352.618089	927.8314	1320.346	1615.502	1002.102
20Oct2016 17:00:00	2016	1366.439502	932.5488	1321.905	1620.755	1020.773

20Oct2016 18:00:00	2016	1360.897508	942.026	1337.312	1665.67	1034.05
20Oct2016 19:00:00	2016	1366.693489	954.1229	1362.338	1701.903	1043.286
20Oct2016 20:00:00	2016	1317.075147	939.4417	1339.481	1673.249	1019.087
20Oct2016 21:00:00	2016	1225.204988	905.3396	1311.342	1584.813	1035.874
20Oct2016 22:00:00	2016	1105.444226	866.9394	1264.019	1479.61	996.5108
20Oct2016 23:00:00	2016	995.0472925	833.5796	1226.85	1366.532	978.5858
21Oct2016 0:00:00	2016	933.7490293	828.214	1208.884	1290.659	976.4973
21Oct2016 1:00:00	2016	892.2884016	820.5705	1202.819	1257.756	973.0946
21Oct2016 2:00:00	2016	870.5888268	818.8702	1197.76	1249.193	974.6842
21Oct2016 3:00:00	2016	866.3071995	815.7171	1197.236	1246.545	965.2145
21Oct2016 4:00:00	2016	888.2193116	823.9838	1201.122	1226.74	990.1091
21Oct2016 5:00:00	2016	963.3748938	843.2274	1216.424	1293.45	1000.73
21Oct2016 6:00:00	2016	1133.801313	894.0537	1263.591	1450.002	1018.126
21Oct2016 7:00:00	2016	1304.111752	949.2092	1334.423	1625.593	1048.87
21Oct2016 8:00:00	2016	1324.86714	953.8215	1344.735	1657.373	1048.914
21Oct2016 9:00:00	2016	1338.376854	956.8963	1354.063	1669.4	1038.9
21Oct2016 10:00:00	2016	1342.180053	952.858	1350.989	1678.531	1041.242
21Oct2016 11:00:00	2016	1338.995027	939.1836	1336.803	1653.671	1050.909
21Oct2016 12:00:00	2016	1336.149867	929.4979	1338.11	1667.084	1042.493
21Oct2016 13:00:00	2016	1334.863437	933.4226	1340.436	1643.039	1030.347
21Oct2016 14:00:00	2016	1323.782444	928.9668	1351.888	1647.816	1029.445
21Oct2016 15:00:00	2016	1311.770896	926.0642	1352.357	1633.883	1057.723
21Oct2016 16:00:00	2016	1302.068946	919.968	1350.889	1622.923	1053.561
21Oct2016 17:00:00	2016	1299.893829	918.9389	1328.568	1611.221	1054.342
21Oct2016 18:00:00	2016	1299.408636	939.1344	1384.502	1644.987	1074.248
21Oct2016 19:00:00	2016	1315.770399	955.9479	1418.799	1694.074	1084.581
21Oct2016 20:00:00	2016	1272.025749	949.8707	1414.828	1662.461	1066.251
21Oct2016 21:00:00	2016	1205.203989	932.1225	1387.008	1593.927	1056.235
21Oct2016 22:00:00	2016	1113.945385	901.67	1339.556	1510.65	1049.509
21Oct2016 23:00:00	2016	1016.194772	871.0969	1300.879	1405.582	1045.614
22Oct2016 0:00:00	2016	944.2094286	847.4287	1272.574	1327.635	1063.675
22Oct2016 1:00:00	2016	897.0983528	832.9757	1259.842	1273.541	1082.436
22Oct2016 2:00:00	2016	870.6154466	825.7786	1255.217	1249.25	1074.542
22Oct2016 3:00:00	2016	858.2191389	824.0766	1254.603	1237.747	1082.477
22Oct2016 4:00:00	2016	862.4733468	828.2865	1248.357	1241.423	1082.537
22Oct2016 5:00:00	2016	892.3471052	839.3738	1236.328	1256.967	1098.405
22Oct2016 6:00:00	2016	952.1724243	862.0816	1268.452	1327.499	1091.201
22Oct2016 7:00:00	2016	1044.313674	900.2986	1291.043	1431.231	1090.183
22Oct2016 8:00:00	2016	1125.076158	926.6745	1307.182	1480.156	1083.26
22Oct2016 9:00:00	2016	1176.195554	932.7569	1313.067	1521.236	1083.921
22Oct2016 10:00:00	2016	1209.954047	920.4864	1307.065	1529.853	1092.083
22Oct2016 11:00:00	2016	1212.982416	915.0238	1298.863	1555.723	1083.104
22Oct2016 12:00:00	2016	1210.273715	910.7754	1290.451	1558.858	1079.384
22Oct2016 13:00:00	2016	1197.543137	894.9359	1268.71	1521.011	1066.295
22Oct2016 14:00:00	2016	1178.874815	893.5816	1262.033	1497.094	1066.092
22Oct2016 15:00:00	2016	1170.123754	900.3598	1267.665	1502.109	1065.734
22Oct2016 16:00:00	2016	1176.821321	909.0927	1281.926	1513.115	1073.337

22Oct2016 17:00:00	2016	1192.871681	923.0175	1302.326	1527.264	1078.121
22Oct2016 18:00:00	2016	1223.766052	932.5856	1327.718	1575.698	1084.121
22Oct2016 19:00:00	2016	1249.038396	944.7726	1343.903	1607.181	1091.224
22Oct2016 20:00:00	2016	1206.055778	939.8689	1328.936	1578.337	1084.846
22Oct2016 21:00:00	2016	1155.53663	926.4534	1301.406	1532.439	1089.346
22Oct2016 22:00:00	2016	1085.870642	901.2902	1273.257	1479.278	1085.166
22Oct2016 23:00:00	2016	1006.04106	874.1087	1261.554	1385.738	1070.012
23Oct2016 0:00:00	2016	937.2567375	855.435	1230.822	1323.399	1066.26
23Oct2016 1:00:00	2016	889.81794	843.377	1216.285	1276.208	1054.392
23Oct2016 2:00:00	2016	862.7651886	834.362	1215.015	1247.762	1065.391
23Oct2016 3:00:00	2016	851.6770207	836.4937	1207.496	1208.406	1078.126
23Oct2016 4:00:00	2016	854.4498665	840.5392	1206.366	1219.352	1074.068
23Oct2016 5:00:00	2016	878.142583	847.3221	1217.845	1241.142	1078.121
23Oct2016 6:00:00	2016	920.1345813	859.0464	1233.75	1274.524	1082.495
23Oct2016 7:00:00	2016	994.0547562	895.7824	1257.63	1325.051	1100.104
23Oct2016 8:00:00	2016	1055.909679	911.7966	1190.911	1339.495	1106.91
23Oct2016 9:00:00	2016	1109.114821	922.6949	1200.837	1393.217	1108.443
23Oct2016 10:00:00	2016	1157.037442	925.2863	1251.259	1440.173	1115.844
23Oct2016 11:00:00	2016	1174.495679	911.944	1306.468	1511.749	1134.948
23Oct2016 12:00:00	2016	1186.037799	907.8148	1321.137	1561.444	1115.993
23Oct2016 13:00:00	2016	1181.675912	905.1239	1295.982	1551.818	1075.462
23Oct2016 14:00:00	2016	1172.763171	899.1397	1289.592	1547.408	1084.211
23Oct2016 15:00:00	2016	1174.802628	884.1357	1291.865	1565.94	1107.681
23Oct2016 16:00:00	2016	1200.278479	902.4549	1335.44	1586.437	1127.281
23Oct2016 17:00:00	2016	1231.605379	918.5358	1358.207	1628.619	1124.576
23Oct2016 18:00:00	2016	1278.084407	944.3542	1382.437	1677.947	1122.562
23Oct2016 19:00:00	2016	1300.116647	959.5771	1385.881	1682.043	1135.755
23Oct2016 20:00:00	2016	1262.272725	949.1913	1438.43	1622.459	1144.992
23Oct2016 21:00:00	2016	1186.65291	927.743	1408.64	1560.297	1133.355
23Oct2016 22:00:00	2016	1077.791217	895.9985	1358.472	1444.308	1114.112
23Oct2016 23:00:00	2016	972.6855095	864.3502	1315.66	1355.844	1139.5
24Oct2016 0:00:00	2016	899.4649619	842.942	1297.071	1266.056	1125.775
24Oct2016 1:00:00	2016	862.1550927	833.505	1285.723	1230.065	1118.992
24Oct2016 2:00:00	2016	845.7218616	828.7617	1289.848	1242.439	1098.318
24Oct2016 3:00:00	2016	843.5200346	827.5356	1296.719	1232.584	1102.391
24Oct2016 4:00:00	2016	867.5411642	835.9694	1306.079	1269.26	1106.973
24Oct2016 5:00:00	2016	952.6980565	860.9532	1322.233	1335.9	1116.737
24Oct2016 6:00:00	2016	1136.926776	918.8145	1377.161	1484.816	1117.239
24Oct2016 7:00:00	2016	1306.304909	970.1554	1457.447	1682.594	1129.724
24Oct2016 8:00:00	2016	1352.380324	987.296	1490.519	1737.044	1127.482
24Oct2016 9:00:00	2016	1356.397723	972.0579	1494.72	1742.312	1142.339
24Oct2016 10:00:00	2016	1364.968869	965.0959	1481.522	1766.443	1095.265
24Oct2016 11:00:00	2016	1373.049428	972.7484	1469.767	1783.697	1090.119
24Oct2016 12:00:00	2016	1377.105554	960.8213	1466.157	1800.856	1090.896
24Oct2016 13:00:00	2016	1371.985699	953.002	1458.106	1802.65	1091.587
24Oct2016 14:00:00	2016	1355.642498	933.4108	1483.771	1820.025	1086.041
24Oct2016 15:00:00	2016	1347.242325	931.0741	1500.125	1802.25	1085.708

24Oct2016 16:00:00	2016	1363.236305	935.4238	1502.989	1791.181	1112.698
24Oct2016 17:00:00	2016	1387.047918	933.2138	1507.531	1797.277	1134.882
24Oct2016 18:00:00	2016	1405.92987	944.2209	1507.824	1808.492	1145.768
24Oct2016 19:00:00	2016	1395.479958	948.6596	1496.203	1786.387	1148.19
24Oct2016 20:00:00	2016	1340.455998	940.4162	1474.194	1736.917	1140.738
24Oct2016 21:00:00	2016	1241.566411	957.7394	1436.523	1643.911	1133.951
24Oct2016 22:00:00	2016	1113.170053	924.1434	1398.472	1510.337	1128.42
24Oct2016 23:00:00	2016	994.9078648	888.8756	1355.74	1426.555	1106.971
25Oct2016 0:00:00	2016	920.574606	871.2789	1322.302	1346.162	1102.409
25Oct2016 1:00:00	2016	878.0679349	859.0265	1310.576	1301.578	1080.515
25Oct2016 2:00:00	2016	857.6463848	859.7657	1301.849	1271.288	1088.43
25Oct2016 3:00:00	2016	851.5790474	859.8272	1299.974	1269.702	1079.08
25Oct2016 4:00:00	2016	874.279411	869.4231	1305.055	1262.312	1088.283
25Oct2016 5:00:00	2016	958.3503888	894.2061	1315.011	1332.861	1082.283
25Oct2016 6:00:00	2016	1135.908766	940.5403	1369.667	1487.568	1077.722
25Oct2016 7:00:00	2016	1305.003688	977.8047	1455.254	1671.906	1097.924
25Oct2016 8:00:00	2016	1348.288998	974.2155	1486.871	1739.399	1118.043
25Oct2016 9:00:00	2016	1352.78086	965.7681	1489.201	1746.454	1125.22
25Oct2016 10:00:00	2016	1365.768608	954.2674	1462.772	1738.287	1128.054
25Oct2016 11:00:00	2016	1374.646859	947.2516	1445.182	1744.63	1121.158
25Oct2016 12:00:00	2016	1364.71679	941.9472	1445.853	1736.709	1117.143
25Oct2016 13:00:00	2016	1342.949081	931.9865	1461.36	1728.616	1108.834
25Oct2016 14:00:00	2016	1334.076797	921.8807	1467.118	1729.148	1111.193
25Oct2016 15:00:00	2016	1338.741918	918.5908	1457.682	1765.918	1104.44
25Oct2016 16:00:00	2016	1350.658258	898.8753	1489.55	1801.399	1127.659
25Oct2016 17:00:00	2016	1355.36175	898.6537	1513.288	1801.388	1154.143
25Oct2016 18:00:00	2016	1365.93181	912.1065	1518.671	1806.426	1162.041
25Oct2016 19:00:00	2016	1378.06308	923.2846	1506.647	1775.295	1147.794
25Oct2016 20:00:00	2016	1329.212954	913.0641	1497.819	1727.456	1158.455
25Oct2016 21:00:00	2016	1238.233746	935.5363	1463.326	1649.543	1147.437
25Oct2016 22:00:00	2016	1111.372798	906.4849	1406.957	1529.349	1149.784
25Oct2016 23:00:00	2016	995.733736	870.83	1351.139	1413.257	1143.682
26Oct2016 0:00:00	2016	925.5640937	848.9107	1318.273	1331.528	1138.886
26Oct2016 1:00:00	2016	888.0546406	836.882	1307.09	1276.905	1116.365
26Oct2016 2:00:00	2016	869.5294059	840.2264	1292.934	1262.347	1096.654
26Oct2016 3:00:00	2016	865.7838599	841.0756	1292.7	1250.988	1088.235
26Oct2016 4:00:00	2016	889.2878231	849.0906	1296.443	1267.763	1071.303
26Oct2016 5:00:00	2016	976.5634686	871.8118	1309.716	1335.223	1067.148
26Oct2016 6:00:00	2016	1156.79151	917.5043	1355.732	1479.267	1061.105
26Oct2016 7:00:00	2016	1320.301706	965.9889	1396.448	1640.437	1032.233
26Oct2016 8:00:00	2016	1344.264825	981.2423	1397.25	1687.172	1045.883
26Oct2016 9:00:00	2016	1334.470681	975.9141	1389.528	1679.282	1034.409
26Oct2016 10:00:00	2016	1340.741457	970.831	1393.312	1713.893	1039.075
26Oct2016 11:00:00	2016	1345.282765	967.427	1408.71	1719.907	1051.212
26Oct2016 12:00:00	2016	1341.61007	963.3306	1404.365	1708.608	1062.268
26Oct2016 13:00:00	2016	1341.303824	963.4981	1433.938	1700.535	1055.563
26Oct2016 14:00:00	2016	1338.201013	955.2468	1431.631	1689.784	1069.563

26Oct2016 15:00:00	2016	1343.150875	955.1085	1425.534	1687.229	1075.032
26Oct2016 16:00:00	2016	1369.05355	940.4497	1422.93	1698.061	1094.004
26Oct2016 17:00:00	2016	1387.417531	947.9653	1429.863	1721.853	1111.217
26Oct2016 18:00:00	2016	1395.197079	955.1423	1454.66	1760.184	1097.249
26Oct2016 19:00:00	2016	1374.414656	948.4705	1466.955	1762.902	1097.215
26Oct2016 20:00:00	2016	1322.502885	933.6238	1451.238	1719.764	1102.047
26Oct2016 21:00:00	2016	1233.687425	950.7686	1413.494	1635.501	1113.206
26Oct2016 22:00:00	2016	1117.318142	914.9729	1366.6	1519.099	1111.986
26Oct2016 23:00:00	2016	1002.6738	873.8404	1324.037	1405.782	1130.18
27Oct2016 0:00:00	2016	930.2173403	847.2209	1295.838	1319.462	1085.935
27Oct2016 1:00:00	2016	888.0626233	835.4258	1282.208	1270.478	1104.158
27Oct2016 2:00:00	2016	864.8508882	833.1017	1279.492	1247.544	1104.247
27Oct2016 3:00:00	2016	863.4388198	831.6924	1276.904	1238.591	1111.687
27Oct2016 4:00:00	2016	885.5961196	839.009	1276.994	1236.007	1112.289
27Oct2016 5:00:00	2016	970.414453	858.0268	1286.649	1289.913	1110.742
27Oct2016 6:00:00	2016	1145.889332	910.3552	1336.187	1440.471	1092.709
27Oct2016 7:00:00	2016	1313.057594	956.7049	1417.31	1623.101	1137.684
27Oct2016 8:00:00	2016	1344.027382	966.9956	1445.511	1692.739	1145.783
27Oct2016 9:00:00	2016	1339.588924	960.7939	1445.887	1721.963	1135.304
27Oct2016 10:00:00	2016	1345.678955	950.6059	1408.059	1713.155	1141.663
27Oct2016 11:00:00	2016	1347.156929	946.4951	1443.974	1772.701	1152.334
27Oct2016 12:00:00	2016	1349.646813	937.2436	1444.04	1770.144	1143.987
27Oct2016 13:00:00	2016	1355.098566	935.4052	1436.029	1761.249	1146.323
27Oct2016 14:00:00	2016	1350.981179	932.6152	1418.815	1754.592	1138.783
27Oct2016 15:00:00	2016	1348.57314	931.679	1416.286	1761.339	1148.494
27Oct2016 16:00:00	2016	1358.48943	924.4132	1449.465	1778.622	1177.373
27Oct2016 17:00:00	2016	1370.2775	917.8732	1467.225	1796.399	1163.582
27Oct2016 18:00:00	2016	1384.104151	926.8276	1502.799	1814.858	1146.827
27Oct2016 19:00:00	2016	1369.240521	922.9538	1514.279	1790.762	1124.057
27Oct2016 20:00:00	2016	1313.692346	910.4675	1502.232	1743.252	1096.262
27Oct2016 21:00:00	2016	1228.774299	930.5905	1453.839	1634.838	1083.186
27Oct2016 22:00:00	2016	1109.131595	915.8022	1405.521	1527.086	1088.1
27Oct2016 23:00:00	2016	994.8432512	878.3662	1351.806	1393.57	1058.933
28Oct2016 0:00:00	2016	926.508586	855.6295	1321.186	1302.428	1040.431
28Oct2016 1:00:00	2016	884.4596356	843.463	1309.199	1256.396	1049.286
28Oct2016 2:00:00	2016	861.4654059	841.1881	1283.053	1234.192	1073.787
28Oct2016 3:00:00	2016	854.6550354	842.6931	1286.373	1251.903	1066.128
28Oct2016 4:00:00	2016	875.622106	850.6329	1284.757	1268.539	1045.417
28Oct2016 5:00:00	2016	954.8774227	872.3752	1308.828	1329.067	1014.561
28Oct2016 6:00:00	2016	1122.058302	900.3288	1349.17	1474.619	1019.286
28Oct2016 7:00:00	2016	1291.426439	955.3795	1416.44	1661.682	1030.059
28Oct2016 8:00:00	2016	1349.501403	969.5863	1421.858	1705.003	1065.361
28Oct2016 9:00:00	2016	1357.139133	964.6249	1402.6	1743.233	1082.611
28Oct2016 10:00:00	2016	1371.846271	970.2482	1413.081	1747.68	1095.832
28Oct2016 11:00:00	2016	1375.361129	966.5359	1424.915	1733.726	1086.569
28Oct2016 12:00:00	2016	1371.793907	961.5346	1430.606	1725.652	1089.56
28Oct2016 13:00:00	2016	1360.085078	969.7045	1456.552	1744.491	1068.857

28Oct2016 14:00:00	2016	1348.371593	961.5454	1481.123	1739.839	1068.303
28Oct2016 15:00:00	2016	1347.31641	958.9914	1465.755	1722.106	1086.435
28Oct2016 16:00:00	2016	1346.221494	937.2795	1441.129	1696.122	1069.331
28Oct2016 17:00:00	2016	1365.78351	930.5732	1448.128	1707.981	1083.89
28Oct2016 18:00:00	2016	1368.759574	940.3439	1466.015	1733.557	1100.522
28Oct2016 19:00:00	2016	1337.063034	937.0923	1453.958	1709.958	1094.938
28Oct2016 20:00:00	2016	1287.953761	925.9386	1430.27	1658.367	1074.94
28Oct2016 21:00:00	2016	1215.827039	952.2945	1406.492	1589.91	1067.062
28Oct2016 22:00:00	2016	1119.044667	921.3321	1404.302	1530.073	1055.446
28Oct2016 23:00:00	2016	1022.451133	890.5088	1371.918	1432.859	1044.354
29Oct2016 0:00:00	2016	948.5651344	867.1846	1338.859	1351.977	1017.311
29Oct2016 1:00:00	2016	895.4329578	862.1545	1318.153	1295.729	1020.351
29Oct2016 2:00:00	2016	864.5562387	849.2038	1313.445	1255.639	1007.75
29Oct2016 3:00:00	2016	849.2904471	846.2501	1313.041	1248.938	1001.515
29Oct2016 4:00:00	2016	853.2953222	849.4284	1287.232	1220.931	1002.868
29Oct2016 5:00:00	2016	879.8922706	859.799	1285.745	1231.328	1008.769
29Oct2016 6:00:00	2016	937.3191155	881.5854	1340.55	1317.205	1018.83
29Oct2016 7:00:00	2016	1024.303555	920.0611	1369.839	1395.349	1023.781
29Oct2016 8:00:00	2016	1116.193905	947.1974	1414.23	1517.046	1018.362
29Oct2016 9:00:00	2016	1179.790419	945.5519	1392.816	1539.728	1032.316
29Oct2016 10:00:00	2016	1221.062207	953.6525	1414.682	1557.788	1031.28
29Oct2016 11:00:00	2016	1239.741956	955.9062	1437.733	1573.434	1041.411
29Oct2016 12:00:00	2016	1243.423167	969.8996	1437.541	1582.086	1043.189
29Oct2016 13:00:00	2016	1230.270205	964.1088	1428.792	1571.715	1065.114
29Oct2016 14:00:00	2016	1218.701941	958.6124	1420.532	1582.587	1055.893
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29Oct2016 17:00:00	2016	1233.349612	961.5869	1437.122	1671.866	1037.6
29Oct2016 18:00:00	2016	1273.885605	974.3687	1435.561	1713.783	1055.336
29Oct2016 19:00:00	2016	1261.603629	971.2758	1433.079	1670.24	1047.628
29Oct2016 20:00:00	2016	1215.666159	954.2688	1434.042	1603.261	1062.912
29Oct2016 21:00:00	2016	1155.551534	937.4735	1409.615	1557.696	1104.521
29Oct2016 22:00:00	2016	1083.866478	915.503	1387.452	1476.274	1072.9
29Oct2016 23:00:00	2016	999.9370042	883.1058	1352.602	1370.163	1083.004
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30Oct2016 1:00:00	2016	884.2332417	844.4383	1308.844	1258.975	1102.813
30Oct2016 2:00:00	2016	856.2897834	836.1384	1304.299	1214.129	1120.933
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30Oct2016 4:00:00	2016	841.8609473	830.8277	1291.928	1194.448	1093.494
30Oct2016 5:00:00	2016	865.3648673	835.2023	1295.982	1204.809	1082.58
30Oct2016 6:00:00	2016	908.1626751	851.757	1323.974	1234.337	1066.34
30Oct2016 7:00:00	2016	974.8214586	875.1271	1348.622	1326.452	1100.786
30Oct2016 8:00:00	2016	1040.982707	898.2603	1393.721	1436.087	1094.961
30Oct2016 9:00:00	2016	1088.783699	910.951	1411.771	1480.502	1077.749
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30Oct2016 11:00:00	2016	1154.303813	908.1776	1424.639	1579.228	1082.895
30Oct2016 12:00:00	2016	1166.109587	903.4524	1435.821	1576.245	1075.187

30Oct2016 13:00:00	2016	1162.612353	886.2854	1421.703	1580.569	1071.995
30Oct2016 14:00:00	2016	1151.679886	881.4063	1379.374	1573.801	1068.708
30Oct2016 15:00:00	2016	1156.95545	883.9231	1331.037	1569.632	1068.263
30Oct2016 16:00:00	2016	1178.464675	901.631	1335.937	1624.633	1021.764
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30Oct2016 18:00:00	2016	1276.592841	945.6096	1398.004	1697.014	1019.184
30Oct2016 19:00:00	2016	1285.370456	944.4901	1400.531	1695.305	1029.008
30Oct2016 20:00:00	2016	1244.895536	927.0552	1386.943	1653.114	1045.229
30Oct2016 21:00:00	2016	1177.846899	906.0225	1353.497	1589.156	1039.97
30Oct2016 22:00:00	2016	1080.418972	878.356	1314.358	1492.159	1021.745
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31Oct2016 5:00:00	2016	948.7312849	843.3473	1269.428	1345.248	1042.863
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31Oct2016 7:00:00	2016	1293.471783	946.9889	1378.721	1669.5	1025.862
31Oct2016 8:00:00	2016	1353.335709	952.1391	1422.288	1764.726	1030.387
31Oct2016 9:00:00	2016	1356.592158	954.2258	1419.583	1771.078	1017.429
31Oct2016 10:00:00	2016	1373.197722	958.1785	1409.451	1785.216	1005.926
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31Oct2016 14:00:00	2016	1358.202449	939.3156	1392.428	1730.011	1023.928
31Oct2016 15:00:00	2016	1358.78133	933.3429	1386.971	1710.087	1025.069
31Oct2016 16:00:00	2016	1390.429295	914.947	1387.917	1748.861	1037.027
31Oct2016 17:00:00	2016	1404.7708	913.8036	1386.692	1730.249	1063.281
31Oct2016 18:00:00	2016	1382.663103	914.6582	1379.463	1759.085	1114.748
31Oct2016 19:00:00	2016	1342.893807	909.4655	1358.245	1715.937	1114.752
31Oct2016 20:00:00	2016	1299.98546	911.3434	1349.466	1693.75	1126.047
31Oct2016 21:00:00	2016	1217.6686	928.716	1339.388	1597.186	1133.973
31Oct2016 22:00:00	2016	1101.756611	898.2012	1290.919	1510.858	1127.351
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01Nov2016 0:00:00	2016	921.4883811	847.6704	1236.501	1311.62	1110.38
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01Nov2016 19:00:00	2016	1396.723872	969.7045	1441.016	1823.163	1137.543
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02Nov2016 13:00:00	2016	1368.574082	942.0117	1383.17	1758.605	1075.05
02Nov2016 14:00:00	2016	1361.31831	938.5626	1379.391	1739.37	1105.051
02Nov2016 15:00:00	2016	1360.568589	941.2487	1374.831	1687.316	1123.114
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02Nov2016 18:00:00	2016	1404.753681	969.362	1415.802	1779.893	1141.305
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02Nov2016 20:00:00	2016	1331.867087	956.5736	1404.258	1703.763	1115.601
02Nov2016 21:00:00	2016	1243.918424	928.9139	1362.566	1621.485	1110.831
02Nov2016 22:00:00	2016	1127.254283	907.3615	1313.314	1513.374	1108.019
02Nov2016 23:00:00	2016	1010.017814	871.1242	1264.072	1390.006	1105.259
03Nov2016 0:00:00	2016	926.0090419	847.3542	1230.968	1325.901	1094.692
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03Nov2016 15:00:00	2016	1373.716025	919.3456	1367.104	1717.691	1047.609
03Nov2016 16:00:00	2016	1375.999122	930.7804	1355.981	1736.162	1052.547
03Nov2016 17:00:00	2016	1378.887791	937.7609	1364.912	1751.68	1073.008
03Nov2016 18:00:00	2016	1395.645973	960.3068	1402.066	1803.471	1056.219
03Nov2016 19:00:00	2016	1383.036495	965.5265	1405.811	1777.852	1049.335
03Nov2016 20:00:00	2016	1322.718744	944.3782	1369.843	1738.637	1061.211
03Nov2016 21:00:00	2016	1233.400497	915.3871	1326.454	1644.941	1085.76
03Nov2016 22:00:00	2016	1112.970448	892.4419	1290.275	1519.654	1079.867
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04Nov2016 0:00:00	2016	922.7500543	836.7805	1236.883	1328.754	1039.103
04Nov2016 1:00:00	2016	879.839306	831.3265	1219.569	1292.576	1044.726
04Nov2016 2:00:00	2016	861.5804078	824.196	1218.747	1271.827	1037.962
04Nov2016 3:00:00	2016	856.6384878	821.0122	1225.955	1250.48	1023.054
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04Nov2016 5:00:00	2016	954.4728405	840.5619	1240.931	1294.656	1045.742
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04Nov2016 7:00:00	2016	1299.211692	936.1533	1373.774	1622.027	1039.142
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04Nov2016 13:00:00	2016	1363.67213	943.2127	1356.215	1690.716	999.4601
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05Nov2016 2:00:00	2016	854.6597969	822.7177	1252.937	1265.219	1058.134
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05Nov2016 5:00:00	2016	872.4659877	819.6208	1228.71	1244.49	1034.255
05Nov2016 6:00:00	2016	929.4592855	841.0667	1239.981	1291.804	983.733
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06Nov2016 1:00:00	2016	1695.298863	1642.738	2480.593	2523.789	2069.075
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06Nov2016 5:00:00	2016	850.9585502	819.7708	1236.656	1204.843	1042.666
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06Nov2016 10:00:00	2016	1142.859769	896.6714	1318.764	1555.919	925.1632
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07Nov2016 3:00:00	2016	852.155492	826.6154	1256.23	1243.824	1062.946
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12Nov2016 4:00:00	2016	833.2838381	775.4007	1254.176	1190.088	1044.215
12Nov2016 5:00:00	2016	863.1557079	785.818	1256.93	1212.763	1048.383
12Nov2016 6:00:00	2016	918.1462455	812.3496	1276.825	1262.353	1071.693
12Nov2016 7:00:00	2016	998.3875023	843.9602	1295.782	1349.352	1079.024
12Nov2016 8:00:00	2016	1073.803365	869.0797	1313.404	1390.069	1063.517
12Nov2016 9:00:00	2016	1143.945499	896.3869	1327.81	1459.953	1048.567
12Nov2016 10:00:00	2016	1184.516074	900.1608	1350.457	1510.913	1050.897
12Nov2016 11:00:00	2016	1199.256751	907.6719	1351.573	1537.176	1037.886
12Nov2016 12:00:00	2016	1199.391209	903.6073	1345.792	1542.536	1031.622
12Nov2016 13:00:00	2016	1195.788353	905.7829	1343.059	1538.582	1023.572
12Nov2016 14:00:00	2016	1180.261676	901.6869	1364.985	1533.086	1058.831
12Nov2016 15:00:00	2016	1172.937885	895.937	1375.422	1555.64	1045.698
12Nov2016 16:00:00	2016	1208.489863	902.3179	1408.287	1653.081	1075.388
12Nov2016 17:00:00	2016	1308.821943	947.3965	1436.313	1715.905	1084.728
12Nov2016 18:00:00	2016	1287.914826	942.0068	1403.989	1682.508	1068.666
12Nov2016 19:00:00	2016	1236.919353	924.7879	1386.075	1631.091	1061.683
12Nov2016 20:00:00	2016	1186.961971	906.723	1368.213	1607.375	1046.751
12Nov2016 21:00:00	2016	1130.564134	902.6821	1341.259	1527.231	1046.445
12Nov2016 22:00:00	2016	1054.410912	877.6128	1310.695	1476.801	1030.925
12Nov2016 23:00:00	2016	976.2222213	854.7614	1281.48	1379.154	1025.025
13Nov2016 0:00:00	2016	913.7414814	829.4924	1251.269	1328.961	1035.17
13Nov2016 1:00:00	2016	868.1905719	816.4933	1224.933	1258.118	1027.455
13Nov2016 2:00:00	2016	841.0368344	807.1444	1213.621	1247.405	1061.606
13Nov2016 3:00:00	2016	829.2126914	802.7609	1214.641	1216.237	1054.115
13Nov2016 4:00:00	2016	831.3851403	805.4362	1227.979	1230.966	1034.789
13Nov2016 5:00:00	2016	856.5126794	810.6472	1249.927	1240.891	1049.06

13Nov2016 6:00:00	2016	903.7252351	828.2177	1262.888	1296.615	1040.801
13Nov2016 7:00:00	2016	964.5007985	849.2718	1294.651	1356.767	1045.934
13Nov2016 8:00:00	2016	1006.563052	852.7519	1301.238	1381.026	1052.35
13Nov2016 9:00:00	2016	1063.132098	868.7032	1314.957	1439.425	1037.932
13Nov2016 10:00:00	2016	1109.887608	878.7459	1326.006	1491.542	1015.626
13Nov2016 11:00:00	2016	1142.113482	891.1302	1333.631	1513.11	1008.7
13Nov2016 12:00:00	2016	1162.822044	885.6175	1331.334	1532.475	998.7981
13Nov2016 13:00:00	2016	1160.398253	886.0318	1325.303	1514.171	995.9731
13Nov2016 14:00:00	2016	1159.621387	892.2803	1319.353	1520.538	1000.628
13Nov2016 15:00:00	2016	1194.180226	908.3584	1326.903	1529.327	999.5809
13Nov2016 16:00:00	2016	1295.667016	929.914	1361.9	1651.162	1014.882
13Nov2016 17:00:00	2016	1367.540651	958.3676	1391.472	1753.942	1049.401
13Nov2016 18:00:00	2016	1327.522017	949.7049	1370.975	1713.281	1050.101
13Nov2016 19:00:00	2016	1278.267495	932.3027	1353.151	1668.07	1046.445
13Nov2016 20:00:00	2016	1227.23821	921.4717	1355.428	1593.839	1044.684
13Nov2016 21:00:00	2016	1156.755167	894.3412	1315.276	1539.681	1055.499
13Nov2016 22:00:00	2016	1054.661419	857.6685	1277.973	1462.079	1040.234
13Nov2016 23:00:00	2016	955.9762044	834.1322	1249.921	1375.472	1019.225
14Nov2016 0:00:00	2016	892.663521	821.9465	1229.044	1282.551	1017.447
14Nov2016 1:00:00	2016	855.3260248	809.5695	1220.578	1251.236	1002.217
14Nov2016 2:00:00	2016	839.4272458	797.2207	1217.379	1246.284	1026.425
14Nov2016 3:00:00	2016	839.5562823	797.3231	1219.8	1243.418	1018.699
14Nov2016 4:00:00	2016	869.7120617	807.0282	1226.56	1256.813	1024.875
14Nov2016 5:00:00	2016	956.7267654	827.9846	1253.378	1322.277	1024.386
14Nov2016 6:00:00	2016	1129.041688	878.8218	1301.859	1474.179	985.4923
14Nov2016 7:00:00	2016	1283.862918	930.4327	1332.238	1617.736	963.7327
14Nov2016 8:00:00	2016	1298.352119	943.7178	1338.859	1645.44	950.3812
14Nov2016 9:00:00	2016	1314.195512	949.3827	1345.309	1665.805	916.6719
14Nov2016 10:00:00	2016	1339.657382	943.3406	1344.517	1698.305	933.8969
14Nov2016 11:00:00	2016	1357.838198	954.3096	1354.089	1712.293	914.2983
14Nov2016 12:00:00	2016	1361.63879	951.4064	1349.603	1710.997	929.9681
14Nov2016 13:00:00	2016	1361.944193	943.9716	1372.277	1726.38	925.7684
14Nov2016 14:00:00	2016	1370.232351	940.4054	1375.637	1720.751	915.877
14Nov2016 15:00:00	2016	1356.079282	939.8366	1373.999	1717.821	935.7465
14Nov2016 16:00:00	2016	1395.985734	956.7089	1372.115	1749.099	946.9206
14Nov2016 17:00:00	2016	1502.973032	1009.03	1432.645	1873.588	950.9712
14Nov2016 18:00:00	2016	1452.339333	1001.334	1457.723	1831.962	953.5314
14Nov2016 19:00:00	2016	1393.749992	986.8539	1444.113	1772.5	983.854
14Nov2016 20:00:00	2016	1338.641523	973.9653	1420.507	1717.284	982.4369
14Nov2016 21:00:00	2016	1245.525473	950.6019	1375.32	1629.511	1030.265
14Nov2016 22:00:00	2016	1116.813764	911.202	1320.187	1496.739	1018.376
14Nov2016 23:00:00	2016	1007.786784	879.3907	1282.365	1394.686	987.0911
15Nov2016 0:00:00	2016	940.5043589	856.0785	1266.775	1304.78	982.438
15Nov2016 1:00:00	2016	901.500023	844.6877	1254.498	1254.427	972.9483
15Nov2016 2:00:00	2016	883.6299631	843.1595	1246.217	1262.516	965.8348
15Nov2016 3:00:00	2016	881.8045263	843.2715	1244.229	1241.108	981.7908
15Nov2016 4:00:00	2016	909.7580003	855.5842	1238.288	1297.729	958.3828

15Nov2016 5:00:00	2016	995.9296823	869.3504	1232.573	1374.543	944.4696
15Nov2016 6:00:00	2016	1169.695628	918.7676	1293.023	1522.472	936.4108
15Nov2016 7:00:00	2016	1333.126769	957.9815	1367.514	1658.992	966.7848
15Nov2016 8:00:00	2016	1369.01652	957.8371	1364.936	1714.927	951.6737
15Nov2016 9:00:00	2016	1379.324721	959.5016	1373.291	1739.088	884.7879
15Nov2016 10:00:00	2016	1399.941009	961.6927	1390.145	1760.518	886.0497
15Nov2016 11:00:00	2016	1398.18108	961.8846	1401.479	1774.025	903.9371
15Nov2016 12:00:00	2016	1387.586297	952.0118	1395.225	1765.477	918.6351
15Nov2016 13:00:00	2016	1389.638505	951.4033	1393.355	1768.271	953.8813
15Nov2016 14:00:00	2016	1396.335044	952.4433	1396.277	1770.545	950.5182
15Nov2016 15:00:00	2016	1416.90876	955.16	1414.587	1788.459	973.3453
15Nov2016 16:00:00	2016	1476.498142	966.0489	1450.781	1870.124	1045.072
15Nov2016 17:00:00	2016	1531.313266	995.3067	1478.224	1892.595	1100.252
15Nov2016 18:00:00	2016	1468.397434	979.5874	1451.892	1853.39	1096.683
15Nov2016 19:00:00	2016	1410.609311	968.729	1428.067	1805.672	1084.317
15Nov2016 20:00:00	2016	1347.506287	960.0556	1411.91	1755.61	1065.174
15Nov2016 21:00:00	2016	1252.802924	935.716	1378.32	1690.222	1082.995
15Nov2016 22:00:00	2016	1128.64312	894.1976	1334.536	1567.449	1062.038
15Nov2016 23:00:00	2016	1013.919755	865.7453	1302.533	1442.765	1047.504
16Nov2016 0:00:00	2016	946.6887837	842.9895	1272.174	1369.713	1031.428
16Nov2016 1:00:00	2016	906.0153915	830.4298	1253.541	1313.562	1071.974
16Nov2016 2:00:00	2016	888.1201591	828.0939	1245.317	1276.06	1090.357
16Nov2016 3:00:00	2016	886.1875185	827.0608	1230.124	1254.537	1073.338
16Nov2016 4:00:00	2016	913.3147253	837.0545	1225.678	1266.804	1055.061
16Nov2016 5:00:00	2016	1001.271844	860.8104	1221.92	1328.961	1072.622
16Nov2016 6:00:00	2016	1171.285934	909.9576	1247.868	1460.221	1055.488
16Nov2016 7:00:00	2016	1332.709434	976.6504	1296.298	1611.043	1071.773
16Nov2016 8:00:00	2016	1362.701991	988.367	1309.966	1641.307	1093.496
16Nov2016 9:00:00	2016	1375.160294	993.8684	1299.52	1655.693	1084.269
16Nov2016 10:00:00	2016	1398.740908	993.4819	1296.053	1670.22	1096.061
16Nov2016 11:00:00	2016	1409.635722	995.413	1300.664	1679.166	1090.706
16Nov2016 12:00:00	2016	1401.693383	982.0985	1308.253	1669.839	1097.208
16Nov2016 13:00:00	2016	1397.664509	980.3647	1321.192	1674.674	1099.135
16Nov2016 14:00:00	2016	1389.966885	978.1175	1323.471	1679.102	1084.206
16Nov2016 15:00:00	2016	1409.491948	978.1915	1369.633	1701.103	1082.578
16Nov2016 16:00:00	2016	1464.409158	994.5724	1415.605	1782.622	1135.991
16Nov2016 17:00:00	2016	1532.109667	1021.775	1449.74	1869.358	1125.477
16Nov2016 18:00:00	2016	1476.151972	1009.948	1424.226	1809.109	1115.792
16Nov2016 19:00:00	2016	1421.477534	1007.77	1436.333	1760.818	1121.857
16Nov2016 20:00:00	2016	1359.919371	990.5277	1426.277	1711.584	1127.502
16Nov2016 21:00:00	2016	1267.90878	969.4687	1416.373	1637.672	1133.614
16Nov2016 22:00:00	2016	1148.216822	938.5528	1364.342	1507.854	1113.039
16Nov2016 23:00:00	2016	1037.678147	917.4763	1358.781	1402.858	1073.079
17Nov2016 0:00:00	2016	966.6150004	890.3636	1325.966	1323.639	1089.084
17Nov2016 1:00:00	2016	923.1190192	872.2097	1298.894	1277.623	1103.353
17Nov2016 2:00:00	2016	902.0045774	866.5276	1275.913	1250.332	1083.381
17Nov2016 3:00:00	2016	898.020304	863.4265	1261.337	1246.813	1099.931

17Nov2016 4:00:00	2016	924.3892462	868.8496	1274.54	1275.298	1115.034
17Nov2016 5:00:00	2016	1009.128474	892.197	1297.839	1372.34	1107.135
17Nov2016 6:00:00	2016	1179.132751	934.6846	1334.629	1514.156	1105.317
17Nov2016 7:00:00	2016	1339.225191	984.5445	1373.753	1691.622	1098.719
17Nov2016 8:00:00	2016	1359.56923	995.2068	1395.003	1744.02	1076.394
17Nov2016 9:00:00	2016	1369.737622	1003.363	1395.725	1764.989	1063.835
17Nov2016 10:00:00	2016	1382.827287	1004.254	1414.372	1772.839	1059.36
17Nov2016 11:00:00	2016	1395.952947	992.2439	1433.732	1834.427	1032.305
17Nov2016 12:00:00	2016	1398.208783	994.448	1417.91	1812.305	1062.626
17Nov2016 13:00:00	2016	1399.074298	992.029	1422.139	1828.538	1090.605
17Nov2016 14:00:00	2016	1399.132243	983.1524	1421.078	1835.499	1076.926
17Nov2016 15:00:00	2016	1419.668588	962.9296	1416.788	1822.52	1106.93
17Nov2016 16:00:00	2016	1473.268962	986.2753	1439.199	1852.167	1135.637
17Nov2016 17:00:00	2016	1541.021613	997.2879	1471.562	1910.406	1121.91
17Nov2016 18:00:00	2016	1489.927414	980.683	1463.051	1869.039	1142.869
17Nov2016 19:00:00	2016	1431.213464	1002.294	1452.734	1825.004	1146.527
17Nov2016 20:00:00	2016	1374.941091	998.7538	1432.516	1777.028	1150.046
17Nov2016 21:00:00	2016	1283.351865	974.5436	1394.329	1679.672	1111.331
17Nov2016 22:00:00	2016	1159.389753	942.3047	1349.608	1553.937	1128.943
17Nov2016 23:00:00	2016	1049.1827	914.8452	1310.798	1435.563	1159.849
18Nov2016 0:00:00	2016	975.7432595	889.7999	1297.887	1330.193	1142.391
18Nov2016 1:00:00	2016	931.3282646	874.5301	1281.572	1305.34	1140.57
18Nov2016 2:00:00	2016	907.6207933	867.7004	1284.52	1310.121	1132.866
18Nov2016 3:00:00	2016	903.153116	868.0839	1287.336	1285.009	1113.936
18Nov2016 4:00:00	2016	926.7596293	875.2986	1290.136	1304.539	1132.47
18Nov2016 5:00:00	2016	1003.771471	896.9181	1302.931	1381.172	1135.735
18Nov2016 6:00:00	2016	1166.421106	937.9374	1348.977	1539.149	1126.151
18Nov2016 7:00:00	2016	1330.256697	989.4132	1415.934	1689.654	1157.626
18Nov2016 8:00:00	2016	1366.279313	999.3988	1437.596	1763.073	1101.866
18Nov2016 9:00:00	2016	1380.601754	1008.583	1441.392	1759.4	1037.254
18Nov2016 10:00:00	2016	1389.75863	1011.72	1433.914	1780.02	1034.348
18Nov2016 11:00:00	2016	1394.65749	1013.722	1437.446	1788.196	1031.728
18Nov2016 12:00:00	2016	1391.4873	1006.115	1430.321	1758.236	1029.861
18Nov2016 13:00:00	2016	1388.732672	997.7942	1416.48	1767.937	994.5975
18Nov2016 14:00:00	2016	1381.132473	936.4281	1436.991	1780.214	993.8107
18Nov2016 15:00:00	2016	1394.463032	930.0907	1458.098	1813.729	999.0746
18Nov2016 16:00:00	2016	1441.140644	943.2559	1490.499	1868.79	1023.397
18Nov2016 17:00:00	2016	1501.366451	968.8729	1506.89	1895.376	1029.876
18Nov2016 18:00:00	2016	1442.594768	945.2325	1484.944	1854.508	1022.514
18Nov2016 19:00:00	2016	1384.01388	968.6309	1462.083	1792.537	1016.056
18Nov2016 20:00:00	2016	1330.310364	964.9373	1457.666	1728.225	1011.56
18Nov2016 21:00:00	2016	1253.902788	950.9772	1426.02	1647.271	1031.309
18Nov2016 22:00:00	2016	1160.043985	921.0313	1383.957	1561.001	1031.699
18Nov2016 23:00:00	2016	1062.428036	890.9939	1357.492	1447.864	1066.004
19Nov2016 0:00:00	2016	986.8812908	873.3377	1320.359	1368.773	1122.774
19Nov2016 1:00:00	2016	937.828998	864.1604	1301.905	1315.275	1113.427
19Nov2016 2:00:00	2016	908.0286975	859.5499	1260.896	1282.133	1076.553

19Nov2016 3:00:00	2016	897.0051436	853.3898	1282.1	1286.726	1101.389
19Nov2016 4:00:00	2016	900.217228	852.0078	1304.6	1291.724	1104.811
19Nov2016 5:00:00	2016	928.5862351	861.1076	1311.488	1336.009	1102.061
19Nov2016 6:00:00	2016	984.4140132	882.0088	1319.542	1372.661	1083.155
19Nov2016 7:00:00	2016	1070.962839	916.2246	1361.904	1470.338	1104.08
19Nov2016 8:00:00	2016	1148.407561	944.2547	1400.991	1550.049	1111.25
19Nov2016 9:00:00	2016	1204.213533	959.5027	1429.774	1594.425	1127.557
19Nov2016 10:00:00	2016	1246.223208	958.6847	1432.656	1664.112	1122.883
19Nov2016 11:00:00	2016	1270.0698	944.8889	1433.561	1680.32	1108.927
19Nov2016 12:00:00	2016	1269.256159	939.3372	1426.356	1691.697	1119.185
19Nov2016 13:00:00	2016	1248.615003	927.4707	1420.437	1689.661	1126.499
19Nov2016 14:00:00	2016	1222.569564	920.6277	1410.011	1665.144	1124.618
19Nov2016 15:00:00	2016	1221.389345	931.949	1409.37	1684.141	1121.221
19Nov2016 16:00:00	2016	1276.073909	934.695	1450.238	1757.912	1151.586
19Nov2016 17:00:00	2016	1376.797895	967.5122	1497.294	1818.056	1156.397
19Nov2016 18:00:00	2016	1349.373903	958.5748	1480.418	1753.992	1159.624
19Nov2016 19:00:00	2016	1298.21878	943.3942	1460.942	1715.08	1175.015
19Nov2016 20:00:00	2016	1250.312447	937.0179	1445.704	1650.801	1178.855
19Nov2016 21:00:00	2016	1194.350304	919.8695	1421.666	1597.311	1167.363
19Nov2016 22:00:00	2016	1117.487218	897.1709	1383.884	1497.713	1164.565
19Nov2016 23:00:00	2016	1037.213293	864.26	1361.002	1415.927	1164.631
20Nov2016 0:00:00	2016	967.2333185	839.6176	1348.173	1369.756	1162.15
20Nov2016 1:00:00	2016	920.6908352	833.4417	1333.803	1334.114	1166.11
20Nov2016 2:00:00	2016	893.8333256	825.7589	1322.654	1283.635	1155.352
20Nov2016 3:00:00	2016	880.6512757	822.7065	1298.017	1247.078	1170.199
20Nov2016 4:00:00	2016	884.4604287	826.1387	1291.214	1262.501	1168.099
20Nov2016 5:00:00	2016	909.2516196	837.097	1309.211	1304.54	1166.161
20Nov2016 6:00:00	2016	955.1287595	853.7807	1343.13	1338.064	1164.055
20Nov2016 7:00:00	2016	1020.494366	876.505	1373.249	1396.108	1163.897
20Nov2016 8:00:00	2016	1074.259243	900.5548	1386.718	1433.5	1170.958
20Nov2016 9:00:00	2016	1129.911245	921.3484	1397.827	1464.776	1174.227
20Nov2016 10:00:00	2016	1174.785667	922.2839	1412.892	1522.241	1183.115
20Nov2016 11:00:00	2016	1205.399784	917.1499	1421.878	1569.95	1192.606
20Nov2016 12:00:00	2016	1220.47292	905.7651	1424.987	1592.07	1186.795
20Nov2016 13:00:00	2016	1211.045067	881.048	1424.442	1620.002	1182.251
20Nov2016 14:00:00	2016	1202.379869	884.3085	1423.9	1620.243	1174.958
20Nov2016 15:00:00	2016	1200.892947	897.297	1433.029	1639.88	1143.36
20Nov2016 16:00:00	2016	1283.222932	912.9463	1470.649	1772.831	1110.873
20Nov2016 17:00:00	2016	1408.113818	960.9544	1519.455	1833.597	1121.56
20Nov2016 18:00:00	2016	1391.241902	953.6841	1509.52	1805.761	1105.993
20Nov2016 19:00:00	2016	1340.167023	931.9842	1492.789	1753.121	1134.877
20Nov2016 20:00:00	2016	1287.002309	908.1243	1452.149	1710.149	1199.359
20Nov2016 21:00:00	2016	1209.664035	891.6152	1407.479	1616.434	1176.519
20Nov2016 22:00:00	2016	1098.941374	852.8493	1360.92	1500.919	1166.555
20Nov2016 23:00:00	2016	993.8104783	819.3711	1325.937	1394.188	1141.737
21Nov2016 0:00:00	2016	928.6093713	799.1528	1299.762	1315.715	1157.474
21Nov2016 1:00:00	2016	887.8933514	791.6755	1279.793	1249.428	1122.969

21Nov2016 2:00:00	2016	868.0572374	787.2225	1268.122	1225.872	1151.33
21Nov2016 3:00:00	2016	865.7385746	786.7816	1250.014	1219.213	1157.919
21Nov2016 4:00:00	2016	891.8597116	787.7842	1255.741	1244.378	1134.685
21Nov2016 5:00:00	2016	980.0987015	806.3067	1273.929	1324.2	1145.199
21Nov2016 6:00:00	2016	1157.031936	868.9475	1349.561	1481.863	1157.023
21Nov2016 7:00:00	2016	1324.171752	929.2376	1431.207	1670.746	1140.519
21Nov2016 8:00:00	2016	1333.551688	939.753	1452.51	1733.191	1163.371
21Nov2016 9:00:00	2016	1335.620473	941.0681	1443.622	1741.417	1124.37
21Nov2016 10:00:00	2016	1364.543833	934.8093	1461.891	1765.037	1105.796
21Nov2016 11:00:00	2016	1377.325139	927.9677	1455.809	1782.354	1084.497
21Nov2016 12:00:00	2016	1371.751055	929.8506	1452.413	1801.106	1085.22
21Nov2016 13:00:00	2016	1354.730559	943.9302	1450.132	1821.102	1079.557
21Nov2016 14:00:00	2016	1348.749573	944.4217	1450.517	1821.637	1087.481
21Nov2016 15:00:00	2016	1356.62594	928.8699	1464.754	1835.183	1151.159
21Nov2016 16:00:00	2016	1415.618814	943.6733	1504.908	1915.544	1171.487
21Nov2016 17:00:00	2016	1524.968751	989.5336	1540.615	1955.524	1211.923
21Nov2016 18:00:00	2016	1475.034063	972.6053	1539.1	1892.517	1181.917
21Nov2016 19:00:00	2016	1421.238093	990.5825	1526.871	1837.992	1164.42
21Nov2016 20:00:00	2016	1361.185842	991.2291	1503.274	1788.579	1166.294
21Nov2016 21:00:00	2016	1265.720431	989.8878	1460.218	1695.896	1173.409
21Nov2016 22:00:00	2016	1137.545585	946.1602	1403.86	1572.129	1161.374
21Nov2016 23:00:00	2016	1021.980034	909.8755	1351.606	1437.729	1179.366
22Nov2016 0:00:00	2016	949.0972568	886.9641	1308.642	1352.443	1128.771
22Nov2016 1:00:00	2016	909.3926486	875.4567	1300.372	1323.828	1119.186
22Nov2016 2:00:00	2016	888.8577189	869.6348	1293.688	1293.401	1116.758
22Nov2016 3:00:00	2016	886.0939029	868.7647	1288.085	1281.871	1149.175
22Nov2016 4:00:00	2016	914.5805503	874.5522	1299.83	1293.456	1148.761
22Nov2016 5:00:00	2016	1001.186654	897.7096	1302.605	1370.713	1161.657
22Nov2016 6:00:00	2016	1175.117111	946.793	1349.001	1501.045	1154.191
22Nov2016 7:00:00	2016	1341.282953	997.6025	1412.262	1682.594	1152.187
22Nov2016 8:00:00	2016	1359.056044	1005.935	1422.739	1770.143	1167.004
22Nov2016 9:00:00	2016	1364.825551	1002.98	1447.735	1789.323	1146.342
22Nov2016 10:00:00	2016	1375.146785	998.0594	1467.791	1813.695	1129.086
22Nov2016 11:00:00	2016	1376.951397	992.916	1459.436	1821.422	1148.77
22Nov2016 12:00:00	2016	1369.388194	991.0582	1461.202	1832.851	1160.024
22Nov2016 13:00:00	2016	1361.38187	981.312	1467.804	1820.248	1174.363
22Nov2016 14:00:00	2016	1351.941826	980.3569	1472.766	1819.616	1183.178
22Nov2016 15:00:00	2016	1357.023133	934.9077	1478.691	1845.926	1209.72
22Nov2016 16:00:00	2016	1423.852917	954.7046	1512.103	1927.622	1220.624
22Nov2016 17:00:00	2016	1530.58292	1001.352	1545.728	1983.804	1227.299
22Nov2016 18:00:00	2016	1487.33424	993.9337	1506.533	1925.559	1217.357
22Nov2016 19:00:00	2016	1436.839766	1020.287	1496.456	1864.62	1198.724
22Nov2016 20:00:00	2016	1382.326722	1007.195	1473.882	1787.343	1195.811
22Nov2016 21:00:00	2016	1291.013807	999.9942	1428.207	1709.529	1190.559
22Nov2016 22:00:00	2016	1162.899126	960.1584	1371.366	1571.673	1180.216
22Nov2016 23:00:00	2016	1048.745177	931.5137	1336.847	1454.197	1149.504
23Nov2016 0:00:00	2016	972.7705555	909.7435	1311.014	1352.18	1146.396

23Nov2016 1:00:00	2016	933.1351082	895.8577	1283.533	1309.534	1154.323
23Nov2016 2:00:00	2016	914.0342062	885.1943	1258.672	1279.315	1159.376
23Nov2016 3:00:00	2016	911.6113211	879.495	1244.956	1272.272	1165.5
23Nov2016 4:00:00	2016	941.0687417	878.0885	1250.909	1284.782	1158.14
23Nov2016 5:00:00	2016	1027.464505	904.864	1284.943	1356.91	1156.569
23Nov2016 6:00:00	2016	1200.563552	951.6623	1345.785	1524.516	1155.051
23Nov2016 7:00:00	2016	1360.89012	1017.885	1417.368	1719.056	1173.152
23Nov2016 8:00:00	2016	1371.086282	1017.961	1388.273	1747.491	1173.042
23Nov2016 9:00:00	2016	1376.482837	1023.557	1409.81	1756.508	1127.388
23Nov2016 10:00:00	2016	1384.212495	1017.24	1400.984	1773.776	1127.06
23Nov2016 11:00:00	2016	1384.89078	1001.863	1358.553	1783.054	1125.985
23Nov2016 12:00:00	2016	1376.949433	990.8224	1360.052	1777.671	1140.337
23Nov2016 13:00:00	2016	1384.431317	993.7605	1364.306	1781.148	1163.838
23Nov2016 14:00:00	2016	1382.474688	988.0874	1373.774	1793.891	1177.318
23Nov2016 15:00:00	2016	1401.629659	958.6875	1390.267	1822.534	1166.229
23Nov2016 16:00:00	2016	1470.330477	963.4952	1444.734	1914.557	1201.607
23Nov2016 17:00:00	2016	1541.90533	999.8055	1497.523	1961.09	1184.632
23Nov2016 18:00:00	2016	1486.211266	989.0511	1484.171	1909.833	1176.174
23Nov2016 19:00:00	2016	1433.872084	1010.34	1467.187	1862.96	1214.67
23Nov2016 20:00:00	2016	1371.653743	994.3088	1438.358	1801.91	1223.811
23Nov2016 21:00:00	2016	1280.924058	972.2075	1414.767	1696.399	1221.046
23Nov2016 22:00:00	2016	1154.958221	937.9998	1377.764	1568.005	1196.546
23Nov2016 23:00:00	2016	1038.311286	911.1483	1341.061	1446.059	1183.122
24Nov2016 0:00:00	2016	963.6767898	889.9158	1321.12	1365.846	1184.952
24Nov2016 1:00:00	2016	920.4059476	880.7012	1316.633	1329.408	1153.692
24Nov2016 2:00:00	2016	899.7302405	876.5881	1315.006	1343.543	1183.704
24Nov2016 3:00:00	2016	895.4050078	876.8503	1318.981	1324.136	1153.408
24Nov2016 4:00:00	2016	919.9367516	881.4204	1307.8	1336.905	1183.531
24Nov2016 5:00:00	2016	1008.388064	892.202	1322.625	1443.125	1198.372
24Nov2016 6:00:00	2016	1176.060819	943.5257	1366.16	1578.211	1203.232
24Nov2016 7:00:00	2016	1335.913414	995.9652	1402.976	1742.498	1201.694
24Nov2016 8:00:00	2016	1349.697576	1002.16	1448.706	1798.581	1191.249
24Nov2016 9:00:00	2016	1352.88467	999.2067	1434.654	1768.067	1196.603
24Nov2016 10:00:00	2016	1358.416292	993.3495	1406.375	1781.713	1176.573
24Nov2016 11:00:00	2016	1360.964258	979.8475	1421.584	1783.759	1223.87
24Nov2016 12:00:00	2016	1357.320625	974.8877	1428.394	1786.576	1222.732
24Nov2016 13:00:00	2016	1353.123159	975.3404	1454.12	1780.35	1238.984
24Nov2016 14:00:00	2016	1345.555594	975.3169	1426.76	1767.274	1279.784
24Nov2016 15:00:00	2016	1361.137458	989.6153	1418.736	1791.886	1289.502
24Nov2016 16:00:00	2016	1444.233473	966.4313	1446.785	1860.662	1231.549
24Nov2016 17:00:00	2016	1508.788407	994.737	1508.677	1933.298	1238.816
24Nov2016 18:00:00	2016	1452.663213	989.6539	1502.922	1876.563	1186.978
24Nov2016 19:00:00	2016	1403.725327	1011.632	1493.465	1839.204	1162.822
24Nov2016 20:00:00	2016	1348.454752	1004.796	1480.319	1780.208	1119.635
24Nov2016 21:00:00	2016	1261.147995	991.3315	1439.936	1686.263	1122.214
24Nov2016 22:00:00	2016	1139.493195	955.6091	1386.913	1579.381	1126.837
24Nov2016 23:00:00	2016	1027.18204	905.748	1337.493	1448.932	1111.9

25Nov2016 0:00:00	2016	952.6238085	874.9405	1303.633	1406.827	1131.751
25Nov2016 1:00:00	2016	908.718203	864.4935	1316.112	1333.813	1168.11
25Nov2016 2:00:00	2016	885.6136693	856.3087	1324.752	1328.796	1146.365
25Nov2016 3:00:00	2016	880.3787194	857.2925	1323.455	1324.424	1161.513
25Nov2016 4:00:00	2016	902.6762031	863.2356	1319.477	1336.589	1146.601
25Nov2016 5:00:00	2016	981.7923953	879.941	1341.037	1400.547	1130.299
25Nov2016 6:00:00	2016	1141.372086	924.8851	1384.889	1557.496	1094.478
25Nov2016 7:00:00	2016	1297.396536	974.1909	1446.658	1709.592	1130.543
25Nov2016 8:00:00	2016	1340.871733	990.7762	1475.4	1775.656	1124.329
25Nov2016 9:00:00	2016	1341.805803	996.8193	1472.16	1786.707	1133.696
25Nov2016 10:00:00	2016	1347.271729	994.4407	1472.367	1774.47	1129.799
25Nov2016 11:00:00	2016	1346.404192	989.5146	1470.691	1766.455	1131.694
25Nov2016 12:00:00	2016	1341.320154	969.5382	1443.452	1734.304	1158.98
25Nov2016 13:00:00	2016	1334.933849	965.0844	1445.111	1760.58	1172.718
25Nov2016 14:00:00	2016	1322.263413	962.3246	1439.385	1756.558	1160.526
25Nov2016 15:00:00	2016	1316.424529	968.1872	1431.488	1719.477	1193.453
25Nov2016 16:00:00	2016	1360.430617	977.6409	1467.891	1792.049	1210.839
25Nov2016 17:00:00	2016	1444.750273	1016.611	1502.504	1845.929	1217.033
25Nov2016 18:00:00	2016	1395.312989	1009.336	1453.422	1780.505	1197.646
25Nov2016 19:00:00	2016	1346.380404	991.6652	1460.316	1742.35	1233.314
25Nov2016 20:00:00	2016	1293.041124	985.8376	1440.713	1708.041	1217.16
25Nov2016 21:00:00	2016	1228.24065	974.654	1429.391	1631.849	1203.072
25Nov2016 22:00:00	2016	1136.345045	940.777	1398.236	1553.721	1192.39
25Nov2016 23:00:00	2016	1040.451308	906.6592	1363.039	1435.08	1173.671
26Nov2016 0:00:00	2016	965.5286933	886.0248	1341.538	1383.735	1155.019
26Nov2016 1:00:00	2016	917.1522242	875.8317	1323.279	1342.88	1158.611
26Nov2016 2:00:00	2016	889.5684686	865.9536	1316.876	1298.36	1160.422
26Nov2016 3:00:00	2016	879.1550578	860.4631	1315.075	1278.487	1156.214
26Nov2016 4:00:00	2016	885.5154015	861.2501	1324.571	1284.419	1177.423
26Nov2016 5:00:00	2016	917.2281597	874.2427	1334.953	1311.823	1191.428
26Nov2016 6:00:00	2016	977.7979676	895.5868	1354.39	1359.866	1196.666
26Nov2016 7:00:00	2016	1066.144724	925.4085	1388.294	1443.49	1239.937
26Nov2016 8:00:00	2016	1134.417927	942.1545	1397.951	1509.386	1232.217
26Nov2016 9:00:00	2016	1196.339806	955.5266	1385.061	1552.311	1229.893
26Nov2016 10:00:00	2016	1232.969532	949.7193	1378.106	1593.062	1244.804
26Nov2016 11:00:00	2016	1234.258953	941.0756	1388.421	1653.025	1253.185
26Nov2016 12:00:00	2016	1223.096256	940.8765	1394.501	1661.406	1248.627
26Nov2016 13:00:00	2016	1200.989752	928.9343	1390.693	1633.852	1247.019
26Nov2016 14:00:00	2016	1193.576422	930.821	1391.698	1602.083	1234.353
26Nov2016 15:00:00	2016	1191.868593	930.0068	1391.11	1618.643	1246.613
26Nov2016 16:00:00	2016	1261.987285	958.4938	1440.969	1685.437	1247.388
26Nov2016 17:00:00	2016	1357.091458	981.7632	1474.317	1785.596	1234.617
26Nov2016 18:00:00	2016	1324.07324	974.1853	1464.723	1716.451	1240.904
26Nov2016 19:00:00	2016	1272.59709	969.7431	1454.826	1685.506	1234.584
26Nov2016 20:00:00	2016	1231.015331	957.2628	1444.571	1657.021	1222.213
26Nov2016 21:00:00	2016	1180.05525	950.55	1428.077	1618.623	1206.493
26Nov2016 22:00:00	2016	1104.512167	919.3529	1394.756	1556.028	1190.126

26Nov2016 23:00:00	2016	1018.466271	881.4142	1353.956	1450.954	1182.412
27Nov2016 0:00:00	2016	948.8844942	864.4845	1344.079	1377.998	1178.156
27Nov2016 1:00:00	2016	901.6427074	852.2477	1333.502	1336.561	1184.866
27Nov2016 2:00:00	2016	870.318807	848.6136	1329.494	1296.867	1178.536
27Nov2016 3:00:00	2016	858.8542455	845.4056	1330.303	1279.48	1158.074
27Nov2016 4:00:00	2016	862.8065348	850.8309	1320.258	1283.889	1131.879
27Nov2016 5:00:00	2016	888.9012374	858.8858	1333.127	1302.723	1104.279
27Nov2016 6:00:00	2016	936.5614669	882.2361	1351.496	1342.793	1113.108
27Nov2016 7:00:00	2016	1008.819848	910.8256	1378.65	1401.144	1148.383
27Nov2016 8:00:00	2016	1066.760414	927.7094	1392.142	1480.424	1151.379
27Nov2016 9:00:00	2016	1113.480049	942.0061	1416.403	1533.867	1162.18
27Nov2016 10:00:00	2016	1155.682142	942.9084	1429.544	1560.202	1189.766
27Nov2016 11:00:00	2016	1175.612181	939.8766	1431.186	1589.909	1179.843
27Nov2016 12:00:00	2016	1188.159531	937.3454	1435.007	1602.315	1180.425
27Nov2016 13:00:00	2016	1189.498444	924.2668	1439.419	1611.186	1227.982
27Nov2016 14:00:00	2016	1186.868662	916.8276	1458.068	1656.83	1233.426
27Nov2016 15:00:00	2016	1213.574242	927.5603	1473.473	1682.876	1235.354
27Nov2016 16:00:00	2016	1307.036455	956.5994	1524.887	1795.547	1238.053
27Nov2016 17:00:00	2016	1403.8815	986.9992	1558.188	1849.437	1205.49
27Nov2016 18:00:00	2016	1376.548549	979.9031	1537.383	1790.166	1214.881
27Nov2016 19:00:00	2016	1334.290999	975.3988	1504.569	1726.81	1209.223
27Nov2016 20:00:00	2016	1292.57063	963.3411	1483.213	1694.71	1179.818
27Nov2016 21:00:00	2016	1229.328735	952.4192	1450.764	1623.391	1190.052
27Nov2016 22:00:00	2016	1116.513835	915.4769	1401.7	1498.358	1182.988
27Nov2016 23:00:00	2016	1003.655905	881.125	1354.745	1393.31	1155.801
28Nov2016 0:00:00	2016	932.5583978	861.7265	1341.793	1356.692	1144.279
28Nov2016 1:00:00	2016	892.4480285	850.5035	1329.787	1320.585	1150.199
28Nov2016 2:00:00	2016	874.4554738	855.1136	1321.958	1298.127	1179.017
28Nov2016 3:00:00	2016	871.7260271	857.7406	1307.887	1291.415	1211.155
28Nov2016 4:00:00	2016	898.3530543	867.0823	1321.457	1329.636	1222.404
28Nov2016 5:00:00	2016	984.5633594	893.5593	1336.912	1397.948	1205.141
28Nov2016 6:00:00	2016	1154.512736	926.8596	1377.692	1557.035	1203.852
28Nov2016 7:00:00	2016	1322.576125	995.6014	1478.25	1731.095	1219.559
28Nov2016 8:00:00	2016	1366.473472	1003.983	1518.695	1785.947	1240.365
28Nov2016 9:00:00	2016	1374.997157	1009.654	1517.723	1793.34	1230.794
28Nov2016 10:00:00	2016	1386.912969	1009.468	1498.41	1780.038	1244.223
28Nov2016 11:00:00	2016	1393.087517	1018.178	1498.49	1776.61	1206.099
28Nov2016 12:00:00	2016	1379.394966	1011.721	1482.776	1766.195	1221.006
28Nov2016 13:00:00	2016	1371.686029	1006.138	1475.963	1774.998	1244.573
28Nov2016 14:00:00	2016	1367.017097	1000.094	1486.234	1752.276	1225.225
28Nov2016 15:00:00	2016	1378.306312	1005.42	1493.422	1792.856	1237.263
28Nov2016 16:00:00	2016	1454.669768	975.7153	1546.087	1885.224	1261.967
28Nov2016 17:00:00	2016	1557.490333	1016.791	1583.219	1967.305	1281.275
28Nov2016 18:00:00	2016	1505.633865	1006.035	1569.024	1926.294	1304.016
28Nov2016 19:00:00	2016	1448.342227	1037.72	1547.041	1888.983	1266.576
28Nov2016 20:00:00	2016	1388.023181	1023.42	1518.642	1813.363	1235.723
28Nov2016 21:00:00	2016	1291.642111	994.4781	1461.84	1706.946	1231.964

28Nov2016 22:00:00	2016	1159.207819	949.2197	1415.622	1576.512	1228.856
28Nov2016 23:00:00	2016	1040.467949	919.7457	1374.049	1430.802	1214.601
29Nov2016 0:00:00	2016	964.1611937	899.5926	1338.263	1352.612	1206.008
29Nov2016 1:00:00	2016	922.2124742	882.608	1332.389	1321.333	1208.385
29Nov2016 2:00:00	2016	903.3593019	879.6286	1322.65	1283.549	1205.314
29Nov2016 3:00:00	2016	903.0259783	879.5158	1330.207	1303.542	1219.139
29Nov2016 4:00:00	2016	929.4578714	888.6796	1340.247	1338.813	1229.306
29Nov2016 5:00:00	2016	1015.739325	913.0372	1363.312	1411.187	1225.595
29Nov2016 6:00:00	2016	1191.511451	958.8109	1418.62	1576.56	1225.249
29Nov2016 7:00:00	2016	1357.227253	1013.881	1476.084	1748.373	1310.627
29Nov2016 8:00:00	2016	1372.737399	1033.32	1477.656	1777.626	1347.17
29Nov2016 9:00:00	2016	1368.072148	1030.772	1501.318	1802.369	1300.128
29Nov2016 10:00:00	2016	1374.165742	1023.346	1491.852	1823.45	1280.662
29Nov2016 11:00:00	2016	1377.481099	1017.905	1483.059	1819.557	1281.202
29Nov2016 12:00:00	2016	1368.349819	1003.045	1471.55	1802.61	1236.559
29Nov2016 13:00:00	2016	1363.259085	987.6051	1475.503	1808.315	1242.229
29Nov2016 14:00:00	2016	1357.597446	978.036	1470.824	1796.836	1199.901
29Nov2016 15:00:00	2016	1364.966063	982.0473	1485.559	1841.072	1151.172
29Nov2016 16:00:00	2016	1438.07059	962.9792	1544.363	1954.145	1215.54
29Nov2016 17:00:00	2016	1547.129238	1003.52	1582.957	2008.34	1266.644
29Nov2016 18:00:00	2016	1498.189413	990.3996	1572.093	1944.818	1234.349
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16Dec2016 21:00:00	2016	1450.716388	1103.391	1615.959	1927.921	1326.708
16Dec2016 22:00:00	2016	1350.836506	1074.435	1577.392	1812.797	1313.52
16Dec2016 23:00:00	2016	1248.05366	1047.572	1522.711	1723.458	1336.111
17Dec2016 0:00:00	2016	1165.081661	1030.36	1498.846	1642.91	1365.752
17Dec2016 1:00:00	2016	1111.086763	1020.072	1511.484	1581.367	1353.193
17Dec2016 2:00:00	2016	1082.461457	1007.317	1502.552	1549.405	1346.484
17Dec2016 3:00:00	2016	1067.831156	997.5376	1474.26	1537.071	1325.314
17Dec2016 4:00:00	2016	1071.25246	996.34	1499.547	1546.155	1302.145
17Dec2016 5:00:00	2016	1098.192102	1001.556	1500.997	1574.833	1319.362
17Dec2016 6:00:00	2016	1155.191612	1023.257	1521.273	1610.259	1307.565
17Dec2016 7:00:00	2016	1238.09794	1049.248	1549.902	1714.173	1306.033
17Dec2016 8:00:00	2016	1320.266867	1070.122	1551.318	1795.519	1300.797
17Dec2016 9:00:00	2016	1358.146098	1068.125	1561.443	1826.815	1273.383
17Dec2016 10:00:00	2016	1380.187005	1072.061	1556.801	1841.368	1252.274
17Dec2016 11:00:00	2016	1387.606101	1078.433	1548.668	1838.466	1273.94
17Dec2016 12:00:00	2016	1382.599838	1068.578	1540.79	1839.639	1290.11
17Dec2016 13:00:00	2016	1362.021234	1058.226	1551.479	1838.199	1287.278
17Dec2016 14:00:00	2016	1339.478646	1053.672	1552.822	1822.145	1297.977
17Dec2016 15:00:00	2016	1350.45082	1056.968	1567.337	1819.579	1285.557
17Dec2016 16:00:00	2016	1425.960965	1074.025	1620.041	1928.192	1294.169
17Dec2016 17:00:00	2016	1524.514851	1118.219	1663.673	2032.598	1284.962
17Dec2016 18:00:00	2016	1489.063767	1107.285	1622.565	2001.531	1216.488
17Dec2016 19:00:00	2016	1444.722196	1095.729	1594.935	1946.419	1206.763
17Dec2016 20:00:00	2016	1402.490046	1101.644	1572.184	1896.279	1211.802
17Dec2016 21:00:00	2016	1348.573166	1075.283	1540.613	1834.929	1207.559
17Dec2016 22:00:00	2016	1268.338024	1049.95	1501.868	1741.185	1179.315
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18Dec2016 1:00:00	2016	1040.720815	977.3472	1416.489	1451.813	1240.547
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18Dec2016 6:00:00	2016	1057.146731	983.4689	1391.709	1433.054	1166.058
18Dec2016 7:00:00	2016	1124.546631	998.9305	1387.612	1500.388	1223.272
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18Dec2016 9:00:00	2016	1231.46613	1026.239	1416.348	1591.65	1242.035
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18Dec2016 17:00:00	2016	1514.785599	1109.038	1567.625	1928	1229.528
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18Dec2016 19:00:00	2016	1436.161117	1097.145	1529.766	1843.788	1216.438
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19Dec2016 1:00:00	2016	971.3385569	942.3917	1356.638	1403.257	1114.299
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19Dec2016 11:00:00	2016	1438.645048	1073.631	1521.138	1830.883	1107.05
19Dec2016 12:00:00	2016	1438.765326	1060.854	1511.395	1815.036	1160.76
19Dec2016 13:00:00	2016	1439.50011	1055.562	1509.519	1820.146	1139.732
19Dec2016 14:00:00	2016	1428.436728	1065.622	1516.5	1812.411	1140.011
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19Dec2016 20:00:00	2016	1462.176014	1091.627	1568.41	1882.979	1149.646
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20Dec2016 16:00:00	2016	1490.328258	1045.493	1576.835	1979.043	1142.182
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20Dec2016 19:00:00	2016	1477.031133	1058.084	1546.984	1926.239	1151.545
20Dec2016 20:00:00	2016	1422.927463	1064.285	1548.108	1870.477	1155.791
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21Dec2016 0:00:00	2016	1022.327799	928.9125	1375.704	1442.743	1099.25
21Dec2016 1:00:00	2016	976.3750487	914.6958	1363.057	1390.756	1092.36
21Dec2016 2:00:00	2016	952.9398594	909.2398	1359.218	1368.429	1114.953
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21Dec2016 4:00:00	2016	970.6408843	918.6614	1372.38	1365.114	1115.204
21Dec2016 5:00:00	2016	1051.89047	941.2059	1388.442	1441.24	1113.924
21Dec2016 6:00:00	2016	1198.49822	979.5431	1421.707	1588.625	1085.716
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21Dec2016 9:00:00	2016	1403.93317	1050.633	1558.256	1827.995	1111.531
21Dec2016 10:00:00	2016	1418.032436	1047.612	1531.611	1813.309	1110.923
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21Dec2016 16:00:00	2016	1470.265954	1051.047	1578.754	1926.997	1111.691
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21Dec2016 18:00:00	2016	1516.477752	1064.663	1570.493	1958.69	1102.03
21Dec2016 19:00:00	2016	1467.825083	1066.623	1548.063	1934.013	1096.614
21Dec2016 20:00:00	2016	1419.690243	1062.835	1530.76	1879.343	1092.461
21Dec2016 21:00:00	2016	1342.235838	1045.908	1510.29	1807.126	1089.139
21Dec2016 22:00:00	2016	1222.962896	1009.859	1461.67	1684.147	1090.919
21Dec2016 23:00:00	2016	1107.30206	973.2838	1417.409	1549.427	1084.275
22Dec2016 0:00:00	2016	1022.163632	941.9813	1379.689	1459.61	1052.326
22Dec2016 1:00:00	2016	965.3816506	924.9251	1368.001	1400.273	1050.938
22Dec2016 2:00:00	2016	937.1619496	919.3374	1356.454	1380.679	1035.384
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22Dec2016 4:00:00	2016	953.0082945	917.9224	1349.886	1368.149	1029.815
22Dec2016 5:00:00	2016	1026.37275	936.0442	1353.662	1435.961	1047.114
22Dec2016 6:00:00	2016	1166.777688	974.3917	1390.515	1570.422	1055.793
22Dec2016 7:00:00	2016	1309.843845	1030.954	1456.929	1747.085	1080.338
22Dec2016 8:00:00	2016	1382.485016	1055.781	1502.039	1830.552	1081.59
22Dec2016 9:00:00	2016	1388.517644	1035.991	1477.054	1806.256	1048.745

22Dec2016 10:00:00	2016	1394.910255	1029.327	1471.923	1814.979	1022.997
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22Dec2016 18:00:00	2016	1495.687847	1082.118	1523.841	1904.314	1087.142
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22Dec2016 20:00:00	2016	1402.670256	1070.008	1484.937	1832.674	1099.448
22Dec2016 21:00:00	2016	1330.020894	1050.995	1452.08	1741.314	1103.579
22Dec2016 22:00:00	2016	1220.705656	1011.248	1421.586	1642.349	1131.052
22Dec2016 23:00:00	2016	1107.646125	972.752	1371.04	1499.378	1134.338
23Dec2016 0:00:00	2016	1023.487145	939.0594	1346.789	1436.491	1114.642
23Dec2016 1:00:00	2016	970.4160703	924.0376	1338.286	1389.771	1091.258
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23Dec2016 3:00:00	2016	937.3035537	923.6125	1326.288	1354.824	1090.431
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23Dec2016 5:00:00	2016	1024.774445	950.8681	1344.596	1437.484	1051.736
23Dec2016 6:00:00	2016	1144.987624	983.7178	1344.661	1556.809	1009.092
23Dec2016 7:00:00	2016	1266.600766	1025.999	1414.774	1710.966	1040.471
23Dec2016 8:00:00	2016	1356.212351	1058.56	1501.883	1786.537	1069.938
23Dec2016 9:00:00	2016	1407.640297	1065.69	1509.917	1812.565	1107.047
23Dec2016 10:00:00	2016	1424.708219	1072.013	1529.661	1829.892	1111.345
23Dec2016 11:00:00	2016	1432.845508	1072.573	1537.519	1833.241	1095.631
23Dec2016 12:00:00	2016	1409.337673	1070.653	1505.588	1775.486	1105.174
23Dec2016 13:00:00	2016	1387.37567	1070.382	1498.001	1752.964	1095.809
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23Dec2016 16:00:00	2016	1443.720201	1087.428	1560.384	1868.919	1067.795
23Dec2016 17:00:00	2016	1519.396834	1103.709	1595.363	1932.382	1056.683
23Dec2016 18:00:00	2016	1471.887816	1089.438	1568.672	1883.368	1048.983
23Dec2016 19:00:00	2016	1426.664383	1078.021	1546.313	1846.922	1058.46
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23Dec2016 21:00:00	2016	1313.233479	1052.532	1485.374	1734.633	1092.555
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24Dec2016 5:00:00	2016	964.7549466	935.9002	1356.444	1401.625	1022.289
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24Dec2016 7:00:00	2016	1089.865826	981.1058	1397.841	1532.841	1076.842
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24Dec2016 12:00:00	2016	1308.362366	1041.627	1472.256	1729.067	1051.969
24Dec2016 13:00:00	2016	1297.241576	1043.304	1473.753	1725.361	1063.924
24Dec2016 14:00:00	2016	1289.74367	1043.635	1460.854	1695.55	1061.439
24Dec2016 15:00:00	2016	1300.031655	1052.624	1478.215	1709.679	1064.099
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24Dec2016 17:00:00	2016	1417.571875	1077.51	1549.85	1828.937	1069.106
24Dec2016 18:00:00	2016	1365.363116	1059.723	1516.109	1755.725	1057.855
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24Dec2016 20:00:00	2016	1276.952795	1035.602	1495.924	1660.049	1039.512
24Dec2016 21:00:00	2016	1243.806866	1031.087	1448.223	1631.858	1031.205
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24Dec2016 23:00:00	2016	1121.754192	971.5158	1393.834	1504.463	1020.248
25Dec2016 0:00:00	2016	1053.105501	948.9943	1364.88	1430.334	1047.053
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25Dec2016 6:00:00	2016	1012.886937	962.0441	1418.121	1403.275	1065.773
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25Dec2016 8:00:00	2016	1145.814788	1033.062	1486.556	1570.705	1069.688
25Dec2016 9:00:00	2016	1180.115279	1045.958	1461.952	1585.534	1066.676
25Dec2016 10:00:00	2016	1203.782756	1044.506	1457.717	1604.506	1045.046
25Dec2016 11:00:00	2016	1214.996741	1033.74	1457.747	1619.241	1034.765
25Dec2016 12:00:00	2016	1216.480266	1017.552	1467.096	1621.126	1035.797
25Dec2016 13:00:00	2016	1212.164273	1015.426	1458.684	1614.427	993.244
25Dec2016 14:00:00	2016	1210.632665	1015.239	1443.536	1612.758	1010.117
25Dec2016 15:00:00	2016	1222.751265	1006.656	1455.676	1632.67	1008.357
25Dec2016 16:00:00	2016	1289.083867	1029.431	1498.739	1715.723	1036.448
25Dec2016 17:00:00	2016	1351.606861	1063.776	1538.294	1787.212	1065.388
25Dec2016 18:00:00	2016	1302.981622	1055.822	1524.112	1728.657	1053.943
25Dec2016 19:00:00	2016	1268.996067	1044.802	1517.883	1693.659	1059.334
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26Dec2016 3:00:00	2016	982.6806927	928.1465	1355.245	1359.854	1082.075
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26Dec2016 21:00:00	2016	1239.304057	1014.359	1468.417	1700.428	1116.421
26Dec2016 22:00:00	2016	1155.767813	986.995	1437.233	1611.769	1108.893
26Dec2016 23:00:00	2016	1067.171944	957.3397	1398.589	1518.758	1102.944
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27Dec2016 1:00:00	2016	951.6357058	918.4638	1343.445	1374.789	1083.314
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27Dec2016 9:00:00	2016	1223.196263	1017.947	1419.963	1598.767	1085.681
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27Dec2016 17:00:00	2016	1459.284145	1079.892	1559.994	1877.35	1115.772
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27Dec2016 19:00:00	2016	1386.556663	1061.95	1529.2	1807.842	1131.31
27Dec2016 20:00:00	2016	1336.727849	1052.601	1512.928	1766.391	1136.409
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28Dec2016 0:00:00	2016	1004.64072	937.7237	1408.355	1424.16	1085.29
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28Dec2016 2:00:00	2016	940.4592226	919.4826	1376.268	1336.131	1114.472
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28Dec2016 4:00:00	2016	948.9741193	920.3654	1370.382	1319.167	1111.356
28Dec2016 5:00:00	2016	1007.124733	935.3586	1358.669	1330.373	1106.912
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03Jan2017 6:00:00	2017	1263.731676	1039.857	1464.733	1674.779	1078.977
03Jan2017 7:00:00	2017	1399.953839	1079	1524.099	1762.559	1092.998
03Jan2017 8:00:00	2017	1452.071958	1108.352	1582.081	1863.78	1095.997
03Jan2017 9:00:00	2017	1464.570025	1115.583	1588.877	1873.098	1082.175
03Jan2017 10:00:00	2017	1480.687914	1122.268	1585.596	1884.399	1079.735
03Jan2017 11:00:00	2017	1490.596354	1118.704	1587.508	1892.209	1076.21
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03Jan2017 15:00:00	2017	1486.269025	1104.53	1596.176	1917.978	1060.11
03Jan2017 16:00:00	2017	1545.461616	1124.796	1638.539	1990.936	1066.321
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03Jan2017 22:00:00	2017	1295.327511	1082.348	1503.68	1717.754	1074.586
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11Jan2017 23:00:00	2017	1156.153742	1025.42	1459.448	1651.883	1115.226
12Jan2017 0:00:00	2017	1084.201038	1002.408	1442.365	1570.501	1101.513
12Jan2017 1:00:00	2017	1042.905516	981.7991	1427.788	1541.198	1109.879
12Jan2017 2:00:00	2017	1024.332796	979.3441	1390.438	1520.039	1045.813
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12Jan2017 4:00:00	2017	1047.694504	989.1063	1390.87	1504.41	1085.696
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12Jan2017 6:00:00	2017	1289.768138	1030.055	1418.725	1704.206	1067.268
12Jan2017 7:00:00	2017	1444.864355	1094.529	1508.5	1871.217	1083.561
12Jan2017 8:00:00	2017	1473.83873	1102.551	1547.481	1934.139	1085.011
12Jan2017 9:00:00	2017	1468.141251	1089.64	1552.116	1945.57	1124.763
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12Jan2017 12:00:00	2017	1471.149516	1060.978	1554.484	1928.991	1152.101
12Jan2017 13:00:00	2017	1466.446176	1053.939	1551.252	1939.687	1129.947
12Jan2017 14:00:00	2017	1449.615616	1049.346	1544.116	1930.277	1129.149
12Jan2017 15:00:00	2017	1457.855156	1051.021	1551.039	1908.727	1134.058
12Jan2017 16:00:00	2017	1504.592671	1029.015	1579.035	1916.867	1148.772
12Jan2017 17:00:00	2017	1617.919193	1069.449	1640.318	2042.089	1142.848
12Jan2017 18:00:00	2017	1591.864973	1073.293	1634.309	2006.95	1140.772
12Jan2017 19:00:00	2017	1538.483208	1109.726	1636.418	1973.217	1133.437
12Jan2017 20:00:00	2017	1479.706437	1093.929	1612.351	1921.368	1098.36
12Jan2017 21:00:00	2017	1381.809644	1062.348	1570.803	1854.351	1078.654
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12Jan2017 23:00:00	2017	1141.392073	978.9304	1425.683	1624.547	1066.499
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13Jan2017 1:00:00	2017	1023.017872	962.719	1425.073	1495.879	1064.116
13Jan2017 2:00:00	2017	1001.222642	956.3014	1419.559	1478.563	1067.112
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13Jan2017 4:00:00	2017	1017.435481	965.4848	1423.579	1469.203	1060.021
13Jan2017 5:00:00	2017	1092.553595	968.2643	1424.03	1532.077	1071.48
13Jan2017 6:00:00	2017	1245.379695	1000.327	1470.782	1667.718	1073.237
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13Jan2017 8:00:00	2017	1449.868252	1061.134	1577.167	1908.244	1076.397
13Jan2017 9:00:00	2017	1445.155696	1058.7	1563.329	1894.044	1067.974
13Jan2017 10:00:00	2017	1442.005722	1048.573	1528.507	1849.497	1025.283
13Jan2017 11:00:00	2017	1438.453876	1037.132	1521.368	1845.646	1001.924
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13Jan2017 15:00:00	2017	1402.462747	1008.905	1496.744	1782.279	1041.504
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13Jan2017 17:00:00	2017	1528.347411	1081.501	1580.294	1952.007	1079.624
13Jan2017 18:00:00	2017	1500.518188	1078.615	1566.558	1933.509	1063.771
13Jan2017 19:00:00	2017	1448.767436	1063.168	1548.256	1878.231	1055.982
13Jan2017 20:00:00	2017	1394.71117	1057.854	1533.425	1826.928	1072.118
13Jan2017 21:00:00	2017	1322.174186	1035.698	1506.581	1745.061	1056.47
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14Jan2017 1:00:00	2017	1003.601729	946.1025	1413.899	1439.622	994.2741
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14Jan2017 7:00:00	2017	1123.855326	972.9658	1429.98	1545.777	1009.447
14Jan2017 8:00:00	2017	1192.228823	995.4938	1445.084	1598.568	1010.456
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14Jan2017 13:00:00	2017	1247.12968	978.9913	1451.204	1655.738	997.5055
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15Jan2017 3:00:00	2017	902.6808212	892.5434	1348.698	1318.619	954.2847
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17Jan2017 1:00:00	2017	922.8405279	893.345	1283.396	1313.208	1028.397
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17Jan2017 23:00:00	2017	1030.512555	905.765	1287.459	1385.643	1036.828
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20Jan2017 13:00:00	2017	1364.711682	976.9311	1419.126	1732.171	971.0973
20Jan2017 14:00:00	2017	1350.279076	965.2787	1399.603	1718.593	951.7134
20Jan2017 15:00:00	2017	1339.853514	965.1619	1386.032	1689.458	971.2238
20Jan2017 16:00:00	2017	1356.213771	971.7422	1406.949	1717.637	993.3064
20Jan2017 17:00:00	2017	1439.210971	1013.476	1469.711	1820.475	1009.756
20Jan2017 18:00:00	2017	1425.70428	1025.785	1475.642	1812.732	1001.239

20Jan2017 19:00:00	2017	1372.562855	1014.601	1469.059	1779.775	993.4769
20Jan2017 20:00:00	2017	1323.976519	1006.098	1450.633	1739.826	1041.226
20Jan2017 21:00:00	2017	1255.397595	986.7382	1427.779	1663.997	1065.354
20Jan2017 22:00:00	2017	1160.599605	960.2526	1361.251	1568.427	1023.509
20Jan2017 23:00:00	2017	1065.47262	942.9602	1325.391	1477.081	1011.632
21Jan2017 0:00:00	2017	995.5271947	929.3791	1312.238	1420.342	997.1807
21Jan2017 1:00:00	2017	950.2542672	917.0276	1302.283	1369.643	1025.457
21Jan2017 2:00:00	2017	926.3998519	910.7453	1295.399	1351.881	1010.806
21Jan2017 3:00:00	2017	914.9521616	909.9552	1283.739	1337.558	1000.179
21Jan2017 4:00:00	2017	920.0821379	912.8003	1283.454	1332.759	996.8507
21Jan2017 5:00:00	2017	948.6237819	927.6651	1283.071	1361.395	982.536
21Jan2017 6:00:00	2017	1005.921587	942.1988	1340.795	1402.206	1020.411
21Jan2017 7:00:00	2017	1092.658131	953.6169	1388.578	1500.167	1002.172
21Jan2017 8:00:00	2017	1162.690632	974.0312	1424.261	1585.179	1001.523
21Jan2017 9:00:00	2017	1201.620095	992.9591	1441.556	1614.016	1009.359
21Jan2017 10:00:00	2017	1229.779336	1000.901	1455.464	1651.356	1007.51
21Jan2017 11:00:00	2017	1241.65093	989.6932	1450.619	1659.606	994.5739
21Jan2017 12:00:00	2017	1240.654403	985.6892	1438.7	1676.679	991.7226
21Jan2017 13:00:00	2017	1220.733494	978.6027	1432.978	1661.725	969.948
21Jan2017 14:00:00	2017	1204.293732	971.386	1420.086	1646.57	988.3289
21Jan2017 15:00:00	2017	1206.639285	972.3825	1426.192	1660.902	989.8898
21Jan2017 16:00:00	2017	1247.78954	983.7595	1461.461	1707.396	999.8625
21Jan2017 17:00:00	2017	1353.278507	1023.24	1527.068	1819.574	1018.679
21Jan2017 18:00:00	2017	1357.482375	1023.043	1525.852	1820.075	1025.964
21Jan2017 19:00:00	2017	1310.897491	1016.683	1503.802	1772.986	1025.923
21Jan2017 20:00:00	2017	1266.346785	1004.616	1493.859	1728.534	1002.32
21Jan2017 21:00:00	2017	1212.593805	982.4219	1469.105	1652.914	990.9844
21Jan2017 22:00:00	2017	1136.978183	956.6198	1436.224	1569.304	1000.384
21Jan2017 23:00:00	2017	1052.452953	942.0541	1396.835	1480.308	1016.369
22Jan2017 0:00:00	2017	984.357259	919.9874	1373.725	1404.924	1030.659
22Jan2017 1:00:00	2017	934.5082859	901.6333	1358.27	1364.814	1014.278
22Jan2017 2:00:00	2017	906.8581159	895.6067	1340.934	1318.098	993.5211
22Jan2017 3:00:00	2017	894.8472493	890.8949	1326.881	1315.772	986.7586
22Jan2017 4:00:00	2017	896.2949844	895.9865	1322.306	1315.306	984.7906
22Jan2017 5:00:00	2017	922.703562	907.3308	1327.666	1332.337	1020.987
22Jan2017 6:00:00	2017	967.0096782	925.8662	1342.453	1366.176	1011.148
22Jan2017 7:00:00	2017	1032.679342	930.4831	1375.515	1427.107	1022.487
22Jan2017 8:00:00	2017	1104.421418	954.1143	1408.201	1502.205	1039.412
22Jan2017 9:00:00	2017	1159.028856	976.4922	1426.022	1552.933	1034.233
22Jan2017 10:00:00	2017	1214.921634	987.4129	1429.737	1597.684	1046.265
22Jan2017 11:00:00	2017	1248.022219	998.8711	1429.347	1623.902	1053.891
22Jan2017 12:00:00	2017	1268.808444	1008.122	1452.351	1654.777	1064.871
22Jan2017 13:00:00	2017	1273.086232	1007.394	1458.688	1652.849	1062.138
22Jan2017 14:00:00	2017	1276.863939	1007.161	1454.9	1668.409	1068.573
22Jan2017 15:00:00	2017	1299.175171	1012.402	1470.126	1657.886	1073.715
22Jan2017 16:00:00	2017	1354.45692	1028.957	1502.868	1749.243	1096.129
22Jan2017 17:00:00	2017	1437.597652	1061.797	1547.486	1831.994	1113.635

22Jan2017 18:00:00	2017	1421.16613	1053.882	1532.058	1822.179	1102.16
22Jan2017 19:00:00	2017	1375.13217	1041.114	1514.925	1781.605	1104.049
22Jan2017 20:00:00	2017	1321.788255	1023.019	1490.553	1717.673	1103.448
22Jan2017 21:00:00	2017	1245.721452	995.2094	1465.358	1637.025	1068.433
22Jan2017 22:00:00	2017	1138.731211	954.7747	1418.765	1545.626	1033.49
22Jan2017 23:00:00	2017	1037.103239	932.2474	1359.348	1439.321	1033.716
23Jan2017 0:00:00	2017	967.8223477	910.2097	1303.159	1372.445	1039.256
23Jan2017 1:00:00	2017	929.6197883	894.4517	1284.555	1328.409	1043.697
23Jan2017 2:00:00	2017	915.353626	889.2329	1293.314	1328.259	1025.876
23Jan2017 3:00:00	2017	915.5657063	889.3887	1314.297	1347.238	1031.816
23Jan2017 4:00:00	2017	942.182192	900.3296	1335.602	1371.841	1018.862
23Jan2017 5:00:00	2017	1027.868119	920.2727	1364.77	1407.243	1041.643
23Jan2017 6:00:00	2017	1193.472708	959.9526	1416.246	1570.258	1045.517
23Jan2017 7:00:00	2017	1357.686388	1011.448	1500.769	1749.77	1067.778
23Jan2017 8:00:00	2017	1403.07949	1034.183	1522.542	1804.283	1078.023
23Jan2017 9:00:00	2017	1405.934699	1040.611	1498.807	1811.505	1085.699
23Jan2017 10:00:00	2017	1418.09709	1045.915	1508.171	1830.796	1083.317
23Jan2017 11:00:00	2017	1427.998881	1050.922	1520.485	1855.126	1076.883
23Jan2017 12:00:00	2017	1421.039797	1044.241	1529.305	1855.151	1066.478
23Jan2017 13:00:00	2017	1410.953612	1037.327	1538.132	1886.212	1059.901
23Jan2017 14:00:00	2017	1408.899965	1016.946	1497.805	1862.02	1065.238
23Jan2017 15:00:00	2017	1415.558869	1021.286	1503.982	1885.041	1079.073
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23Jan2017 17:00:00	2017	1542.251603	1082.724	1582.622	1980.049	1118.349
23Jan2017 18:00:00	2017	1516.810388	1080.787	1566.624	1946.272	1105.893
23Jan2017 19:00:00	2017	1459.470994	1059.855	1546.206	1886.592	1096.256
23Jan2017 20:00:00	2017	1397.928414	1041.128	1519.209	1827.165	1089.654
23Jan2017 21:00:00	2017	1304.886399	1016.253	1502.149	1747.065	1057.111
23Jan2017 22:00:00	2017	1176.36637	976.7172	1453.077	1639.379	1059.958
23Jan2017 23:00:00	2017	1059.121759	945.1698	1410.01	1517.807	1052.058
24Jan2017 0:00:00	2017	986.9873558	922.1777	1396.131	1436.53	1059.266
24Jan2017 1:00:00	2017	950.8424815	908.765	1363.331	1392.678	1064.041
24Jan2017 2:00:00	2017	928.2880495	901.6372	1344.704	1352.087	1057.678
24Jan2017 3:00:00	2017	927.7422929	900.7115	1349.848	1344.705	1053.142
24Jan2017 4:00:00	2017	952.6514193	910.1479	1356.5	1360.279	1049.21
24Jan2017 5:00:00	2017	1041.987498	933.3849	1371.653	1423.888	1071.067
24Jan2017 6:00:00	2017	1210.159361	979.8929	1431.736	1574.312	1108.865
24Jan2017 7:00:00	2017	1371.3239	1027.132	1507.592	1732.925	1126.896
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24Jan2017 9:00:00	2017	1389.40008	1040.215	1523.1	1761.157	1114.273
24Jan2017 10:00:00	2017	1407.303581	1043.011	1493.211	1794.901	1119.345
24Jan2017 11:00:00	2017	1411.673447	1041.818	1481.626	1823.592	1102.731
24Jan2017 12:00:00	2017	1402.622769	1032.977	1482.348	1816.389	1088.642
24Jan2017 13:00:00	2017	1395.961092	1014.146	1469.789	1814.758	1055.988
24Jan2017 14:00:00	2017	1387.108964	1005.072	1436.461	1789.073	1074.228
24Jan2017 15:00:00	2017	1394.044807	1009.046	1450.785	1790.521	1095.078
24Jan2017 16:00:00	2017	1419.409738	1029.577	1505.97	1835.327	1124.623

24Jan2017 17:00:00	2017	1513.117595	1073.196	1566.057	1960.655	1131.985
24Jan2017 18:00:00	2017	1504.062238	1067.271	1521.207	1946.224	1097.67
24Jan2017 19:00:00	2017	1452.138975	1050.102	1524.322	1897.021	1084.273
24Jan2017 20:00:00	2017	1396.256376	1021.054	1363.651	1817.324	1067.208
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24Jan2017 22:00:00	2017	1175.44322	949.853	1348.581	1638.281	1059.666
24Jan2017 23:00:00	2017	1062.542947	923.3422	1307.266	1537.733	1034.294
25Jan2017 0:00:00	2017	992.7913034	904.9465	1322.417	1452.079	1012.542
25Jan2017 1:00:00	2017	951.138253	893.0102	1340.588	1389.952	1016.12
25Jan2017 2:00:00	2017	933.7049645	888.9791	1352.445	1373.12	1030.575
25Jan2017 3:00:00	2017	932.3702312	887.0501	1368.158	1373.147	1038.093
25Jan2017 4:00:00	2017	955.4708735	896.7665	1372.43	1388.9	1040.032
25Jan2017 5:00:00	2017	1042.109475	917.109	1378.225	1449.758	1065.771
25Jan2017 6:00:00	2017	1209.757408	959.9654	1417.299	1569.228	1064.545
25Jan2017 7:00:00	2017	1365.04391	1009.036	1484.722	1748.922	1073.228
25Jan2017 8:00:00	2017	1397.072098	1023.736	1484.091	1790.271	1093.046
25Jan2017 9:00:00	2017	1395.350308	1023.773	1480.673	1785.039	1084.501
25Jan2017 10:00:00	2017	1396.972128	1004.947	1487.706	1793.75	1076.307
25Jan2017 11:00:00	2017	1398.965574	1000.926	1488.297	1800.09	1062.662
25Jan2017 12:00:00	2017	1392.436706	993.565	1481.006	1785.788	1043.467
25Jan2017 13:00:00	2017	1384.256361	985.8399	1477.626	1802.131	1021.442
25Jan2017 14:00:00	2017	1374.489576	979.9421	1453.261	1786.721	1023.336
25Jan2017 15:00:00	2017	1373.468882	977.6325	1425.857	1771.126	1038.868
25Jan2017 16:00:00	2017	1402.597088	984.1226	1452.159	1800.312	1042.229
25Jan2017 17:00:00	2017	1496.192995	1027.581	1510.432	1927.409	1055.599
25Jan2017 18:00:00	2017	1494.158073	1038.839	1492.078	1913.79	1061.209
25Jan2017 19:00:00	2017	1446.913984	1039.412	1489.237	1874.061	1047.405
25Jan2017 20:00:00	2017	1395.52286	1025.566	1474.617	1835.878	1047.181
25Jan2017 21:00:00	2017	1308.662122	1001.754	1436.618	1749.558	1055.688
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25Jan2017 23:00:00	2017	1073.057849	925.5078	1346.631	1517.71	1058.355
26Jan2017 0:00:00	2017	1000.579051	907.4771	1342.817	1466.177	1053.45
26Jan2017 1:00:00	2017	961.3556758	899.5715	1325.16	1393.576	1047.546
26Jan2017 2:00:00	2017	943.3772537	897.8722	1324.019	1373.939	1025.788
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26Jan2017 4:00:00	2017	962.166548	900.9309	1327.374	1366.114	1031.907
26Jan2017 5:00:00	2017	1045.952997	922.6147	1339.2	1423.92	1035.132
26Jan2017 6:00:00	2017	1210.244244	952.8135	1376.516	1561.442	1041.453
26Jan2017 7:00:00	2017	1370.159472	997.6879	1443.344	1730.359	1044.804
26Jan2017 8:00:00	2017	1393.15972	1009.234	1473.076	1760.946	1030.92
26Jan2017 9:00:00	2017	1391.507038	993.7048	1470.655	1760.464	1030.483
26Jan2017 10:00:00	2017	1396.089169	995.9205	1467.554	1785.168	1020.965
26Jan2017 11:00:00	2017	1397.131338	1003.988	1462.764	1776.704	1007.678
26Jan2017 12:00:00	2017	1390.01685	990.5795	1404.502	1771.72	995.3955
26Jan2017 13:00:00	2017	1381.546571	988.288	1393.251	1793.242	991.2575
26Jan2017 14:00:00	2017	1372.545533	982.2728	1397.341	1779.704	958.4039
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26Jan2017 17:00:00	2017	1474.013566	1027.693	1475.074	1916.154	1011.005
26Jan2017 18:00:00	2017	1478.752627	1043.789	1478.619	1912.578	1003.875
26Jan2017 19:00:00	2017	1436.112428	1035.259	1469.338	1864.256	985.8961
26Jan2017 20:00:00	2017	1381.430155	1021.995	1466.154	1816.156	1014.649
26Jan2017 21:00:00	2017	1293.880005	1000.372	1440.828	1724.696	1017.589
26Jan2017 22:00:00	2017	1176.14053	966.0551	1399.407	1557.977	999.2889
26Jan2017 23:00:00	2017	1067.561722	938.3152	1367.835	1455.765	985.2759
27Jan2017 0:00:00	2017	990.284344	919.7198	1354.945	1364.23	976.3015
27Jan2017 1:00:00	2017	948.2252861	907.5495	1345.073	1334.219	967.489
27Jan2017 2:00:00	2017	927.7924128	900.7193	1327.662	1318.257	966.4426
27Jan2017 3:00:00	2017	924.1208433	898.1898	1331.886	1308.897	960.8809
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27Jan2017 5:00:00	2017	1026.511586	921.1105	1325.155	1398.37	976.4027
27Jan2017 6:00:00	2017	1179.799799	959.6102	1358.387	1559.889	981.2943
27Jan2017 7:00:00	2017	1335.177203	998.7374	1413.519	1728.007	997.0144
27Jan2017 8:00:00	2017	1376.099596	1010.245	1423.223	1760.83	990.9204
27Jan2017 9:00:00	2017	1380.21779	1014.217	1415.2	1756.693	995.2306
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27Jan2017 11:00:00	2017	1390.808303	1000.137	1423.869	1767.144	964.317
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27Jan2017 13:00:00	2017	1373.194901	977.0926	1424.021	1741.001	966.7002
27Jan2017 14:00:00	2017	1367.781738	971.3768	1409.242	1732.17	964.7725
27Jan2017 15:00:00	2017	1362.419121	977.8179	1420.972	1739.818	952.6353
27Jan2017 16:00:00	2017	1383.55917	993.9657	1439.215	1750.694	968.8581
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27Jan2017 18:00:00	2017	1431.016457	1022.867	1477.628	1847.529	1005.469
27Jan2017 19:00:00	2017	1376.948853	1007.041	1477.014	1792.829	997.1475
27Jan2017 20:00:00	2017	1321.704967	1001.638	1477.422	1753.204	1004
27Jan2017 21:00:00	2017	1251.412482	975.3934	1450.702	1667.546	990.8365
27Jan2017 22:00:00	2017	1154.575284	945.6172	1408.367	1572.867	979.5018
27Jan2017 23:00:00	2017	1058.813757	909.028	1364.437	1489.278	968.7916
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28Jan2017 7:00:00	2017	1063.40905	926.3909	1370.396	1482.596	980.7462
28Jan2017 8:00:00	2017	1124.857035	943.4124	1380.231	1524.26	977.2025
28Jan2017 9:00:00	2017	1169.395166	960.9346	1385.565	1527.082	971.2696
28Jan2017 10:00:00	2017	1211.953912	970.0576	1394.937	1571.854	978.718
28Jan2017 11:00:00	2017	1232.778957	970.8563	1374.316	1595.104	986.3228
28Jan2017 12:00:00	2017	1234.425839	966.4079	1349.212	1575.875	974.0291
28Jan2017 13:00:00	2017	1232.127459	964.99	1341.644	1567.206	963.7571
28Jan2017 14:00:00	2017	1228.637021	963.4342	1335.304	1574.623	974.8293

28Jan2017 15:00:00	2017	1237.642831	966.8978	1339.329	1583.562	992.6895
28Jan2017 16:00:00	2017	1268.810225	981.9502	1374.442	1627.871	978.123
28Jan2017 17:00:00	2017	1339.678591	1010.229	1426.367	1690.613	995.037
28Jan2017 18:00:00	2017	1326.957307	1008.601	1427.424	1700.558	992.5373
28Jan2017 19:00:00	2017	1280.243629	993.5526	1404.192	1669.148	984.0714
28Jan2017 20:00:00	2017	1233.306323	981.0178	1391.336	1625.261	1002.002
28Jan2017 21:00:00	2017	1178.898316	963.2739	1380.116	1603.386	1006.214
28Jan2017 22:00:00	2017	1108.199637	937.3602	1346.071	1521.147	992.9766
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29Jan2017 0:00:00	2017	956.760535	884.0344	1297.294	1376.136	965.3636
29Jan2017 1:00:00	2017	910.810976	870.7981	1285.329	1320.961	959.6762
29Jan2017 2:00:00	2017	882.7124496	864.5764	1271.035	1300.884	956.9491
29Jan2017 3:00:00	2017	869.790218	855.6552	1268.743	1274.765	955.4383
29Jan2017 4:00:00	2017	867.193405	855.2278	1270.394	1294.006	954.7791
29Jan2017 5:00:00	2017	891.2604781	859.9585	1272.556	1291.816	953.4325
29Jan2017 6:00:00	2017	936.2785664	875.499	1285.66	1329.715	953.5449
29Jan2017 7:00:00	2017	1005.624283	898.5275	1311.407	1395.45	971.7128
29Jan2017 8:00:00	2017	1064.035081	918.2432	1332.676	1464.079	985.1058
29Jan2017 9:00:00	2017	1114.883553	936.3044	1353.341	1489.867	981.5399
29Jan2017 10:00:00	2017	1155.297702	943.3735	1360.729	1520.058	975.8756
29Jan2017 11:00:00	2017	1174.365513	939.181	1355.477	1540.021	963.9231
29Jan2017 12:00:00	2017	1186.463671	934.1668	1358.498	1559.822	977.5253
29Jan2017 13:00:00	2017	1187.957268	933.3899	1350.014	1544.13	988.8647
29Jan2017 14:00:00	2017	1184.836056	929.1612	1353.142	1568.351	995.0663
29Jan2017 15:00:00	2017	1183.396931	931.1138	1360.893	1578.117	982.0825
29Jan2017 16:00:00	2017	1219.535843	946.2851	1351.842	1636.327	997.193
29Jan2017 17:00:00	2017	1339.401354	984.2412	1395.578	1787.264	1026.759
29Jan2017 18:00:00	2017	1374.537382	997.1429	1396.185	1780.441	1038.887
29Jan2017 19:00:00	2017	1330.836012	995.6714	1427.584	1734.839	1044.753
29Jan2017 20:00:00	2017	1278.190333	986.2421	1431.574	1703.052	1042.97
29Jan2017 21:00:00	2017	1208.032728	962.1554	1394.019	1637.305	1031.111
29Jan2017 22:00:00	2017	1112.679299	928.442	1349.101	1535.294	1020.98
29Jan2017 23:00:00	2017	1008.875242	899.8025	1319.279	1429.307	1024.615
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30Jan2017 1:00:00	2017	900.1289665	880.3129	1262.769	1288.774	1073.861
30Jan2017 2:00:00	2017	879.7018576	871.9126	1259.964	1252.437	1078.788
30Jan2017 3:00:00	2017	878.2158714	871.1121	1261.291	1253.621	1073.001
30Jan2017 4:00:00	2017	907.7927481	882.7446	1265.226	1282.525	1087.55
30Jan2017 5:00:00	2017	992.4326467	898.6124	1287.266	1381.424	1092.045
30Jan2017 6:00:00	2017	1162.049384	948.7581	1339.622	1522.934	1091.367
30Jan2017 7:00:00	2017	1327.68907	996.8687	1410.26	1679.797	1087.336
30Jan2017 8:00:00	2017	1362.973205	1010.505	1446.884	1720.737	1097.711
30Jan2017 9:00:00	2017	1364.321264	1013.369	1443.858	1739.822	1095.429
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30Jan2017 11:00:00	2017	1377.229318	1011.067	1445.565	1769.163	1105.781
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30Jan2017 16:00:00	2017	1416.573738	1009.441	1478.988	1851.445	1132.787
30Jan2017 17:00:00	2017	1501.135128	1066.124	1519.712	1947.607	1145.565
30Jan2017 18:00:00	2017	1492.978635	1069.958	1514.923	1906.409	1135.907
30Jan2017 19:00:00	2017	1441.480977	1054.565	1484.852	1837.353	1112.943
30Jan2017 20:00:00	2017	1384.587566	1035.786	1479.604	1791.599	1146.299
30Jan2017 21:00:00	2017	1289.458824	1004.826	1449.138	1720.32	1113.098
30Jan2017 22:00:00	2017	1161.379794	969.6054	1399.545	1595.711	1080.666
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31Jan2017 1:00:00	2017	941.8874588	925.4927	1330.472	1375.501	1051.158
31Jan2017 2:00:00	2017	921.1894407	922.0188	1305.811	1348.786	1076.684
31Jan2017 3:00:00	2017	921.4978957	920.372	1334.177	1372.969	1080.22
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31Jan2017 11:00:00	2017	1426.622624	1055.012	1523.018	1859.333	1073.878
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31Jan2017 14:00:00	2017	1418.186662	1043.712	1512.924	1850.161	1046.019
31Jan2017 15:00:00	2017	1422.57644	1043.471	1512.14	1845.208	1064.811
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31Jan2017 19:00:00	2017	1484.28946	1083.578	1557.174	1925.702	1068.542
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01Feb2017 0:00:00	2017	1022.351521	944.9992	1361.799	1424.752	991.5049
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02Feb2017 0:00:00	2017	1025.146938	949.2242	1409.631	1424.153	1036.061
02Feb2017 1:00:00	2017	982.7053764	935.0851	1392.872	1397.792	1030.683
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02Feb2017 14:00:00	2017	1394.61539	1027.834	1458.139	1815.634	996.3128
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02Feb2017 20:00:00	2017	1430.27883	1075.155	1524.366	1865.345	1024.554
02Feb2017 21:00:00	2017	1344.827103	1044.877	1488.122	1765.641	1022.275
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02Feb2017 23:00:00	2017	1115.85162	973.221	1421.821	1531.193	1049.161
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07Feb2017 0:00:00	2017	1124.556214	994.5647	1445.305	1587.169	1069.149
07Feb2017 1:00:00	2017	1087.178305	988.8698	1435.469	1534.886	1066.812
07Feb2017 2:00:00	2017	1073.651311	983.4555	1428.723	1503.012	1059.736
07Feb2017 3:00:00	2017	1072.452049	984.7138	1421.849	1498.092	1059.874
07Feb2017 4:00:00	2017	1093.366601	989.718	1398.541	1506.401	1054.997
07Feb2017 5:00:00	2017	1171.601883	1007.668	1421.346	1556.421	1062.914
07Feb2017 6:00:00	2017	1326.328485	1047.688	1469.378	1706.565	1038.068
07Feb2017 7:00:00	2017	1469.856981	1095.123	1541.484	1854.572	1057.11
07Feb2017 8:00:00	2017	1481.412485	1085.671	1543.551	1860.448	1058.36
07Feb2017 9:00:00	2017	1490.216705	1093.622	1555.723	1871.423	1053.696

07Feb2017 10:00:00	2017	1496.650965	1093.662	1551.619	1894.843	1062.775
07Feb2017 11:00:00	2017	1494.978758	1090.396	1547.236	1897.018	1063.023
07Feb2017 12:00:00	2017	1486.418355	1093.241	1545.621	1881.255	1022.44
07Feb2017 13:00:00	2017	1477.179898	1091.399	1538.635	1877.826	1003.966
07Feb2017 14:00:00	2017	1468.201772	1082.652	1537.044	1866.712	1015.692
07Feb2017 15:00:00	2017	1468.420894	1080.252	1529.774	1859.049	1069.173
07Feb2017 16:00:00	2017	1491.124145	1047.961	1541.608	1879.18	1089.206
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07Feb2017 21:00:00	2017	1436.370885	1090.932	1515.132	1879.206	1065.003
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07Feb2017 23:00:00	2017	1197.008146	1019.798	1408.833	1629.758	1065.122
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08Feb2017 12:00:00	2017	1473.99459	1066.499	1504.838	1857.333	1076.151
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09Feb2017 1:00:00	2017	1042.20188	983.744	1412.854	1520.359	1061.675
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09Feb2017 6:00:00	2017	1270.159845	1019.248	1435.387	1662.621	1053.997
09Feb2017 7:00:00	2017	1421.77343	1034.753	1492.709	1802.072	1071.001
09Feb2017 8:00:00	2017	1429.536222	1028.329	1508.816	1842.542	1066.519

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09Feb2017 23:00:00	2017	1123.962468	932.3219	1424.189	1558.337	1050.026
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11Feb2017 0:00:00	2017	1010.701405	922.1569	1319.943	1419.391	1023.899
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14Feb2017 17:00:00	2017	1387.853967	986.2595	1397.613	1717.03	1068.312
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15Feb2017 14:00:00	2017	1355.501413	949.7037	1312.011	1657.48	1058.427
15Feb2017 15:00:00	2017	1350.562711	948.5127	1309.132	1652.941	1059.021
15Feb2017 16:00:00	2017	1368.726084	962.623	1335.965	1660.93	1062.471
15Feb2017 17:00:00	2017	1401.266379	985.2033	1379.917	1694.348	1098.151
15Feb2017 18:00:00	2017	1417.910762	1004.59	1412.537	1740.923	1129.48
15Feb2017 19:00:00	2017	1378.514372	994.5928	1399.204	1703.102	1127.565
15Feb2017 20:00:00	2017	1326.932396	979.4051	1380.017	1645.356	1125.446
15Feb2017 21:00:00	2017	1247.385506	945.244	1348.215	1566.841	1121.562
15Feb2017 22:00:00	2017	1132.373961	904.9131	1281.861	1455.853	1109.658
15Feb2017 23:00:00	2017	1024.11648	875.9103	1252.988	1350.924	1127.91
16Feb2017 0:00:00	2017	951.2748841	858.2123	1267.172	1273.246	1100.55
16Feb2017 1:00:00	2017	908.2894867	849.369	1247.377	1235.322	1101.345
16Feb2017 2:00:00	2017	884.8883493	850.6355	1249.141	1214.082	1070.458
16Feb2017 3:00:00	2017	880.6749	846.9774	1236.511	1199.964	1056.119
16Feb2017 4:00:00	2017	903.8023184	854.2831	1233.315	1217.09	1054.073
16Feb2017 5:00:00	2017	987.434901	862.0378	1239.34	1289.069	1033.637
16Feb2017 6:00:00	2017	1149.133185	906.7495	1292.791	1430.214	1048.467
16Feb2017 7:00:00	2017	1280.791027	954.3102	1349.295	1600.567	1020.962
16Feb2017 8:00:00	2017	1309.122129	946.9091	1359.678	1623.444	998.9223
16Feb2017 9:00:00	2017	1333.169497	930.3775	1360.554	1637.133	986.2582
16Feb2017 10:00:00	2017	1347.346193	945.0091	1354.437	1657.127	978.8844
16Feb2017 11:00:00	2017	1356.320759	947.258	1340.727	1664.891	973.657
16Feb2017 12:00:00	2017	1359.609643	942.5177	1334.399	1655.501	968.0432
16Feb2017 13:00:00	2017	1357.049297	950.6938	1332.313	1672.581	966.1125
16Feb2017 14:00:00	2017	1352.389196	938.8711	1365.636	1701.003	979.1258
16Feb2017 15:00:00	2017	1347.993738	941.5938	1370.187	1715.093	981.5084
16Feb2017 16:00:00	2017	1346.254252	956.6766	1397.506	1726.844	974.2083
16Feb2017 17:00:00	2017	1368.273292	969.3451	1419.518	1733.213	987.1292
16Feb2017 18:00:00	2017	1402.376686	992.7173	1458.541	1790.367	1013.388
16Feb2017 19:00:00	2017	1373.062107	993.1707	1457.247	1766.925	1013.943
16Feb2017 20:00:00	2017	1317.184226	979.7628	1443.538	1723.589	1008.369
16Feb2017 21:00:00	2017	1235.165543	953.3616	1409.143	1648.146	1021.628
16Feb2017 22:00:00	2017	1121.625767	908.4653	1361.742	1519.4	1016.784
16Feb2017 23:00:00	2017	1020.115028	861.1941	1293.453	1397.089	1017.068
17Feb2017 0:00:00	2017	951.2040497	834.817	1278.474	1321.339	1025.129
17Feb2017 1:00:00	2017	908.4040743	835.4996	1289.173	1283.488	1035.544
17Feb2017 2:00:00	2017	888.9403082	846.1092	1283.917	1247.304	985.7929
17Feb2017 3:00:00	2017	885.1942129	835.0398	1269.572	1266.905	965.6096
17Feb2017 4:00:00	2017	907.2104812	843.5945	1279.33	1265.958	954.2083

17Feb2017 5:00:00	2017	983.5907093	860.7112	1297.835	1333.31	984.2558
17Feb2017 6:00:00	2017	1131.361556	902.3999	1331.136	1501.425	1001.17
17Feb2017 7:00:00	2017	1257.199043	940.7677	1387.848	1626.802	986.697
17Feb2017 8:00:00	2017	1293.607992	948.5669	1406.175	1645	970.9083
17Feb2017 9:00:00	2017	1328.217281	952.2778	1411.852	1691.252	1003.669
17Feb2017 10:00:00	2017	1336.984581	952.9674	1411.067	1723.751	1001.363
17Feb2017 11:00:00	2017	1348.558998	944.2116	1407.167	1731.35	1014.292
17Feb2017 12:00:00	2017	1339.832781	937.7493	1399.84	1731.62	1015.98
17Feb2017 13:00:00	2017	1330.263022	939.5626	1404.044	1744.211	1020.806
17Feb2017 14:00:00	2017	1320.339381	942.7463	1411.182	1714.947	998.8191
17Feb2017 15:00:00	2017	1307.974179	943.0075	1409.988	1688.237	1001.047
17Feb2017 16:00:00	2017	1302.170612	946.0573	1379.858	1649.476	997.7051
17Feb2017 17:00:00	2017	1321.759007	958.4801	1371.034	1654.473	988.0654
17Feb2017 18:00:00	2017	1353.293533	967.5035	1408.173	1715.296	1000.325
17Feb2017 19:00:00	2017	1324.019717	972.2949	1393.166	1701.223	997.5088
17Feb2017 20:00:00	2017	1280.629469	958.0297	1379.19	1654.74	997.8472
17Feb2017 21:00:00	2017	1212.837258	937.0894	1349.15	1568.091	988.8982
17Feb2017 22:00:00	2017	1122.229958	911.5014	1326.017	1471.503	974.3539
17Feb2017 23:00:00	2017	1032.596807	883.1564	1292.183	1378.908	959.9906
18Feb2017 0:00:00	2017	964.8714089	872.5767	1298.966	1313.075	973.2234
18Feb2017 1:00:00	2017	920.1721553	854.8831	1291.288	1264.489	948.1272
18Feb2017 2:00:00	2017	896.5222001	857.758	1286.155	1263.541	935.1599
18Feb2017 3:00:00	2017	890.0914367	859.509	1287.184	1262.032	942.3824
18Feb2017 4:00:00	2017	893.8460154	866.1997	1286.093	1236.264	944.3136
18Feb2017 5:00:00	2017	921.0759056	880.9498	1291.625	1282.019	954.7207
18Feb2017 6:00:00	2017	974.4161525	896.9358	1306.832	1329.635	954.8289
18Feb2017 7:00:00	2017	1045.480571	907.1023	1338.268	1411.895	957.3334
18Feb2017 8:00:00	2017	1101.714332	924.5569	1360.12	1468.258	963.5425
18Feb2017 9:00:00	2017	1169.036582	937.0405	1382.637	1519	969.5439
18Feb2017 10:00:00	2017	1210.576616	956.3967	1382.602	1577.471	968.1478
18Feb2017 11:00:00	2017	1217.514154	965.2473	1386.287	1584.36	967.3596
18Feb2017 12:00:00	2017	1211.455981	958.7408	1372.422	1579.85	956.9222
18Feb2017 13:00:00	2017	1200.137223	947.1655	1357.058	1575.536	957.0295
18Feb2017 14:00:00	2017	1200.316551	941.4048	1353.381	1553.175	1005.084
18Feb2017 15:00:00	2017	1204.094243	945.2295	1359.747	1568.48	977.7177
18Feb2017 16:00:00	2017	1245.627647	955.317	1379.047	1586.281	997.9384
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18Feb2017 18:00:00	2017	1315.932229	974.937	1376.687	1704.612	1044.302
18Feb2017 19:00:00	2017	1281.119868	958.5818	1401.313	1683.478	1036.641
18Feb2017 20:00:00	2017	1234.902966	945.5399	1413.461	1664.32	1020.51
18Feb2017 21:00:00	2017	1180.101386	929.484	1395.6	1609.929	1035.042
18Feb2017 22:00:00	2017	1110.988967	912.9811	1364.69	1529.465	1036.265
18Feb2017 23:00:00	2017	1031.485877	884.7421	1322.917	1446.9	1032.63
19Feb2017 0:00:00	2017	964.0964791	858.0033	1305.888	1380.111	1034.855
19Feb2017 1:00:00	2017	920.06567	838.1522	1263.979	1328.705	1027.617
19Feb2017 2:00:00	2017	894.3969578	839.4944	1252.129	1297.855	1017.783
19Feb2017 3:00:00	2017	883.4249937	847.7661	1278.11	1266.918	1029.073

19Feb2017 4:00:00	2017	884.96724	845.4507	1280.575	1283.168	1039.694
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19Feb2017 6:00:00	2017	953.3720722	871.1131	1286.496	1312.81	1034.42
19Feb2017 7:00:00	2017	1007.586527	875.1395	1307.419	1393.025	1028.879
19Feb2017 8:00:00	2017	1048.068736	887.845	1323.432	1425.034	1027.556
19Feb2017 9:00:00	2017	1106.154915	902.5516	1339.123	1447.576	1031.524
19Feb2017 10:00:00	2017	1151.913229	914.7729	1352.25	1514.258	1030.344
19Feb2017 11:00:00	2017	1176.961469	920.1295	1382.194	1557.872	1014.028
19Feb2017 12:00:00	2017	1188.339369	910.0867	1421.722	1557.833	1009.87
19Feb2017 13:00:00	2017	1184.968139	899.7193	1424.604	1538.666	1003.607
19Feb2017 14:00:00	2017	1161.862168	900.3554	1426.665	1533.847	1008.214
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19Feb2017 16:00:00	2017	1203.523068	909.0082	1382.151	1539.445	1015.058
19Feb2017 17:00:00	2017	1253.617262	927.0567	1378.614	1592.773	1034.142
19Feb2017 18:00:00	2017	1292.79874	950.4685	1431	1678.799	1051.009
19Feb2017 19:00:00	2017	1256.294701	943.7577	1396.728	1637.11	1037.913
19Feb2017 20:00:00	2017	1211.661641	935.9302	1365.656	1596.065	1024.528
19Feb2017 21:00:00	2017	1161.024026	910.6496	1346.828	1533.796	1035.273
19Feb2017 22:00:00	2017	1090.352051	885.2477	1323.335	1457.697	1048.188
19Feb2017 23:00:00	2017	1011.097366	869.6416	1294.239	1383.996	1029.9
20Feb2017 0:00:00	2017	950.3254302	842.4235	1282.687	1295.17	1023.711
20Feb2017 1:00:00	2017	912.7157658	834.4031	1268.946	1257.017	1021.054
20Feb2017 2:00:00	2017	892.6341218	834.6028	1264.501	1236.183	1015.327
20Feb2017 3:00:00	2017	887.215732	834.0265	1261.723	1220.424	1030.228
20Feb2017 4:00:00	2017	898.4747769	843.5117	1260.054	1225.507	1020.856
20Feb2017 5:00:00	2017	939.6607864	857.8054	1269.825	1261.989	1054.656
20Feb2017 6:00:00	2017	1002.01397	882.5369	1293.502	1330.41	1041.233
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20Feb2017 12:00:00	2017	1234.054514	944.9715	1388.35	1597.369	1034.159
20Feb2017 13:00:00	2017	1221.034748	938.5302	1385.664	1597.795	1017.783
20Feb2017 14:00:00	2017	1212.602507	935.5664	1378.33	1570.917	1001.416
20Feb2017 15:00:00	2017	1212.763869	936.461	1380.988	1605.339	1017.833
20Feb2017 16:00:00	2017	1251.715995	946.0341	1400.098	1628.795	1017.425
20Feb2017 17:00:00	2017	1310.911536	959.0987	1427.944	1712.007	1017.409
20Feb2017 18:00:00	2017	1366.143435	976.1727	1454.078	1754.226	1026.529
20Feb2017 19:00:00	2017	1345.659297	981.2353	1447.938	1697.083	1031.009
20Feb2017 20:00:00	2017	1296.866593	969.9275	1422.204	1658.747	1022.953
20Feb2017 21:00:00	2017	1219.990055	945.3029	1389.318	1572.843	1015.306
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20Feb2017 23:00:00	2017	1008.320456	878.1648	1308.254	1354.653	1031.364
21Feb2017 0:00:00	2017	944.2861122	859.8198	1301.983	1313.01	1033.688
21Feb2017 1:00:00	2017	909.3046919	855.1459	1288.619	1281.765	1027.037
21Feb2017 2:00:00	2017	891.439635	854.785	1281.573	1279.451	1023.905

21Feb2017 3:00:00	2017	890.9017769	857.0881	1276.113	1275.634	1028.232
21Feb2017 4:00:00	2017	920.4701155	866.6498	1280.461	1293.345	1020.251
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21Feb2017 6:00:00	2017	1171.998491	933.7541	1334.866	1490.553	1017.526
21Feb2017 7:00:00	2017	1323.009016	968.854	1386.427	1636.516	1010.73
21Feb2017 8:00:00	2017	1342.858878	997.9654	1410.486	1664.867	1006.71
21Feb2017 9:00:00	2017	1360.943458	1011.662	1409.729	1704.268	987.961
21Feb2017 10:00:00	2017	1383.478353	1018.592	1415.819	1735.808	998.4054
21Feb2017 11:00:00	2017	1386.82502	1022.101	1435.808	1736.905	1020.982
21Feb2017 12:00:00	2017	1376.159851	1022.051	1430.111	1717.115	1023.513
21Feb2017 13:00:00	2017	1364.155399	1022.504	1440.705	1724.696	1058.994
21Feb2017 14:00:00	2017	1359.186939	1007.861	1432.54	1721.391	1054.674
21Feb2017 15:00:00	2017	1355.73563	1015.14	1428.869	1740.364	1038.198
21Feb2017 16:00:00	2017	1373.477501	1024.851	1442.472	1765.988	1038.991
21Feb2017 17:00:00	2017	1415.542936	1030.665	1460.536	1796.608	1051.006
21Feb2017 18:00:00	2017	1447.677971	1035.927	1496.396	1859.083	1062.527
21Feb2017 19:00:00	2017	1419.775679	1028.419	1488.953	1843.108	1066.892
21Feb2017 20:00:00	2017	1367.805263	1013.764	1464.364	1774.862	1045.235
21Feb2017 21:00:00	2017	1279.312205	985.9038	1431.658	1699.257	1020.517
21Feb2017 22:00:00	2017	1153.810169	942.249	1387.797	1571.436	1004.951
21Feb2017 23:00:00	2017	1046.26702	910.9681	1344.943	1464.963	1019.485
22Feb2017 0:00:00	2017	975.9529085	888.7028	1322.894	1394.94	990.4227
22Feb2017 1:00:00	2017	939.0389241	880.0595	1309.969	1351.317	974.7977
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22Feb2017 6:00:00	2017	1189.496715	922.8572	1349.14	1531.454	985.2618
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22Feb2017 8:00:00	2017	1358.02982	971.029	1411.262	1713.476	1000.469
22Feb2017 9:00:00	2017	1374.157458	979.8424	1419.784	1768.294	994.1841
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22Feb2017 13:00:00	2017	1400.63973	995.4844	1402.812	1790.385	1001.841
22Feb2017 14:00:00	2017	1395.701172	989.8348	1402.945	1781.667	1012.271
22Feb2017 15:00:00	2017	1399.552274	990.2908	1415.314	1755.905	994.3591
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22Feb2017 20:00:00	2017	1378.05736	1004.982	1483.789	1820.314	1027.612
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22Feb2017 22:00:00	2017	1165.534629	947.0186	1416.089	1620.702	1007.516
22Feb2017 23:00:00	2017	1058.626048	926.8596	1380.982	1511.97	1012.384
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23Feb2017 4:00:00	2017	947.6983043	906.3951	1338.309	1372.221	1026.38
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23Feb2017 6:00:00	2017	1193.666605	959.0874	1403.105	1564.782	1038.867
23Feb2017 7:00:00	2017	1327.251963	973.4512	1416.235	1731.835	1050.627
23Feb2017 8:00:00	2017	1344.397942	979.4956	1421.333	1750.188	1045.491
23Feb2017 9:00:00	2017	1369.932014	989.2874	1432.054	1774.232	1021.913
23Feb2017 10:00:00	2017	1381.684282	993.9235	1443.979	1822.009	1014.08
23Feb2017 11:00:00	2017	1383.886121	989.7536	1444.714	1822.628	999.5434
23Feb2017 12:00:00	2017	1384.541692	989.6718	1436.089	1806.761	1004.08
23Feb2017 13:00:00	2017	1389.344032	991.1573	1421.63	1793.082	997.1325
23Feb2017 14:00:00	2017	1387.087707	985.8667	1440.562	1794.442	1009.165
23Feb2017 15:00:00	2017	1376.400201	986.5842	1439.325	1802.841	993.8616
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23Feb2017 17:00:00	2017	1414.636766	1004.324	1458.383	1789.702	1011.885
23Feb2017 18:00:00	2017	1452.199154	1023.445	1492.191	1839.782	1029.646
23Feb2017 19:00:00	2017	1441.412403	1026.997	1508.871	1871.321	1032.199
23Feb2017 20:00:00	2017	1391.956966	1022.562	1493.405	1806.212	1033.096
23Feb2017 21:00:00	2017	1305.452945	997.9762	1462.015	1716.635	1028.76
23Feb2017 22:00:00	2017	1181.500455	957.64	1419.598	1604.21	1008.617
23Feb2017 23:00:00	2017	1075.974916	924.1073	1381.978	1527.36	1021.058
24Feb2017 0:00:00	2017	1009.468561	901.8252	1368.681	1421.895	1012.495
24Feb2017 1:00:00	2017	971.1306455	891.9048	1358.08	1376.134	1019.854
24Feb2017 2:00:00	2017	952.2706044	897.8589	1355.713	1353.394	991.8327
24Feb2017 3:00:00	2017	949.0358144	903.8784	1352.758	1356.785	992.4903
24Feb2017 4:00:00	2017	969.7952453	911.3693	1363.385	1386.393	1016.884
24Feb2017 5:00:00	2017	1050.351334	930.7357	1368.136	1424.529	1024.518
24Feb2017 6:00:00	2017	1203.059422	970.2274	1403.036	1562.937	1027.032
24Feb2017 7:00:00	2017	1340.700584	989.4973	1449.529	1714.244	1035.291
24Feb2017 8:00:00	2017	1360.695612	1010.132	1472.321	1745.837	1012.055
24Feb2017 9:00:00	2017	1384.451567	1021.779	1490.251	1791.25	1043.945
24Feb2017 10:00:00	2017	1399.472858	1023.071	1493.951	1811.785	1054.239
24Feb2017 11:00:00	2017	1412.489289	1025.928	1494.233	1812.037	1049.789
24Feb2017 12:00:00	2017	1412.882909	1019.155	1477.973	1791.654	1043.678
24Feb2017 13:00:00	2017	1407.334754	1019.692	1466.428	1797.117	1043.104
24Feb2017 14:00:00	2017	1390.998863	1013.075	1456.018	1769.833	1041.576
24Feb2017 15:00:00	2017	1381.612021	1011.691	1460.879	1776.025	1029.69
24Feb2017 16:00:00	2017	1393.08717	1019.224	1476.008	1783.003	1023.931
24Feb2017 17:00:00	2017	1420.949923	1025.145	1482.874	1787.271	1032.218
24Feb2017 18:00:00	2017	1439.479108	1040.209	1515.295	1835.103	1055.056
24Feb2017 19:00:00	2017	1413.367009	1031.854	1499.654	1820.511	1063.086
24Feb2017 20:00:00	2017	1360.191035	1025.975	1483.132	1759.028	1071.821
24Feb2017 21:00:00	2017	1285.104527	1008.375	1463.038	1706.809	1067.266
24Feb2017 22:00:00	2017	1186.548083	978.4949	1433.057	1606.613	1068.341
24Feb2017 23:00:00	2017	1093.693861	950.5627	1393.231	1500.682	1056.503
25Feb2017 0:00:00	2017	1023.415542	927.762	1369.359	1425.517	1059.069

25Feb2017 1:00:00	2017	976.1072288	913.6883	1356.024	1398.624	1036.128
25Feb2017 2:00:00	2017	950.1057506	907.6003	1363.568	1374.102	1050.976
25Feb2017 3:00:00	2017	940.0800391	904.7219	1363.187	1359.465	1039.644
25Feb2017 4:00:00	2017	943.5103698	905.8525	1368.045	1362.144	1048.895
25Feb2017 5:00:00	2017	973.2539947	914.5352	1374.533	1389.938	1050.23
25Feb2017 6:00:00	2017	1028.590599	944.0268	1393.798	1441.398	1054.771
25Feb2017 7:00:00	2017	1096.711889	945.0339	1415.507	1532.741	1037.915
25Feb2017 8:00:00	2017	1156.241041	962.035	1428.185	1577.08	1039.468
25Feb2017 9:00:00	2017	1210.383967	977.8977	1437.52	1620.164	1031.659
25Feb2017 10:00:00	2017	1237.093806	974.6242	1430.579	1685.058	1027.052
25Feb2017 11:00:00	2017	1249.368531	961.0795	1423.119	1702.971	1022.225
25Feb2017 12:00:00	2017	1243.7931	952.4618	1426.764	1679.101	1019.89
25Feb2017 13:00:00	2017	1224.942378	941.9226	1412.71	1650.583	1026.581
25Feb2017 14:00:00	2017	1210.751712	940.4375	1409.126	1652.34	1024.182
25Feb2017 15:00:00	2017	1213.083855	941.8276	1413.855	1648.243	1023.218
25Feb2017 16:00:00	2017	1241.525975	958.4801	1424.375	1644.952	1031.631
25Feb2017 17:00:00	2017	1290.268126	979.81	1447.09	1689.937	1044.085
25Feb2017 18:00:00	2017	1331.923731	1000.373	1481.415	1757.582	1048.099
25Feb2017 19:00:00	2017	1315.312997	993.5705	1476.476	1724.149	1038.838
25Feb2017 20:00:00	2017	1275.843019	980.9463	1457.876	1704.41	1028.065
25Feb2017 21:00:00	2017	1219.496338	960.5106	1431.219	1646.797	1039.99
25Feb2017 22:00:00	2017	1144.093338	932.8755	1402.843	1556.437	1028.351
25Feb2017 23:00:00	2017	1064.001417	911.342	1372.053	1491.251	1053.677
26Feb2017 0:00:00	2017	1000.94697	893.1049	1352.118	1419.563	1048.375
26Feb2017 1:00:00	2017	957.7494653	889.1313	1336.851	1355.328	1041.543
26Feb2017 2:00:00	2017	931.4031851	891.0207	1345.105	1380.018	1057.39
26Feb2017 3:00:00	2017	924.3701694	891.2677	1343.983	1351.51	1031.255
26Feb2017 4:00:00	2017	928.873181	896.1179	1338.322	1371.058	1036.596
26Feb2017 5:00:00	2017	954.3443375	905.8074	1325.776	1382.614	1055.558
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26Feb2017 8:00:00	2017	1100.742424	941.962	1409.817	1515.902	1001.759
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26Feb2017 10:00:00	2017	1218.238056	963.1598	1443.144	1636.994	1022.904
26Feb2017 11:00:00	2017	1251.639157	972.2842	1445.099	1631.64	1023.597
26Feb2017 12:00:00	2017	1256.152932	965.4581	1445.305	1645.627	1010.496
26Feb2017 13:00:00	2017	1250.098879	960.0187	1436.504	1640.066	1002.857
26Feb2017 14:00:00	2017	1247.927903	958.3757	1435.199	1639.443	987.4919
26Feb2017 15:00:00	2017	1264.106071	964.9789	1431.161	1643.724	978.8263
26Feb2017 16:00:00	2017	1312.344837	977.6454	1444.476	1663.155	994.2642
26Feb2017 17:00:00	2017	1358.985388	998.7272	1462.085	1726.729	1024.95
26Feb2017 18:00:00	2017	1403.415051	1022.567	1504.605	1787.782	1065.928
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26Feb2017 20:00:00	2017	1347.535293	1013.701	1511.099	1745.064	1074.374
26Feb2017 21:00:00	2017	1276.371834	991.5123	1479.745	1675.304	1071.922
26Feb2017 22:00:00	2017	1175.837609	959.6565	1440.671	1616.554	1051.012
26Feb2017 23:00:00	2017	1074.692978	931.7738	1410.501	1535.749	1067.961

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27Feb2017 18:00:00	2017	1485.456655	1037.653	1526.78	1847.045	1022.665
27Feb2017 19:00:00	2017	1468.679858	1061.608	1534.192	1847.587	1018.735
27Feb2017 20:00:00	2017	1413.054313	1049.958	1512.943	1794.747	1025.627
27Feb2017 21:00:00	2017	1322.919024	1021.249	1476.481	1707.642	1013.573
27Feb2017 22:00:00	2017	1197.639812	984.0923	1424.965	1591.307	1013.538
27Feb2017 23:00:00	2017	1088.277139	948.9671	1391.855	1495.959	1033.338
28Feb2017 0:00:00	2017	1020.556292	926.9157	1382.572	1440.057	1048.323
28Feb2017 1:00:00	2017	982.6813349	918.0468	1378.116	1403.1	1056.406
28Feb2017 2:00:00	2017	966.2723233	921.365	1371.301	1364.172	1050.7
28Feb2017 3:00:00	2017	967.6690509	922.8264	1371.004	1362.148	1042.162
28Feb2017 4:00:00	2017	994.4182182	933.5418	1374.864	1372.489	1066.391
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28Feb2017 7:00:00	2017	1373.963522	1028.573	1496.284	1745.17	1054.938
28Feb2017 8:00:00	2017	1384.351084	1039.184	1507.789	1771.517	1048.543
28Feb2017 9:00:00	2017	1391.763553	1033.098	1486.16	1779.169	1041.652
28Feb2017 10:00:00	2017	1396.231103	1030.852	1493.508	1799.094	1066.035
28Feb2017 11:00:00	2017	1397.758611	1019.011	1483.222	1802.389	1065.913
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28Feb2017 14:00:00	2017	1379.719503	989.9715	1442.688	1754.068	1064.209
28Feb2017 15:00:00	2017	1378.749543	991.6717	1431.593	1736.157	1050.014
28Feb2017 16:00:00	2017	1394.124925	998.6296	1466.132	1754.615	1056.198
28Feb2017 17:00:00	2017	1423.651186	1006.81	1481.091	1774.652	1061.973
28Feb2017 18:00:00	2017	1457.618494	1033.373	1518.434	1834.05	1076.47
28Feb2017 19:00:00	2017	1463.562681	1041.816	1532.794	1846.775	1075.35
28Feb2017 20:00:00	2017	1421.353914	1030.139	1516.282	1804.247	1085.203
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28Feb2017 22:00:00	2017	1201.634665	952.7503	1446.434	1605.144	1081.971

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02Mar2017 8:00:00	2017	1361.756689	980.9868	1433.718	1716.991	1033.538
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02Mar2017 11:00:00	2017	1390.124649	977.4049	1414.73	1762.125	1030.163
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02Mar2017 21:00:00	2017	1287.080278	964.3503	1436.47	1714.927	1016.428

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03Mar2017 19:00:00	2017	1346.696885	966.7505	1452.492	1776.86	1043.218
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04Mar2017 23:00:00	2017	1083.19916	912.6147	1388.028	1531.646	1031.597
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05Mar2017 9:00:00	2017	1191.906908	967.3522	1441.17	1561.897	1064.097
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05Mar2017 12:00:00	2017	1290.551459	972.253	1443.419	1618.75	1019.824
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05Mar2017 21:00:00	2017	1281.122327	985.5948	1463.917	1658.058	1060.318
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08Mar2017 6:00:00	2017	1269.650527	960.4644	1376.36	1687.254	1019.291
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13Mar2017 16:00:00	2017	1391.570676	1002.803	1443.673	1804.255	978.9153
13Mar2017 17:00:00	2017	1394.871096	1008.922	1443.095	1818.04	955.8432
13Mar2017 18:00:00	2017	1351.916578	1000.746	1436.618	1776.098	960.1007
13Mar2017 19:00:00	2017	1359.314272	1011.285	1453.146	1797.857	970.8664
13Mar2017 20:00:00	2017	1383.058598	1020.896	1477.232	1864.626	996.8659
13Mar2017 21:00:00	2017	1307.02927	995.984	1454.682	1789.13	981.0047
13Mar2017 22:00:00	2017	1187.677574	958.9426	1416.077	1684.053	976.2651
13Mar2017 23:00:00	2017	1068.47062	922.209	1372.811	1572.907	956.2306
14Mar2017 0:00:00	2017	991.6924044	898.1231	1354.858	1473.215	967.9459
14Mar2017 1:00:00	2017	947.1492934	888.5417	1343.008	1413.244	969.5908
14Mar2017 2:00:00	2017	920.9183005	895.3404	1344.875	1389.705	967.9422
14Mar2017 3:00:00	2017	917.5734644	894.5284	1345.876	1380.842	962.9312
14Mar2017 4:00:00	2017	938.1283478	903.2423	1356.74	1396.543	976.0263
14Mar2017 5:00:00	2017	1015.381483	922.5459	1368.367	1468.014	972.0749
14Mar2017 6:00:00	2017	1184.904673	966.1268	1415.701	1623.133	965.7993
14Mar2017 7:00:00	2017	1338.194806	1002.34	1482.311	1763.864	958.3856
14Mar2017 8:00:00	2017	1351.279598	1013.753	1486.634	1784.026	935.7728
14Mar2017 9:00:00	2017	1358.537925	1012.868	1480.961	1797.639	918.0425
14Mar2017 10:00:00	2017	1373.147345	1009.951	1472.672	1803.895	910.8771
14Mar2017 11:00:00	2017	1379.182149	1007.941	1458.713	1804.134	914.6779
14Mar2017 12:00:00	2017	1376.241928	1001.167	1441.233	1792.331	925.7255
14Mar2017 13:00:00	2017	1360.116629	1004.813	1428.117	1779.134	940.1923
14Mar2017 14:00:00	2017	1346.157522	989.3694	1424.42	1763.554	908.2802
14Mar2017 15:00:00	2017	1348.159975	984.091	1415.118	1739.553	902.1309
14Mar2017 16:00:00	2017	1355.041602	989.2185	1411.963	1745.57	895.3349

14Mar2017 17:00:00	2017	1355.729288	992.0753	1407.481	1733.492	898.6795
14Mar2017 18:00:00	2017	1314.104465	986.9529	1398.023	1680.271	908.0257
14Mar2017 19:00:00	2017	1321.581528	996.3537	1407.452	1692.113	910.6305
14Mar2017 20:00:00	2017	1353.477954	1007.018	1428.044	1773	925.2704
14Mar2017 21:00:00	2017	1280.966207	982.8036	1399.788	1692.739	922.1287
14Mar2017 22:00:00	2017	1162.431798	947.7144	1346.369	1594.305	909.625
14Mar2017 23:00:00	2017	1047.431289	907.5088	1311.63	1474.038	911.3765
15Mar2017 0:00:00	2017	969.1215245	874.4105	1291.13	1390.161	944.1187
15Mar2017 1:00:00	2017	929.3622505	863.8861	1278.35	1338.054	950.0869
15Mar2017 2:00:00	2017	908.9659182	864.8614	1272.212	1320.153	954.7256
15Mar2017 3:00:00	2017	903.3782033	867.2952	1269.919	1290.68	959.1507
15Mar2017 4:00:00	2017	923.4120032	880.278	1281.728	1302.744	962.6655
15Mar2017 5:00:00	2017	1005.253689	910.1956	1287.972	1372.884	952.0087
15Mar2017 6:00:00	2017	1174.320457	957.6165	1336.575	1516.356	953.3406
15Mar2017 7:00:00	2017	1329.806328	986.8684	1412.931	1681.011	959.0063
15Mar2017 8:00:00	2017	1345.371149	990.2118	1435.027	1686.295	976.9415
15Mar2017 9:00:00	2017	1355.023361	990.5485	1428.485	1689.205	969.0573
15Mar2017 10:00:00	2017	1355.329793	981.9262	1419.777	1689.612	974.5368
15Mar2017 11:00:00	2017	1361.743942	979.2192	1415.887	1691.453	943.2911
15Mar2017 12:00:00	2017	1360.396132	969.5935	1391.811	1680.572	922.4693
15Mar2017 13:00:00	2017	1363.419686	973.066	1381.206	1673.671	914.1152
15Mar2017 14:00:00	2017	1357.497483	963.6876	1361.379	1658.829	925.5919
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15Mar2017 16:00:00	2017	1352.9927	970.472	1399.422	1657.837	914.4947
15Mar2017 17:00:00	2017	1345.535042	975.1674	1398.188	1660.488	926.5299
15Mar2017 18:00:00	2017	1296.817847	957.8944	1362.386	1631.357	927.4873
15Mar2017 19:00:00	2017	1314.90113	967.7968	1382.839	1661.697	948.9762
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15Mar2017 21:00:00	2017	1274.032947	971.328	1406.818	1619.045	951.4129
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15Mar2017 23:00:00	2017	1043.961738	904.0549	1331.556	1403.254	972.3959
16Mar2017 0:00:00	2017	970.7927263	880.6472	1304.553	1353.488	957.8706
16Mar2017 1:00:00	2017	926.8076487	868.8118	1299.229	1314.366	958.5152
16Mar2017 2:00:00	2017	905.0677873	867.3984	1285.026	1288.564	952.0892
16Mar2017 3:00:00	2017	900.6898861	869.02	1286.775	1285.166	952.7181
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16Mar2017 5:00:00	2017	1004.910749	896.509	1316.988	1363.372	979.5667
16Mar2017 6:00:00	2017	1170.099346	939.4289	1364.743	1509.039	978.2155
16Mar2017 7:00:00	2017	1327.366121	980.8123	1433.732	1680.629	997.9763
16Mar2017 8:00:00	2017	1355.673007	992.5976	1440.693	1700.422	1004.074
16Mar2017 9:00:00	2017	1367.638194	996.0716	1442.393	1722.174	993.5117
16Mar2017 10:00:00	2017	1388.407339	998.4008	1434.563	1728.026	1003.426
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16Mar2017 12:00:00	2017	1366.5591	957.3323	1417.057	1742.457	945.9453
16Mar2017 13:00:00	2017	1357.221235	955.6683	1407.842	1760.742	965.4004
16Mar2017 14:00:00	2017	1351.383481	948.7562	1411.035	1732.581	961.3684
16Mar2017 15:00:00	2017	1346.957964	947.195	1413.572	1742.383	979.6068

16Mar2017 16:00:00	2017	1346.432124	944.7409	1427.664	1736.699	1002.314
16Mar2017 17:00:00	2017	1350.582707	945.7805	1431.084	1750.382	994.3134
16Mar2017 18:00:00	2017	1301.111713	945.2252	1419.44	1742.418	961.2212
16Mar2017 19:00:00	2017	1303.12892	953.8603	1418.472	1742.601	974.8661
16Mar2017 20:00:00	2017	1343.887521	978.8142	1442.736	1793.241	988.1577
16Mar2017 21:00:00	2017	1283.842003	962.5973	1418.61	1727.77	987.1955
16Mar2017 22:00:00	2017	1165.982019	927.4563	1391.748	1586.357	972.9659
16Mar2017 23:00:00	2017	1052.708384	893.0884	1353.422	1508.68	952.8751
17Mar2017 0:00:00	2017	973.5498023	863.7918	1331.765	1399.737	957.69
17Mar2017 1:00:00	2017	932.1964638	857.8789	1317.844	1377.122	958.4738
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17Mar2017 6:00:00	2017	1159.81363	917.7777	1357.02	1554.637	994.3264
17Mar2017 7:00:00	2017	1305.222469	949.1765	1404.271	1692.966	1009.427
17Mar2017 8:00:00	2017	1326.413751	966.5877	1342.405	1699.891	1017.112
17Mar2017 9:00:00	2017	1350.192456	984.2992	1361.253	1720.251	1032.955
17Mar2017 10:00:00	2017	1369.795203	986.4642	1340.009	1721.103	1015.672
17Mar2017 11:00:00	2017	1373.496213	983.03	1348.282	1738.581	1016.824
17Mar2017 12:00:00	2017	1367.062135	981.2836	1386.452	1735.119	1009.501
17Mar2017 13:00:00	2017	1359.96038	982.7911	1378.085	1732.17	1007.043
17Mar2017 14:00:00	2017	1350.505274	974.6149	1366.421	1703.635	973.8552
17Mar2017 15:00:00	2017	1337.427668	966.0781	1359.192	1661.495	958.7822
17Mar2017 16:00:00	2017	1323.607813	964.0295	1399.725	1667.834	962.222
17Mar2017 17:00:00	2017	1301.391782	962.4431	1394.457	1662.78	959.9391
17Mar2017 18:00:00	2017	1248.715949	951.5267	1377.344	1599.578	965.8256
17Mar2017 19:00:00	2017	1252.067621	956.5403	1375.731	1603.799	964.5412
17Mar2017 20:00:00	2017	1288.435102	973.9136	1396.594	1652.537	965.2437
17Mar2017 21:00:00	2017	1235.45813	962.323	1386.388	1604.994	959.6752
17Mar2017 22:00:00	2017	1146.633286	938.3942	1357.51	1512.051	952.1073
17Mar2017 23:00:00	2017	1053.018177	903.518	1317.614	1416.32	945.6045
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18Mar2017 2:00:00	2017	901.3632016	846.1152	1275.34	1282.09	948.0303
18Mar2017 3:00:00	2017	889.3985716	840.8181	1269.521	1263.296	957.3716
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18Mar2017 5:00:00	2017	920.2398333	862.4017	1261.792	1284.533	969.7009
18Mar2017 6:00:00	2017	975.7233029	880.6612	1265.19	1339.17	963.4336
18Mar2017 7:00:00	2017	1050.785908	889.6537	1289.527	1398.118	948.7861
18Mar2017 8:00:00	2017	1107.200626	908.3187	1329.833	1473.584	935.8455
18Mar2017 9:00:00	2017	1173.039064	926.1778	1362.989	1542.111	946.5674
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18Mar2017 11:00:00	2017	1223.121903	928.0797	1355.664	1584.182	940.095
18Mar2017 12:00:00	2017	1225.380478	922.0625	1351.457	1585.503	947.2865
18Mar2017 13:00:00	2017	1204.519481	913.8218	1348.967	1557.66	937.8545
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18Mar2017 16:00:00	2017	1176.916006	904.9747	1260.216	1466.904	928.8895
18Mar2017 17:00:00	2017	1182.197275	907.777	1265.384	1478.961	932.7524
18Mar2017 18:00:00	2017	1168.900836	912.3378	1261.269	1452.971	943.3376
18Mar2017 19:00:00	2017	1174.642566	925.9639	1310.44	1510.303	953.8596
18Mar2017 20:00:00	2017	1210.732929	946.7284	1365.565	1570.248	949.8958
18Mar2017 21:00:00	2017	1175.413274	934.8304	1352.608	1528.77	944.1283
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19Mar2017 0:00:00	2017	956.0538229	865.4303	1292.896	1325.621	951.4649
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19Mar2017 9:00:00	2017	1114.271029	934.0637	1336.404	1478.098	946.102
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19Mar2017 22:00:00	2017	1138.191836	931.3571	1321.785	1467.826	995.3181
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22Mar2017 4:00:00	2017	920.0111408	886.1189	1255.433	1326.138	978.0703
22Mar2017 5:00:00	2017	998.7934836	916.5228	1294.235	1400.931	979.5598
22Mar2017 6:00:00	2017	1166.653171	946.4876	1347.331	1529.138	962.193
22Mar2017 7:00:00	2017	1322.863402	988.2992	1408.789	1708.306	958.0099
22Mar2017 8:00:00	2017	1350.385241	985.7761	1411.376	1726.968	948.4246
22Mar2017 9:00:00	2017	1362.917833	990.4001	1426.847	1731.94	962.92
22Mar2017 10:00:00	2017	1367.464265	991.5197	1429.536	1747.038	958.5379
22Mar2017 11:00:00	2017	1365.465069	993.9419	1431.995	1756.347	955.7765
22Mar2017 12:00:00	2017	1366.387413	988.5931	1420.337	1749.223	949.4114

22Mar2017 13:00:00	2017	1362.018886	982.1949	1418.008	1753.443	937.3855
22Mar2017 14:00:00	2017	1356.602866	972.5694	1419.256	1740.404	934.4509
22Mar2017 15:00:00	2017	1354.587177	970.1795	1402.493	1722.138	939.9831
22Mar2017 16:00:00	2017	1353.617725	977.2023	1394.199	1726.848	949.0475
22Mar2017 17:00:00	2017	1345.291694	982.1917	1384.028	1747.465	953.2712
22Mar2017 18:00:00	2017	1276.54605	968.4191	1372.673	1681.582	960.6379
22Mar2017 19:00:00	2017	1252.757178	966.8148	1362.901	1685.593	961.522
22Mar2017 20:00:00	2017	1293.922131	989.7085	1396.871	1738.333	991.3304
22Mar2017 21:00:00	2017	1239.19156	969.7867	1409.574	1687.246	1014.696
22Mar2017 22:00:00	2017	1125.363752	942.7937	1362.605	1580.499	1004.874
22Mar2017 23:00:00	2017	1014.236719	907.1008	1315.106	1479.779	1006.797
23Mar2017 0:00:00	2017	944.9554256	881.893	1302.659	1406.51	972.4321
23Mar2017 1:00:00	2017	901.2263794	871.8978	1293.813	1356.365	960.0945
23Mar2017 2:00:00	2017	881.5611346	866.3151	1292.395	1319.871	949.2181
23Mar2017 3:00:00	2017	878.274599	864.888	1282.296	1292.764	957.266
23Mar2017 4:00:00	2017	903.3266106	876.3523	1286.291	1299.489	958.7987
23Mar2017 5:00:00	2017	985.9676279	907.4365	1300.188	1367.025	983.3515
23Mar2017 6:00:00	2017	1148.016649	948.4532	1348.657	1517.323	974.8147
23Mar2017 7:00:00	2017	1280.746548	983.0754	1403.773	1671.698	996.0467
23Mar2017 8:00:00	2017	1307.269121	986.9012	1407.375	1699.525	997.727
23Mar2017 9:00:00	2017	1326.208928	984.9613	1420.31	1753.609	1006.417
23Mar2017 10:00:00	2017	1344.410252	984.422	1426.134	1790.75	979.7141
23Mar2017 11:00:00	2017	1357.180269	980.028	1421.211	1794.228	1016.794
23Mar2017 12:00:00	2017	1360.321492	974.19	1416.336	1785.008	1020.998
23Mar2017 13:00:00	2017	1357.36445	986.229	1416.271	1767.003	1018.265
23Mar2017 14:00:00	2017	1347.817281	982.8964	1406.921	1752.001	1001.291
23Mar2017 15:00:00	2017	1344.870533	979.9952	1400.387	1726.742	1003.632
23Mar2017 16:00:00	2017	1350.048633	982.0267	1406.577	1737.114	1008.605
23Mar2017 17:00:00	2017	1352.063808	977.9185	1410.901	1694.714	996.956
23Mar2017 18:00:00	2017	1298.206305	968.7477	1401.822	1645.242	977.2832
23Mar2017 19:00:00	2017	1270.349948	968.0095	1407.268	1646.315	986.7776
23Mar2017 20:00:00	2017	1313.806034	980.4248	1438.801	1748.75	1004.673
23Mar2017 21:00:00	2017	1253.058824	959.9187	1405.986	1667.042	1010.358
23Mar2017 22:00:00	2017	1141.458877	940.6871	1360.671	1526.153	1004.652
23Mar2017 23:00:00	2017	1028.453564	910.0615	1324.715	1445.942	1015.634
24Mar2017 0:00:00	2017	957.2417477	889.5896	1304.294	1344.353	1025.898
24Mar2017 1:00:00	2017	914.914308	880.333	1285.47	1300.373	1035.842
24Mar2017 2:00:00	2017	891.9641754	878.8378	1280.802	1268.058	1005.801
24Mar2017 3:00:00	2017	886.5536209	878.3837	1285.816	1257.659	1003.416
24Mar2017 4:00:00	2017	909.0924871	879.8353	1280.665	1272.719	1007.929
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24Mar2017 6:00:00	2017	1136.429933	932.9754	1337.331	1467.717	1010.112
24Mar2017 7:00:00	2017	1268.9666	976.0824	1386.159	1598.582	992.3312
24Mar2017 8:00:00	2017	1305.689202	1001.308	1419.503	1661.825	1006.314
24Mar2017 9:00:00	2017	1353.737018	1010.696	1443.417	1727.519	1006.764
24Mar2017 10:00:00	2017	1370.249516	1012.322	1431.252	1743.654	996.0418
24Mar2017 11:00:00	2017	1369.728222	999.3753	1413.602	1698.164	995.9625

24Mar2017 12:00:00	2017	1361.024076	986.4983	1400.668	1698.564	1009.167
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24Mar2017 14:00:00	2017	1340.367394	971.4331	1398.15	1679.799	994.3415
24Mar2017 15:00:00	2017	1329.685497	961.2601	1392.68	1680.309	990.1621
24Mar2017 16:00:00	2017	1316.465999	957.2686	1389.557	1682.888	966.2652
24Mar2017 17:00:00	2017	1304.29192	948.1585	1371.117	1673.304	964.5823
24Mar2017 18:00:00	2017	1243.634713	930.5297	1332.867	1638.192	993.012
24Mar2017 19:00:00	2017	1226.608533	932.0689	1334.764	1640.48	1000.894
24Mar2017 20:00:00	2017	1260.845504	947.5768	1372.053	1683.236	1014.039
24Mar2017 21:00:00	2017	1208.418462	941.3714	1345.284	1632.782	995.5757
24Mar2017 22:00:00	2017	1118.206962	908.4065	1302.912	1512.493	982.867
24Mar2017 23:00:00	2017	1029.688904	875.4685	1287.04	1416.921	1009.593
25Mar2017 0:00:00	2017	958.6082845	853.6747	1278.64	1375.331	1016.908
25Mar2017 1:00:00	2017	910.1755879	846.0218	1269.033	1298.65	1007.451
25Mar2017 2:00:00	2017	884.0881918	846.8487	1276.696	1268.333	994.7173
25Mar2017 3:00:00	2017	871.6770655	845.1043	1272.313	1262.651	990.9676
25Mar2017 4:00:00	2017	875.001542	848.4183	1276.243	1278.629	978.6648
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25Mar2017 8:00:00	2017	1077.995414	923.4096	1346.795	1457.457	1034.139
25Mar2017 9:00:00	2017	1147.040894	939.2804	1364.249	1557.815	1015.63
25Mar2017 10:00:00	2017	1182.494365	937.6983	1366.692	1562.494	1018.999
25Mar2017 11:00:00	2017	1201.328385	936.5859	1367.204	1587.662	1028.552
25Mar2017 12:00:00	2017	1198.962884	929.9803	1359.022	1562.995	1027.49
25Mar2017 13:00:00	2017	1185.377249	919.4116	1346.292	1541.541	1028.424
25Mar2017 14:00:00	2017	1169.896594	910.7014	1336.103	1525.655	1031.158
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25Mar2017 18:00:00	2017	1142.851537	911.9806	1319.964	1465.841	999.0233
25Mar2017 19:00:00	2017	1130.766017	913.1766	1319.536	1465.919	1020.281
25Mar2017 20:00:00	2017	1177.070877	932.6944	1369.19	1526.333	1033.409
25Mar2017 21:00:00	2017	1152.203232	926.6294	1351.995	1506.626	1030.22
25Mar2017 22:00:00	2017	1091.861993	905.2915	1330.711	1451.556	1024.791
25Mar2017 23:00:00	2017	1015.562515	879.0758	1311.823	1373.036	1052.011
26Mar2017 0:00:00	2017	949.5197256	857.8578	1293.396	1297.181	1049.761
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26Mar2017 9:00:00	2017	1089.682741	916.9892	1346.515	1435.143	993.3687
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26Mar2017 16:00:00	2017	1155.033853	910.4729	1340.26	1478.584	976.5421
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26Mar2017 18:00:00	2017	1161.295011	920.7521	1342.888	1470.387	952.0899
26Mar2017 19:00:00	2017	1157.259327	922.9326	1347.243	1469.321	975.9506
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26Mar2017 22:00:00	2017	1082.948042	906.4722	1341.938	1460.421	981.2258
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27Mar2017 10:00:00	2017	1324.388831	962.9904	1428.834	1734.525	989.252
27Mar2017 11:00:00	2017	1344.886308	961.3204	1426.73	1754.164	989.8616
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27Mar2017 13:00:00	2017	1341.516551	952.9053	1416.937	1741.491	969.8981
27Mar2017 14:00:00	2017	1335.111669	944.0824	1402.341	1713.904	969.4078
27Mar2017 15:00:00	2017	1329.968044	941.3004	1386.779	1698.263	969.4412
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27Mar2017 17:00:00	2017	1335.268995	960.268	1387.344	1657.304	986.8577
27Mar2017 18:00:00	2017	1279.62785	943.698	1372.419	1607.366	986.6352
27Mar2017 19:00:00	2017	1259.217361	937.933	1370.022	1625.449	986.2708
27Mar2017 20:00:00	2017	1283.985708	957.12	1387.252	1681.197	997.5527
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27Mar2017 23:00:00	2017	1007.750732	871.5796	1283.753	1381.756	1000.859
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28Mar2017 6:00:00	2017	1136.69511	934.7152	1352.581	1495.846	1026.626
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28Mar2017 13:00:00	2017	1339.71891	967.4868	1422.077	1690.423	1045.652
28Mar2017 14:00:00	2017	1319.15494	963.6627	1414.74	1676.172	1046.083
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28Mar2017 16:00:00	2017	1311.60288	968.6148	1411.661	1666.585	1052.812
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28Mar2017 19:00:00	2017	1235.660411	950.6524	1383.006	1608.915	1052.235
28Mar2017 20:00:00	2017	1272.07312	972.2268	1402.578	1672.745	1073.444
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29Mar2017 2:00:00	2017	874.9762894	842.0312	1282.682	1260.838	1071.737
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30Mar2017 19:00:00	2017	1272.548899	975.7532	1359.95	1565.731	1040.915
30Mar2017 20:00:00	2017	1284.310469	997.4646	1388.646	1642.764	1052.614
30Mar2017 21:00:00	2017	1223.390864	981.7045	1375.47	1615.078	1045.359
30Mar2017 22:00:00	2017	1115.133335	945.5134	1346.929	1495.139	1044.941
30Mar2017 23:00:00	2017	1011.017548	910.7833	1313.336	1394.329	1035.942
31Mar2017 0:00:00	2017	938.2944019	884.9625	1294.616	1311.018	1028.157
31Mar2017 1:00:00	2017	895.8825709	873.0567	1281.672	1271.91	1028.804
31Mar2017 2:00:00	2017	874.7142594	873.1737	1270.112	1235.769	1032.526
31Mar2017 3:00:00	2017	867.7516808	873.3818	1264.11	1224.884	1025.206
31Mar2017 4:00:00	2017	887.758147	878.7381	1269.114	1222.503	1022.908
31Mar2017 5:00:00	2017	963.1311722	892.9869	1290.896	1308.705	1026.025
31Mar2017 6:00:00	2017	1111.442753	938.204	1329.973	1442.12	1055.813
31Mar2017 7:00:00	2017	1213.776466	981.5509	1372.652	1556.302	1037.044
31Mar2017 8:00:00	2017	1259.903071	995.032	1398.561	1615.008	1048.862
31Mar2017 9:00:00	2017	1298.279232	1006.011	1421.35	1687.127	1069.346
31Mar2017 10:00:00	2017	1324.530274	1002.006	1411.382	1680.295	1076.065
31Mar2017 11:00:00	2017	1327.806042	988.3163	1376.552	1715.716	1069.1
31Mar2017 12:00:00	2017	1321.164217	965.2299	1364.548	1689.868	1040.874
31Mar2017 13:00:00	2017	1315.044035	968.7144	1335.433	1689.147	1041.934
31Mar2017 14:00:00	2017	1307.304306	958.2086	1313.311	1676.032	1040.984
31Mar2017 15:00:00	2017	1299.232782	949.4374	1311.619	1667.382	1048.126
31Mar2017 16:00:00	2017	1285.245577	943.0082	1310.102	1642.919	1043.496
31Mar2017 17:00:00	2017	1276.906021	938.3244	1300.243	1628.163	1033.253
31Mar2017 18:00:00	2017	1212.184328	930.9842	1308.82	1582.962	1040.15
31Mar2017 19:00:00	2017	1180.34535	932.5497	1334.015	1571.225	1037.69
31Mar2017 20:00:00	2017	1214.86407	950.45	1370.918	1615.711	1054.012
31Mar2017 21:00:00	2017	1183.427776	943.525	1363.455	1582.587	1056.678
31Mar2017 22:00:00	2017	1099.814615	917.8572	1332.375	1508.07	1058.627
31Mar2017 23:00:00	2017	1005.303261	886.9606	1292.583	1419.694	1076.73
01Apr2017 0:00:00	2017	927.9913747	865.9916	1251.57	1325.358	1058.369
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01Apr2017 2:00:00	2017	857.3765402	844.5939	1224.82	1253.9	1059.282
01Apr2017 3:00:00	2017	845.1272244	846.5522	1227.131	1217.531	1051.724
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01Apr2017 5:00:00	2017	869.3355144	859.1807	1254.667	1235.296	1049.811
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01Apr2017 10:00:00	2017	1165.462948	953.0994	1342.801	1544.143	1005.583
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01Apr2017 12:00:00	2017	1191.514891	937.318	1346.011	1519.512	998.0998
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01Apr2017 14:00:00	2017	1167.737459	925.2921	1323.955	1505.484	999.6011
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01Apr2017 18:00:00	2017	1131.744767	920.759	1314.323	1461.235	983.1647
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02Apr2017 1:00:00	2017	881.3984562	850.6614	1262.857	1268.639	976.5806
02Apr2017 2:00:00	2017	857.9950892	847.1953	1185.907	1181.877	966.9479
02Apr2017 3:00:00	2017	845.9531141	851.9487	1179.276	1185.478	958.6991
02Apr2017 4:00:00	2017	847.9233084	856.5293	1187.059	1177.632	956.5556
02Apr2017 5:00:00	2017	868.1948147	869.1462	1262.502	1224.16	951.199
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02Apr2017 9:00:00	2017	1094.268398	923.9192	1277.844	1360.678	972.7531
02Apr2017 10:00:00	2017	1158.553067	917.9175	1292.154	1413.19	973.1652
02Apr2017 11:00:00	2017	1197.040034	921.6945	1290.239	1469.879	967.4312
02Apr2017 12:00:00	2017	1200.815636	929.0118	1285.626	1488.344	960.8353
02Apr2017 13:00:00	2017	1193.165382	935.3281	1291.837	1481.027	957.6715
02Apr2017 14:00:00	2017	1196.640187	931.5461	1295.139	1472.052	952.1364
02Apr2017 15:00:00	2017	1198.171458	931.9899	1304.033	1479.828	955.1565
02Apr2017 16:00:00	2017	1211.63805	946.5604	1322.181	1498.623	966.5691
02Apr2017 17:00:00	2017	1231.05953	936.6278	1338.883	1522.146	967.5783
02Apr2017 18:00:00	2017	1222.304127	935.0851	1327.422	1513.531	957.1717
02Apr2017 19:00:00	2017	1226.328151	938.3399	1328.375	1509.6	962.0057
02Apr2017 20:00:00	2017	1238.850562	950.7222	1354.49	1577.547	990.8828
02Apr2017 21:00:00	2017	1199.137458	936.9997	1338.481	1527.434	997.2364
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02Apr2017 23:00:00	2017	992.2409564	894.064	1256.904	1332.594	974.8018
03Apr2017 0:00:00	2017	919.9717882	863.3933	1233.208	1244.961	966.1226
03Apr2017 1:00:00	2017	880.1659269	859.3163	1225.061	1228.157	966.4244
03Apr2017 2:00:00	2017	863.0792242	861.0462	1228.678	1243.121	976.8893
03Apr2017 3:00:00	2017	862.3808879	860.2881	1228.398	1237.844	978.6005
03Apr2017 4:00:00	2017	884.2587289	867.4875	1232.893	1245.378	978.306
03Apr2017 5:00:00	2017	970.9621297	886.8555	1239.935	1311.839	974.5003
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03Apr2017 7:00:00	2017	1259.853365	978.6335	1340.797	1626.186	972.086
03Apr2017 8:00:00	2017	1289.963437	976.1089	1369.248	1661.01	978.9924
03Apr2017 9:00:00	2017	1313.108285	942.1781	1386.662	1688.876	986.3219
03Apr2017 10:00:00	2017	1341.066198	950.87	1388.192	1689.897	989.6662
03Apr2017 11:00:00	2017	1360.235243	966.6542	1394.15	1685.072	992.0177
03Apr2017 12:00:00	2017	1356.270986	963.9513	1377.447	1678.485	990.0472
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03Apr2017 14:00:00	2017	1336.32368	952.5983	1359.634	1664.363	984.6571
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03Apr2017 16:00:00	2017	1331.713105	932.9373	1354.277	1652.169	968.3882
03Apr2017 17:00:00	2017	1328.53055	922.7336	1347.814	1655.064	956.2208
03Apr2017 18:00:00	2017	1266.404354	907.0877	1318.251	1607.463	948.3406
03Apr2017 19:00:00	2017	1241.755858	890.9927	1302.923	1574.388	926.6249
03Apr2017 20:00:00	2017	1274.060269	910.4315	1321.175	1624.431	940.8024
03Apr2017 21:00:00	2017	1237.346173	962.3209	1340.504	1639.689	958.0439
03Apr2017 22:00:00	2017	1121.921364	927.7522	1322.737	1518.258	953.7708
03Apr2017 23:00:00	2017	1007.864898	894.7644	1291.945	1415.83	931.8476
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04Apr2017 1:00:00	2017	895.7401588	860.5738	1255.209	1299.987	951.3245
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04Apr2017 7:00:00	2017	1263.250506	956.435	1349.048	1611.638	945.7097
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04Apr2017 10:00:00	2017	1323.447796	907.145	1348.202	1686.458	965.4526
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16Apr2017 22:00:00	2017	1088.299207	907.448	1233.86	1422.463	952.3278
16Apr2017 23:00:00	2017	991.7366992	880.8747	1206.03	1326.693	968.5394

17Apr2017 0:00:00	2017	923.030392	869.3966	1180.348	1257.114	995.7126
17Apr2017 1:00:00	2017	883.4491425	876.0822	1161.171	1208.457	989.772
17Apr2017 2:00:00	2017	864.8803254	870.7431	1156.158	1181.631	988.5727
17Apr2017 3:00:00	2017	860.804977	870.1371	1157.233	1181.683	989.4216
17Apr2017 4:00:00	2017	880.9432319	865.0019	1176.69	1216.856	996.6949
17Apr2017 5:00:00	2017	954.3794668	872.7869	1198.729	1277.196	994.2373
17Apr2017 6:00:00	2017	1087.691232	901.4908	1225.202	1363.609	960.1766
17Apr2017 7:00:00	2017	1185.449543	929.9597	1257.592	1438.956	930.7641
17Apr2017 8:00:00	2017	1258.500511	957.6417	1300.813	1527.839	964.6596
17Apr2017 9:00:00	2017	1316.137416	970.7933	1327.513	1592.532	976.1756
17Apr2017 10:00:00	2017	1335.044818	974.2674	1338.997	1644.728	971.3703
17Apr2017 11:00:00	2017	1355.450093	937.1153	1342.985	1666.994	978.9483
17Apr2017 12:00:00	2017	1351.330838	921.4	1347.823	1659.373	975.3912
17Apr2017 13:00:00	2017	1341.893137	916.1778	1349.262	1668.736	983.0581
17Apr2017 14:00:00	2017	1335.991739	912.5549	1343.155	1668.075	974.5634
17Apr2017 15:00:00	2017	1328.669178	912.5873	1337.606	1664.935	955.0179
17Apr2017 16:00:00	2017	1326.446437	944.287	1340.457	1660.823	945.314
17Apr2017 17:00:00	2017	1331.078676	947.5324	1328.636	1625.303	960.8134
17Apr2017 18:00:00	2017	1277.221003	939.4368	1318.698	1571.142	956.9796
17Apr2017 19:00:00	2017	1257.138599	934.5101	1311.183	1572.758	960.531
17Apr2017 20:00:00	2017	1266.537227	945.8685	1327.631	1594.323	962.0759
17Apr2017 21:00:00	2017	1233.769922	950.8629	1321.901	1567.153	971.5543
17Apr2017 22:00:00	2017	1123.715014	922.0062	1284.143	1443.829	969.1851
17Apr2017 23:00:00	2017	1014.429703	886.7614	1243.664	1334.695	968.4439
18Apr2017 0:00:00	2017	934.2775117	885.727	1219.874	1257.657	966.3098
18Apr2017 1:00:00	2017	890.3258438	878.7564	1196.966	1228.161	962.1273
18Apr2017 2:00:00	2017	871.9462301	868.7595	1191.811	1230.009	966.753
18Apr2017 3:00:00	2017	866.4106344	867.8754	1213.719	1242.098	969.053
18Apr2017 4:00:00	2017	888.7447465	875.6868	1220.954	1233.523	970.1447
18Apr2017 5:00:00	2017	970.8234201	892.2754	1217.75	1322.562	973.7931
18Apr2017 6:00:00	2017	1130.220627	901.0058	1243.679	1442.628	962.4175
18Apr2017 7:00:00	2017	1252.189747	924.2742	1265.51	1552.201	970.5417
18Apr2017 8:00:00	2017	1295.410154	940.207	1278.548	1588.347	978.4654
18Apr2017 9:00:00	2017	1321.597595	906.3579	1298.4	1632.912	975.1638
18Apr2017 10:00:00	2017	1342.643634	897.0907	1301.519	1662.384	975.9752
18Apr2017 11:00:00	2017	1342.39407	892.3678	1307.488	1675.675	971.872
18Apr2017 12:00:00	2017	1344.02061	883.657	1299.015	1682.482	954.5235
18Apr2017 13:00:00	2017	1343.556124	881.3733	1292.818	1675.684	954.5657
18Apr2017 14:00:00	2017	1341.767818	881.3811	1283.619	1658.706	954.1748
18Apr2017 15:00:00	2017	1343.944538	889.512	1282.642	1665.049	952.8145
18Apr2017 16:00:00	2017	1349.567579	909.4912	1281.721	1672.635	959.3047
18Apr2017 17:00:00	2017	1352.34553	915.2793	1272.328	1662.84	969.4118
18Apr2017 18:00:00	2017	1275.991498	927.1703	1252.882	1622.056	946.9417
18Apr2017 19:00:00	2017	1234.940358	925.5002	1253.75	1606.738	962.1522
18Apr2017 20:00:00	2017	1242.564309	935.6232	1305.9	1630.303	974.8135
18Apr2017 21:00:00	2017	1236.055513	934.7657	1317.5	1627.844	999.0783
18Apr2017 22:00:00	2017	1125.809448	904.2251	1277.467	1520.754	993.7715

18Apr2017 23:00:00	2017	1009.786478	871.2285	1234.826	1398.526	991.1202
19Apr2017 0:00:00	2017	934.1772678	847.718	1206.441	1306.52	961.2864
19Apr2017 1:00:00	2017	893.6746828	833.2743	1187.848	1222.142	952.0166
19Apr2017 2:00:00	2017	873.9951205	833.8343	1178.687	1182.306	980.5603
19Apr2017 3:00:00	2017	866.2226742	831.3599	1187.863	1170.247	985.08
19Apr2017 4:00:00	2017	886.2052049	838.853	1191.108	1185.626	974.2437
19Apr2017 5:00:00	2017	966.4493218	856.602	1189.796	1256.694	952.7443
19Apr2017 6:00:00	2017	1129.855583	880.1713	1231.548	1373.717	951.113
19Apr2017 7:00:00	2017	1254.752028	924.8565	1273.56	1531.749	949.1644
19Apr2017 8:00:00	2017	1298.09667	944.6008	1309.34	1591.787	956.2959
19Apr2017 9:00:00	2017	1311.7831	954.1264	1335.453	1611.443	945.1356
19Apr2017 10:00:00	2017	1323.362875	962.9391	1339.539	1638.169	937
19Apr2017 11:00:00	2017	1335.193973	966.2949	1337.942	1650.17	932.0036
19Apr2017 12:00:00	2017	1335.027176	958.2744	1326.444	1649.734	922.6828
19Apr2017 13:00:00	2017	1334.48386	955.0235	1327.319	1662.301	937.1204
19Apr2017 14:00:00	2017	1335.011682	944.0367	1305.372	1637.066	951.9227
19Apr2017 15:00:00	2017	1334.157336	940.6594	1299.836	1638.445	951.3825
19Apr2017 16:00:00	2017	1338.817272	946.2249	1303.778	1605.228	951.8516
19Apr2017 17:00:00	2017	1331.514973	951.7434	1304.255	1574.721	963.3421
19Apr2017 18:00:00	2017	1267.503389	941.2819	1307.291	1548.489	956.9137
19Apr2017 19:00:00	2017	1224.736046	936.259	1290.431	1510.974	951.2469
19Apr2017 20:00:00	2017	1224.3979	943.5861	1303.794	1531.302	976.2299
19Apr2017 21:00:00	2017	1229.004663	952.7017	1324.785	1559.593	1000.443
19Apr2017 22:00:00	2017	1121.918654	927.8126	1293.802	1471.829	1000.582
19Apr2017 23:00:00	2017	1007.438672	892.5794	1256.471	1378.43	985.6702
20Apr2017 0:00:00	2017	929.2029282	867.5473	1236.907	1296.593	979.4336
20Apr2017 1:00:00	2017	883.0714166	860.3923	1225.721	1257.616	1008.11
20Apr2017 2:00:00	2017	865.1664244	845.2921	1194.265	1234.11	1022.762
20Apr2017 3:00:00	2017	859.846786	848.4176	1178.249	1227.739	1022.066
20Apr2017 4:00:00	2017	879.301248	871.4817	1206.971	1251.612	1014.039
20Apr2017 5:00:00	2017	963.32086	890.4957	1231.751	1317.659	1001.451
20Apr2017 6:00:00	2017	1118.964644	913.4838	1260.933	1425.411	987.4911
20Apr2017 7:00:00	2017	1243.147235	950.9779	1268.615	1545.636	963.6813
20Apr2017 8:00:00	2017	1294.537826	980.1038	1294.859	1574.851	956.3441
20Apr2017 9:00:00	2017	1316.522397	983.5027	1290.246	1597.116	916.1621
20Apr2017 10:00:00	2017	1330.606197	986.3049	1302.57	1632.167	911.8584
20Apr2017 11:00:00	2017	1346.032697	988.3393	1304.49	1610.743	924.2888
20Apr2017 12:00:00	2017	1347.117791	977.8427	1298.171	1616.519	929.9302
20Apr2017 13:00:00	2017	1346.97424	985.6254	1292.841	1618.686	934.5609
20Apr2017 14:00:00	2017	1344.591742	974.5307	1288.976	1595.396	941.4812
20Apr2017 15:00:00	2017	1344.660272	973.8989	1296.228	1635.979	982
20Apr2017 16:00:00	2017	1344.819934	980.2465	1311.545	1642.826	994.9153
20Apr2017 17:00:00	2017	1339.253889	979.8434	1312.961	1636.93	991.8443
20Apr2017 18:00:00	2017	1275.492412	966.1188	1301.41	1583.15	983.8586
20Apr2017 19:00:00	2017	1243.946974	958.7073	1289.11	1587.035	989.3489
20Apr2017 20:00:00	2017	1246.435755	968.1627	1291.414	1582.241	996.98
20Apr2017 21:00:00	2017	1232.561848	969.4462	1297.385	1616.705	1016.199

20Apr2017 22:00:00	2017	1118.114404	938.1675	1260.063	1502.313	1004.771
20Apr2017 23:00:00	2017	1003.48119	901.6224	1221.677	1417.457	981.2495
21Apr2017 0:00:00	2017	927.0449431	878.6831	1200.153	1316.894	1026.611
21Apr2017 1:00:00	2017	879.9947692	864.3857	1189.836	1268.856	1023.711
21Apr2017 2:00:00	2017	858.3073253	845.798	1174.235	1246.495	1029.072
21Apr2017 3:00:00	2017	853.4218012	845.6436	1163.252	1239.696	1020.444
21Apr2017 4:00:00	2017	872.1937592	848.7815	1170.585	1247.877	1034.496
21Apr2017 5:00:00	2017	948.7376993	864.7888	1185.5	1320.393	1045.168
21Apr2017 6:00:00	2017	1108.561886	892.5937	1215.077	1417.085	1027.417
21Apr2017 7:00:00	2017	1242.691229	942.6884	1265.854	1530.654	995.7492
21Apr2017 8:00:00	2017	1292.776609	971.3059	1316.776	1614.142	999.2631
21Apr2017 9:00:00	2017	1324.216222	963.1306	1328.343	1636.88	1013.854
21Apr2017 10:00:00	2017	1354.635597	980.9968	1322.721	1649.869	994.0013
21Apr2017 11:00:00	2017	1371.996329	977.3665	1307.639	1640.18	997.6077
21Apr2017 12:00:00	2017	1368.048539	968.1024	1290.468	1624.334	1000.886
21Apr2017 13:00:00	2017	1358.142368	955.3568	1283.156	1613.122	995.2699
21Apr2017 14:00:00	2017	1337.937618	943.6354	1279.794	1596.625	975.252
21Apr2017 15:00:00	2017	1316.93525	936.0404	1269.882	1593.667	971.2974
21Apr2017 16:00:00	2017	1301.307164	930.6695	1274.047	1579.338	969.006
21Apr2017 17:00:00	2017	1279.871814	966.1284	1268.732	1548.959	988.5923
21Apr2017 18:00:00	2017	1217.742739	958.3578	1212.797	1501.493	973.8016
21Apr2017 19:00:00	2017	1177.655957	928.5969	1219.06	1496.836	977.3452
21Apr2017 20:00:00	2017	1177.140989	931.3776	1249.58	1554.207	975.2323
21Apr2017 21:00:00	2017	1193.732761	942.8904	1298.802	1576.095	973.6708
21Apr2017 22:00:00	2017	1112.942574	935.9401	1269.582	1503.673	974.7778
21Apr2017 23:00:00	2017	1015.28601	901.5307	1218.922	1414.947	996.8187
22Apr2017 0:00:00	2017	939.3358216	877.9483	1196.378	1325.326	1029.746
22Apr2017 1:00:00	2017	891.3647307	865.2338	1149.799	1276.716	1028.916
22Apr2017 2:00:00	2017	864.1609313	855.4778	1122.222	1228.279	1041.712
22Apr2017 3:00:00	2017	853.1360564	851.8739	1120.399	1198.703	1043.058
22Apr2017 4:00:00	2017	857.5770864	857.9048	1123.652	1193.995	1030.504
22Apr2017 5:00:00	2017	889.0446306	864.2034	1135.906	1215.439	1026.152
22Apr2017 6:00:00	2017	923.9654543	872.0401	1137.082	1243.147	1028.776
22Apr2017 7:00:00	2017	981.9174248	888.2204	1148.027	1303.3	1014.664
22Apr2017 8:00:00	2017	1061.710709	914.5849	1186.833	1404.735	1009.1
22Apr2017 9:00:00	2017	1128.765885	925.6863	1224.238	1489.232	1009.925
22Apr2017 10:00:00	2017	1168.942963	948.9825	1241.131	1536.672	1007.863
22Apr2017 11:00:00	2017	1185.28394	943.2442	1252.366	1570.667	1038.743
22Apr2017 12:00:00	2017	1181.825032	935.992	1253.134	1573.505	1033.84
22Apr2017 13:00:00	2017	1163.592783	928.9864	1239.619	1536.936	1031.205
22Apr2017 14:00:00	2017	1157.717566	923.3084	1218.897	1512.724	1028.381
22Apr2017 15:00:00	2017	1155.867063	920.7425	1230.463	1517.402	1031.118
22Apr2017 16:00:00	2017	1165.255148	930.4725	1229.793	1504.112	1033.547
22Apr2017 17:00:00	2017	1207.50017	935.0657	1230.706	1539.697	1021.115
22Apr2017 18:00:00	2017	1193.989193	927.1687	1210.332	1510.308	1019.654
22Apr2017 19:00:00	2017	1181.276062	923.7282	1202.551	1472.618	1023.447
22Apr2017 20:00:00	2017	1183.157003	931.3951	1218.247	1497.926	1028.528

22Apr2017 21:00:00	2017	1158.356748	938.9359	1237.473	1500.144	1054.525
22Apr2017 22:00:00	2017	1088.804255	919.3757	1219.954	1440.654	1048.219
22Apr2017 23:00:00	2017	1003.02044	892.1643	1199.842	1357.441	1049.165
23Apr2017 0:00:00	2017	942.6711646	858.2395	1117.766	1278.424	1048.766
23Apr2017 1:00:00	2017	897.4846778	845.8914	1088.745	1201.88	1035.13
23Apr2017 2:00:00	2017	865.8787592	843.2715	1101.135	1180.77	1015.497
23Apr2017 3:00:00	2017	853.8558235	850.7493	1127.793	1181.086	1026.422
23Apr2017 4:00:00	2017	855.090329	855.9339	1146.409	1184.902	1039.777
23Apr2017 5:00:00	2017	875.649695	866.0023	1158.167	1198.778	1044.769
23Apr2017 6:00:00	2017	911.9789442	880.3288	1171.383	1219.95	1030.584
23Apr2017 7:00:00	2017	956.5414999	888.4203	1176.949	1276.533	1011.153
23Apr2017 8:00:00	2017	1029.838549	910.2746	1211.4	1343.178	1015.883
23Apr2017 9:00:00	2017	1105.540451	933.9985	1236.19	1411.555	1011.565
23Apr2017 10:00:00	2017	1156.25846	943.4468	1252.987	1437.938	1028.85
23Apr2017 11:00:00	2017	1182.321352	945.4095	1271.293	1476.543	1036.329
23Apr2017 12:00:00	2017	1185.771429	936.3044	1268.707	1491.359	1011.035
23Apr2017 13:00:00	2017	1176.786054	926.6652	1269.712	1488.414	983.8911
23Apr2017 14:00:00	2017	1169.23165	919.9827	1267.979	1480.594	985.5322
23Apr2017 15:00:00	2017	1169.4152	910.2657	1259.601	1486.445	989.2624
23Apr2017 16:00:00	2017	1192.861987	913.408	1272.877	1518.796	991.6794
23Apr2017 17:00:00	2017	1231.512412	920.8616	1271.448	1549.464	980.5172
23Apr2017 18:00:00	2017	1245.909566	917.7024	1242.538	1517.476	984.9219
23Apr2017 19:00:00	2017	1232.207152	918.7973	1233.723	1497.305	996.435
23Apr2017 20:00:00	2017	1221.018383	929.2572	1265.748	1504.574	1009.213
23Apr2017 21:00:00	2017	1198.069906	934.4303	1274.104	1529.313	1010.613
23Apr2017 22:00:00	2017	1101.027031	899.4275	1223.571	1442.924	1007.549
23Apr2017 23:00:00	2017	993.0505822	868.8566	1194.589	1329.617	1010.223
24Apr2017 0:00:00	2017	922.0797747	846.1395	1169.552	1244.971	975.1808
24Apr2017 1:00:00	2017	884.8293207	837.0042	1152.009	1210.029	980.4537
24Apr2017 2:00:00	2017	865.4964292	838.1319	1159.014	1197.592	1001.942
24Apr2017 3:00:00	2017	859.4824159	838.7062	1152.81	1194.767	987.3784
24Apr2017 4:00:00	2017	883.9071972	843.8215	1159.155	1208.226	989.3663
24Apr2017 5:00:00	2017	966.7430366	867.7996	1197.528	1278.342	985.0463
24Apr2017 6:00:00	2017	1133.622797	915.7473	1244.55	1390.519	983.9912
24Apr2017 7:00:00	2017	1266.424511	955.8887	1303.843	1518.208	996.709
24Apr2017 8:00:00	2017	1309.723603	945.3768	1362.383	1575.331	1009.392
24Apr2017 9:00:00	2017	1342.251233	942.8766	1371.344	1599.624	1002.733
24Apr2017 10:00:00	2017	1372.658339	947.7235	1372.057	1632.545	1016.523
24Apr2017 11:00:00	2017	1387.877453	940.9017	1376.632	1649.045	1026.16
24Apr2017 12:00:00	2017	1382.677738	933.2379	1371.001	1645.184	1035.863
24Apr2017 13:00:00	2017	1374.711455	928.0571	1380.361	1648.205	1036.849
24Apr2017 14:00:00	2017	1368.285637	935.3638	1376.381	1644.573	1023.484
24Apr2017 15:00:00	2017	1366.212627	926.4009	1371.47	1643.823	1028.505
24Apr2017 16:00:00	2017	1383.603592	933.66	1378.7	1663.08	1031.549
24Apr2017 17:00:00	2017	1390.270788	932.446	1376.694	1647.223	1029.056
24Apr2017 18:00:00	2017	1334.194937	954.7298	1350.293	1590.904	1019.568
24Apr2017 19:00:00	2017	1306.647387	954.3975	1349.444	1568.705	1029.806

24Apr2017 20:00:00	2017	1297.734418	952.7745	1344.051	1566.027	1030.851
24Apr2017 21:00:00	2017	1258.903623	944.2153	1333.576	1564.773	1030.03
24Apr2017 22:00:00	2017	1140.146805	925.6962	1289.725	1453.937	1030.211
24Apr2017 23:00:00	2017	1027.991104	900.6545	1259.31	1345.191	991.0872
25Apr2017 0:00:00	2017	946.9830187	877.9015	1237.404	1271.604	1025.78
25Apr2017 1:00:00	2017	908.6342883	866.0353	1220.214	1231.045	1011.797
25Apr2017 2:00:00	2017	889.5276549	860.4352	1209.354	1209.63	1013.359
25Apr2017 3:00:00	2017	882.5483262	853.8105	1206.984	1200.329	1014.219
25Apr2017 4:00:00	2017	907.302787	858.8308	1217.342	1210.17	1005.625
25Apr2017 5:00:00	2017	989.1580075	882.7507	1236.154	1280.104	1011.228
25Apr2017 6:00:00	2017	1144.69029	920.4634	1268.85	1420.344	1021.017
25Apr2017 7:00:00	2017	1261.505263	948.8756	1319.417	1569.64	1044.402
25Apr2017 8:00:00	2017	1303.215206	942.5988	1358.871	1641.072	1044.171
25Apr2017 9:00:00	2017	1334.687165	927.0222	1378.198	1678.267	1026.772
25Apr2017 10:00:00	2017	1350.816022	935.87	1374.891	1707.088	1022.515
25Apr2017 11:00:00	2017	1357.995152	940.5124	1358.338	1715.63	1029.764
25Apr2017 12:00:00	2017	1352.984911	931.438	1341.653	1692.089	1003.515
25Apr2017 13:00:00	2017	1349.407214	927.8348	1332.113	1666.945	1007.432
25Apr2017 14:00:00	2017	1346.784961	923.2685	1325.532	1658.829	1012.191
25Apr2017 15:00:00	2017	1350.774025	917.5478	1317.177	1662.882	1015.349
25Apr2017 16:00:00	2017	1361.577005	924.8512	1327.168	1670.195	1034.862
25Apr2017 17:00:00	2017	1367.697146	924.6584	1336.283	1657.846	1025.827
25Apr2017 18:00:00	2017	1322.177554	963.1495	1319.476	1603.311	1021.214
25Apr2017 19:00:00	2017	1281.033018	946.1772	1334.115	1584.946	1031.541
25Apr2017 20:00:00	2017	1264.550245	953.7404	1338.023	1579.444	1046.993
25Apr2017 21:00:00	2017	1257.586343	959.8579	1322.78	1590.407	1057.836
25Apr2017 22:00:00	2017	1147.169218	927.4265	1278.174	1484.783	1052.773
25Apr2017 23:00:00	2017	1027.630017	892.4243	1234.664	1391.48	1010.236
26Apr2017 0:00:00	2017	952.7578808	864.6107	1225.095	1320.347	1028.995
26Apr2017 1:00:00	2017	910.3542473	849.5728	1228.479	1282.489	1034.927
26Apr2017 2:00:00	2017	887.3642635	852.3117	1229.994	1262.451	1036.01
26Apr2017 3:00:00	2017	882.9036668	856.9173	1235.408	1251.924	1032.948
26Apr2017 4:00:00	2017	904.7075691	865.5034	1231.577	1253.877	1040.763
26Apr2017 5:00:00	2017	991.6000531	892.2036	1246.604	1309.521	1033.746
26Apr2017 6:00:00	2017	1143.076204	925.7204	1262.495	1409.396	1036.495
26Apr2017 7:00:00	2017	1269.070023	962.5267	1295.575	1544.302	1050.207
26Apr2017 8:00:00	2017	1318.85425	964.7447	1369.575	1628.505	1038.858
26Apr2017 9:00:00	2017	1352.104257	919.654	1405.491	1668.87	1030.705
26Apr2017 10:00:00	2017	1365.693244	927.4092	1398.653	1671.862	1036.044
26Apr2017 11:00:00	2017	1374.396211	924.7441	1395.072	1674.27	1042.71
26Apr2017 12:00:00	2017	1369.991933	916.6013	1384.81	1668.796	1046.047
26Apr2017 13:00:00	2017	1364.787504	909.0878	1380.848	1671.134	1042.956
26Apr2017 14:00:00	2017	1355.641771	916.5047	1378.331	1671.321	1039.19
26Apr2017 15:00:00	2017	1356.929667	912.4691	1382.716	1670.05	1034.473
26Apr2017 16:00:00	2017	1369.290993	917.0668	1374.547	1670.479	1036.328
26Apr2017 17:00:00	2017	1368.290147	913.437	1362.442	1652.768	1050.99
26Apr2017 18:00:00	2017	1315.186676	932.1671	1334.619	1599.605	1040.773

26Apr2017 19:00:00	2017	1275.945743	940.0159	1309.984	1583.754	1058.417
26Apr2017 20:00:00	2017	1276.066323	944.5959	1319.914	1594.73	1068.346
26Apr2017 21:00:00	2017	1254.338515	947.594	1334.341	1590.978	1075.826
26Apr2017 22:00:00	2017	1145.168992	917.9796	1318.617	1500.3	1069.457
26Apr2017 23:00:00	2017	1029.131607	880.4866	1294.456	1400.369	1054.902
27Apr2017 0:00:00	2017	948.5257509	854.9204	1260.914	1306.234	1044.59
27Apr2017 1:00:00	2017	901.1506467	851.9188	1240.519	1256.201	1027.667
27Apr2017 2:00:00	2017	880.1674919	854.6448	1230.361	1229.997	1018.983
27Apr2017 3:00:00	2017	877.5884384	856.2232	1227.626	1219.053	1034.334
27Apr2017 4:00:00	2017	898.2969166	871.8431	1231.101	1231.215	1013.221
27Apr2017 5:00:00	2017	978.2919138	899.094	1252.234	1294.75	1018.928
27Apr2017 6:00:00	2017	1132.567767	934.3323	1271.354	1400.283	1025.934
27Apr2017 7:00:00	2017	1264.222942	958.51	1303.144	1529.674	1051.179
27Apr2017 8:00:00	2017	1307.168122	986.9499	1347.289	1605.988	1042.147
27Apr2017 9:00:00	2017	1332.43252	961.2675	1358.181	1650.912	1031.757
27Apr2017 10:00:00	2017	1350.743267	937.2844	1354.305	1654.334	1036.464
27Apr2017 11:00:00	2017	1354.8631	937.7295	1357.363	1650.782	1040.289
27Apr2017 12:00:00	2017	1350.253082	933.9943	1364.24	1654.244	1047.865
27Apr2017 13:00:00	2017	1347.21178	937.7216	1369.612	1657.813	1048.078
27Apr2017 14:00:00	2017	1338.694079	941.6439	1368.314	1653.305	1029.985
27Apr2017 15:00:00	2017	1329.466017	941.8535	1363.003	1653.205	1022.726
27Apr2017 16:00:00	2017	1336.970173	938.3453	1356.714	1651.558	1032.81
27Apr2017 17:00:00	2017	1333.932266	935.6692	1351.524	1639.33	1022.082
27Apr2017 18:00:00	2017	1286.768943	959.9857	1337.346	1585.745	1021.647
27Apr2017 19:00:00	2017	1265.740187	956.6383	1313.767	1560.014	1029.46
27Apr2017 20:00:00	2017	1259.881583	965.4796	1317.408	1533.69	1032.489
27Apr2017 21:00:00	2017	1236.952145	965.5261	1342.608	1579.051	1056.996
27Apr2017 22:00:00	2017	1129.217757	932.9082	1313.657	1486.966	1056.769
27Apr2017 23:00:00	2017	1015.720612	903.6035	1273.87	1377.723	1038.292
28Apr2017 0:00:00	2017	943.3423903	878.7254	1239.844	1306.035	1039.104
28Apr2017 1:00:00	2017	899.0199855	860.5131	1213.787	1265.403	1031.554
28Apr2017 2:00:00	2017	880.804685	843.5098	1206.665	1237.95	1028.416
28Apr2017 3:00:00	2017	874.9119051	842.402	1203.142	1228.689	1031.952
28Apr2017 4:00:00	2017	894.4646916	851.824	1212.492	1245.932	1019.426
28Apr2017 5:00:00	2017	976.4657533	877.7	1226.02	1302.808	1022.193
28Apr2017 6:00:00	2017	1112.542866	914.9943	1241.187	1359.322	1020.785
28Apr2017 7:00:00	2017	1236.542055	945.2305	1277.146	1477.897	1041.49
28Apr2017 8:00:00	2017	1296.644882	975.3395	1308.228	1548.263	1055.264
28Apr2017 9:00:00	2017	1327.21232	996.4673	1323.039	1588.622	1046.5
28Apr2017 10:00:00	2017	1344.701496	970.6699	1329.057	1612.186	1041.748
28Apr2017 11:00:00	2017	1342.11533	977.6301	1341.335	1631.085	1031.408
28Apr2017 12:00:00	2017	1341.584631	970.8413	1342.116	1636.814	1028.538
28Apr2017 13:00:00	2017	1339.647144	967.6224	1341.66	1637.477	1012.137
28Apr2017 14:00:00	2017	1327.306668	978.6785	1313.104	1627.153	1015.973
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28Apr2017 16:00:00	2017	1297.077966	977.8166	1283.792	1595.901	1012.344
28Apr2017 17:00:00	2017	1274.166882	970.8427	1266.751	1549.257	1011.104

28Apr2017 18:00:00	2017	1215.84617	955.7568	1255.622	1478.106	1007.96
28Apr2017 19:00:00	2017	1189.699363	952.1191	1260.906	1443.849	1008.553
28Apr2017 20:00:00	2017	1181.735245	956.3405	1263.588	1438.933	1022.155
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28Apr2017 22:00:00	2017	1121.137343	944.1022	1279.292	1429.66	1038.306
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29Apr2017 0:00:00	2017	944.3934369	900.2078	1205.825	1258.363	1026.707
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29Apr2017 4:00:00	2017	862.7787229	872.4873	1182.336	1168.261	1023.014
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29Apr2017 6:00:00	2017	917.5456567	891.0862	1175.584	1169.194	997.9465
29Apr2017 7:00:00	2017	985.42666	900.3044	1174.303	1208.2	985.9175
29Apr2017 8:00:00	2017	1070.262749	922.3259	1206.135	1297.854	986.2943
29Apr2017 9:00:00	2017	1134.908576	933.823	1227.822	1370.814	1012.922
29Apr2017 10:00:00	2017	1168.60107	940.8731	1240.565	1408.672	1028.8
29Apr2017 11:00:00	2017	1185.66086	936.3897	1241.1	1423.452	1022.188
29Apr2017 12:00:00	2017	1186.868962	933.6308	1241.206	1457.48	1011.558
29Apr2017 13:00:00	2017	1174.113201	926.1066	1239.06	1448.378	1021.351
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29Apr2017 17:00:00	2017	1164.456834	913.3666	1263.09	1434.167	1007.991
29Apr2017 18:00:00	2017	1134.375003	907.4762	1237.875	1404.722	1023.852
29Apr2017 19:00:00	2017	1110.154194	902.7756	1233.143	1392.541	1024.012
29Apr2017 20:00:00	2017	1109.70112	915.0463	1249.363	1391.119	1029.961
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29Apr2017 22:00:00	2017	1073.984936	908.7465	1247.121	1397.506	1062.784
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30Apr2017 12:00:00	2017	1164.542695	914.831	1217.786	1402.137	1021.806
30Apr2017 13:00:00	2017	1161.542088	910.7529	1218.467	1407.366	1021.828
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30Apr2017 15:00:00	2017	1162.097595	914.4237	1240.973	1431.039	1036.083
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30Apr2017 17:00:00	2017	1204.754694	927.0504	1266.459	1480.114	1047.048
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03May2017 13:00:00	2017	1386.298767	951.1177	1285.671	1650.314	995.1
03May2017 14:00:00	2017	1392.57264	946.1616	1295.442	1654.417	1001.816
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04May2017 5:00:00	2017	937.750826	839.0903	1139.133	1238.379	1013.02
04May2017 6:00:00	2017	1072.449909	854.0571	1148.32	1305.758	992.85
04May2017 7:00:00	2017	1207.34175	898.646	1204.432	1440.845	984.2104
04May2017 8:00:00	2017	1293.187769	927.528	1258.031	1528.718	986.4934
04May2017 9:00:00	2017	1347.819927	941.3357	1272.768	1584.949	979.6973
04May2017 10:00:00	2017	1387.393247	941.5425	1284.684	1627.25	987.3416
04May2017 11:00:00	2017	1420.581569	920.4774	1312.01	1645.715	987.1163
04May2017 12:00:00	2017	1434.340214	915.9664	1292.075	1637.571	991.0378
04May2017 13:00:00	2017	1446.345832	922.3563	1305.756	1687.121	998.9611
04May2017 14:00:00	2017	1452.709327	922.9351	1309.261	1699.09	1006.656

04May2017 15:00:00	2017	1452.702798	920.6679	1314.232	1717.293	984.4324
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04May2017 17:00:00	2017	1437.423127	940.063	1315.778	1700.741	982.4159
04May2017 18:00:00	2017	1357.99923	935.9928	1284.07	1629.4	971.8676
04May2017 19:00:00	2017	1321.681601	930.6819	1280.16	1584.785	970.0108
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04May2017 21:00:00	2017	1277.672539	956.0593	1284.653	1582.956	975.3255
04May2017 22:00:00	2017	1173.712737	938.9905	1248.705	1504.234	983.2681
04May2017 23:00:00	2017	1046.823311	894.457	1182.738	1371.312	994.1471
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06May2017 13:00:00	2017	1269.308572	930.0651	1286.77	1613.084	996.4627

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12May2017 18:00:00	2017	1264.777187	977.8779	1283.74	1592.899	954.2813
12May2017 19:00:00	2017	1237.082383	980.8859	1277.316	1540.363	939.2033
12May2017 20:00:00	2017	1218.49236	982.5888	1279.929	1533.533	950.5764
12May2017 21:00:00	2017	1185.607856	972.5564	1283.216	1542.906	956.9311
12May2017 22:00:00	2017	1099.786194	946.8482	1257.514	1465.053	982.0979
12May2017 23:00:00	2017	998.1920725	915.1348	1221.406	1352.936	979.747
13May2017 0:00:00	2017	919.8317922	890.5479	1194.678	1262.439	987.6362
13May2017 1:00:00	2017	872.037521	879.0022	1183.042	1220.799	991.9484
13May2017 2:00:00	2017	841.5852966	867.3026	1182.215	1219.927	1018.877
13May2017 3:00:00	2017	828.6537006	862.6572	1178.243	1178.229	1038.773
13May2017 4:00:00	2017	829.7789969	863.8243	1168.206	1176.675	1065.932
13May2017 5:00:00	2017	847.5012729	865.5119	1169.677	1194.698	1058.053
13May2017 6:00:00	2017	872.5504845	867.5125	1163.42	1257.059	1061.627
13May2017 7:00:00	2017	951.4447931	894.1641	1199.972	1306.437	1064.328
13May2017 8:00:00	2017	1041.839118	922.8645	1253.716	1410.432	1055.708
13May2017 9:00:00	2017	1112.498975	941.4002	1296.925	1490.404	1078.332
13May2017 10:00:00	2017	1150.378239	947.8698	1311.492	1524.409	1079.162
13May2017 11:00:00	2017	1169.702614	952.5598	1314.757	1573.547	1083.134
13May2017 12:00:00	2017	1175.067595	952.1604	1304.604	1585.765	1080.842
13May2017 13:00:00	2017	1161.213464	947.1947	1297.345	1561.08	1075.927
13May2017 14:00:00	2017	1152.804102	943.0345	1287.261	1539.578	1087.779
13May2017 15:00:00	2017	1153.594844	944.9641	1286.076	1524.608	1082.493
13May2017 16:00:00	2017	1156.047461	950.4437	1290.172	1520.382	1063.233
13May2017 17:00:00	2017	1160.437651	952.1133	1297.982	1519.284	1049.64
13May2017 18:00:00	2017	1142.623683	942.186	1281.76	1475.484	1036.604
13May2017 19:00:00	2017	1130.015836	935.0868	1259.69	1429.587	1018.596
13May2017 20:00:00	2017	1116.593501	933.34	1256.045	1405.569	1011.131
13May2017 21:00:00	2017	1111.302751	941.2221	1270.454	1404.13	1038.37
13May2017 22:00:00	2017	1058.419328	922.2392	1244.893	1393.799	1074.937
13May2017 23:00:00	2017	974.1868008	892.7947	1190.558	1318.589	1040.947
14May2017 0:00:00	2017	900.3777128	868.6173	1164.099	1239.826	1035.957
14May2017 1:00:00	2017	855.556469	856.8033	1143.733	1186.722	1048.104
14May2017 2:00:00	2017	826.0184392	848.3113	1139.981	1153.373	1065.387
14May2017 3:00:00	2017	816.5889369	848.5941	1158.847	1143.298	1057.903
14May2017 4:00:00	2017	818.2157864	847.375	1171.186	1166.071	1034.304
14May2017 5:00:00	2017	834.8354743	844.6723	1179.974	1180.677	1025.936
14May2017 6:00:00	2017	847.7546312	846.4837	1177.168	1197.331	1000.246
14May2017 7:00:00	2017	912.2068657	865.7595	1193.964	1261.52	1010.867
14May2017 8:00:00	2017	988.7785784	889.1095	1230.473	1332.637	1039.51
14May2017 9:00:00	2017	1055.730582	906.7401	1261.774	1398.868	1043.062

14May2017 10:00:00	2017	1100.505528	913.9616	1270.193	1443.808	1041.635
14May2017 11:00:00	2017	1125.924644	913.771	1280.215	1472.285	1076.535
14May2017 12:00:00	2017	1134.31419	912.3258	1285.518	1492.753	1076.65
14May2017 13:00:00	2017	1132.767728	913.4093	1292.247	1491.535	1073.949
14May2017 14:00:00	2017	1129.107425	915.9856	1287.239	1488.705	1068.668
14May2017 15:00:00	2017	1134.571344	923.2662	1288.23	1494.153	1069.998
14May2017 16:00:00	2017	1145.294406	926.8006	1294.668	1520.922	1069.698
14May2017 17:00:00	2017	1170.424438	931.1506	1301.617	1510.368	1050.183
14May2017 18:00:00	2017	1167.078313	924.3342	1256.509	1447.502	1033.194
14May2017 19:00:00	2017	1150.612472	919.7358	1271.243	1462.649	1028.159
14May2017 20:00:00	2017	1124.550673	921.0123	1302.784	1464.828	1025.816
14May2017 21:00:00	2017	1121.992569	924.8041	1294.734	1473.011	1035.449
14May2017 22:00:00	2017	1065.021687	914.274	1276.941	1417.882	1042.455
14May2017 23:00:00	2017	962.8260094	869.9613	1191.81	1309.359	1085.152
15May2017 0:00:00	2017	889.2389422	850.6625	1153.995	1233.686	1055.053
15May2017 1:00:00	2017	849.3917068	847.2882	1158.695	1196.097	1046.232
15May2017 2:00:00	2017	831.1726741	849.5269	1177.136	1172.635	1050.251
15May2017 3:00:00	2017	826.3935724	846.6084	1180.204	1168.461	1062.474
15May2017 4:00:00	2017	852.7824429	850.2779	1186.064	1182.573	1046.917
15May2017 5:00:00	2017	925.0879113	859.8081	1193.555	1245.502	1039.617
15May2017 6:00:00	2017	1057.068904	887.673	1223.082	1336.188	1044.821
15May2017 7:00:00	2017	1200.749423	933.9085	1264.579	1459.582	1024.865
15May2017 8:00:00	2017	1260.585913	954.8101	1295.982	1534.266	1038.783
15May2017 9:00:00	2017	1293.768845	973.9945	1328.037	1590.892	1044.692
15May2017 10:00:00	2017	1323.722775	984.2848	1345.333	1625.522	1047.933
15May2017 11:00:00	2017	1346.012905	965.7249	1352.381	1655.571	1050.766
15May2017 12:00:00	2017	1354.72395	972.9605	1363.617	1685.283	1043.369
15May2017 13:00:00	2017	1358.808329	980.9798	1363.851	1688.151	1079.711
15May2017 14:00:00	2017	1354.784411	978.8518	1335.139	1682.91	1108.087
15May2017 15:00:00	2017	1354.841893	978.7563	1325.558	1671.046	1091.807
15May2017 16:00:00	2017	1352.93485	984.0194	1342.236	1672.733	1102.515
15May2017 17:00:00	2017	1343.923818	976.3477	1337.23	1677.459	1086.225
15May2017 18:00:00	2017	1272.847732	967.7989	1299.601	1584.114	1081.93
15May2017 19:00:00	2017	1230.752004	970.74	1284.165	1582.405	1059.329
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15May2017 22:00:00	2017	1108.758112	947.5319	1288.152	1440.332	1070.445
15May2017 23:00:00	2017	988.715219	908.1294	1228.281	1339.984	1067.06
16May2017 0:00:00	2017	908.0719738	880.7835	1209.372	1301.818	1062.471
16May2017 1:00:00	2017	866.0957966	865.0257	1202.567	1247.312	1058.897
16May2017 2:00:00	2017	846.761308	854.2654	1202.75	1241.146	1066.157
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16May2017 4:00:00	2017	864.9945741	853.5439	1202.056	1230.636	1055.209
16May2017 5:00:00	2017	933.1810373	859.7651	1188.696	1260.414	1047.343
16May2017 6:00:00	2017	1063.361102	877.396	1192.464	1347.84	1043.209
16May2017 7:00:00	2017	1198.037229	926.4573	1231.988	1503.404	1030.652
16May2017 8:00:00	2017	1250.444703	940.4031	1260.585	1573.068	1034.653

16May2017 9:00:00	2017	1282.802337	952.086	1283.833	1627.461	1037.08
16May2017 10:00:00	2017	1303.211757	980.0402	1293.87	1682.237	1035.535
16May2017 11:00:00	2017	1323.907582	974.5602	1299.889	1677.21	1028.591
16May2017 12:00:00	2017	1332.6039	972.9452	1287.055	1644.245	1038.012
16May2017 13:00:00	2017	1336.415182	975.7687	1276.532	1648.448	1030.047
16May2017 14:00:00	2017	1336.653037	977.1672	1278.803	1648.773	1026.351
16May2017 15:00:00	2017	1336.154166	977.2387	1291.686	1651.604	1038.317
16May2017 16:00:00	2017	1341.111194	981.1215	1288.801	1651.376	1047.988
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16May2017 18:00:00	2017	1291.728997	965.8853	1252.03	1601.764	1065.999
16May2017 19:00:00	2017	1262.910233	959.9609	1245.426	1562.316	1052.38
16May2017 20:00:00	2017	1232.06322	956.7991	1239.075	1551.975	1061.544
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16May2017 23:00:00	2017	998.5149883	893.9317	1196.018	1360.885	1069.165
17May2017 0:00:00	2017	925.8040251	871.7326	1175.778	1267.977	1071.313
17May2017 1:00:00	2017	883.2314925	858.4914	1147.471	1203.656	1076.632
17May2017 2:00:00	2017	860.9591827	855.5821	1136.96	1183.408	1074.15
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17May2017 4:00:00	2017	878.8519312	855.0506	1142.398	1229.774	1069.603
17May2017 5:00:00	2017	956.0586932	874.9904	1154.138	1269.076	1067.454
17May2017 6:00:00	2017	1110.809355	907.4632	1189.274	1385.724	1056.218
17May2017 7:00:00	2017	1260.122798	955.4344	1232.155	1554.391	1046.284
17May2017 8:00:00	2017	1309.247208	972.4117	1260.684	1627.585	1027.691
17May2017 9:00:00	2017	1337.759638	975.0937	1236.755	1631.346	1029.923
17May2017 10:00:00	2017	1359.047638	974.665	1247.537	1654.707	1021.049
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17May2017 12:00:00	2017	1368.248849	974.0697	1233.452	1665.553	1028.49
17May2017 13:00:00	2017	1361.45535	972.9265	1235.263	1668.389	1036.56
17May2017 14:00:00	2017	1352.348687	967.0244	1240.525	1662.978	1024.277
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17May2017 16:00:00	2017	1357.370416	974.0079	1243.71	1657.022	953.7363
17May2017 17:00:00	2017	1351.035102	966.4657	1228.611	1652.846	930.8945
17May2017 18:00:00	2017	1287.528119	949.3763	1212.6	1569.567	947.6601
17May2017 19:00:00	2017	1250.281051	928.0635	1199.445	1536.595	925.4462
17May2017 20:00:00	2017	1223.889983	939.761	1195.337	1523.354	947.0069
17May2017 21:00:00	2017	1203.035605	942.1071	1202.3	1522.806	951.9106
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17May2017 23:00:00	2017	1011.152889	876.4671	1166.073	1362.038	974.5247
18May2017 0:00:00	2017	933.1061306	849.4084	1155.278	1275.934	966.7926
18May2017 1:00:00	2017	890.4201049	837.1569	1150.079	1255.696	976.3985
18May2017 2:00:00	2017	870.1983071	829.4913	1147.474	1232.782	975.926
18May2017 3:00:00	2017	863.8799927	826.8781	1156.519	1222.08	974.4772
18May2017 4:00:00	2017	882.7557691	828.6179	1153.834	1227.428	976.7277
18May2017 5:00:00	2017	950.7515579	842.3453	1151.267	1243.052	962.7557
18May2017 6:00:00	2017	1076.123118	868.2455	1173.074	1344.445	935.2202
18May2017 7:00:00	2017	1211.277826	911.7885	1226.362	1498.042	938.0191

18May2017 8:00:00	2017	1264.636057	929.0945	1254.876	1558.011	944.2617
18May2017 9:00:00	2017	1293.244751	927.6837	1249.566	1611.584	948.4629
18May2017 10:00:00	2017	1318.466524	938.9875	1253.297	1654.947	943.9629
18May2017 11:00:00	2017	1336.748285	940.176	1259.335	1673.31	971.5808
18May2017 12:00:00	2017	1350.936387	931.5552	1259.087	1695.062	981.2116
18May2017 13:00:00	2017	1357.689483	930.8396	1259.124	1705.088	963.4403
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18May2017 15:00:00	2017	1344.772155	925.7499	1285.42	1713.976	982.9885
18May2017 16:00:00	2017	1349.509582	928.2588	1286.857	1705.622	974.6011
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18May2017 20:00:00	2017	1204.910784	895.9859	1290.196	1560.885	926.2429
18May2017 21:00:00	2017	1188.767196	902.7904	1302.57	1520.3	939.491
18May2017 22:00:00	2017	1121.144063	887.0248	1285.774	1493.403	944.5585
18May2017 23:00:00	2017	1008.540007	849.4205	1245.607	1373.751	933.6758
19May2017 0:00:00	2017	925.128201	831.0859	1221.886	1288.297	903.8531
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19May2017 3:00:00	2017	842.991726	818.3484	1172.448	1197.557	910.1865
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19May2017 5:00:00	2017	917.323608	833.0288	1171.111	1216.13	913.1702
19May2017 6:00:00	2017	1028.953949	852.7351	1193.022	1301.247	925.0298
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19May2017 16:00:00	2017	1324.635463	966.4039	1339.032	1650.417	944.0654
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19May2017 18:00:00	2017	1238.710271	954.8611	1287.127	1593.64	935.8751
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19May2017 20:00:00	2017	1150.758831	931.6785	1245.621	1506.647	928.4228
19May2017 21:00:00	2017	1127.734946	933.2143	1260.841	1495.067	954.6969
19May2017 22:00:00	2017	1081.219397	919.1461	1263.06	1472.972	963.2735
19May2017 23:00:00	2017	986.7908045	887.267	1222.367	1387.951	940.844
20May2017 0:00:00	2017	906.7187987	861.0766	1188.281	1308.239	913.2291
20May2017 1:00:00	2017	856.9808975	848.2143	1159.374	1256.278	916.2143
20May2017 2:00:00	2017	832.4078403	843.3265	1158.064	1226.394	903.1942
20May2017 3:00:00	2017	819.8835732	839.3072	1150.169	1214.294	917.2748
20May2017 4:00:00	2017	822.7482436	839.2971	1131.534	1170.506	915.6009
20May2017 5:00:00	2017	828.427936	832.3196	1114.625	1131.059	894.6541
20May2017 6:00:00	2017	848.316033	834.3355	1108.996	1157.4	877.8191

20May2017 7:00:00	2017	917.3968779	860.5375	1134.837	1211.071	880.2409
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20May2017 11:00:00	2017	1158.741381	920.0331	1240.115	1491.813	916.8914
20May2017 12:00:00	2017	1165.183336	914.3288	1241.667	1511.1	925.212
20May2017 13:00:00	2017	1155.558188	909.8278	1252.039	1520.038	913.6875
20May2017 14:00:00	2017	1146.607071	913.0963	1250.077	1511.683	914.2466
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20May2017 16:00:00	2017	1151.401474	921.4009	1250.346	1518.143	930.6962
20May2017 17:00:00	2017	1155.55327	927.7702	1254.647	1525.657	929.9819
20May2017 18:00:00	2017	1137.316835	920.8731	1228.766	1497.173	922.8994
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20May2017 23:00:00	2017	975.9557293	868.8644	1207.057	1348.557	914.823
21May2017 0:00:00	2017	900.934409	842.6852	1173.555	1266.205	893.2375
21May2017 1:00:00	2017	851.7880794	827.1549	1151.407	1203.675	875.5234
21May2017 2:00:00	2017	819.0298779	821.4218	1135.641	1168.747	863.5444
21May2017 3:00:00	2017	804.8490422	816.9921	1128.125	1167.196	865.5608
21May2017 4:00:00	2017	805.7097758	815.5958	1129.988	1163.047	870.2954
21May2017 5:00:00	2017	807.8698244	804.7174	1117.287	1113.536	863.9573
21May2017 6:00:00	2017	816.48423	809.9214	1103.524	1124.049	852.2937
21May2017 7:00:00	2017	873.4610114	830.1332	1128.433	1197.142	833.8556
21May2017 8:00:00	2017	956.7719008	855.7143	1175.009	1279.667	854.5988
21May2017 9:00:00	2017	1033.025007	874.5365	1208.352	1374.52	859.5394
21May2017 10:00:00	2017	1086.580333	883.5536	1230.859	1436.764	874.1712
21May2017 11:00:00	2017	1116.361578	891.4905	1239.989	1479.411	872.9148
21May2017 12:00:00	2017	1130.378583	905.3305	1239.684	1490.914	878.2335
21May2017 13:00:00	2017	1131.487825	903.9579	1233.795	1495.743	892.9326
21May2017 14:00:00	2017	1133.483062	908.5582	1249.777	1522.169	900.3623
21May2017 15:00:00	2017	1140.225171	912.1105	1262.7	1537.285	879.6325
21May2017 16:00:00	2017	1158.212211	917.3515	1252.757	1540.539	884.5449
21May2017 17:00:00	2017	1166.745322	923.1679	1247.447	1545.199	913.4333
21May2017 18:00:00	2017	1148.356381	919.5132	1232.062	1513.379	906.3436
21May2017 19:00:00	2017	1117.141766	913.267	1208.119	1464.026	879.1596
21May2017 20:00:00	2017	1090.731403	902.8783	1204.418	1438.232	873.0147
21May2017 21:00:00	2017	1095.386217	904.9539	1207.803	1437.299	874.4955
21May2017 22:00:00	2017	1075.391311	891.4214	1206.481	1438.309	875.8009
21May2017 23:00:00	2017	992.7070273	860.8623	1182.828	1351.131	881.4874
22May2017 0:00:00	2017	915.0508998	841.9613	1139.394	1270.291	862.2271
22May2017 1:00:00	2017	866.2502772	827.0165	1136.539	1219.936	844.796
22May2017 2:00:00	2017	836.6774655	817.1523	1146.241	1172.193	848.1324
22May2017 3:00:00	2017	820.7605742	810.6576	1146.003	1176.214	870.7189
22May2017 4:00:00	2017	821.7872414	809.0063	1134.719	1171.337	870.7136
22May2017 5:00:00	2017	834.7108159	808.4316	1098.543	1161.979	850.6258

22May2017 6:00:00	2017	857.095331	811.3547	1096.258	1167.782	825.7376
22May2017 7:00:00	2017	914.143338	837.7751	1126.746	1235.457	819.7442
22May2017 8:00:00	2017	995.968989	865.2064	1169.387	1298.018	834.3555
22May2017 9:00:00	2017	1087.859652	894.6622	1211.687	1415.382	836.2124
22May2017 10:00:00	2017	1163.886376	917.7202	1240.193	1478.401	875.4111
22May2017 11:00:00	2017	1210.729513	929.2935	1255.477	1535.65	883.0114
22May2017 12:00:00	2017	1236.055687	938.6571	1281.565	1584.658	886.2356
22May2017 13:00:00	2017	1246.207031	943.9105	1289.671	1609.476	894.5591
22May2017 14:00:00	2017	1254.590056	953.5192	1279.072	1594.857	900.9558
22May2017 15:00:00	2017	1270.799091	965.1943	1279.356	1612.591	905.5171
22May2017 16:00:00	2017	1292.659928	960.7632	1288.866	1644.599	910.5036
22May2017 17:00:00	2017	1314.043635	966.9849	1288.469	1664.292	899.6436
22May2017 18:00:00	2017	1289.222435	966.4183	1290.434	1638.488	895.3638
22May2017 19:00:00	2017	1269.063319	970.4441	1287.514	1618.977	896.6348
22May2017 20:00:00	2017	1240.123675	961.3595	1273.633	1589.057	917.2968
22May2017 21:00:00	2017	1218.454349	956.6016	1259.049	1579.756	924.678
22May2017 22:00:00	2017	1159.440107	930.32	1230.835	1530.984	922.3049
22May2017 23:00:00	2017	1030.494977	892.6801	1185.988	1420.332	905.6199
23May2017 0:00:00	2017	933.6017237	850.9604	1143.826	1318.64	893.8971
23May2017 1:00:00	2017	880.4749388	836.3615	1140.749	1276.215	904.3322
23May2017 2:00:00	2017	849.8514027	823.0279	1131.588	1267.486	875.2286
23May2017 3:00:00	2017	840.9596016	819.0617	1180.248	1241.822	906.7257
23May2017 4:00:00	2017	858.0559705	823.1755	1206.022	1261.997	920.6705
23May2017 5:00:00	2017	921.3906251	835.0218	1213.509	1268.476	914.0681
23May2017 6:00:00	2017	1054.669161	856.0955	1244.015	1363.299	904.073
23May2017 7:00:00	2017	1212.070769	906.1335	1315.134	1548.013	899.2712
23May2017 8:00:00	2017	1288.136902	931.5313	1358.314	1666.043	912.5285
23May2017 9:00:00	2017	1360.617464	942.9595	1370.211	1715.098	929.3069
23May2017 10:00:00	2017	1418.722112	949.8581	1382.654	1794.281	921.7914
23May2017 11:00:00	2017	1463.704633	921.1559	1397.388	1839.412	928.398
23May2017 12:00:00	2017	1488.906028	922.3589	1395.915	1878.795	962.1531
23May2017 13:00:00	2017	1512.344424	932.2386	1400.143	1907.424	976.9045
23May2017 14:00:00	2017	1522.062102	945.8457	1398.137	1917.48	974.243
23May2017 15:00:00	2017	1531.824398	958.1125	1392.83	1945.356	982.9026
23May2017 16:00:00	2017	1553.517076	969.6622	1394.909	1949.917	971.7545
23May2017 17:00:00	2017	1548.65385	976.4757	1394.805	1931.361	961.0864
23May2017 18:00:00	2017	1457.982174	971.4362	1398.709	1893.603	945.105
23May2017 19:00:00	2017	1401.482564	996.109	1376.964	1838.007	927.4983
23May2017 20:00:00	2017	1356.663836	989.8072	1367.915	1772.885	936.5986
23May2017 21:00:00	2017	1301.398289	990.1202	1353.902	1725.51	903.9764
23May2017 22:00:00	2017	1221.314654	962.0525	1332.997	1673.999	912.331
23May2017 23:00:00	2017	1082.61266	915.1973	1285.289	1519.28	895.1846
24May2017 0:00:00	2017	980.6412304	882.4163	1235.006	1394.003	885.4986
24May2017 1:00:00	2017	917.2212756	863.3024	1211.626	1317.84	879.873
24May2017 2:00:00	2017	880.7241857	850.8816	1204.176	1286.702	855.4969
24May2017 3:00:00	2017	867.0006188	847.6316	1197.496	1260.447	863.5998
24May2017 4:00:00	2017	883.2137425	850.9056	1196.4	1250.856	850.9433

24May2017 5:00:00	2017	948.8993097	855.1669	1202.286	1290.551	847.4696
24May2017 6:00:00	2017	1081.670571	881.9257	1228.616	1383.753	843.2587
24May2017 7:00:00	2017	1216.129768	935.2081	1287.917	1518.123	829.1219
24May2017 8:00:00	2017	1273.63114	958.9117	1316.594	1636.69	835.1332
24May2017 9:00:00	2017	1313.208314	968.8683	1330.36	1713.916	843.2308
24May2017 10:00:00	2017	1344.506591	973.8174	1342.115	1772.191	863.3883
24May2017 11:00:00	2017	1365.240215	954.3691	1364.062	1791.763	877.4097
24May2017 12:00:00	2017	1367.048776	950.7422	1375.226	1756.529	874.7824
24May2017 13:00:00	2017	1362.855718	949.9153	1378.392	1761.962	873.7333
24May2017 14:00:00	2017	1360.62158	954.7479	1364.926	1732.248	881.4456
24May2017 15:00:00	2017	1368.32453	965.3176	1320.899	1706.656	893.5754
24May2017 16:00:00	2017	1389.88906	963.9985	1284.943	1718.842	887.8012
24May2017 17:00:00	2017	1409.0811	955.2417	1281.551	1695.799	886.6594
24May2017 18:00:00	2017	1354.50564	926.4878	1295.234	1668.068	856.2537
24May2017 19:00:00	2017	1296.97502	923.5655	1330.157	1642.366	868.9465
24May2017 20:00:00	2017	1256.465753	928.367	1335.507	1604.294	893.21
24May2017 21:00:00	2017	1211.481883	919.0427	1335.521	1562.24	897.8874
24May2017 22:00:00	2017	1115.465347	891.5301	1282.437	1471.804	887.9162
24May2017 23:00:00	2017	1003.746277	860.0849	1247.224	1372.068	890.8948
25May2017 0:00:00	2017	927.1874949	838.5161	1226.285	1287.064	893.6118
25May2017 1:00:00	2017	880.1074303	824.2383	1213.602	1221.62	899.4517
25May2017 2:00:00	2017	856.064677	816.5978	1218.816	1191.724	893.8702
25May2017 3:00:00	2017	845.0732595	815.3319	1217.403	1185.417	899.2859
25May2017 4:00:00	2017	864.3476223	818.8377	1223.74	1196.105	901.2726
25May2017 5:00:00	2017	924.7760738	826.6059	1229.281	1220.059	890.9933
25May2017 6:00:00	2017	1053.247928	851.6079	1257.54	1323.449	883.9507
25May2017 7:00:00	2017	1196.693042	887.8868	1302.59	1501.577	870.4404
25May2017 8:00:00	2017	1258.870279	908.892	1342.45	1610.209	878.5669
25May2017 9:00:00	2017	1294.653329	912.8542	1371.248	1673.951	883.0483
25May2017 10:00:00	2017	1334.494789	919.7152	1380.245	1697.726	908.9686
25May2017 11:00:00	2017	1354.552307	919.7033	1363.8	1703.404	875.0646
25May2017 12:00:00	2017	1354.578102	915.5141	1348.062	1690.072	853.8241
25May2017 13:00:00	2017	1358.544346	922.6856	1396.226	1664.558	857.6366
25May2017 14:00:00	2017	1355.228432	926.062	1399.456	1681.369	866.8167
25May2017 15:00:00	2017	1353.17722	926.7436	1398.678	1688.457	878.71
25May2017 16:00:00	2017	1344.532075	929.4075	1420.464	1685.388	877.5923
25May2017 17:00:00	2017	1329.843398	936.9741	1384.227	1678.964	884.9628
25May2017 18:00:00	2017	1258.89687	924.279	1356.43	1622.542	885.8041
25May2017 19:00:00	2017	1216.774284	911.3026	1353.465	1565.259	868.2998
25May2017 20:00:00	2017	1184.96113	904.2058	1349.216	1549.354	874.2015
25May2017 21:00:00	2017	1161.404207	906.5025	1343.344	1513.994	877.7246
25May2017 22:00:00	2017	1119.431467	894.185	1347.231	1491.115	874.2314
25May2017 23:00:00	2017	1003.849462	845.8634	1308.319	1407.627	864.7749
26May2017 0:00:00	2017	916.2316203	816.4338	1273.629	1315.525	849.7212
26May2017 1:00:00	2017	869.9423415	809.0952	1257.319	1269.197	842.5772
26May2017 2:00:00	2017	846.1783233	812.046	1245.838	1244.058	852.6108
26May2017 3:00:00	2017	841.881403	810.1396	1239.449	1228.952	849.9259

26May2017 4:00:00	2017	862.1388379	815.5348	1244.626	1239.886	844.6792
26May2017 5:00:00	2017	916.3502454	814.2298	1235.275	1259.225	852.4338
26May2017 6:00:00	2017	1040.295178	837.2414	1255.002	1340.163	855.8152
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26May2017 8:00:00	2017	1251.176993	907.6779	1331.425	1580.677	865.7416
26May2017 9:00:00	2017	1301.210574	916.8021	1342.315	1660.172	860.5234
26May2017 10:00:00	2017	1345.701531	926.2598	1324.6	1667.036	852.4172
26May2017 11:00:00	2017	1371.67755	950.6612	1367.942	1686.906	860.3116
26May2017 12:00:00	2017	1382.910946	953.6385	1369.458	1726.157	864.9126
26May2017 13:00:00	2017	1390.886629	954.2836	1372.461	1743.37	869.4786
26May2017 14:00:00	2017	1385.862257	951.6377	1370.723	1743.507	875.0453
26May2017 15:00:00	2017	1374.663603	955.5245	1367.319	1722.141	879.8681
26May2017 16:00:00	2017	1363.036027	956.1028	1370.991	1718.346	876.3306
26May2017 17:00:00	2017	1340.507129	950.8465	1355.105	1677.838	875.8435
26May2017 18:00:00	2017	1266.288905	939.7352	1321.41	1600.004	879.3344
26May2017 19:00:00	2017	1219.199269	928.3094	1319.166	1560.188	861.6501
26May2017 20:00:00	2017	1179.659883	920.4673	1313.566	1502.995	850.8901
26May2017 21:00:00	2017	1152.572293	918.8925	1306.092	1477.98	837.1167
26May2017 22:00:00	2017	1114.129747	908.054	1318.871	1504.224	835.0772
26May2017 23:00:00	2017	1015.902257	873.2153	1299.446	1411.428	847.239
27May2017 0:00:00	2017	927.6539936	846.2038	1269.236	1335.751	843.4543
27May2017 1:00:00	2017	870.5804156	827.8108	1250.273	1264.127	831.436
27May2017 2:00:00	2017	838.728514	819.2392	1234.805	1233.064	817.2069
27May2017 3:00:00	2017	829.3740462	817.1815	1222.056	1207.167	828.2656
27May2017 4:00:00	2017	825.466552	817.7176	1206.627	1155.993	831.3596
27May2017 5:00:00	2017	826.4418159	812.8562	1189.422	1129.226	813.4722
27May2017 6:00:00	2017	854.5032141	817.6187	1190.34	1151.276	800.6649
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27May2017 8:00:00	2017	1047.39678	887.4061	1269.585	1357.065	820.2048
27May2017 9:00:00	2017	1141.29771	915.5936	1311.806	1467.38	836.502
27May2017 10:00:00	2017	1203.61823	938.2122	1334.182	1531.605	831.3661
27May2017 11:00:00	2017	1235.356002	955.3038	1340.378	1569.768	828.6868
27May2017 12:00:00	2017	1250.451834	957.7036	1344.557	1615.093	844.1306
27May2017 13:00:00	2017	1253.889803	965.5613	1336.694	1634.323	879.4336
27May2017 14:00:00	2017	1252.136232	963.5563	1325.735	1638.64	900.2445
27May2017 15:00:00	2017	1258.098315	965.5374	1324.602	1624.575	869.1458
27May2017 16:00:00	2017	1263.412285	962.6775	1323.815	1633.921	865.2812
27May2017 17:00:00	2017	1262.303691	968.5635	1325.263	1636.177	840.3883
27May2017 18:00:00	2017	1221.970869	959.5683	1296.279	1590.037	849.35
27May2017 19:00:00	2017	1188.113707	950.7392	1300.504	1546.353	849.5359
27May2017 20:00:00	2017	1153.567178	943.7293	1299.336	1526.946	854.3661
27May2017 21:00:00	2017	1138.460158	942.4093	1287.55	1475.053	826.9579
27May2017 22:00:00	2017	1115.270062	936.9114	1291.691	1452.675	828.4508
27May2017 23:00:00	2017	1028.262939	908.9445	1266.975	1389.42	831.0798
28May2017 0:00:00	2017	946.8717022	875.3524	1242.157	1283.147	839.9177
28May2017 1:00:00	2017	883.4822621	854.5053	1215.97	1229.567	829.9552
28May2017 2:00:00	2017	847.8529091	848.9436	1184.533	1203.775	827.0759

28May2017 3:00:00	2017	828.5134704	842.6817	1193.186	1192.665	827.3042
28May2017 4:00:00	2017	822.1025782	835.0019	1212.946	1182.549	834.6109
28May2017 5:00:00	2017	815.1815107	818.8033	1204.894	1142.667	823.7738
28May2017 6:00:00	2017	826.6698351	820.9969	1217.431	1155.588	808.5567
28May2017 7:00:00	2017	889.7594311	839.3877	1242.758	1220.636	808.256
28May2017 8:00:00	2017	977.8502086	870.0295	1274.423	1291.517	814.7097
28May2017 9:00:00	2017	1063.974669	894.3986	1299.078	1358.554	822.9555
28May2017 10:00:00	2017	1131.850764	918.8291	1322.779	1446.065	830.5961
28May2017 11:00:00	2017	1172.065296	929.2813	1339.151	1489.503	839.8933
28May2017 12:00:00	2017	1197.809561	934.9518	1352.124	1520.218	837.362
28May2017 13:00:00	2017	1208.77349	936.6103	1342.618	1530.557	835.8587
28May2017 14:00:00	2017	1214.39393	949.9933	1340.43	1536.102	842.322
28May2017 15:00:00	2017	1226.313179	958.1616	1339.087	1546.413	843.52
28May2017 16:00:00	2017	1250.207527	969.5233	1350.735	1579.969	847.1493
28May2017 17:00:00	2017	1271.719331	975.8912	1362.747	1612.06	841.8292
28May2017 18:00:00	2017	1251.164238	979.2613	1355.742	1597.541	837.3438
28May2017 19:00:00	2017	1225.870761	968.6337	1328.433	1575.075	840.098
28May2017 20:00:00	2017	1197.980643	958.4426	1322.093	1541.716	843.3327
28May2017 21:00:00	2017	1174.205558	949.8161	1318.798	1516.027	836.8695
28May2017 22:00:00	2017	1127.712632	931.8478	1324.092	1487.345	840.3746
28May2017 23:00:00	2017	1008.032435	892.1176	1276.541	1398.814	853.622
29May2017 0:00:00	2017	916.4234419	852.5144	1232.646	1299.318	837.5768
29May2017 1:00:00	2017	866.3798251	841.8451	1202.314	1229.838	839.6052
29May2017 2:00:00	2017	842.5469555	837.1529	1193.937	1210.891	850.0207
29May2017 3:00:00	2017	835.1197009	838.431	1184.971	1206.961	848.1726
29May2017 4:00:00	2017	848.6701455	842.9012	1205.554	1212.695	834.5409
29May2017 5:00:00	2017	898.874347	849.1719	1204.335	1187.981	840.0097
29May2017 6:00:00	2017	1037.385423	880.5859	1234.172	1297.667	843.1363
29May2017 7:00:00	2017	1192.939887	925.9596	1302.057	1490.17	840.1602
29May2017 8:00:00	2017	1277.958528	960.5605	1364.31	1607.749	848.482
29May2017 9:00:00	2017	1340.087786	984.1577	1383.583	1675.288	851.0129
29May2017 10:00:00	2017	1384.730201	1001.968	1393.507	1714.534	865.5164
29May2017 11:00:00	2017	1421.837182	1011.295	1390.084	1723.206	882.2861
29May2017 12:00:00	2017	1447.353594	1001.823	1383.182	1739.218	903.5723
29May2017 13:00:00	2017	1465.41705	1032.131	1381.78	1803.699	895.9896
29May2017 14:00:00	2017	1484.300105	1029.321	1410.574	1817.632	897.2338
29May2017 15:00:00	2017	1495.566851	1037.263	1425.339	1830.981	900.4019
29May2017 16:00:00	2017	1508.966779	1051.934	1415.074	1821.001	912.6967
29May2017 17:00:00	2017	1496.302377	1049.835	1398.3	1819.871	897.6572
29May2017 18:00:00	2017	1409.047909	1052.887	1374.219	1752.866	903.1371
29May2017 19:00:00	2017	1349.455838	1031.83	1358.342	1698.588	884.9652
29May2017 20:00:00	2017	1299.47087	1020.949	1345.25	1648.964	884.993
29May2017 21:00:00	2017	1250.480324	1011.629	1326.83	1585.946	876.1719
29May2017 22:00:00	2017	1175.55881	988.9896	1320.582	1551.147	882.1485
29May2017 23:00:00	2017	1048.570846	941.6367	1276.737	1440.673	877.7366
30May2017 0:00:00	2017	952.2698487	911.7903	1242.43	1351.42	836.5084
30May2017 1:00:00	2017	895.7601238	889.4217	1220.17	1296.943	826.161

30May2017 2:00:00	2017	864.8339075	879.0244	1211.267	1267.609	826.2567
30May2017 3:00:00	2017	853.0539947	876.196	1206.135	1245.792	821.1236
30May2017 4:00:00	2017	865.0482121	877.0517	1205.927	1252.596	813.1927
30May2017 5:00:00	2017	914.1559872	887.8583	1211.762	1269.525	807.216
30May2017 6:00:00	2017	1048.565324	908.0435	1242.36	1368.109	806.9114
30May2017 7:00:00	2017	1206.298849	958.617	1305.382	1544.945	815.0465
30May2017 8:00:00	2017	1284.828787	997.4208	1335.194	1652.814	823.9789
30May2017 9:00:00	2017	1343.584135	1013.837	1343.267	1721.385	827.298
30May2017 10:00:00	2017	1393.962044	1008.753	1357.837	1790.398	826.92
30May2017 11:00:00	2017	1435.886279	970.6317	1379.98	1828.071	837.9275
30May2017 12:00:00	2017	1463.829152	980.3191	1380.644	1841.737	875.512
30May2017 13:00:00	2017	1498.936456	996.2152	1365.232	1840.992	896.0352
30May2017 14:00:00	2017	1516.127813	1010.415	1377.089	1859.799	894.7833
30May2017 15:00:00	2017	1529.506529	1021.682	1385.064	1872.272	886.4233
30May2017 16:00:00	2017	1542.72726	1037.335	1385.883	1877.93	883.4285
30May2017 17:00:00	2017	1535.451199	1043.315	1350.136	1862.295	889.0535
30May2017 18:00:00	2017	1450.944628	1084.039	1328.534	1808.28	886.085
30May2017 19:00:00	2017	1401.82487	1072.907	1317.694	1760.708	889.4695
30May2017 20:00:00	2017	1354.174869	1054.565	1318.73	1715.704	881.9019
30May2017 21:00:00	2017	1300.083995	1037.387	1299.168	1648.515	879.3236
30May2017 22:00:00	2017	1221.693415	1016.958	1311.923	1612.428	883.5685
30May2017 23:00:00	2017	1084.424454	973.1422	1275.413	1488.162	873.0627
31May2017 0:00:00	2017	976.5387545	942.6177	1236.905	1380.017	868.0067
31May2017 1:00:00	2017	921.061219	924.3011	1218.756	1314.156	848.8605
31May2017 2:00:00	2017	888.4218558	912.7675	1213.354	1268.998	840.3933
31May2017 3:00:00	2017	873.2012215	909.3369	1206.141	1243.923	839.0536
31May2017 4:00:00	2017	886.4089243	914.9325	1207.294	1240.671	832.9566
31May2017 5:00:00	2017	939.9242342	914.9418	1193.737	1235.248	812.3251
31May2017 6:00:00	2017	1075.136944	947.7243	1215.77	1342.879	819.4164
31May2017 7:00:00	2017	1233.054045	986.6596	1278.141	1518.75	830.0759
31May2017 8:00:00	2017	1330.722447	1022.621	1329.347	1640.225	852.2662
31May2017 9:00:00	2017	1404.241241	1049.168	1354.38	1700.093	876.8132
31May2017 10:00:00	2017	1458.625682	1074.745	1370.3	1763.255	903.1006
31May2017 11:00:00	2017	1501.117831	1041.774	1377.42	1825.28	944.9744
31May2017 12:00:00	2017	1530.512618	1042.97	1354.641	1855.313	1120.046
31May2017 13:00:00	2017	1564.806467	1057.923	1355.305	1903.984	1114.786
31May2017 14:00:00	2017	1580.951474	1072.096	1372.329	1929.593	1025.204
31May2017 15:00:00	2017	1590.864789	1083.066	1377.341	1946.273	1003.848
31May2017 16:00:00	2017	1592.940918	1101.644	1383.161	1937.306	1023.5
31May2017 17:00:00	2017	1561.677759	1095.266	1357.272	1860.706	1012.867
31May2017 18:00:00	2017	1459.446942	1073.288	1318.234	1782.942	984.2432
31May2017 19:00:00	2017	1392.93866	1111.108	1302.201	1751.003	975.9414
31May2017 20:00:00	2017	1352.244755	1092.903	1284.307	1718.555	981.8284
31May2017 21:00:00	2017	1296.740603	1070.88	1292.731	1669.819	975.9696
31May2017 22:00:00	2017	1214.267714	1040.275	1285.607	1618.959	979.7056
31May2017 23:00:00	2017	1082.799227	988.8099	1223.193	1529.352	920.4314
01Jun2017 0:00:00	2017	984.5957055	945.9481	1191.721	1416.866	888.3917

01Jun2017 1:00:00	2017	926.0437234	926.2513	1167.072	1360.306	866.433
01Jun2017 2:00:00	2017	891.9827627	915.0681	1155.867	1330.911	854.5404
01Jun2017 3:00:00	2017	883.4417029	908.4112	1159.228	1301.155	853.1081
01Jun2017 4:00:00	2017	895.2823036	910.5222	1165.45	1306.373	861.953
01Jun2017 5:00:00	2017	959.0028864	920.4391	1160.152	1360.549	853.5648
01Jun2017 6:00:00	2017	1094.48657	955.5819	1184.706	1435.262	844.0165
01Jun2017 7:00:00	2017	1240.933986	992.4206	1241.63	1596.532	876.5734
01Jun2017 8:00:00	2017	1317.229924	1024.844	1293.092	1692.966	916.4715
01Jun2017 9:00:00	2017	1373.489316	1044.65	1335.734	1736.644	918.2016
01Jun2017 10:00:00	2017	1414.254328	1058.974	1343.595	1767.251	906.2591
01Jun2017 11:00:00	2017	1456.668692	1076.526	1348.752	1792.543	896.4072
01Jun2017 12:00:00	2017	1490.293706	1047.278	1356.371	1775.707	895.4862
01Jun2017 13:00:00	2017	1503.431715	1045.353	1385.533	1819.88	912.276
01Jun2017 14:00:00	2017	1497.630727	1054.052	1385.526	1843.549	904.3412
01Jun2017 15:00:00	2017	1491.451783	1060.571	1393.997	1881.401	934.6986
01Jun2017 16:00:00	2017	1495.552335	1069.757	1410.665	1899.851	952.2033
01Jun2017 17:00:00	2017	1500.051478	1075.928	1400.093	1901.383	936.4118
01Jun2017 18:00:00	2017	1415.786246	1083.155	1389.246	1856.99	919.0598
01Jun2017 19:00:00	2017	1359.290075	1075.649	1376.961	1811.468	994.1246
01Jun2017 20:00:00	2017	1322.271185	1058.756	1358.876	1746.896	1013.38
01Jun2017 21:00:00	2017	1289.518716	1047.302	1345.957	1687.193	1009.25
01Jun2017 22:00:00	2017	1205.094269	1026.244	1338.765	1624.49	1052.489
01Jun2017 23:00:00	2017	1072.621105	974.9293	1292.025	1507.54	989.1888
02Jun2017 0:00:00	2017	978.7409855	950.4463	1264.512	1390.023	978.9815
02Jun2017 1:00:00	2017	918.2825645	937.0692	1255.133	1329.641	983.8405
02Jun2017 2:00:00	2017	886.5210309	925.002	1260.405	1272.545	972.2368
02Jun2017 3:00:00	2017	872.8120125	918.8371	1252.162	1253.45	970.4461
02Jun2017 4:00:00	2017	884.664164	921.7843	1252.818	1262.308	958.2847
02Jun2017 5:00:00	2017	946.3990434	924.0042	1253.337	1301.348	952.347
02Jun2017 6:00:00	2017	1074.583432	942.0539	1267.848	1398.552	946.4581
02Jun2017 7:00:00	2017	1226.404839	989.1207	1327.92	1547.72	949.3556
02Jun2017 8:00:00	2017	1314.198057	1019.261	1347.597	1627.196	983.4188
02Jun2017 9:00:00	2017	1382.980207	1046.827	1392.034	1691.921	977.5633
02Jun2017 10:00:00	2017	1422.423916	1050.501	1417.592	1718.422	985.7265
02Jun2017 11:00:00	2017	1449.918761	1050.17	1420.253	1732.452	993.7743
02Jun2017 12:00:00	2017	1453.250164	1050.783	1425.177	1728.871	1003.569
02Jun2017 13:00:00	2017	1454.549494	1051.772	1412.524	1767.624	1005.269
02Jun2017 14:00:00	2017	1454.23074	1050.02	1418.608	1778.485	999.8907
02Jun2017 15:00:00	2017	1452.406432	1047.952	1411.045	1766.256	987.4817
02Jun2017 16:00:00	2017	1443.940141	1050.792	1376.33	1752.278	967.0187
02Jun2017 17:00:00	2017	1418.149733	1027.314	1346.035	1669.621	881.7735
02Jun2017 18:00:00	2017	1334.911216	1017.017	1315.741	1586.911	856.3945
02Jun2017 19:00:00	2017	1284.498693	1003.965	1325.38	1575.174	869.4275
02Jun2017 20:00:00	2017	1234.76267	989.3056	1320.948	1544.862	878.34
02Jun2017 21:00:00	2017	1179.27472	975.0983	1304.374	1511.741	882.7424
02Jun2017 22:00:00	2017	1131.836233	965.1687	1275.198	1466.667	875.1685
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03Jun2017 0:00:00	2017	947.3697672	908.1857	1227.377	1311.202	895.6193
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03Jun2017 3:00:00	2017	832.1891927	867.6008	1145.688	1188.845	859.2912
03Jun2017 4:00:00	2017	823.8575688	867.4853	1133.792	1173.4	845.7474
03Jun2017 5:00:00	2017	821.2835954	862.1945	1109.526	1148.703	837.1682
03Jun2017 6:00:00	2017	855.6443419	877.2703	1115.461	1174.782	824.3942
03Jun2017 7:00:00	2017	945.4968705	907.8318	1155.997	1246.506	837.6572
03Jun2017 8:00:00	2017	1049.722377	941.7824	1195.304	1346.376	844.986
03Jun2017 9:00:00	2017	1140.070081	969.6746	1232.736	1466.213	861.259
03Jun2017 10:00:00	2017	1198.086411	991.7425	1253.632	1524.657	869.9844
03Jun2017 11:00:00	2017	1235.732305	1002.2	1288.616	1604.084	873.5672
03Jun2017 12:00:00	2017	1259.699442	1007.443	1305.87	1600.758	886.2765
03Jun2017 13:00:00	2017	1269.456756	1013.5	1304.434	1604.967	889.5447
03Jun2017 14:00:00	2017	1272.230382	1021.701	1311.271	1626.165	878.818
03Jun2017 15:00:00	2017	1281.220349	1022.629	1302.893	1618.146	877.1402
03Jun2017 16:00:00	2017	1290.370568	1033.707	1299.714	1654.247	868.6586
03Jun2017 17:00:00	2017	1291.543217	1044.017	1305.465	1647.996	889.818
03Jun2017 18:00:00	2017	1253.596145	1040.785	1296.207	1628.431	886.2869
03Jun2017 19:00:00	2017	1221.918	1034.915	1282.359	1607.935	895.0531
03Jun2017 20:00:00	2017	1190.561579	1021.868	1254.958	1559.654	908.7333
03Jun2017 21:00:00	2017	1156.260733	998.6989	1236.385	1523.175	900.6841
03Jun2017 22:00:00	2017	1135.96817	982.5918	1239.236	1518.418	898.2727
03Jun2017 23:00:00	2017	1051.675859	942.6627	1189.407	1435.843	862.3215
04Jun2017 0:00:00	2017	965.9360909	909.3439	1153.814	1342.275	859.4448
04Jun2017 1:00:00	2017	900.150111	889.7524	1129.839	1276.903	838.2201
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04Jun2017 3:00:00	2017	840.1481698	862.526	1126.47	1217.525	842.3689
04Jun2017 4:00:00	2017	830.8408381	862.9666	1120.973	1177.649	832.4152
04Jun2017 5:00:00	2017	831.2040803	860.4002	1093.963	1126.841	803.2189
04Jun2017 6:00:00	2017	841.3100693	854.4232	1088.913	1117.813	787.8852
04Jun2017 7:00:00	2017	902.5870334	870.3495	1113.826	1187.632	813.6953
04Jun2017 8:00:00	2017	986.8479155	903.2437	1154.155	1270.768	831.5291
04Jun2017 9:00:00	2017	1060.126748	926.5823	1186.917	1373.796	852.6653
04Jun2017 10:00:00	2017	1127.169332	952.3863	1216.952	1434.135	883.2226
04Jun2017 11:00:00	2017	1170.552893	969.5277	1242.903	1479.28	889.7463
04Jun2017 12:00:00	2017	1199.396588	982.2748	1262.445	1493.934	869.2558
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04Jun2017 16:00:00	2017	1269.897445	1036.286	1280.04	1628.298	876.9678
04Jun2017 17:00:00	2017	1289.471678	1048.492	1260.973	1670.138	881.2926
04Jun2017 18:00:00	2017	1279.81941	1040.035	1256.76	1664.308	866.5831
04Jun2017 19:00:00	2017	1255.241278	1025.377	1265.292	1638.155	865.4512
04Jun2017 20:00:00	2017	1236.802112	1013.848	1267.611	1612.536	843.2684
04Jun2017 21:00:00	2017	1229.79662	995.7337	1263.309	1576.805	839.3735
04Jun2017 22:00:00	2017	1120.542447	934.2835	1234.66	1502.347	857.2645

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05Jun2017 1:00:00	2017	865.5847742	842.0631	1118.283	1198.762	862.4754
05Jun2017 2:00:00	2017	839.6360417	839.1742	1125.393	1173.363	855.0866
05Jun2017 3:00:00	2017	836.0611866	843.4106	1120.804	1162.307	825.6862
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05Jun2017 5:00:00	2017	921.3045737	866.1036	1125.155	1211.495	845.41
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05Jun2017 18:00:00	2017	1339.293016	928.9112	1304.597	1738.65	882.0182
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05Jun2017 20:00:00	2017	1255.851008	915.8864	1268.464	1624.763	892.3859
05Jun2017 21:00:00	2017	1204.14657	903.2094	1212.376	1573.304	887.2594
05Jun2017 22:00:00	2017	1143.618785	889.9117	1209.356	1524.781	887.3081
05Jun2017 23:00:00	2017	1026.57528	850.6245	1173.998	1420.438	871.0544
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06Jun2017 1:00:00	2017	878.0325346	804.9239	1176.314	1244.552	857.6746
06Jun2017 2:00:00	2017	850.3428302	797.9978	1171.249	1219.91	870.4825
06Jun2017 3:00:00	2017	840.2763123	796.3048	1171.682	1210.084	856.5882
06Jun2017 4:00:00	2017	852.9698812	801.7834	1171.553	1204.252	851.5015
06Jun2017 5:00:00	2017	900.0227767	807.9257	1180.471	1222.4	821.672
06Jun2017 6:00:00	2017	1039.266269	836.119	1210.503	1351.106	789.7328
06Jun2017 7:00:00	2017	1188.807783	883.1047	1270.359	1535.696	780.1882
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06Jun2017 9:00:00	2017	1333.548579	926.3924	1349.371	1735.513	825.2817
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06Jun2017 12:00:00	2017	1442.495567	948.7638	1379.125	1840.765	862.5726
06Jun2017 13:00:00	2017	1452.75588	954.2534	1393.565	1861.238	904.596
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06Jun2017 17:00:00	2017	1458.80336	977.0178	1363.513	1865.707	910.9021
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06Jun2017 19:00:00	2017	1315.277687	948.9178	1336.533	1734.89	904.7819
06Jun2017 20:00:00	2017	1272.196065	939.2717	1321.223	1677.824	893.1447
06Jun2017 21:00:00	2017	1222.388959	927.4304	1291.631	1627.253	883.9139

06Jun2017 22:00:00	2017	1167.666536	915.7485	1296.357	1567.586	895.5335
06Jun2017 23:00:00	2017	1048.2253	879.9111	1242.668	1460.166	908.3513
07Jun2017 0:00:00	2017	949.0740272	848.2853	1200.772	1356.65	899.1672
07Jun2017 1:00:00	2017	894.0231259	832.3713	1178.261	1293.814	877.5346
07Jun2017 2:00:00	2017	864.6057446	821.4854	1166.394	1259.291	888.5337
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07Jun2017 4:00:00	2017	865.4310036	825.5145	1157.712	1233.739	881.8586
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07Jun2017 7:00:00	2017	1201.077863	898.3723	1231.225	1564.342	833.9359
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07Jun2017 11:00:00	2017	1470.342918	987.4314	1299.296	1846.972	885.9318
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07Jun2017 13:00:00	2017	1516.458468	960.2707	1313.97	1905.345	907.3576
07Jun2017 14:00:00	2017	1533.097785	972.2805	1311.766	1917.422	900.2071
07Jun2017 15:00:00	2017	1553.025334	982.9582	1321.125	1924.987	889.4851
07Jun2017 16:00:00	2017	1557.405702	987.196	1358.134	1928.257	884.7281
07Jun2017 17:00:00	2017	1542.930664	992.4539	1351.91	1939.214	894.4294
07Jun2017 18:00:00	2017	1462.345	994.8715	1329.118	1867.973	911.3406
07Jun2017 19:00:00	2017	1414.389401	1010.778	1318.316	1813.605	901.7968
07Jun2017 20:00:00	2017	1369.435287	1006.569	1312.283	1755.62	905.2161
07Jun2017 21:00:00	2017	1306.410528	983.5382	1303.529	1701.55	921.1384
07Jun2017 22:00:00	2017	1239.436521	963.4296	1296.189	1642.053	922.2636
07Jun2017 23:00:00	2017	1108.036408	919.1837	1246.203	1513.09	913.5386
08Jun2017 0:00:00	2017	1004.496128	879.9359	1200.381	1381.366	884.7665
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08Jun2017 2:00:00	2017	905.1348902	853.0687	1166.486	1278.376	843.5664
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08Jun2017 6:00:00	2017	1088.574089	871.8742	1166.15	1362.383	803.9789
08Jun2017 7:00:00	2017	1244.975239	916.4665	1216.563	1549.099	841.3891
08Jun2017 8:00:00	2017	1329.71881	941.3617	1258.097	1675.593	852.197
08Jun2017 9:00:00	2017	1394.599352	963.3661	1293.377	1780.332	869.7107
08Jun2017 10:00:00	2017	1444.44775	985.1147	1324.49	1846.729	897.1766
08Jun2017 11:00:00	2017	1496.16671	993.0077	1348.665	1912.45	932.2302
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08Jun2017 14:00:00	2017	1530.688791	992.4203	1365.614	1942.57	996.391
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09Jun2017 5:00:00	2017	941.1921821	777.6176	1113.251	1273.04	871.0197
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09Jun2017 9:00:00	2017	1356.043612	908.9149	1283.132	1699.056	933.5402
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09Jun2017 19:00:00	2017	1248.892262	905.5218	1241.26	1543.034	947.2831
09Jun2017 20:00:00	2017	1197.348582	893.2156	1221.752	1509.538	961.9814
09Jun2017 21:00:00	2017	1151.008817	881.3797	1223.758	1496.398	949.4653
09Jun2017 22:00:00	2017	1108.596981	880.8526	1226.604	1449.029	938.8659
09Jun2017 23:00:00	2017	1018.598546	849.3501	1187.161	1358.105	918.7457
10Jun2017 0:00:00	2017	931.5693051	818.9235	1164.389	1281.927	912.1048
10Jun2017 1:00:00	2017	872.7433381	801.8186	1143.721	1217.534	905.4535
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10Jun2017 3:00:00	2017	824.8386437	789.3375	1116.596	1164.145	904.0909
10Jun2017 4:00:00	2017	821.2859437	790.3164	1114.065	1151.181	886.0397
10Jun2017 5:00:00	2017	819.7564188	781.6116	1115.854	1165.763	889.2099
10Jun2017 6:00:00	2017	847.2289619	790.2675	1114.946	1173.562	887.1258
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10Jun2017 11:00:00	2017	1171.143259	879.712	1278.253	1498.502	924.5611
10Jun2017 12:00:00	2017	1184.07907	885.1052	1277.222	1528.753	943.0571
10Jun2017 13:00:00	2017	1178.852462	887.7009	1265.657	1482.006	941.4251
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10Jun2017 18:00:00	2017	1172.739851	882.1476	1233.019	1450.295	940.1651
10Jun2017 19:00:00	2017	1140.902205	872.7311	1227.244	1427.732	931.649

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11Jun2017 2:00:00	2017	825.4713853	788.1907	1167.788	1188.142	986.3367
11Jun2017 3:00:00	2017	814.650868	780.2349	1156.888	1173.468	994.943
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11Jun2017 6:00:00	2017	830.892043	774.88	1117.617	1134.06	935.4553
11Jun2017 7:00:00	2017	888.4175205	792.7537	1130.8	1181.265	948.2793
11Jun2017 8:00:00	2017	967.522121	815.5187	1177.496	1249.56	962.7439
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11Jun2017 13:00:00	2017	1164.339493	848.7054	1236.589	1426.34	940.1875
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11Jun2017 16:00:00	2017	1200.385727	875.7538	1241.112	1450.845	945.9177
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16Jun2017 2:00:00	2017	849.7804133	783.7838	1157.188	1212.221	964.3816
16Jun2017 3:00:00	2017	841.2669306	774.7744	1147.016	1214.564	959.2706
16Jun2017 4:00:00	2017	857.4569916	778.2592	1145.224	1222.831	952.0197
16Jun2017 5:00:00	2017	912.5184337	785.2832	1132.34	1227.728	935.6097
16Jun2017 6:00:00	2017	1034.059828	804.9773	1145.105	1308.683	929.2944
16Jun2017 7:00:00	2017	1182.128357	851.0219	1206.941	1462.547	933.7822
16Jun2017 8:00:00	2017	1262.505341	881.3473	1263.096	1569.676	927.5842
16Jun2017 9:00:00	2017	1323.580299	899.5484	1284.255	1627.096	921.9374
16Jun2017 10:00:00	2017	1370.281067	907.4738	1292.237	1683.472	937.8916
16Jun2017 11:00:00	2017	1412.041339	918.6943	1296.423	1703.767	942.2537
16Jun2017 12:00:00	2017	1428.09582	919.9144	1298.151	1718.64	947.867
16Jun2017 13:00:00	2017	1440.920772	924.7415	1307.958	1729.79	1000.011
16Jun2017 14:00:00	2017	1434.350043	929.4885	1315.381	1702.831	1004.084
16Jun2017 15:00:00	2017	1417.457384	928.7687	1309.942	1717.715	1016.863
16Jun2017 16:00:00	2017	1408.701476	928.1396	1306.724	1707.56	1018.989

16Jun2017 17:00:00	2017	1387.857845	915.7393	1305.431	1682.687	1012.5
16Jun2017 18:00:00	2017	1303.402176	897.9503	1273.292	1623.642	1001.074
16Jun2017 19:00:00	2017	1240.06273	879.6732	1232.43	1571.498	990.5224
16Jun2017 20:00:00	2017	1187.011046	876.2974	1220.946	1530.77	976.6076
16Jun2017 21:00:00	2017	1152.541481	871.9867	1208.618	1516.087	930.4445
16Jun2017 22:00:00	2017	1105.415682	870.9257	1228.277	1463.435	929.8502
16Jun2017 23:00:00	2017	1005.81241	838.5478	1231.674	1411.759	914.4379
17Jun2017 0:00:00	2017	925.4133562	806.4577	1201.202	1297.735	896.5311
17Jun2017 1:00:00	2017	870.4162208	788.8604	1176.286	1267.362	890.7729
17Jun2017 2:00:00	2017	837.3136844	776.5593	1165.045	1212.317	891.6716
17Jun2017 3:00:00	2017	824.4675509	768.5366	1151.587	1197.262	891.3163
17Jun2017 4:00:00	2017	822.3769843	769.2863	1148.76	1185.202	896.8382
17Jun2017 5:00:00	2017	829.6503653	768.3605	1122.294	1132.543	891.4243
17Jun2017 6:00:00	2017	851.5957124	775.6199	1128.139	1173.351	869.0136
17Jun2017 7:00:00	2017	923.7674769	804.6538	1154.606	1255.79	872.267
17Jun2017 8:00:00	2017	1015.277259	836.9188	1182.862	1310.968	870.6095
17Jun2017 9:00:00	2017	1098.671083	863.0637	1218.44	1413.28	872.304
17Jun2017 10:00:00	2017	1156.959349	871.6591	1230.409	1473.52	871.6062
17Jun2017 11:00:00	2017	1188.235114	878.9309	1230.045	1479.203	870.0297
17Jun2017 12:00:00	2017	1200.468639	877.0127	1242.208	1501.237	878.7742
17Jun2017 13:00:00	2017	1192.777379	878.159	1234.639	1494.792	883.2215
17Jun2017 14:00:00	2017	1183.053555	874.816	1237.848	1491.269	874.8227
17Jun2017 15:00:00	2017	1184.853147	878.2095	1242.348	1535.304	872.5465
17Jun2017 16:00:00	2017	1192.935554	882.7755	1247.915	1554.671	869.2541
17Jun2017 17:00:00	2017	1194.366336	886.4523	1253.64	1544.045	876.2533
17Jun2017 18:00:00	2017	1174.971985	879.0179	1249.056	1524.872	892.7157
17Jun2017 19:00:00	2017	1145.019481	871.7127	1240.719	1497.239	900.9033
17Jun2017 20:00:00	2017	1108.799654	864.507	1239.448	1481.876	914.197
17Jun2017 21:00:00	2017	1082.751477	856.8816	1231.444	1464.11	935.1576
17Jun2017 22:00:00	2017	1063.017096	852.547	1237.068	1445.325	931.4356
17Jun2017 23:00:00	2017	989.4742929	820.3447	1213.683	1384.857	932.414
18Jun2017 0:00:00	2017	908.0443644	792.1933	1189.118	1298.856	919.0192
18Jun2017 1:00:00	2017	854.4712856	775.7455	1171.01	1234.154	904.3506
18Jun2017 2:00:00	2017	826.0132124	766.0476	1156.376	1200.826	896.1928
18Jun2017 3:00:00	2017	811.6053617	762.3962	1143.24	1175.863	881.7535
18Jun2017 4:00:00	2017	808.4143975	762.1897	1133.048	1146.851	878.2925
18Jun2017 5:00:00	2017	812.4434216	760.0425	1118.862	1100.882	879.6597
18Jun2017 6:00:00	2017	826.2572812	761.8173	1103.072	1111.298	865.6384
18Jun2017 7:00:00	2017	877.6666321	777.8412	1124.823	1181.296	871.3482
18Jun2017 8:00:00	2017	964.6089797	801.9924	1180.872	1254.358	881.4283
18Jun2017 9:00:00	2017	1044.016879	824.7699	1218.303	1351.583	897.161
18Jun2017 10:00:00	2017	1099.622335	839.5635	1249.601	1435.425	894.5744
18Jun2017 11:00:00	2017	1138.417352	849.1996	1266.988	1504.276	877.4994
18Jun2017 12:00:00	2017	1158.342109	854.3956	1268.718	1524.793	880.7739
18Jun2017 13:00:00	2017	1166.473322	849.5155	1272.111	1537.602	872.5728
18Jun2017 14:00:00	2017	1171.976983	857.0083	1275.592	1531.716	872.9874
18Jun2017 15:00:00	2017	1185.887045	865.9087	1270.819	1527.846	902.1179

18Jun2017 16:00:00	2017	1212.303063	874.3947	1270.811	1553.03	897.0318
18Jun2017 17:00:00	2017	1228.015074	883.2569	1268.977	1569.444	901.5245
18Jun2017 18:00:00	2017	1206.357168	882.8773	1270.388	1560.603	898.2181
18Jun2017 19:00:00	2017	1184.926896	875.1381	1250.729	1557.723	901.2277
18Jun2017 20:00:00	2017	1164.533428	874.154	1258.944	1531.825	903.3902
18Jun2017 21:00:00	2017	1139.556237	861.7071	1246.75	1510.869	911.4649
18Jun2017 22:00:00	2017	1103.709758	861.153	1246.215	1451.982	924.5757
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19Jun2017 0:00:00	2017	908.2979782	787.8064	1182.5	1253.778	893.3074
19Jun2017 1:00:00	2017	855.6317263	774.8498	1160.929	1200.824	890.4369
19Jun2017 2:00:00	2017	828.0536874	761.623	1149.756	1165.153	897.3283
19Jun2017 3:00:00	2017	822.4159505	764.4106	1139.58	1150.175	888.519
19Jun2017 4:00:00	2017	836.6439324	771.3631	1138.101	1155.937	871.4666
19Jun2017 5:00:00	2017	884.3197717	780.9574	1145.63	1171.852	878.3414
19Jun2017 6:00:00	2017	1018.24356	814.2166	1183.551	1313.342	858.811
19Jun2017 7:00:00	2017	1178.588791	867.9015	1253.209	1476.364	884.702
19Jun2017 8:00:00	2017	1253.741049	900.0473	1301.568	1587.13	901.0452
19Jun2017 9:00:00	2017	1307.86381	917.4026	1327.625	1646.385	890.2831
19Jun2017 10:00:00	2017	1352.874274	948.4784	1337.187	1700.168	899.7067
19Jun2017 11:00:00	2017	1396.498453	979.4722	1325.776	1703.18	908.818
19Jun2017 12:00:00	2017	1417.846139	984.8147	1329.88	1720.145	911.8082
19Jun2017 13:00:00	2017	1435.656033	1000.505	1348.549	1738.802	913.5474
19Jun2017 14:00:00	2017	1444.586083	986.1287	1362.96	1769.652	914.665
19Jun2017 15:00:00	2017	1444.986295	986.1625	1377.965	1802.114	924.0555
19Jun2017 16:00:00	2017	1456.418846	993.9126	1389.709	1814.231	942.1394
19Jun2017 17:00:00	2017	1446.370067	986.5057	1381.959	1791.97	944.9625
19Jun2017 18:00:00	2017	1358.646384	987.4709	1354.399	1730.185	948.4298
19Jun2017 19:00:00	2017	1306.78802	972.2412	1379.439	1653.213	947.4727
19Jun2017 20:00:00	2017	1270.985853	965.386	1366.112	1579.121	945.971
19Jun2017 21:00:00	2017	1210.238033	949.009	1298.44	1506.395	946.5188
19Jun2017 22:00:00	2017	1148.808404	931.8625	1274.412	1478.599	950.3304
19Jun2017 23:00:00	2017	1035.205482	899.1172	1223.908	1402.048	921.5226
20Jun2017 0:00:00	2017	947.3951992	869.1979	1205.438	1310.928	897.3567
20Jun2017 1:00:00	2017	896.8728998	858.8531	1209.181	1237.993	881.96
20Jun2017 2:00:00	2017	869.0065638	850.4341	1191.917	1198.739	872.8687
20Jun2017 3:00:00	2017	859.6745218	846.388	1191.4	1180.876	858.7499
20Jun2017 4:00:00	2017	869.9169689	848.5571	1182.122	1182.697	851.2864
20Jun2017 5:00:00	2017	921.0395555	850.8158	1160.132	1207.158	846.1719
20Jun2017 6:00:00	2017	1066.936035	874.2791	1181.031	1299.084	843.2317
20Jun2017 7:00:00	2017	1226.440194	924.1446	1241.58	1453.49	868.042
20Jun2017 8:00:00	2017	1311.836198	965.2567	1296.891	1551.083	876.3972
20Jun2017 9:00:00	2017	1393.187904	984.3945	1323.827	1635.681	880.3326
20Jun2017 10:00:00	2017	1447.34166	1002.28	1330.861	1682	899.9931
20Jun2017 11:00:00	2017	1489.074296	1024.647	1335.881	1735.194	915.1933
20Jun2017 12:00:00	2017	1515.219969	1035.18	1324.127	1753.266	938.3231
20Jun2017 13:00:00	2017	1536.48807	1043.266	1285.478	1774.917	937.3872
20Jun2017 14:00:00	2017	1546.680983	1044.624	1248.716	1790.925	938.8189

20Jun2017 15:00:00	2017	1569.532201	1056.344	1259.478	1814.131	930.258
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20Jun2017 17:00:00	2017	1555.31274	1070.162	1369.431	1791.414	888.895
20Jun2017 18:00:00	2017	1475.087389	1065.159	1329.401	1693.875	887.9483
20Jun2017 19:00:00	2017	1421.9208	1058.15	1138.056	1567.606	880.6402
20Jun2017 20:00:00	2017	1353.140237	1040.104	1103.78	1499.738	880.3025
20Jun2017 21:00:00	2017	1237.711477	1003.993	1102.859	1476.722	882.5186
20Jun2017 22:00:00	2017	1162.766966	969.9498	1116.304	1440.423	893.0303
20Jun2017 23:00:00	2017	1046.182859	935.8781	1133.212	1346.414	854.6499
21Jun2017 0:00:00	2017	954.6658745	913.9936	1135.659	1267.075	863.7456
21Jun2017 1:00:00	2017	896.0957296	891.553	1118.419	1197.788	849.3366
21Jun2017 2:00:00	2017	867.2785389	886.9874	1104.646	1163.822	863.6777
21Jun2017 3:00:00	2017	857.2214671	880.7155	1107.07	1153.764	863.1896
21Jun2017 4:00:00	2017	866.6606184	878.1963	1104.375	1165.905	876.4808
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21Jun2017 8:00:00	2017	1270.268992	1000.445	1255.067	1583.359	840.556
21Jun2017 9:00:00	2017	1320.086434	1022.071	1268.321	1617.835	851.8473
21Jun2017 10:00:00	2017	1361.266094	1035.926	1266.82	1689.98	867.8831
21Jun2017 11:00:00	2017	1399.240177	1042.135	1283.751	1725.155	890.2308
21Jun2017 12:00:00	2017	1416.185917	1041.956	1284.13	1720.944	887.5734
21Jun2017 13:00:00	2017	1430.32553	1046.853	1290.493	1718.259	886.7089
21Jun2017 14:00:00	2017	1430.75924	1055.579	1303.894	1724.501	890.5136
21Jun2017 15:00:00	2017	1434.80092	1043.669	1303.709	1723.315	910.7563
21Jun2017 16:00:00	2017	1435.402401	1054.586	1318.226	1714.682	920.8541
21Jun2017 17:00:00	2017	1419.024172	1050.024	1334.935	1699.355	924.1888
21Jun2017 18:00:00	2017	1330.204831	1031.254	1301.423	1602.191	906.2928
21Jun2017 19:00:00	2017	1273.271491	1016.42	1289.684	1559.249	881.4301
21Jun2017 20:00:00	2017	1229.444251	999.4071	1286.97	1515.297	900.8735
21Jun2017 21:00:00	2017	1187.457188	987.695	1282.442	1482.024	907.0944
21Jun2017 22:00:00	2017	1124.964898	983.919	1287.518	1456.62	918.6541
21Jun2017 23:00:00	2017	1014.559544	955.7187	1259.238	1350.776	908.3195
22Jun2017 0:00:00	2017	930.6724215	920.7234	1231.552	1280.04	906.3505
22Jun2017 1:00:00	2017	873.2711588	902.9081	1223.056	1230.861	906.5296
22Jun2017 2:00:00	2017	837.6022229	885.3308	1198.281	1182.367	919.7371
22Jun2017 3:00:00	2017	829.5014907	876.2107	1192.157	1188.155	954.7671
22Jun2017 4:00:00	2017	844.578075	877.1699	1193.937	1200.835	940.809
22Jun2017 5:00:00	2017	901.6500246	881.3738	1189.672	1233.556	943.2597
22Jun2017 6:00:00	2017	1037.155326	907.035	1218.435	1331.772	913.0547
22Jun2017 7:00:00	2017	1179.080626	956.6606	1286.905	1482.669	934.7843
22Jun2017 8:00:00	2017	1248.685344	989.5149	1331.451	1589.079	915.4331
22Jun2017 9:00:00	2017	1289.38908	1005.321	1349.993	1640.362	926.3672
22Jun2017 10:00:00	2017	1316.152461	1007.119	1364.727	1671.385	938.472
22Jun2017 11:00:00	2017	1335.436959	1003.924	1358.286	1694.838	951.8004
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22Jun2017 13:00:00	2017	1368.496697	1010.683	1359.434	1693.015	956.2995

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22Jun2017 16:00:00	2017	1372.068894	1024.506	1340.116	1684.984	932.7572
22Jun2017 17:00:00	2017	1362.36472	1023.548	1341.904	1669.491	932.7108
22Jun2017 18:00:00	2017	1291.290016	1004.738	1323.555	1634.265	939.1535
22Jun2017 19:00:00	2017	1252.515673	995.8614	1323.935	1578.539	934.0665
22Jun2017 20:00:00	2017	1210.720274	990.9354	1309.485	1567.716	928.7283
22Jun2017 21:00:00	2017	1188.956439	984.2257	1294.584	1503.545	928.6552
22Jun2017 22:00:00	2017	1126.11336	975.5734	1289.8	1452.661	924.1391
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23Jun2017 0:00:00	2017	928.2586404	918.204	1204.1	1284.373	914.1371
23Jun2017 1:00:00	2017	878.4313463	899.2405	1199.542	1261.942	903.96
23Jun2017 2:00:00	2017	853.2050314	889.2664	1215.713	1235.188	897.8937
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23Jun2017 6:00:00	2017	1025.910151	921.3635	1230.551	1351.944	897.0784
23Jun2017 7:00:00	2017	1170.884241	971.7721	1279.307	1525.303	879.6461
23Jun2017 8:00:00	2017	1255.946031	1001.24	1310.191	1630.482	879.6527
23Jun2017 9:00:00	2017	1320.025197	1003.173	1362.513	1667.11	923.6142
23Jun2017 10:00:00	2017	1359.969806	1016.341	1387.679	1740.335	940.2388
23Jun2017 11:00:00	2017	1389.220598	1026.484	1376.298	1742.834	929.2747
23Jun2017 12:00:00	2017	1397.643397	1034.741	1374.274	1772.217	939.8611
23Jun2017 13:00:00	2017	1397.631814	1036.182	1380.308	1781.524	948.3592
23Jun2017 14:00:00	2017	1396.111399	1042.135	1386.418	1776.414	957.502
23Jun2017 15:00:00	2017	1391.38486	1040.241	1379.947	1761.726	965.1692
23Jun2017 16:00:00	2017	1384.121227	1041.744	1365.418	1750.395	964.0474
23Jun2017 17:00:00	2017	1362.063552	1032.596	1342.976	1726.56	953.2952
23Jun2017 18:00:00	2017	1278.396894	1018.016	1320.473	1672.645	954.9938
23Jun2017 19:00:00	2017	1236.888368	1024.551	1307.199	1608.074	967.8798
23Jun2017 20:00:00	2017	1191.342837	1015.461	1298.019	1568.897	965.4561
23Jun2017 21:00:00	2017	1152.978589	1006.529	1276.428	1494.852	958.9053
23Jun2017 22:00:00	2017	1113.971485	1002.641	1268.587	1459.757	949.8156
23Jun2017 23:00:00	2017	1017.494874	976.8407	1253.719	1411.895	952.3817
24Jun2017 0:00:00	2017	932.9103318	943.5188	1226.738	1311.965	926.6267
24Jun2017 1:00:00	2017	879.5481268	923.4313	1209.52	1254.798	955.4296
24Jun2017 2:00:00	2017	849.0180171	908.3113	1199.417	1214.685	957.2775
24Jun2017 3:00:00	2017	832.7842354	902.4025	1200.454	1195.438	942.495
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24Jun2017 10:00:00	2017	1187.812003	1005.919	1335.514	1549.441	919.2631
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24Jun2017 12:00:00	2017	1229.894072	1020.972	1301.297	1611.473	936.888

24Jun2017 13:00:00	2017	1227.111901	1025.771	1281.962	1624.855	938.6298
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24Jun2017 15:00:00	2017	1211.101797	1024.448	1288.727	1621.874	947.2083
24Jun2017 16:00:00	2017	1217.851611	1024.964	1297.862	1629.571	955.4587
24Jun2017 17:00:00	2017	1230.135237	1033.619	1299.237	1638.2	958.0295
24Jun2017 18:00:00	2017	1214.610695	1038.552	1283.43	1618.728	956.7
24Jun2017 19:00:00	2017	1186.738945	1029.531	1266.613	1564.935	956.4695
24Jun2017 20:00:00	2017	1152.088775	1015.189	1252.365	1537.052	947.5536
24Jun2017 21:00:00	2017	1119.569659	995.3156	1236.672	1476.628	924.4128
24Jun2017 22:00:00	2017	1102.314109	995.0257	1239.974	1450.15	917.9167
24Jun2017 23:00:00	2017	1023.008391	969.7129	1228.982	1398.712	911.5209
25Jun2017 0:00:00	2017	940.0525677	931.3522	1192.712	1320.947	919.3492
25Jun2017 1:00:00	2017	878.8203001	908.5215	1157.254	1260.349	917.8628
25Jun2017 2:00:00	2017	842.7583049	894.474	1144.117	1199.279	916.9927
25Jun2017 3:00:00	2017	822.7785851	888.0093	1137.166	1189.356	903.8325
25Jun2017 4:00:00	2017	818.853865	880.5892	1127.682	1180.475	915.4969
25Jun2017 5:00:00	2017	807.2617414	869.0223	1114.891	1171.063	918.0468
25Jun2017 6:00:00	2017	830.1422105	870.7212	1118.163	1189.883	909.4318
25Jun2017 7:00:00	2017	900.5459107	890.8735	1144.291	1262.479	911.3122
25Jun2017 8:00:00	2017	991.1875783	922.6765	1179.231	1376.653	917.3742
25Jun2017 9:00:00	2017	1084.811885	946.7565	1213.652	1454.611	901.4261
25Jun2017 10:00:00	2017	1158.794848	957.8846	1237.61	1527.789	930.2552
25Jun2017 11:00:00	2017	1204.695383	978.2122	1240.1	1582.495	945.387
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25Jun2017 13:00:00	2017	1243.773025	1011.231	1313.851	1666.817	946.3799
25Jun2017 14:00:00	2017	1253.256665	1017.829	1322.338	1650.835	945.4493
25Jun2017 15:00:00	2017	1275.786743	1028.171	1329.863	1683.594	955.4553
25Jun2017 16:00:00	2017	1304.336104	1048.195	1346.661	1695.697	982.5004
25Jun2017 17:00:00	2017	1317.164287	1062.847	1367.628	1745.793	995.6154
25Jun2017 18:00:00	2017	1294.657777	1059.113	1394.22	1725.835	992.4045
25Jun2017 19:00:00	2017	1273.854628	1051.421	1397.353	1716.393	989.6621
25Jun2017 20:00:00	2017	1247.547769	1036.671	1382.853	1669.878	979.2903
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25Jun2017 22:00:00	2017	1169.567908	986.2129	1283.997	1586.824	966.2695
25Jun2017 23:00:00	2017	1057.197482	949.9902	1237.317	1486.607	965.7874
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26Jun2017 3:00:00	2017	856.9031332	881.3941	1144.628	1241.599	949.8369
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26Jun2017 5:00:00	2017	946.2570657	881.7975	1130.565	1279.732	926.6695
26Jun2017 6:00:00	2017	1076.944192	917.2	1166.894	1406.901	918.4865
26Jun2017 7:00:00	2017	1230.006287	967.4376	1229.573	1580.176	925.4814
26Jun2017 8:00:00	2017	1304.860766	1005.142	1282.559	1685.524	929.045
26Jun2017 9:00:00	2017	1358.729002	1028.429	1303.77	1763.216	942.8628
26Jun2017 10:00:00	2017	1435.781086	995.2287	1328.77	1814.855	950.9519
26Jun2017 11:00:00	2017	1513.473091	1010.123	1347.552	1859.612	963.1172

26Jun2017 12:00:00	2017	1554.784779	1026.961	1358.713	1878.87	967.7437
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26Jun2017 14:00:00	2017	1622.034378	1068.816	1356.65	1947.477	997.5458
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26Jun2017 16:00:00	2017	1670.746536	1090.867	1351.231	1985.575	1007.739
26Jun2017 17:00:00	2017	1654.367075	1085.289	1341.704	1975.711	996.6541
26Jun2017 18:00:00	2017	1551.785906	1074.199	1305.422	1930.21	992.2549
26Jun2017 19:00:00	2017	1469.154242	1104.055	1287.853	1889.849	987.4846
26Jun2017 20:00:00	2017	1401.550282	1083.002	1266.904	1853.629	975.1065
26Jun2017 21:00:00	2017	1327.104407	1075.825	1237.814	1775	989.3464
26Jun2017 22:00:00	2017	1253.718417	1042.699	1226.416	1696.723	983.4686
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27Jun2017 0:00:00	2017	1027.957706	953.703	1147.319	1366.915	942.4613
27Jun2017 1:00:00	2017	965.9285276	938.2473	1123.365	1307.012	944.5257
27Jun2017 2:00:00	2017	930.0578422	923.7894	1096.061	1268.473	959.2453
27Jun2017 3:00:00	2017	904.9303419	916.6998	1096.562	1249.028	945.9085
27Jun2017 4:00:00	2017	910.2364676	916.3397	1112.403	1273.012	923.6715
27Jun2017 5:00:00	2017	959.8764304	920.4136	1109.159	1279.69	915.8024
27Jun2017 6:00:00	2017	1083.617288	943.5484	1130.063	1374.09	904.2323
27Jun2017 7:00:00	2017	1230.718677	991.8817	1188.334	1527.724	919.5402
27Jun2017 8:00:00	2017	1291.192617	1022.466	1229.245	1639.785	916.2583
27Jun2017 9:00:00	2017	1337.012491	1043.383	1259.143	1703.441	920.5635
27Jun2017 10:00:00	2017	1387.367509	1053.954	1270.261	1740.918	915.7489
27Jun2017 11:00:00	2017	1434.352914	1069.266	1280.513	1740.169	924.1264
27Jun2017 12:00:00	2017	1453.049215	1079.084	1278.724	1724.404	936.5924
27Jun2017 13:00:00	2017	1471.714329	1091.504	1291.678	1732.326	944.4037
27Jun2017 14:00:00	2017	1488.510862	1100.451	1298.178	1758.368	946.7952
27Jun2017 15:00:00	2017	1505.346448	1103.458	1303.958	1773.408	955.4592
27Jun2017 16:00:00	2017	1517.603317	1111.458	1314.347	1760.632	952.3256
27Jun2017 17:00:00	2017	1509.737178	1115.353	1293.153	1730.668	943.5564
27Jun2017 18:00:00	2017	1429.236175	1118.438	1261.037	1649.317	945.5225
27Jun2017 19:00:00	2017	1368.890093	1093.638	1240.575	1591.375	942.7771
27Jun2017 20:00:00	2017	1313.860741	1082.302	1237.885	1550.862	945.239
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27Jun2017 23:00:00	2017	1073.208078	991.6359	1152.262	1374.877	943.9277
28Jun2017 0:00:00	2017	968.4666661	959.5243	1118.462	1280.895	941.1588
28Jun2017 1:00:00	2017	905.6409362	945.3556	1114.844	1218.897	935.472
28Jun2017 2:00:00	2017	869.7079439	929.1963	1112.15	1214.078	923.6405
28Jun2017 3:00:00	2017	856.6728649	919.9011	1095.984	1199.012	937.0636
28Jun2017 4:00:00	2017	869.7199391	917.015	1091.3	1201.563	937.7638
28Jun2017 5:00:00	2017	916.5255564	922.191	1097.351	1238.989	944.691
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28Jun2017 8:00:00	2017	1306.583793	1042.912	1237.295	1595.728	933.6915
28Jun2017 9:00:00	2017	1372.973345	1059.738	1266.424	1660.729	934.4622
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28Jun2017 17:00:00	2017	1400.651509	1085.564	1262.419	1669.961	988.7334
28Jun2017 18:00:00	2017	1309.553245	1074.411	1223.904	1605.725	984.167
28Jun2017 19:00:00	2017	1262.268822	1061.039	1204.614	1571.595	972.6402
28Jun2017 20:00:00	2017	1226.17342	1040.743	1189.587	1535.88	956.993
28Jun2017 21:00:00	2017	1176.876528	1041.014	1187.946	1485.983	954.3593
28Jun2017 22:00:00	2017	1137.444457	1032.796	1173.497	1448.942	955.0177
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29Jun2017 1:00:00	2017	889.6891657	938.5618	1113.288	1209.424	989.5882
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29Jun2017 5:00:00	2017	924.5457022	928.8196	1102.478	1196.131	914.8884
29Jun2017 6:00:00	2017	1051.33086	948.5934	1108.432	1307.579	907.4703
29Jun2017 7:00:00	2017	1191.786683	989.4839	1150.159	1486.557	929.9289
29Jun2017 8:00:00	2017	1276.295602	1027.975	1195.116	1599.98	946.4484
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29Jun2017 10:00:00	2017	1382.680649	1074.518	1256.956	1717.431	970.0424
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29Jun2017 13:00:00	2017	1440.380658	1089.935	1294.855	1787.848	994.5714
29Jun2017 14:00:00	2017	1449.812729	1095.277	1287.225	1798.633	974.8495
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29Jun2017 16:00:00	2017	1461.372533	1109.387	1282.684	1809.129	986.2938
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29Jun2017 18:00:00	2017	1386.973581	1104.051	1258.96	1743.388	993.3253
29Jun2017 19:00:00	2017	1341.247342	1093.74	1264.804	1720.088	1004.8
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30Jun2017 17:00:00	2017	1496.134963	1116.918	1281.07	1840.747	946.8506
30Jun2017 18:00:00	2017	1403.666664	1145.197	1261.341	1764.404	940.0014
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30Jun2017 20:00:00	2017	1305.606239	1132.969	1262.095	1671.103	965.3679
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03Jul2017 7:00:00	2017	1057.875434	962.1114	1124.492	1345.622	893.8389
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03Jul2017 9:00:00	2017	1222.951538	1055.418	1250.439	1555.156	918.5905
03Jul2017 10:00:00	2017	1291.045977	1100.316	1283.376	1645.544	934.6308
03Jul2017 11:00:00	2017	1341.192717	1126.357	1315.334	1704.864	948.6762
03Jul2017 12:00:00	2017	1364.634822	1141.124	1323.786	1749.128	959.0811
03Jul2017 13:00:00	2017	1377.075403	1148.608	1330.22	1745.716	977.0106
03Jul2017 14:00:00	2017	1392.963461	1158.93	1329.104	1763.73	982.6896
03Jul2017 15:00:00	2017	1415.025167	1174.606	1326.637	1749.684	978.5575
03Jul2017 16:00:00	2017	1438.673748	1177.346	1334.261	1753.333	973.7443
03Jul2017 17:00:00	2017	1443.650181	1195.005	1338.634	1721.55	957.1519
03Jul2017 18:00:00	2017	1409.596312	1196.899	1314.869	1661.185	936.9156
03Jul2017 19:00:00	2017	1380.223954	1185.331	1283.418	1637.136	921.6004
03Jul2017 20:00:00	2017	1337.742565	1164.984	1272.407	1614.566	920.6895
03Jul2017 21:00:00	2017	1271.382721	1137.021	1236.593	1547.606	915.4578
03Jul2017 22:00:00	2017	1176.732478	1108.776	1226.713	1500.827	905.1676
03Jul2017 23:00:00	2017	1060.240569	1061.972	1200.325	1434.187	890.0301
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04Jul2017 1:00:00	2017	912.7767671	990.5282	1146.426	1273.891	867.6992
04Jul2017 2:00:00	2017	879.9939876	975.804	1134.594	1248.92	862.3475
04Jul2017 3:00:00	2017	866.1135584	966.112	1128.976	1224.159	862.4887
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04Jul2017 7:00:00	2017	1186.244971	1069.082	1187.935	1506.351	888.7734

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04Jul2017 14:00:00	2017	1494.293785	1145.515	1308.769	1862.845	1020.256
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04Jul2017 16:00:00	2017	1551.652734	1173.852	1318.179	1879.387	1040.814
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04Jul2017 19:00:00	2017	1457.029514	1214.988	1310.632	1780.661	1022.543
04Jul2017 20:00:00	2017	1410.565586	1195.049	1295.102	1728.834	1017.95
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04Jul2017 22:00:00	2017	1269.76581	1138.607	1228.857	1597.423	1027.015
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05Jul2017 1:00:00	2017	964.7491703	1015.877	1203.222	1307.446	1008.992
05Jul2017 2:00:00	2017	921.6478231	1006.33	1208.292	1278.06	1002.567
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05Jul2017 14:00:00	2017	1555.025591	1179.882	1399.724	1903.463	1059.07
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05Jul2017 16:00:00	2017	1590.823162	1198.246	1401.176	1899.767	1084.212
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05Jul2017 18:00:00	2017	1521.477178	1203.842	1367.171	1832.957	1072.567
05Jul2017 19:00:00	2017	1475.130442	1206.727	1331.252	1797.653	1061.884
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05Jul2017 22:00:00	2017	1295.37144	1143.49	1220.959	1627.149	1039.539
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06Jul2017 1:00:00	2017	987.2566289	1031.126	1208.709	1359.92	959.1062
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06Jul2017 3:00:00	2017	918.664396	1004.093	1188.143	1304.541	977.4024
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06Jul2017 16:00:00	2017	1678.633737	1210.98	1446.131	1976.665	981.8567
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06Jul2017 18:00:00	2017	1589.618243	1210.233	1356.786	1918.012	959.401
06Jul2017 19:00:00	2017	1536.265234	1215.574	1331.128	1866.187	964.5296
06Jul2017 20:00:00	2017	1471.997131	1211.267	1308.618	1809.345	964.7383
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07Jul2017 3:00:00	2017	946.4951149	996.9042	1142.923	1306.549	890.6012
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07Jul2017 5:00:00	2017	986.4051546	1000.324	1132.097	1322.1	881.8582
07Jul2017 6:00:00	2017	1089.815093	1018.579	1153.914	1406.642	878.5966
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07Jul2017 10:00:00	2017	1511.088173	1173.29	1361.924	1933.366	924.2701
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07Jul2017 14:00:00	2017	1664.818859	1204.925	1418.469	2003.988	1031.381
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07Jul2017 16:00:00	2017	1683.69818	1223.914	1405.859	2050.358	1046.528
07Jul2017 17:00:00	2017	1665.254509	1207.458	1386.746	2025.874	1028.03
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07Jul2017 20:00:00	2017	1482.485898	1205.572	1309.26	1850.404	1020.193
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11Jul2017 22:00:00	2017	1146.48681	1028.651	1191.988	1538.347	899.2789
11Jul2017 23:00:00	2017	1044.582014	994.0671	1163.306	1444.454	874.1085
12Jul2017 0:00:00	2017	960.2645591	957.925	1125.628	1339.669	885.4962
12Jul2017 1:00:00	2017	902.8636749	937.1001	1089.723	1291.58	872.1741
12Jul2017 2:00:00	2017	870.4454993	926.6498	1059.709	1232.825	872.6554
12Jul2017 3:00:00	2017	855.1451256	927.5376	1082.233	1232.323	869.1729

12Jul2017 4:00:00	2017	864.0463554	926.2874	1114.068	1222.325	881.5247
12Jul2017 5:00:00	2017	928.1253601	926.9299	1112.207	1238.986	848.4901
12Jul2017 6:00:00	2017	1037.72934	936.9103	1132.205	1345.716	827.37
12Jul2017 7:00:00	2017	1160.083395	983.1393	1153.31	1476.502	848.4379
12Jul2017 8:00:00	2017	1240.237862	1012.784	1183.44	1612.064	864.5517
12Jul2017 9:00:00	2017	1306.636832	1016.969	1216.239	1675.678	884.3952
12Jul2017 10:00:00	2017	1374.285886	1033.8	1237.713	1712.882	893.8554
12Jul2017 11:00:00	2017	1407.087598	1058.94	1243.696	1746.639	887.7991
12Jul2017 12:00:00	2017	1440.475738	1067.517	1231.629	1744.617	909.6432
12Jul2017 13:00:00	2017	1477.012226	1086.33	1246.28	1744.681	923.4625
12Jul2017 14:00:00	2017	1491.974226	1094.366	1241.623	1746.822	933.4338
12Jul2017 15:00:00	2017	1487.56245	1104.359	1252.327	1755.373	930.5374
12Jul2017 16:00:00	2017	1492.456109	1115.817	1259.105	1760.929	932.6157
12Jul2017 17:00:00	2017	1486.793945	1124.474	1250.269	1741.774	942.2888
12Jul2017 18:00:00	2017	1421.284519	1117.328	1233.621	1710.82	946.1397
12Jul2017 19:00:00	2017	1373.691815	1112.266	1225.187	1658.149	946.0801
12Jul2017 20:00:00	2017	1326.093209	1101.138	1227.246	1646.78	922.513
12Jul2017 21:00:00	2017	1278.085594	1079.039	1242.625	1606.655	891.9615
12Jul2017 22:00:00	2017	1222.847599	1057.652	1239.083	1581.901	903.4476
12Jul2017 23:00:00	2017	1108.133591	1022.309	1190.243	1457.114	905.6179
13Jul2017 0:00:00	2017	1009.821903	973.2333	1151.848	1348.011	877.1031
13Jul2017 1:00:00	2017	943.4747601	939.8565	1142.847	1293.353	871.6318
13Jul2017 2:00:00	2017	904.4589885	929.5004	1150.713	1261.187	863.1362
13Jul2017 3:00:00	2017	885.9035594	923.8368	1132.235	1223.543	849.7724
13Jul2017 4:00:00	2017	895.0520324	923.6579	1139.001	1225.232	839.2407
13Jul2017 5:00:00	2017	945.8423765	924.7271	1132.673	1241.609	838.6345
13Jul2017 6:00:00	2017	1055.354669	942.0697	1152.795	1334.179	835.8109
13Jul2017 7:00:00	2017	1192.719241	984.6675	1211.957	1498.996	851.3785
13Jul2017 8:00:00	2017	1304.638688	1049.612	1263.657	1636.662	857.3546
13Jul2017 9:00:00	2017	1395.808963	1087.141	1300.129	1726.372	907.2409
13Jul2017 10:00:00	2017	1475.926218	1122.73	1321.711	1792.327	936.9722
13Jul2017 11:00:00	2017	1538.081929	1137.692	1348.669	1866.142	963.6257
13Jul2017 12:00:00	2017	1570.997067	1141.593	1344.611	1902.565	979.9382
13Jul2017 13:00:00	2017	1597.107947	1160.021	1359.247	1949.352	999.559
13Jul2017 14:00:00	2017	1621.002951	1168.021	1368.76	1968.018	1005.756
13Jul2017 15:00:00	2017	1644.6708	1176.317	1378.751	1983.053	1023.582
13Jul2017 16:00:00	2017	1653.388523	1176.525	1382.767	2010.145	1042.938
13Jul2017 17:00:00	2017	1650.107139	1182.843	1380.303	1993.655	1053.531
13Jul2017 18:00:00	2017	1583.858114	1181.597	1369.502	1926.937	1022.027
13Jul2017 19:00:00	2017	1536.62783	1174.663	1359.298	1818.315	1002.725
13Jul2017 20:00:00	2017	1478.174973	1161.971	1304.518	1709.026	970.6534
13Jul2017 21:00:00	2017	1402.877022	1128.697	1302.055	1601.027	958.8601
13Jul2017 22:00:00	2017	1340.69336	1101.631	1304.55	1551.345	957.0832
13Jul2017 23:00:00	2017	1222.550219	1063.186	1252.399	1448.887	932.1655
14Jul2017 0:00:00	2017	1109.336769	1017.097	1192.472	1347.633	900.9824
14Jul2017 1:00:00	2017	1022.84639	981.6667	1186.629	1281.377	920.9971
14Jul2017 2:00:00	2017	970.9627705	960.5939	1203.995	1260.57	944.8869

14Jul2017 3:00:00	2017	935.2724954	945.3302	1182.723	1238.73	945.4537
14Jul2017 4:00:00	2017	937.972686	944.6446	1150.291	1236.861	928.9532
14Jul2017 5:00:00	2017	978.5316779	948.1138	1114.702	1252.215	925.2072
14Jul2017 6:00:00	2017	1075.512725	970.589	1134.7	1358.144	928.7503
14Jul2017 7:00:00	2017	1213.268632	1011.082	1183.723	1517.806	940.4672
14Jul2017 8:00:00	2017	1324.872214	1056.998	1233.213	1641.769	939.0929
14Jul2017 9:00:00	2017	1407.749879	1084.86	1281.965	1729.745	921.43
14Jul2017 10:00:00	2017	1462.352129	1113.854	1313.283	1798.346	919.3626
14Jul2017 11:00:00	2017	1509.720647	1130.963	1330.585	1854.162	982.6265
14Jul2017 12:00:00	2017	1530.24694	1138.749	1339.141	1881.802	992.8922
14Jul2017 13:00:00	2017	1550.718413	1148.255	1359.159	1900.481	992.5662
14Jul2017 14:00:00	2017	1561.321814	1158.724	1354.126	1914.551	963.2033
14Jul2017 15:00:00	2017	1570.906421	1172.903	1361.755	1916.273	980.7616
14Jul2017 16:00:00	2017	1567.023728	1181.429	1377.796	1910.567	1033.516
14Jul2017 17:00:00	2017	1557.727264	1186.19	1380.668	1921.015	1040.154
14Jul2017 18:00:00	2017	1487.953631	1175.627	1360.525	1858.505	1011.901
14Jul2017 19:00:00	2017	1434.943828	1159.169	1342.831	1806.825	968.2893
14Jul2017 20:00:00	2017	1377.640903	1136.763	1326.211	1758.788	957.9774
14Jul2017 21:00:00	2017	1310.29047	1102.512	1299.521	1685.623	966.4831
14Jul2017 22:00:00	2017	1266.434664	1077.966	1289.257	1652.636	987.56
14Jul2017 23:00:00	2017	1169.10071	1047.186	1232.901	1552.212	985.0773
15Jul2017 0:00:00	2017	1070.654848	1011.162	1207.896	1465.512	965.9582
15Jul2017 1:00:00	2017	994.4102637	982.9437	1183.338	1382.99	967.7757
15Jul2017 2:00:00	2017	946.5074645	961.4061	1159.339	1324.16	965.1226
15Jul2017 3:00:00	2017	916.8159913	952.2074	1133.924	1275.558	919.5895
15Jul2017 4:00:00	2017	903.8521873	946.775	1132.059	1254.642	928.3037
15Jul2017 5:00:00	2017	898.779265	935.4574	1119.573	1211.862	946.4751
15Jul2017 6:00:00	2017	914.9974446	937.1437	1113.82	1224.327	944.4141
15Jul2017 7:00:00	2017	999.680689	960.1724	1141.892	1341.807	930.5652
15Jul2017 8:00:00	2017	1096.045337	1008.628	1194.188	1480.526	920.8538
15Jul2017 9:00:00	2017	1196.753728	1054.489	1242.541	1601.318	938.4372
15Jul2017 10:00:00	2017	1274.358252	1077.801	1266.612	1701.627	950.1674
15Jul2017 11:00:00	2017	1313.787512	1102.641	1287.654	1779.866	967.4541
15Jul2017 12:00:00	2017	1335.686981	1109.225	1304.899	1803.243	988.6327
15Jul2017 13:00:00	2017	1352.897077	1113.083	1331.436	1813.998	1011.351
15Jul2017 14:00:00	2017	1352.698231	1110.002	1342.024	1820.882	1033.367
15Jul2017 15:00:00	2017	1362.790338	1104.024	1344.904	1821.692	1052.77
15Jul2017 16:00:00	2017	1369.353534	1105.193	1355.121	1861.558	1066.153
15Jul2017 17:00:00	2017	1400.215014	1110.284	1354.724	1867.585	1068.879
15Jul2017 18:00:00	2017	1403.361693	1109.921	1333.185	1835.885	1069.959
15Jul2017 19:00:00	2017	1386.75301	1105.239	1314.495	1815.539	1057.044
15Jul2017 20:00:00	2017	1347.814113	1094.108	1302.309	1735.388	1056.582
15Jul2017 21:00:00	2017	1296.237652	1077.668	1334.069	1684.812	1033.833
15Jul2017 22:00:00	2017	1264.385585	1070.944	1353.532	1654.654	1007.387
15Jul2017 23:00:00	2017	1176.672379	1050.937	1324.022	1563.989	990.1666
16Jul2017 0:00:00	2017	1088.403815	1018.496	1289.765	1463.248	971.4145
16Jul2017 1:00:00	2017	1019.659316	988.2766	1218.715	1387.004	966.775

16Jul2017 2:00:00	2017	969.1817025	966.1917	1183.953	1330.564	928.4035
16Jul2017 3:00:00	2017	940.6853922	953.1037	1168.368	1299.872	886.839
16Jul2017 4:00:00	2017	924.0152253	949.2485	1162.253	1266.531	902.951
16Jul2017 5:00:00	2017	910.7121057	937.6392	1143.394	1239.525	912.1039
16Jul2017 6:00:00	2017	913.5646359	936.3816	1136.491	1237.076	914.4395
16Jul2017 7:00:00	2017	978.0051079	968.8109	1153.005	1276.068	902.8462
16Jul2017 8:00:00	2017	1072.678085	1005.998	1190.914	1367.975	910.4475
16Jul2017 9:00:00	2017	1159.981225	1043.002	1228.105	1432.599	934.7912
16Jul2017 10:00:00	2017	1231.720699	1069.427	1255.242	1500.3	931.4977
16Jul2017 11:00:00	2017	1276.016675	1081.324	1266.319	1552.804	928.133
16Jul2017 12:00:00	2017	1301.155824	1085.808	1272.374	1586.949	914.8149
16Jul2017 13:00:00	2017	1311.916216	1087.443	1267.106	1576.621	917.7532
16Jul2017 14:00:00	2017	1316.100853	1079.062	1247.657	1564.987	918.4618
16Jul2017 15:00:00	2017	1325.79258	1078.044	1242.051	1545.454	918.2208
16Jul2017 16:00:00	2017	1312.152449	1088.19	1249.611	1559.026	921.4332
16Jul2017 17:00:00	2017	1263.168189	1090.145	1265.535	1562.02	940.6866
16Jul2017 18:00:00	2017	1206.910813	1071.569	1261.097	1518.361	959.9385
16Jul2017 19:00:00	2017	1165.176209	1046.832	1245.034	1482.371	968.4952
16Jul2017 20:00:00	2017	1130.348544	1024.409	1254.381	1447.565	970.0937
16Jul2017 21:00:00	2017	1109.144522	1011.027	1245.285	1442.03	963.8966
16Jul2017 22:00:00	2017	1087.343943	1004.849	1242.79	1436.334	963.0704
16Jul2017 23:00:00	2017	991.9246896	978.3945	1183.47	1346.93	955.3736
17Jul2017 0:00:00	2017	916.1037175	945.5667	1217.307	1257.596	935.6565
17Jul2017 1:00:00	2017	870.6223948	926.7687	1217.855	1227.145	905.6791
17Jul2017 2:00:00	2017	840.9923698	911.7709	1180.642	1189.175	903.0995
17Jul2017 3:00:00	2017	830.2349986	908.2449	1165.148	1160.444	885.155
17Jul2017 4:00:00	2017	846.7159007	911.2955	1164.86	1166.987	870.3724
17Jul2017 5:00:00	2017	910.2370489	918.6146	1171.097	1210.046	864.7887
17Jul2017 6:00:00	2017	1015.481932	940.5693	1207.176	1292.051	847.818
17Jul2017 7:00:00	2017	1134.519994	984.6735	1262.508	1415.485	855.5887
17Jul2017 8:00:00	2017	1216.639715	1028.921	1317.995	1520.583	875.7656
17Jul2017 9:00:00	2017	1276.928281	1062.525	1321.546	1595.413	836.5092
17Jul2017 10:00:00	2017	1343.317973	1082.427	1344.693	1635.574	856.0373
17Jul2017 11:00:00	2017	1399.012322	1093.284	1370.485	1710.053	879.5828
17Jul2017 12:00:00	2017	1424.105873	1076.45	1372.702	1708.688	898.8219
17Jul2017 13:00:00	2017	1443.08019	1079.215	1364.34	1720.384	903.0667
17Jul2017 14:00:00	2017	1447.901295	1087.901	1354.051	1712.85	886.1851
17Jul2017 15:00:00	2017	1454.291242	1103.071	1353.532	1688.693	887.5626
17Jul2017 16:00:00	2017	1451.316356	1119.843	1392.731	1709.132	888.88
17Jul2017 17:00:00	2017	1445.208054	1115.79	1395.946	1679.113	891.5011
17Jul2017 18:00:00	2017	1358.439253	1106.81	1375.234	1638.784	884.1365
17Jul2017 19:00:00	2017	1292.920878	1091.728	1360.073	1599.809	880.1324
17Jul2017 20:00:00	2017	1243.107054	1068.221	1335.564	1516.09	882.3058
17Jul2017 21:00:00	2017	1206.658126	1051.498	1277.421	1498.374	883.9229
17Jul2017 22:00:00	2017	1145.058424	1029.143	1238.513	1458.565	895.5582
17Jul2017 23:00:00	2017	1032.257808	986.4825	1197.315	1348.574	906.2067
18Jul2017 0:00:00	2017	943.3853233	956.8711	1168.171	1269.481	896.322

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18Jul2017 2:00:00	2017	858.6937147	935.0599	1151.03	1171.694	866.1228
18Jul2017 3:00:00	2017	848.0148898	933.3304	1145.034	1136.501	871.625
18Jul2017 4:00:00	2017	864.3347805	934.2389	1118.407	1169.401	885.1121
18Jul2017 5:00:00	2017	920.7622251	941.3411	1105.479	1199.529	881.8571
18Jul2017 6:00:00	2017	1021.752576	952.3704	1120.876	1291.308	875.2077
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18Jul2017 10:00:00	2017	1349.158989	1059.049	1263.076	1646.851	875.36
18Jul2017 11:00:00	2017	1395.420023	1068.86	1271.564	1710.595	870.1945
18Jul2017 12:00:00	2017	1431.997407	1082.474	1277.645	1750.589	873.9822
18Jul2017 13:00:00	2017	1457.466928	1094.985	1281.058	1762.139	879.739
18Jul2017 14:00:00	2017	1470.240376	1103.774	1288.69	1772.671	891.2573
18Jul2017 15:00:00	2017	1485.023899	1122.029	1291.09	1783.736	898.5367
18Jul2017 16:00:00	2017	1495.531077	1140.816	1303.978	1771.8	894.2935
18Jul2017 17:00:00	2017	1493.558164	1161.375	1305.129	1756.236	897.6693
18Jul2017 18:00:00	2017	1418.522376	1147.959	1304.777	1700.71	903.7631
18Jul2017 19:00:00	2017	1353.676471	1137.655	1306.914	1674.326	904.5506
18Jul2017 20:00:00	2017	1286.417127	1120.203	1304.261	1630.546	913.7827
18Jul2017 21:00:00	2017	1236.370688	1096.469	1288.811	1576.081	903.1415
18Jul2017 22:00:00	2017	1174.126595	1068.687	1285.477	1542.192	897.7836
18Jul2017 23:00:00	2017	1055.341931	1015.852	1243.73	1421.534	888.8535
19Jul2017 0:00:00	2017	960.1481213	996.391	1211.004	1339.086	884.2873
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19Jul2017 2:00:00	2017	867.1094842	958.27	1178.404	1222.638	884.5086
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19Jul2017 4:00:00	2017	865.1194823	951.5207	1178.522	1191.647	876.9829
19Jul2017 5:00:00	2017	919.8435623	960.4724	1172.341	1213.281	870.7891
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19Jul2017 7:00:00	2017	1147.551806	1012.801	1208.609	1431.259	877.526
19Jul2017 8:00:00	2017	1233.690849	1043.542	1230.43	1530.999	886.8653
19Jul2017 9:00:00	2017	1306.911679	1067.445	1263.329	1594.975	878.0175
19Jul2017 10:00:00	2017	1360.999898	1090.129	1301.066	1648.088	887.1388
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19Jul2017 14:00:00	2017	1520.106198	1167.398	1321.548	1775.359	947.7786
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19Jul2017 20:00:00	2017	1346.933631	1168.668	1319.861	1601.124	950.0757
19Jul2017 21:00:00	2017	1290.851067	1144.277	1302.91	1555.761	963.2315
19Jul2017 22:00:00	2017	1229.630442	1117.486	1289.249	1523.42	981.8699
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20Jul2017 1:00:00	2017	939.3365447	1009.754	1199.437	1294.012	916.6515
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20Jul2017 4:00:00	2017	891.5670569	975.0384	1173.667	1239.241	910.0666
20Jul2017 5:00:00	2017	947.6154889	976.9935	1165.583	1270.02	907.2934
20Jul2017 6:00:00	2017	1048.418824	987.8753	1169.503	1351.505	887.0692
20Jul2017 7:00:00	2017	1173.14992	1026.622	1222.125	1495.505	889.6446
20Jul2017 8:00:00	2017	1256.916743	1060.514	1281.202	1605.09	920.5289
20Jul2017 9:00:00	2017	1309.275135	1090.923	1321.179	1686.972	950.0986
20Jul2017 10:00:00	2017	1354.305405	1117.601	1353.342	1755.739	970.1097
20Jul2017 11:00:00	2017	1399.778494	1137.092	1343.576	1799.379	956.8627
20Jul2017 12:00:00	2017	1426.478567	1147.16	1334.821	1821.832	968.7187
20Jul2017 13:00:00	2017	1478.946602	1172.388	1369.514	1854.801	973.6788
20Jul2017 14:00:00	2017	1518.505953	1182.941	1382.897	1890.267	988.6374
20Jul2017 15:00:00	2017	1533.74984	1200.834	1387.84	1914.058	1005.822
20Jul2017 16:00:00	2017	1529.75991	1213.638	1372.086	1896.441	1020.448
20Jul2017 17:00:00	2017	1524.14553	1219.214	1365.416	1880.44	1030.772
20Jul2017 18:00:00	2017	1457.152177	1197.622	1347.69	1825.592	998.0438
20Jul2017 19:00:00	2017	1405.183701	1176.871	1318.676	1749.821	1007.081
20Jul2017 20:00:00	2017	1323.747025	1153.56	1284.357	1679.243	997.4553
20Jul2017 21:00:00	2017	1265.360439	1129.394	1274.802	1599.4	995.0212
20Jul2017 22:00:00	2017	1188.657692	1102.257	1270.088	1505.956	984.4351
20Jul2017 23:00:00	2017	1072.383022	1070.483	1233.535	1413.201	962.5832
21Jul2017 0:00:00	2017	981.3674083	1035.605	1214.717	1328.419	959.8218
21Jul2017 1:00:00	2017	926.0882685	1004.996	1188.256	1281.877	948.9893
21Jul2017 2:00:00	2017	894.4938732	981.9729	1173.514	1246.024	918.4217
21Jul2017 3:00:00	2017	878.8113247	968.5887	1163.845	1223.698	918.4161
21Jul2017 4:00:00	2017	887.6463291	962.4901	1178.748	1237.079	912.3646
21Jul2017 5:00:00	2017	943.2481671	967.8824	1174.053	1270.735	910.7835
21Jul2017 6:00:00	2017	1044.453637	984.7828	1183.07	1340.09	899.3484
21Jul2017 7:00:00	2017	1170.936351	1027.152	1211.962	1461.222	905.4909
21Jul2017 8:00:00	2017	1273.181799	1070.625	1250.419	1559.938	910.9028
21Jul2017 9:00:00	2017	1350.947233	1100.438	1313.943	1613.331	926.9452
21Jul2017 10:00:00	2017	1399.381501	1112.752	1334.78	1643.573	945.1478
21Jul2017 11:00:00	2017	1431.377196	1123.593	1335.032	1650.319	961.0762
21Jul2017 12:00:00	2017	1436.983568	1119.326	1345.714	1679.224	972.3247
21Jul2017 13:00:00	2017	1427.844545	1128.463	1350.405	1688.918	977.6476
21Jul2017 14:00:00	2017	1403.836876	1137.222	1354.278	1704.497	982.4235
21Jul2017 15:00:00	2017	1386.692803	1149.836	1351.307	1677.622	997.2759
21Jul2017 16:00:00	2017	1387.067825	1164.661	1337.379	1686.085	1013.366
21Jul2017 17:00:00	2017	1396.655289	1160	1307.802	1663.131	1003.852
21Jul2017 18:00:00	2017	1333.257444	1137.833	1290.483	1603.525	1007.237
21Jul2017 19:00:00	2017	1277.564982	1114.773	1291.867	1567.027	999.1793
21Jul2017 20:00:00	2017	1225.11552	1095.203	1290.752	1529.992	987.2217
21Jul2017 21:00:00	2017	1184.473553	1079.351	1299.218	1493.685	985.3718
21Jul2017 22:00:00	2017	1144.972126	1066.516	1297.687	1480.885	997.371

21Jul2017 23:00:00	2017	1045.972707	1028.238	1258.578	1387.719	974.5802
22Jul2017 0:00:00	2017	960.0661691	993.8816	1230.843	1283.034	934.5668
22Jul2017 1:00:00	2017	899.1192456	971.771	1210.262	1215.14	911.8343
22Jul2017 2:00:00	2017	862.8430003	960.1416	1195.593	1201.714	897.1263
22Jul2017 3:00:00	2017	843.5661827	954.2197	1181.954	1167.166	882.539
22Jul2017 4:00:00	2017	840.8533282	949.3476	1182.104	1167.282	893.3941
22Jul2017 5:00:00	2017	852.1736149	949.0907	1174.407	1146.473	877.0458
22Jul2017 6:00:00	2017	864.4024732	951.4944	1167.033	1148.785	882.1433
22Jul2017 7:00:00	2017	930.5029781	977.5187	1196.136	1248.338	883.6972
22Jul2017 8:00:00	2017	1024.418052	1016.96	1232.065	1356.022	916.8689
22Jul2017 9:00:00	2017	1116.627334	1037.929	1272.932	1486.997	933.2603
22Jul2017 10:00:00	2017	1199.486881	1061.182	1330.235	1588.262	952.0658
22Jul2017 11:00:00	2017	1251.595698	1077.435	1347.486	1639.797	988.1072
22Jul2017 12:00:00	2017	1281.920159	1090.5	1339.784	1669.815	1009.997
22Jul2017 13:00:00	2017	1296.949502	1100.431	1334.878	1683.827	1038.026
22Jul2017 14:00:00	2017	1306.414076	1109.677	1357.068	1692.158	1033.963
22Jul2017 15:00:00	2017	1318.489279	1130.835	1363.046	1700.282	1035.834
22Jul2017 16:00:00	2017	1340.722125	1149.227	1352.463	1669.383	1049.43
22Jul2017 17:00:00	2017	1350.955029	1160.848	1356.755	1649.013	1060.337
22Jul2017 18:00:00	2017	1316.743594	1162.342	1346.388	1624.731	1050.793
22Jul2017 19:00:00	2017	1269.170059	1147.66	1329.831	1598.75	1035.074
22Jul2017 20:00:00	2017	1230.497044	1125.91	1314.52	1545.492	1019.469
22Jul2017 21:00:00	2017	1190.903591	1096.064	1296.064	1507.356	1019.753
22Jul2017 22:00:00	2017	1168.93444	1075.838	1292.821	1520.27	1023.609
22Jul2017 23:00:00	2017	1077.06672	1042.491	1260.87	1424.033	1023.419
23Jul2017 0:00:00	2017	990.192646	995.3828	1225.256	1324.095	987.0707
23Jul2017 1:00:00	2017	925.5791636	969.8003	1204.584	1280.165	977.9017
23Jul2017 2:00:00	2017	882.2952913	949.1522	1184.689	1242.921	971.2177
23Jul2017 3:00:00	2017	857.4537312	940.5481	1178.059	1218.717	963.5908
23Jul2017 4:00:00	2017	849.2910973	936.7264	1191.474	1190.98	943.9203
23Jul2017 5:00:00	2017	850.2299003	933.4537	1170.062	1183.087	939.358
23Jul2017 6:00:00	2017	853.5323523	933.9922	1157.432	1179.044	924.4013
23Jul2017 7:00:00	2017	922.4440491	956.9329	1175.204	1254.073	928.6317
23Jul2017 8:00:00	2017	1018.700343	991.8263	1220.727	1328.933	951.7608
23Jul2017 9:00:00	2017	1124.842666	1025.257	1259.496	1423.067	981.5035
23Jul2017 10:00:00	2017	1216.676778	1048.595	1294.111	1469.228	983.7823
23Jul2017 11:00:00	2017	1284.907593	1072.995	1315.14	1515.519	973.5082
23Jul2017 12:00:00	2017	1329.569522	1096.258	1324.8	1555.075	977.7016
23Jul2017 13:00:00	2017	1355.316338	1110.887	1337.063	1577.62	999.1321
23Jul2017 14:00:00	2017	1375.732672	1122.427	1355.934	1609.087	1001.351
23Jul2017 15:00:00	2017	1398.972255	1132.086	1346.21	1638.015	1009.71
23Jul2017 16:00:00	2017	1425.018662	1144.318	1354.31	1645.035	1025.476
23Jul2017 17:00:00	2017	1438.66779	1151.418	1346.637	1651.054	1017.104
23Jul2017 18:00:00	2017	1417.165838	1145.706	1323.34	1622.812	1005.537
23Jul2017 19:00:00	2017	1375.645931	1128.076	1306.059	1596.849	978.4114
23Jul2017 20:00:00	2017	1339.000439	1118.844	1279.535	1516.964	971.771
23Jul2017 21:00:00	2017	1262.817594	1111.262	1244.151	1468.327	961.3018

23Jul2017 22:00:00	2017	1141.266197	1050.91	1201.437	1407.311	955.3078
23Jul2017 23:00:00	2017	1017.174373	972.998	1178.228	1310.913	946.1887
24Jul2017 0:00:00	2017	926.610311	928.0525	1169.764	1267.332	947.7188
24Jul2017 1:00:00	2017	869.1322633	880.4194	1153.14	1222.135	934.007
24Jul2017 2:00:00	2017	837.9206271	867.0669	1148.282	1191.29	937.6451
24Jul2017 3:00:00	2017	825.6749822	874.1571	1148.508	1178.518	922.2483
24Jul2017 4:00:00	2017	841.8213421	880.186	1153.795	1202.352	891.244
24Jul2017 5:00:00	2017	900.2355218	893.6308	1156.1	1235.036	920.2432
24Jul2017 6:00:00	2017	997.7393845	913.441	1169.057	1309.597	944.3022
24Jul2017 7:00:00	2017	1124.190826	961.6698	1209.791	1457.714	933.2527
24Jul2017 8:00:00	2017	1215.931763	1013.823	1261.764	1546.204	949.8552
24Jul2017 9:00:00	2017	1283.938998	1049.159	1305.817	1601.244	970.0618
24Jul2017 10:00:00	2017	1338.076179	1073.305	1309.778	1653.664	971.1272
24Jul2017 11:00:00	2017	1383.025563	1093.029	1316.021	1709.258	974.1492
24Jul2017 12:00:00	2017	1410.04336	1100.719	1328.313	1715.304	982.5142
24Jul2017 13:00:00	2017	1435.562682	1111.668	1330.313	1744.429	1000.901
24Jul2017 14:00:00	2017	1443.31757	1119.579	1334.186	1719.88	1019.917
24Jul2017 15:00:00	2017	1451.030253	1137.004	1348.466	1712.498	1001.24
24Jul2017 16:00:00	2017	1452.869765	1148.88	1344.418	1712.163	1017.489
24Jul2017 17:00:00	2017	1446.750173	1150.464	1334.981	1696.691	1013.791
24Jul2017 18:00:00	2017	1365.686039	1132.302	1288.177	1619.241	996.2013
24Jul2017 19:00:00	2017	1300.081232	1114.585	1266.597	1583.39	981.4117
24Jul2017 20:00:00	2017	1243.265338	1091.825	1239.478	1520.076	986.2586
24Jul2017 21:00:00	2017	1192.466156	1066.032	1217.315	1461.005	996.6633
24Jul2017 22:00:00	2017	1135.589679	1047.203	1220.431	1450.789	986.0551
24Jul2017 23:00:00	2017	1019.519833	1013.196	1189.821	1345.808	982.6393
25Jul2017 0:00:00	2017	928.503781	973.2561	1160.587	1247.622	971.6625
25Jul2017 1:00:00	2017	876.694933	957.6713	1147.132	1193.165	970.0743
25Jul2017 2:00:00	2017	847.9314322	952.311	1138.107	1169.917	971.8161
25Jul2017 3:00:00	2017	836.1214878	944.1475	1131.033	1163.971	967.3502
25Jul2017 4:00:00	2017	850.5197094	945.4007	1146.604	1184.564	969.8367
25Jul2017 5:00:00	2017	910.0227895	954.9959	1137.204	1203.291	958.3456
25Jul2017 6:00:00	2017	1008.742837	966.0293	1151.154	1282.677	953.4755
25Jul2017 7:00:00	2017	1134.948716	1005.874	1202.358	1458.02	952.1777
25Jul2017 8:00:00	2017	1226.71828	1040.547	1252.976	1572.283	924.7394
25Jul2017 9:00:00	2017	1306.275365	1070.682	1288.988	1654.343	943.3861
25Jul2017 10:00:00	2017	1370.652793	1092.741	1324.04	1718.282	974.8973
25Jul2017 11:00:00	2017	1418.602275	1106.724	1334.446	1757.505	1005.034
25Jul2017 12:00:00	2017	1440.806272	1114.617	1344.699	1785.495	1028.511
25Jul2017 13:00:00	2017	1463.100466	1130.387	1365.552	1832.23	1040.211
25Jul2017 14:00:00	2017	1473.457257	1142.404	1365.508	1834.121	1056.714
25Jul2017 15:00:00	2017	1491.815345	1149.338	1372.83	1823.974	1067.425
25Jul2017 16:00:00	2017	1501.65538	1155.706	1372.754	1826.792	1059.567
25Jul2017 17:00:00	2017	1501.11351	1165.421	1368.05	1821.646	1059.4
25Jul2017 18:00:00	2017	1429.858951	1160.378	1355.837	1775.117	1052.545
25Jul2017 19:00:00	2017	1379.427738	1159.934	1343.171	1734.8	1041.645
25Jul2017 20:00:00	2017	1325.256251	1140.985	1327.001	1686.918	1042.063

25Jul2017 21:00:00	2017	1266.093439	1120.284	1316.705	1644.064	1040.581
25Jul2017 22:00:00	2017	1199.309805	1095.839	1304.9	1606.989	1047.205
25Jul2017 23:00:00	2017	1077.404846	1053.537	1253.955	1492.104	1019.122
26Jul2017 0:00:00	2017	979.6417981	1018.125	1204.02	1378.466	999.9523
26Jul2017 1:00:00	2017	920.2592929	991.8947	1176.063	1283.605	986.3165
26Jul2017 2:00:00	2017	885.6064689	975.817	1156.196	1234.038	976.385
26Jul2017 3:00:00	2017	869.5852127	972.6246	1147.533	1237.082	965.4761
26Jul2017 4:00:00	2017	883.1129258	972.4127	1144.229	1218.994	967.7609
26Jul2017 5:00:00	2017	938.1626518	978.2969	1142.167	1240.859	954.6978
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26Jul2017 8:00:00	2017	1271.807911	1063.362	1289.062	1598.533	958.8434
26Jul2017 9:00:00	2017	1359.404196	1092.878	1337.021	1713.155	999.2316
26Jul2017 10:00:00	2017	1432.474766	1119.304	1362.035	1813.847	1020.557
26Jul2017 11:00:00	2017	1496.154505	1144.217	1382.037	1884.961	1062.324
26Jul2017 12:00:00	2017	1535.297868	1163.379	1383.403	1914.747	1091.607
26Jul2017 13:00:00	2017	1568.025935	1165.594	1394.526	1942.828	1106.914
26Jul2017 14:00:00	2017	1598.837852	1184.892	1409.969	1961.09	1091.08
26Jul2017 15:00:00	2017	1617.63806	1170.628	1406.484	1993.671	1088.351
26Jul2017 16:00:00	2017	1623.393652	1183.829	1404.857	1965.94	1072.728
26Jul2017 17:00:00	2017	1624.819584	1192.161	1390.383	1942.02	1099.984
26Jul2017 18:00:00	2017	1529.852774	1180.688	1361.549	1901.356	1140.423
26Jul2017 19:00:00	2017	1463.311236	1174.167	1336.508	1846.273	1137.022
26Jul2017 20:00:00	2017	1404.786355	1176.731	1298.055	1792.157	1096.651
26Jul2017 21:00:00	2017	1351.8203	1166.47	1296.697	1728.043	1080.446
26Jul2017 22:00:00	2017	1279.516993	1089.744	1283.614	1683.966	1085.778
26Jul2017 23:00:00	2017	1144.026389	1064.216	1237.936	1560.641	1044.418
27Jul2017 0:00:00	2017	1038.967138	1026.477	1203.728	1461.752	1006.637
27Jul2017 1:00:00	2017	967.7374038	999.7951	1185.034	1396.917	998.4977
27Jul2017 2:00:00	2017	921.302923	983.3632	1167.232	1336.48	981.0932
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27Jul2017 4:00:00	2017	912.7850533	972.1752	1145.606	1319.723	968.4161
27Jul2017 5:00:00	2017	971.5864274	973.6115	1145.102	1336.49	947.7927
27Jul2017 6:00:00	2017	1077.711944	996.1639	1164.366	1425.412	922.3543
27Jul2017 7:00:00	2017	1214.104653	1044.121	1216.041	1591.439	950.1485
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27Jul2017 13:00:00	2017	1678.717604	1168.111	1418.781	1981.904	1101.291
27Jul2017 14:00:00	2017	1701.302563	1177.371	1433.79	2033.166	1115.034
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27Jul2017 18:00:00	2017	1628.034539	1191.066	1391.558	1964.854	1088.767
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27Jul2017 20:00:00	2017	1495.514676	1195.359	1366.35	1891.42	1050.301
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27Jul2017 22:00:00	2017	1338.188604	1134.879	1312.222	1596.758	997.6083
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28Jul2017 0:00:00	2017	1086.466766	1030.429	1202.473	1399.619	959.5319
28Jul2017 1:00:00	2017	996.3760367	1000.377	1195.352	1338.398	946.4666
28Jul2017 2:00:00	2017	948.4193384	981.9325	1186.484	1273.67	951.774
28Jul2017 3:00:00	2017	928.6183262	970.9434	1167.463	1273.033	962.6775
28Jul2017 4:00:00	2017	937.8496882	970.1785	1161.45	1263.171	970.8757
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28Jul2017 7:00:00	2017	1210.8297	1039.184	1220.103	1503.242	955.9405
28Jul2017 8:00:00	2017	1321.788276	1076.738	1278.017	1637.057	981.982
28Jul2017 9:00:00	2017	1407.828202	1112.267	1324.787	1695.465	1014.321
28Jul2017 10:00:00	2017	1470.323181	1138.324	1348.527	1769.786	1033.385
28Jul2017 11:00:00	2017	1518.294615	1166.722	1370.299	1826.633	1032.483
28Jul2017 12:00:00	2017	1537.968707	1175.191	1369.315	1841.257	1049.304
28Jul2017 13:00:00	2017	1558.114566	1179.179	1366.316	1860.313	1048.934
28Jul2017 14:00:00	2017	1572.201283	1182.957	1375.689	1874.104	1048.703
28Jul2017 15:00:00	2017	1579.376105	1186.024	1394.187	1860.782	1052.113
28Jul2017 16:00:00	2017	1585.462254	1200.812	1392.053	1835.251	1083.001
28Jul2017 17:00:00	2017	1575.04954	1209.808	1370.352	1806.601	1075.713
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28Jul2017 19:00:00	2017	1421.078949	1194.757	1322.475	1672.366	1049.865
28Jul2017 20:00:00	2017	1351.683812	1177.364	1306.012	1629.853	1036.51
28Jul2017 21:00:00	2017	1289.465713	1153.946	1299.431	1593.828	1029.528
28Jul2017 22:00:00	2017	1234.8161	1123.422	1302.865	1558.619	1030.614
28Jul2017 23:00:00	2017	1120.519634	1074.317	1268.238	1466.261	1009.805
29Jul2017 0:00:00	2017	1022.715644	1026.259	1228.35	1357.266	1016.051
29Jul2017 1:00:00	2017	955.8135208	993.0221	1206.316	1281.365	992.1877
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29Jul2017 3:00:00	2017	888.527003	971.2588	1181.794	1220.827	973.9953
29Jul2017 4:00:00	2017	880.8422028	970.5656	1186.015	1225.672	979.7355
29Jul2017 5:00:00	2017	892.5538744	970.9136	1188.197	1241.978	957.2976
29Jul2017 6:00:00	2017	902.21832	964.1553	1176.213	1243.237	979.3904
29Jul2017 7:00:00	2017	970.5730347	991.4872	1187.201	1323.031	966.2257
29Jul2017 8:00:00	2017	1084.415587	1031.96	1244.84	1405.406	978.4959
29Jul2017 9:00:00	2017	1186.894549	1066.116	1277.873	1476.08	1006.473
29Jul2017 10:00:00	2017	1260.748019	1094.121	1291.599	1547.052	1014.1
29Jul2017 11:00:00	2017	1308.893003	1117.428	1308.212	1626.254	1013.726
29Jul2017 12:00:00	2017	1334.588586	1114.19	1322.525	1672.132	1027.352
29Jul2017 13:00:00	2017	1353.65933	1127.438	1336.791	1689.961	1034.641
29Jul2017 14:00:00	2017	1369.981949	1148.2	1343.846	1704.645	1017.919
29Jul2017 15:00:00	2017	1391.037023	1162.88	1362.324	1745.501	1014.075
29Jul2017 16:00:00	2017	1406.008847	1172.369	1370.098	1758.45	1019.277
29Jul2017 17:00:00	2017	1408.180591	1178.479	1380.193	1763.283	1027.382
29Jul2017 18:00:00	2017	1377.381126	1172.535	1370.058	1741.691	1033.229

29Jul2017 19:00:00	2017	1337.527203	1153.309	1331.911	1695.398	1029.907
29Jul2017 20:00:00	2017	1286.232488	1130.186	1307.411	1608.666	1044.037
29Jul2017 21:00:00	2017	1254.996971	1110.348	1298.832	1565.875	1037.991
29Jul2017 22:00:00	2017	1212.648896	1082.255	1281.162	1566.011	1040.827
29Jul2017 23:00:00	2017	1119.257748	1026.103	1247.75	1473.216	1030.256
30Jul2017 0:00:00	2017	1026.953457	980.6676	1209.11	1380.542	1015.432
30Jul2017 1:00:00	2017	957.6853287	956.5439	1196.655	1293.133	1011.398
30Jul2017 2:00:00	2017	911.9731316	938.8161	1185.411	1251.611	983.3483
30Jul2017 3:00:00	2017	882.4072434	931.8537	1173.846	1255.607	972.7774
30Jul2017 4:00:00	2017	868.2103549	929.3811	1179.399	1256.59	984.8728
30Jul2017 5:00:00	2017	869.9265359	928.4649	1175.456	1250.021	971.2989
30Jul2017 6:00:00	2017	870.6419834	923.4853	1172.51	1206.952	959.8703
30Jul2017 7:00:00	2017	928.0380348	948.2807	1193.572	1269.632	937.6237
30Jul2017 8:00:00	2017	1021.407693	986.42	1218.03	1356.13	952.3873
30Jul2017 9:00:00	2017	1131.310114	1012.395	1257.891	1441.943	951.5123
30Jul2017 10:00:00	2017	1214.879202	1046.547	1294.782	1544.51	964.5532
30Jul2017 11:00:00	2017	1270.100238	1076.354	1320.26	1615.799	972.864
30Jul2017 12:00:00	2017	1303.578677	1093.865	1338.752	1648.368	977.2639
30Jul2017 13:00:00	2017	1328.914422	1103.5	1342.439	1654.784	989.5622
30Jul2017 14:00:00	2017	1338.184168	1120.439	1346.104	1658.218	1015.864
30Jul2017 15:00:00	2017	1357.695209	1134.937	1363.258	1674.816	1029.174
30Jul2017 16:00:00	2017	1380.493933	1139.911	1375.391	1694.165	1017.389
30Jul2017 17:00:00	2017	1393.956103	1148.925	1384.604	1707.202	1033.464
30Jul2017 18:00:00	2017	1368.013443	1143.393	1377.763	1680.303	1037.912
30Jul2017 19:00:00	2017	1320.157018	1131.491	1360.438	1639.888	1045.996
30Jul2017 20:00:00	2017	1275.953893	1112.441	1346.164	1609.916	1046.754
30Jul2017 21:00:00	2017	1256.527544	1094.103	1322.819	1547.714	1046.884
30Jul2017 22:00:00	2017	1196.956317	1058.188	1291.314	1528.981	1050.699
30Jul2017 23:00:00	2017	1080.51125	1006.24	1224.531	1416.401	1008.767
31Jul2017 0:00:00	2017	995.5588829	969.7437	1186.383	1300.224	988.7382
31Jul2017 1:00:00	2017	936.4201495	945.066	1170.46	1253.966	984.3419
31Jul2017 2:00:00	2017	900.9520447	930.9985	1177.569	1225.21	988.5509
31Jul2017 3:00:00	2017	884.2646942	922.5441	1186.035	1216.693	1005.485
31Jul2017 4:00:00	2017	896.5640351	921.216	1186.858	1230.23	1003.768
31Jul2017 5:00:00	2017	963.6006379	933.7063	1203.869	1300.305	1005.005
31Jul2017 6:00:00	2017	1069.057131	954.9395	1220.749	1399.449	992.1701
31Jul2017 7:00:00	2017	1188.560922	997.3886	1263.212	1514.799	982.1504
31Jul2017 8:00:00	2017	1284.033337	1036.717	1317.294	1618.785	992.056
31Jul2017 9:00:00	2017	1362.292175	1070.397	1352.823	1675.435	1020.716
31Jul2017 10:00:00	2017	1439.595312	1073.778	1359.095	1720.991	1027.753
31Jul2017 11:00:00	2017	1496.756677	1118.135	1370.877	1745.218	1042.001
31Jul2017 12:00:00	2017	1528.968225	1126.541	1372.138	1763.68	1074.946
31Jul2017 13:00:00	2017	1556.524372	1129.868	1371.512	1738.038	1127.997
31Jul2017 14:00:00	2017	1569.165283	1141.083	1380.885	1707.969	1112.917
31Jul2017 15:00:00	2017	1584.230295	1153.314	1390.746	1746.031	1104.524
31Jul2017 16:00:00	2017	1599.964787	1149.019	1393.38	1756.879	1103.818
31Jul2017 17:00:00	2017	1596.139641	1153.191	1382.289	1754.499	1116.038

31Jul2017 18:00:00	2017	1496.42664	1181.177	1357.128	1706.647	1114.817
31Jul2017 19:00:00	2017	1417.212956	1169.941	1331.687	1658.691	1108.746
31Jul2017 20:00:00	2017	1344.705306	1142.64	1316.558	1603.909	1125.756
31Jul2017 21:00:00	2017	1286.056712	1116.68	1311.922	1561.624	1120.039
31Jul2017 22:00:00	2017	1204.911435	1075.745	1290.886	1522.064	1128.01
31Jul2017 23:00:00	2017	1080.516943	1028.057	1245.22	1403.939	1107.745
01Aug2017 0:00:00	2017	989.2869516	988.7944	1215.815	1307.663	1059.626
01Aug2017 1:00:00	2017	927.9954931	965.763	1197.232	1247.01	1048.358
01Aug2017 2:00:00	2017	898.0992146	950.9798	1187.842	1211.167	1032.585
01Aug2017 3:00:00	2017	882.813517	948.7875	1186.467	1193.294	1060.864
01Aug2017 4:00:00	2017	893.8927725	950.4177	1199.383	1228.752	1059.138
01Aug2017 5:00:00	2017	964.2429203	959.1739	1183.101	1279.922	1036.547
01Aug2017 6:00:00	2017	1076.907088	975.414	1179.777	1345.727	1019.451
01Aug2017 7:00:00	2017	1180.105109	1017.926	1235.626	1471.967	1034.932
01Aug2017 8:00:00	2017	1273.613507	1058.539	1282.624	1573.881	1024.522
01Aug2017 9:00:00	2017	1344.234048	1093.369	1296.117	1622.17	1022.77
01Aug2017 10:00:00	2017	1400.353333	1107.635	1297.336	1671.519	1057.08
01Aug2017 11:00:00	2017	1431.843259	1120.675	1333.176	1698.932	1061.064
01Aug2017 12:00:00	2017	1453.844307	1130.617	1336.825	1703.774	1074.729
01Aug2017 13:00:00	2017	1453.863464	1113.23	1351.305	1714.118	1089.343
01Aug2017 14:00:00	2017	1446.607564	1121.202	1400.968	1702.759	1092.313
01Aug2017 15:00:00	2017	1426.629855	1132.818	1419.62	1689.387	1100.282
01Aug2017 16:00:00	2017	1414.395387	1140.965	1400.9	1679.34	1097.715
01Aug2017 17:00:00	2017	1383.9442	1137.83	1351.379	1656.921	1099.109
01Aug2017 18:00:00	2017	1316.916253	1144.589	1324.794	1597.255	1101.843
01Aug2017 19:00:00	2017	1258.137183	1114.873	1336.364	1555.683	1113.478
01Aug2017 20:00:00	2017	1222.481286	1096.102	1376.435	1506.356	1103.425
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02Aug2017 0:00:00	2017	914.3702419	989.446	1260.963	1268.676	1020.158
02Aug2017 1:00:00	2017	866.5418317	970.2281	1177.97	1217.969	1010.543
02Aug2017 2:00:00	2017	842.1662159	962.0155	1134.31	1170.447	1015.931
02Aug2017 3:00:00	2017	834.5978012	959.6035	1126.452	1166.449	999.1024
02Aug2017 4:00:00	2017	852.9310038	965.7273	1132.474	1165.464	997.947
02Aug2017 5:00:00	2017	922.7665116	978.7408	1143.047	1204.945	1013.414
02Aug2017 6:00:00	2017	1036.24239	997.507	1171.469	1272.166	1021.534
02Aug2017 7:00:00	2017	1153.515023	1033.554	1222.875	1419.414	1036.184
02Aug2017 8:00:00	2017	1244.521084	1066.866	1275.097	1534.903	1071.801
02Aug2017 9:00:00	2017	1297.635822	1072.594	1305.279	1618.367	1083.21
02Aug2017 10:00:00	2017	1341.776868	1079.263	1329.447	1689.763	1088.451
02Aug2017 11:00:00	2017	1377.421449	1090.589	1348.908	1737.769	1105.582
02Aug2017 12:00:00	2017	1395.421847	1089.198	1357.404	1753.565	1129.411
02Aug2017 13:00:00	2017	1406.018562	1094.298	1366.378	1771.156	1166.843
02Aug2017 14:00:00	2017	1420.437884	1081.392	1364.777	1788.424	1163.194
02Aug2017 15:00:00	2017	1432.56322	1074.938	1351.01	1781.718	1157.088
02Aug2017 16:00:00	2017	1439.474039	1073.258	1341.437	1782.2	1170.903

02Aug2017 17:00:00	2017	1441.593124	1054.676	1322.805	1767.646	1139.765
02Aug2017 18:00:00	2017	1370.539343	1051.088	1273.84	1680.108	1127.155
02Aug2017 19:00:00	2017	1319.305532	1060.923	1282.881	1665.89	1116.898
02Aug2017 20:00:00	2017	1267.553875	1048.431	1275.782	1635.313	1108.859
02Aug2017 21:00:00	2017	1234.878945	1055.268	1285.175	1583.262	1103.899
02Aug2017 22:00:00	2017	1168.141665	1032.867	1267.917	1525.412	1100.175
02Aug2017 23:00:00	2017	1047.893707	994.2438	1219.047	1409.817	1078.181
03Aug2017 0:00:00	2017	950.5122558	962.556	1184.499	1302.485	1070.06
03Aug2017 1:00:00	2017	900.0951898	941.3769	1159.37	1241.594	1052.238
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03Aug2017 3:00:00	2017	853.1252875	928.2423	1142.593	1177.467	1031.753
03Aug2017 4:00:00	2017	869.0235691	929.2521	1147.72	1182.111	1018.761
03Aug2017 5:00:00	2017	931.435401	939.7997	1171.375	1240.217	1018.049
03Aug2017 6:00:00	2017	1026.594016	948.941	1180.192	1302.442	989.1064
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03Aug2017 8:00:00	2017	1242.173021	1048.474	1261.491	1567.641	996.327
03Aug2017 9:00:00	2017	1317.798137	1061.235	1300.518	1657.381	1047.144
03Aug2017 10:00:00	2017	1382.996729	1082.333	1329.226	1738.662	1061.99
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03Aug2017 12:00:00	2017	1471.260141	1051.625	1400.059	1838.054	1079.5
03Aug2017 13:00:00	2017	1499.299984	1060.139	1401.381	1872.469	1097.895
03Aug2017 14:00:00	2017	1523.103713	1073.477	1380.923	1896.582	1113.609
03Aug2017 15:00:00	2017	1546.685249	1084.803	1394.996	1913.256	1130.297
03Aug2017 16:00:00	2017	1561.390406	1091.193	1398.066	1913.142	1119.892
03Aug2017 17:00:00	2017	1545.153997	1104.277	1377.342	1910.089	1119.829
03Aug2017 18:00:00	2017	1449.038361	1105.291	1359.43	1852.018	1105.264
03Aug2017 19:00:00	2017	1392.564161	1118.463	1328.868	1795.569	1091.349
03Aug2017 20:00:00	2017	1334.298161	1107.191	1282.909	1698.31	1091.142
03Aug2017 21:00:00	2017	1301.283369	1101.87	1274.821	1682.312	1090.991
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04Aug2017 13:00:00	2017	1394.156043	1077.759	1350.371	1759.952	1030.298
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04Aug2017 15:00:00	2017	1356.367835	1083.543	1327.512	1756.751	1050.02

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04Aug2017 17:00:00	2017	1336.761505	1071.941	1278.538	1693.52	1019.146
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04Aug2017 20:00:00	2017	1177.704078	1032.907	1226.812	1496.17	1008.043
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05Aug2017 18:00:00	2017	1128.735438	1001.94	1224.44	1437.952	1114.55
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05Aug2017 21:00:00	2017	1073.225575	982.7314	1221.757	1404.405	1091.418
05Aug2017 22:00:00	2017	1045.144072	966.1925	1209.356	1414.803	1098.443
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06Aug2017 0:00:00	2017	899.5616886	909.4887	1164.32	1251.108	1030.159
06Aug2017 1:00:00	2017	850.2642495	892.7559	1149.975	1203.497	1026.248
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06Aug2017 13:00:00	2017	1158.882153	984.5535	1221.41	1541.029	1065.977
06Aug2017 14:00:00	2017	1171.244303	991.349	1239.229	1551.584	1060.949

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06Aug2017 17:00:00	2017	1232.278522	1028.204	1282.757	1599.769	1080.87
06Aug2017 18:00:00	2017	1212.813125	1024.368	1290.728	1602.151	1075.233
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06Aug2017 20:00:00	2017	1139.875008	997.3497	1299.394	1546.091	1075.168
06Aug2017 21:00:00	2017	1140.841125	990.5672	1295.138	1541.316	1097.308
06Aug2017 22:00:00	2017	1101.972061	968.9433	1262.704	1510.494	1103.804
06Aug2017 23:00:00	2017	1013.370428	932.556	1213.058	1404.518	1075.482
07Aug2017 0:00:00	2017	936.3718976	907.9121	1181.81	1320.411	1070.977
07Aug2017 1:00:00	2017	882.6076558	893.1802	1167.288	1269.812	1051.995
07Aug2017 2:00:00	2017	847.9814953	880.8622	1165.97	1213.121	1055.642
07Aug2017 3:00:00	2017	831.188829	873.5111	1158.964	1203.149	1060.458
07Aug2017 4:00:00	2017	832.8676421	873.2277	1153.517	1200.611	1053.073
07Aug2017 5:00:00	2017	856.9126498	877.6469	1149.773	1208.116	1038.175
07Aug2017 6:00:00	2017	873.7707885	882.6417	1140.138	1220.78	1009.467
07Aug2017 7:00:00	2017	916.0948589	905.0975	1157.05	1259.217	1014.557
07Aug2017 8:00:00	2017	984.340031	937.8818	1189.693	1323.441	1021.329
07Aug2017 9:00:00	2017	1074.528246	969.4524	1220.421	1363.182	1056.065
07Aug2017 10:00:00	2017	1156.468591	988.9995	1248.73	1445.95	1077.038
07Aug2017 11:00:00	2017	1210.044716	1014.702	1284.793	1503.832	1079.24
07Aug2017 12:00:00	2017	1249.609733	1038.466	1294.929	1530.065	1087.824
07Aug2017 13:00:00	2017	1276.969321	1057.262	1300.744	1531.933	1097.967
07Aug2017 14:00:00	2017	1296.584434	1075.61	1298.877	1525.507	1089.929
07Aug2017 15:00:00	2017	1320.680775	1094.283	1316.487	1565.595	1092.953
07Aug2017 16:00:00	2017	1339.083878	1110.829	1320.615	1581.854	1095.872
07Aug2017 17:00:00	2017	1327.765839	1117.12	1312.306	1611.134	1094.326
07Aug2017 18:00:00	2017	1292.497434	1116.043	1299.468	1543.921	1093.509
07Aug2017 19:00:00	2017	1242.804297	1086.069	1278.608	1506.755	1088.004
07Aug2017 20:00:00	2017	1199.234986	1060.784	1266.871	1493.141	1080.037
07Aug2017 21:00:00	2017	1176.926277	1041.457	1270.463	1509.835	1086.317
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08Aug2017 1:00:00	2017	875.9385948	922.3777	1146.935	1215.485	1029.166
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08Aug2017 4:00:00	2017	858.1285639	910.416	1126.77	1158.458	1021.624
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08Aug2017 6:00:00	2017	1041.671375	950.803	1155.325	1315.951	1015.761
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08Aug2017 8:00:00	2017	1230.436128	1010.501	1250.367	1547.318	1022.401
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08Aug2017 10:00:00	2017	1334.098827	1029.855	1327.182	1656.153	1047.335
08Aug2017 11:00:00	2017	1366.861704	1038.125	1357.181	1698.251	1067.23
08Aug2017 12:00:00	2017	1385.105428	1046.122	1370.465	1730.304	1081.278
08Aug2017 13:00:00	2017	1403.982648	1031.725	1373.687	1770.781	1076.672

08Aug2017 14:00:00	2017	1417.509647	1026.737	1386.489	1795.197	1091.035
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08Aug2017 16:00:00	2017	1455.015976	1047.448	1384.97	1812.257	1166.668
08Aug2017 17:00:00	2017	1459.444011	1062.353	1374.698	1827.381	1168.631
08Aug2017 18:00:00	2017	1386.850404	1059.633	1338.734	1773.656	1143.428
08Aug2017 19:00:00	2017	1330.890477	1042.921	1318.434	1714.54	1123.806
08Aug2017 20:00:00	2017	1273.266829	1029.045	1307.607	1660.797	1127.902
08Aug2017 21:00:00	2017	1240.374395	1018.616	1303.847	1633.278	1101.125
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09Aug2017 1:00:00	2017	883.6739758	907.5199	1170.976	1267.894	1063.571
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09Aug2017 4:00:00	2017	853.3037585	901.5963	1131.696	1171.179	1048.173
09Aug2017 5:00:00	2017	918.9046577	913.581	1150.769	1206.375	1047.486
09Aug2017 6:00:00	2017	1018.918219	930.9874	1167.044	1308.281	1041.752
09Aug2017 7:00:00	2017	1132.185449	972.4177	1204.754	1433.482	1030.494
09Aug2017 8:00:00	2017	1221.697922	1008.537	1209.667	1530.855	1042.377
09Aug2017 9:00:00	2017	1295.800837	1031.597	1253.675	1630.794	1048.971
09Aug2017 10:00:00	2017	1361.145061	1053.958	1276.709	1701.893	1068.982
09Aug2017 11:00:00	2017	1411.420671	1066.987	1281.723	1768.701	1114.426
09Aug2017 12:00:00	2017	1445.606583	1038.246	1295.472	1807.393	1152.776
09Aug2017 13:00:00	2017	1474.0983	1047.947	1347.362	1860.419	1164.584
09Aug2017 14:00:00	2017	1494.892851	1044.986	1368.878	1900.792	1171.193
09Aug2017 15:00:00	2017	1514.63351	1059.22	1389.75	1911.262	1177.066
09Aug2017 16:00:00	2017	1526.856494	1071.774	1404.03	1912.248	1178.924
09Aug2017 17:00:00	2017	1505.25677	1080.31	1398.926	1917.345	1183.643
09Aug2017 18:00:00	2017	1408.666925	1063.201	1366.2	1839.541	1174.565
09Aug2017 19:00:00	2017	1344.314063	1038.528	1349.88	1790.349	1180.254
09Aug2017 20:00:00	2017	1318.286342	1015.952	1327.061	1722.017	1180.981
09Aug2017 21:00:00	2017	1288.819692	1011.12	1314.767	1704.407	1168.814
09Aug2017 22:00:00	2017	1178.6985	1013.594	1277.507	1641.134	1153.36
09Aug2017 23:00:00	2017	1054.471145	981.0948	1217.254	1501.508	1117.032
10Aug2017 0:00:00	2017	964.2530395	950.0739	1186.432	1377.654	1100.561
10Aug2017 1:00:00	2017	906.9147137	937.7038	1169.782	1313.816	1079.467
10Aug2017 2:00:00	2017	876.1071037	927.8741	1136.544	1256.345	1066.134
10Aug2017 3:00:00	2017	861.6068996	924.233	1142.167	1265.052	1063.095
10Aug2017 4:00:00	2017	872.1222512	925.8686	1145.802	1247.125	1033.762
10Aug2017 5:00:00	2017	940.7959568	937.0714	1156.64	1309.779	1042.648
10Aug2017 6:00:00	2017	1041.4852	936.8077	1170.934	1378.539	1026.486
10Aug2017 7:00:00	2017	1150.067838	974.1452	1211.068	1477.722	1019.028
10Aug2017 8:00:00	2017	1247.377569	1015.333	1269.128	1612.424	1021.183
10Aug2017 9:00:00	2017	1334.04057	1045.797	1323.28	1716.682	1046.891
10Aug2017 10:00:00	2017	1407.259822	1065.104	1343.677	1794.081	1092.258
10Aug2017 11:00:00	2017	1460.911697	1075.806	1367.567	1845.804	1139.102
10Aug2017 12:00:00	2017	1495.686808	1032.67	1361.797	1853.01	1157.145

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10Aug2017 15:00:00	2017	1554.536841	1071.546	1391.459	1898.136	1187.053
10Aug2017 16:00:00	2017	1557.792347	1092.687	1405.005	1929.567	1191.666
10Aug2017 17:00:00	2017	1549.73975	1098.668	1385.284	1914.283	1197.88
10Aug2017 18:00:00	2017	1464.036357	1091.957	1372.602	1876.918	1181.378
10Aug2017 19:00:00	2017	1392.659139	1068.877	1353.453	1821.561	1144.654
10Aug2017 20:00:00	2017	1330.554309	1064.569	1338.373	1703.844	1137.005
10Aug2017 21:00:00	2017	1301.792219	1050.116	1342.892	1673.426	1126.364
10Aug2017 22:00:00	2017	1209.324723	1019.491	1320.413	1572.506	1124.502
10Aug2017 23:00:00	2017	1084.231132	979.9692	1242.631	1424.078	1098.625
11Aug2017 0:00:00	2017	990.3989311	946.647	1188.742	1313.581	1068.904
11Aug2017 1:00:00	2017	932.5292342	913.5877	1175.391	1266.261	1040.209
11Aug2017 2:00:00	2017	894.0922086	890.127	1166.215	1212.105	1048.187
11Aug2017 3:00:00	2017	880.5764175	886.1383	1168.671	1218.134	1044.664
11Aug2017 4:00:00	2017	889.5999129	883.2379	1169.152	1242.41	1027.704
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11Aug2017 6:00:00	2017	1058.703395	911.0374	1189.57	1333.56	1019.392
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11Aug2017 18:00:00	2017	1436.396957	1066.685	1341.708	1783.041	1203.626
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11Aug2017 20:00:00	2017	1298.419304	1012.455	1305.762	1691.788	1152.29
11Aug2017 21:00:00	2017	1268.421321	1008.194	1294.461	1678.673	1139.399
11Aug2017 22:00:00	2017	1186.933122	976.5581	1272.122	1624.49	1144.942
11Aug2017 23:00:00	2017	1073.129647	935.6624	1225.045	1488.753	1111.231
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14Aug2017 9:00:00	2017	1285.384713	969.25	1306.656	1710.492	1076.05
14Aug2017 10:00:00	2017	1336.247731	990.9183	1328.428	1771.795	1083.152

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14Aug2017 13:00:00	2017	1419.796916	1018.505	1352.875	1825.229	1107.531
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14Aug2017 15:00:00	2017	1409.352467	1048.019	1356.057	1829.515	1115.059
14Aug2017 16:00:00	2017	1379.969141	1052.91	1360.934	1834.068	1117.54
14Aug2017 17:00:00	2017	1362.034176	1041.731	1355.38	1821.753	1108.595
14Aug2017 18:00:00	2017	1276.625496	1014.511	1326.799	1738.507	1095.956
14Aug2017 19:00:00	2017	1225.665877	989.001	1284.792	1662.615	1091.374
14Aug2017 20:00:00	2017	1206.111751	982.0803	1274.471	1601.684	1074.475
14Aug2017 21:00:00	2017	1178.7552	962.767	1261.546	1606.693	1082.463
14Aug2017 22:00:00	2017	1075.253782	935.6779	1233.506	1540.199	1062.555
14Aug2017 23:00:00	2017	967.8821225	907.9675	1196.489	1424.449	1012.747
15Aug2017 0:00:00	2017	894.2602493	887.3694	1164.581	1310.422	1020.469
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15Aug2017 12:00:00	2017	1359.406724	970.0749	1267.135	1750.698	994.9986
15Aug2017 13:00:00	2017	1383.66888	977.8112	1283.865	1784.025	994.9395
15Aug2017 14:00:00	2017	1392.190614	987.9035	1294.866	1793.609	1013.409
15Aug2017 15:00:00	2017	1410.320963	991.2348	1302.858	1792.249	1042.9
15Aug2017 16:00:00	2017	1415.075407	1000.55	1307.436	1792.587	1039.235
15Aug2017 17:00:00	2017	1415.993465	1010.054	1303.895	1782.776	1035.872
15Aug2017 18:00:00	2017	1326.187286	1000.392	1286.194	1722.978	1033.584
15Aug2017 19:00:00	2017	1265.482104	990.1838	1268.088	1666.446	1026.364
15Aug2017 20:00:00	2017	1237.08804	979.7712	1276.502	1610.224	1001.217
15Aug2017 21:00:00	2017	1214.122729	979.415	1271.639	1601.751	1008.468
15Aug2017 22:00:00	2017	1119.206314	944.5917	1233.782	1510.531	994.1502
15Aug2017 23:00:00	2017	1007.225141	923.7514	1183.937	1389.8	984.7787
16Aug2017 0:00:00	2017	923.9688276	890.5788	1142.906	1302.491	974.1777
16Aug2017 1:00:00	2017	873.0819322	867.0644	1127.773	1249.925	962.8442
16Aug2017 2:00:00	2017	842.3843679	857.7692	1115.665	1229.751	985.7143
16Aug2017 3:00:00	2017	828.1829856	844.2146	1116.804	1212.281	971.5771
16Aug2017 4:00:00	2017	841.6885085	846.6385	1111.743	1201.353	957.1902
16Aug2017 5:00:00	2017	908.6111537	857.7283	1128.015	1238.67	942.3157
16Aug2017 6:00:00	2017	1023.516745	871.2138	1140.099	1333.909	939.5765
16Aug2017 7:00:00	2017	1128.823324	901.982	1177.83	1439.152	965.613
16Aug2017 8:00:00	2017	1209.986039	931.0751	1237.906	1522.192	981.9576
16Aug2017 9:00:00	2017	1279.439789	952.2083	1257.714	1603.396	985.727

16Aug2017 10:00:00	2017	1344.410626	973.4222	1252.955	1676.533	978.5045
16Aug2017 11:00:00	2017	1399.882713	986.4371	1254.946	1739.793	1008.946
16Aug2017 12:00:00	2017	1431.222039	989.8742	1237.919	1771.225	1021.368
16Aug2017 13:00:00	2017	1455.986293	1000.744	1256.949	1795.548	1037.366
16Aug2017 14:00:00	2017	1475.430639	1014.386	1282.034	1804.664	1049.606
16Aug2017 15:00:00	2017	1495.146054	1027.237	1291.242	1810.672	1049.682
16Aug2017 16:00:00	2017	1505.097311	1046.198	1296.208	1775.611	1052.975
16Aug2017 17:00:00	2017	1502.07333	1060.632	1282.706	1739.733	1044.196
16Aug2017 18:00:00	2017	1412.788168	1033.981	1255.088	1675.242	1032.052
16Aug2017 19:00:00	2017	1342.507802	1016.851	1221.272	1632.557	1068.317
16Aug2017 20:00:00	2017	1302.934971	1007.63	1232.315	1607.958	1094.322
16Aug2017 21:00:00	2017	1288.594989	995.6252	1252.84	1624.141	1095.322
16Aug2017 22:00:00	2017	1172.860156	966.4158	1215.184	1527.033	1083.279
16Aug2017 23:00:00	2017	1049.288797	914.3023	1156.546	1405.813	1062.417
17Aug2017 0:00:00	2017	957.6349476	881.3856	1124.794	1318.539	1027.241
17Aug2017 1:00:00	2017	900.9393517	856.9045	1116.943	1268.737	1007.326
17Aug2017 2:00:00	2017	867.6962351	849.6161	1123.014	1232.817	1010.661
17Aug2017 3:00:00	2017	853.8344438	851.8716	1129.721	1220.898	997.5903
17Aug2017 4:00:00	2017	866.8472733	853.2561	1128.956	1231.394	1001.936
17Aug2017 5:00:00	2017	933.9728384	862.3421	1131.359	1287.285	990.8905
17Aug2017 6:00:00	2017	1048.935553	882.035	1149.226	1368.646	963.9099
17Aug2017 7:00:00	2017	1152.926696	918.971	1196.818	1484.865	982.1527
17Aug2017 8:00:00	2017	1231.635966	957.9938	1243.548	1604.565	996.1329
17Aug2017 9:00:00	2017	1295.89551	975.8347	1274.552	1682.723	1013.824
17Aug2017 10:00:00	2017	1355.203967	1000.079	1299.697	1750.777	1028.224
17Aug2017 11:00:00	2017	1403.449348	1011.907	1319.491	1784.919	1052.589
17Aug2017 12:00:00	2017	1435.789652	1006.336	1332.794	1803.291	1081.457
17Aug2017 13:00:00	2017	1463.289564	1024.524	1331.421	1813.548	1101.64
17Aug2017 14:00:00	2017	1489.18062	1034.163	1347.923	1813.887	1125.943
17Aug2017 15:00:00	2017	1512.984865	1045.207	1367.25	1830.24	1138.757
17Aug2017 16:00:00	2017	1520.486013	1057.302	1379.287	1839.215	1150.007
17Aug2017 17:00:00	2017	1512.553622	1064.656	1368.832	1829.617	1136.826
17Aug2017 18:00:00	2017	1431.036716	1054.36	1345.615	1755.335	1124.318
17Aug2017 19:00:00	2017	1364.937631	1028.129	1311.853	1685.264	1111.729
17Aug2017 20:00:00	2017	1311.327732	1005.435	1317.102	1666.646	1109.033
17Aug2017 21:00:00	2017	1290.907137	995.7142	1337.446	1687.858	1106.433
17Aug2017 22:00:00	2017	1176.539372	953.8731	1290.334	1586.105	1085.782
17Aug2017 23:00:00	2017	1056.906893	905.8679	1215.587	1461.677	1036.023
18Aug2017 0:00:00	2017	965.0376202	870.7121	1196.973	1362.325	1007.808
18Aug2017 1:00:00	2017	901.3623806	858.7033	1200.304	1299.177	985.3405
18Aug2017 2:00:00	2017	865.9253727	850.5729	1191.838	1277.877	975.8017
18Aug2017 3:00:00	2017	848.3771465	847.6774	1191.787	1264.571	975.2625
18Aug2017 4:00:00	2017	857.794812	845.4964	1190.001	1262.822	964.5361
18Aug2017 5:00:00	2017	921.1165077	856.0608	1203.561	1313.516	965.2187
18Aug2017 6:00:00	2017	1029.925051	874.391	1214.123	1391.114	950.6035
18Aug2017 7:00:00	2017	1132.771536	906.9532	1243.878	1493.719	939.3983
18Aug2017 8:00:00	2017	1229.538808	947.3319	1287.677	1612.38	952.2771

18Aug2017 9:00:00	2017	1320.416716	980.3134	1317.836	1692.182	968.8542
18Aug2017 10:00:00	2017	1398.34033	1007.861	1335.792	1750.407	970.5702
18Aug2017 11:00:00	2017	1470.350636	1031.741	1349.377	1798.403	984.8484
18Aug2017 12:00:00	2017	1500.162121	1038.739	1367.015	1833.355	1004.077
18Aug2017 13:00:00	2017	1498.576804	1047.209	1375.926	1860.087	1025.159
18Aug2017 14:00:00	2017	1497.40667	1050.733	1349.445	1846.27	1051.806
18Aug2017 15:00:00	2017	1497.232121	1063.196	1364.297	1808.885	1055.69
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18Aug2017 17:00:00	2017	1497.844446	1062.834	1361.792	1715.827	1032.966
18Aug2017 18:00:00	2017	1433.541975	1045.085	1333.28	1646.941	1018.862
18Aug2017 19:00:00	2017	1372.443334	1023.107	1306.118	1598.612	1021.183
18Aug2017 20:00:00	2017	1304.83967	1005.966	1300.23	1578.877	1029.527
18Aug2017 21:00:00	2017	1276.179934	997.0855	1310.761	1576.599	1046.238
18Aug2017 22:00:00	2017	1173.456841	959.3836	1286.685	1483.014	1035.724
18Aug2017 23:00:00	2017	1052.93003	919.3887	1238.772	1359.78	1029.707
19Aug2017 0:00:00	2017	954.7282056	894.6459	1208.524	1276.784	994.7207
19Aug2017 1:00:00	2017	882.2987831	866.2827	1196.271	1218.049	993.8152
19Aug2017 2:00:00	2017	845.0840403	853.1287	1190.446	1180.875	980.7166
19Aug2017 3:00:00	2017	827.7055725	841.3968	1184.644	1178.793	969.4529
19Aug2017 4:00:00	2017	825.9728186	839.5743	1178.54	1154.633	945.6801
19Aug2017 5:00:00	2017	847.6220051	844.4945	1153.087	1167.153	946.1268
19Aug2017 6:00:00	2017	890.4194137	853.1067	1150.051	1171.532	928.532
19Aug2017 7:00:00	2017	937.1949041	870.1948	1177.792	1225.44	916.1251
19Aug2017 8:00:00	2017	997.6746486	895.5771	1195.376	1326.236	923.8263
19Aug2017 9:00:00	2017	1075.936093	921.3773	1217.525	1400.287	943.3627
19Aug2017 10:00:00	2017	1128.582308	930.8874	1222.459	1443.654	961.269
19Aug2017 11:00:00	2017	1163.573269	940.4088	1241.789	1487.848	967.6666
19Aug2017 12:00:00	2017	1181.485108	941.7164	1263.403	1500.409	955.0647
19Aug2017 13:00:00	2017	1180.771232	942.8426	1262.11	1493.801	953.2564
19Aug2017 14:00:00	2017	1179.474297	940.6387	1246.093	1481.912	947.0086
19Aug2017 15:00:00	2017	1181.24654	945.6084	1249.951	1468.927	941.2348
19Aug2017 16:00:00	2017	1189.980879	956.2516	1271.925	1514.852	945.567
19Aug2017 17:00:00	2017	1196.154343	960.7144	1283.793	1554.095	944.3387
19Aug2017 18:00:00	2017	1170.189171	953.1349	1270.187	1508.127	944.4842
19Aug2017 19:00:00	2017	1126.211134	940.4979	1252.004	1490.274	960.0296
19Aug2017 20:00:00	2017	1096.053801	929.4388	1241.699	1462.78	961.5103
19Aug2017 21:00:00	2017	1103.612089	933.1935	1257.931	1497.664	979.4055
19Aug2017 22:00:00	2017	1045.22685	910.2207	1238.101	1437.35	965.339
19Aug2017 23:00:00	2017	965.5289426	888.3418	1206.304	1346.013	950.8187
20Aug2017 0:00:00	2017	897.9209745	861.7589	1182.594	1275.504	931.799
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20Aug2017 2:00:00	2017	814.242233	825.9191	1157.977	1188.228	919.4278
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20Aug2017 4:00:00	2017	790.7727209	816.7888	1154.153	1164.058	910.5531
20Aug2017 5:00:00	2017	805.2814954	818.6929	1169.753	1184.235	915.6256
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21Aug2017 0:00:00	2017	871.9861818	862.9648	1184.396	1231.996	906.0127
21Aug2017 1:00:00	2017	827.6841923	840.8291	1164.089	1170.864	898.8924
21Aug2017 2:00:00	2017	805.8872154	833.3305	1155.462	1124.209	923.7021
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21Aug2017 8:00:00	2017	1194.260528	941.7668	1262.66	1546.086	976.0985
21Aug2017 9:00:00	2017	1263.265809	963.5523	1304.723	1647.746	1012.338
21Aug2017 10:00:00	2017	1327.938884	968.3558	1320.69	1712.766	1019.337
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21Aug2017 12:00:00	2017	1373.176627	978.7926	1315.078	1715.179	1037.361
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21Aug2017 17:00:00	2017	1413.343818	1040.009	1343.143	1708.393	1003.847
21Aug2017 18:00:00	2017	1338.010924	1032.873	1323.228	1637.508	1004.068
21Aug2017 19:00:00	2017	1286.479317	1020.028	1316.92	1634.082	998.7166
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22Aug2017 18:00:00	2017	1493.45457	1057.158	1356.222	1875.193	1083.085
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23Aug2017 4:00:00	2017	885.240156	868.2479	1164.898	1305.156	1000.575
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23Aug2017 6:00:00	2017	1069.434195	913.686	1192.426	1419.65	1032.956
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23Aug2017 8:00:00	2017	1266.107004	969.175	1245.409	1636.501	1046.318
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23Aug2017 13:00:00	2017	1607.620869	1044.838	1358.669	1940.3	1078.527
23Aug2017 14:00:00	2017	1633.243918	1062.693	1355.302	1962.158	1071.138
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23Aug2017 16:00:00	2017	1670.67678	1090.101	1357.531	1948.422	1066.764
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23Aug2017 22:00:00	2017	1275.607031	1019.434	1273.067	1647.957	1095.56
23Aug2017 23:00:00	2017	1135.019524	970.9771	1226.762	1517.022	1102.025
24Aug2017 0:00:00	2017	1031.119532	933.6604	1203.023	1401.669	1076.188
24Aug2017 1:00:00	2017	965.8464466	914.9878	1196.399	1369.169	1092.303
24Aug2017 2:00:00	2017	927.0962192	902.5877	1191.592	1320.921	1113.029
24Aug2017 3:00:00	2017	910.4398481	897.6656	1186.053	1307.668	1107.597
24Aug2017 4:00:00	2017	922.7327221	902.0184	1185.706	1281.28	1084.472
24Aug2017 5:00:00	2017	991.8337113	913.5833	1195.485	1349.989	1101.945

24Aug2017 6:00:00	2017	1124.023287	937.4913	1214.193	1452.28	1082.534
24Aug2017 7:00:00	2017	1230.012863	971.9587	1238.359	1555.978	1037.202
24Aug2017 8:00:00	2017	1301.379898	1011.523	1281.979	1636.73	1041.107
24Aug2017 9:00:00	2017	1351.364226	1031.933	1315.887	1705.926	1051.135
24Aug2017 10:00:00	2017	1397.895638	1040.135	1340.589	1784.41	1068.693
24Aug2017 11:00:00	2017	1430.871851	1052.738	1360.454	1820.798	1085.428
24Aug2017 12:00:00	2017	1454.285913	1057.204	1354.508	1846.485	1096.899
24Aug2017 13:00:00	2017	1509.787842	1053.747	1350.33	1872.591	1083.484
24Aug2017 14:00:00	2017	1545.157578	1045.431	1350.252	1901.105	1099.408
24Aug2017 15:00:00	2017	1568.627808	1050.243	1369.863	1892.393	1118.499
24Aug2017 16:00:00	2017	1582.613752	1060.188	1347.263	1874.773	1135.581
24Aug2017 17:00:00	2017	1560.594353	1060.781	1330.733	1795.221	1145.677
24Aug2017 18:00:00	2017	1447.756349	1057.586	1299.187	1652.576	1109.437
24Aug2017 19:00:00	2017	1370.452119	1044.747	1279.753	1609.436	1095.244
24Aug2017 20:00:00	2017	1338.840206	1033.151	1280.749	1569.1	1115.816
24Aug2017 21:00:00	2017	1261.863081	1019.732	1277.812	1554.189	1129.658
24Aug2017 22:00:00	2017	1136.683688	976.8179	1230.672	1437.807	1106.405
24Aug2017 23:00:00	2017	1020.152472	933.9729	1174.913	1345.719	1103.958
25Aug2017 0:00:00	2017	933.2993303	908.0267	1148.056	1280.871	1083.752
25Aug2017 1:00:00	2017	878.6741019	886.2291	1125.924	1227.238	1071.146
25Aug2017 2:00:00	2017	848.6301765	875.6329	1116.956	1185.584	1062.127
25Aug2017 3:00:00	2017	835.4946589	872.8235	1124.127	1192.69	1036.099
25Aug2017 4:00:00	2017	846.6800141	882.3668	1130.096	1189.861	1035.674
25Aug2017 5:00:00	2017	906.9809182	895.8392	1140.9	1238.705	1033.367
25Aug2017 6:00:00	2017	1023.182292	915.4025	1168.011	1338.344	1054.025
25Aug2017 7:00:00	2017	1119.53326	949.2204	1211.482	1459.171	1034.652
25Aug2017 8:00:00	2017	1204.910398	981.4585	1262.103	1557.757	1045.399
25Aug2017 9:00:00	2017	1272.253023	1005.62	1240.843	1574.212	1056.748
25Aug2017 10:00:00	2017	1322.569664	1031.622	1233.677	1612.359	1055.985
25Aug2017 11:00:00	2017	1363.995155	1050.212	1305.099	1670.696	1053.492
25Aug2017 12:00:00	2017	1387.964857	1050.773	1319.255	1681.063	1066.368
25Aug2017 13:00:00	2017	1407.072398	1054.401	1329.883	1701.677	1081.319
25Aug2017 14:00:00	2017	1413.425982	1062.846	1340.537	1714.435	1078.141
25Aug2017 15:00:00	2017	1417.228872	1072.988	1361.057	1714.472	1075.96
25Aug2017 16:00:00	2017	1416.037105	1077.984	1358.14	1724.03	1080.297
25Aug2017 17:00:00	2017	1399.399016	1066.928	1353.338	1690.138	1087.971
25Aug2017 18:00:00	2017	1321.384771	1046.587	1315.615	1640.625	1081.061
25Aug2017 19:00:00	2017	1261.381259	1031.449	1297.104	1597.081	1064.1
25Aug2017 20:00:00	2017	1227.781536	1023.012	1308.748	1581.921	1073.471
25Aug2017 21:00:00	2017	1209.623797	1016.47	1324.573	1587.049	1069.855
25Aug2017 22:00:00	2017	1111.774614	984.2603	1295.51	1488.096	1078.591
25Aug2017 23:00:00	2017	1007.568429	948.4905	1241.56	1398.052	1076.814
26Aug2017 0:00:00	2017	924.1878392	926.6405	1219.577	1287.969	1080.402
26Aug2017 1:00:00	2017	865.001367	901.4529	1198.931	1226.264	1076.488
26Aug2017 2:00:00	2017	831.8084015	886.1598	1179.058	1177.457	1065.019
26Aug2017 3:00:00	2017	815.3909124	879.8382	1167.109	1157.437	1061.889
26Aug2017 4:00:00	2017	812.9479222	877.5692	1175.274	1145.49	1054.958

26Aug2017 5:00:00	2017	834.2622041	886.8402	1187.543	1152.068	1054.505
26Aug2017 6:00:00	2017	867.6916789	893.6181	1179.083	1165.534	1047.576
26Aug2017 7:00:00	2017	912.2891686	911.2096	1176.171	1190.301	1021.288
26Aug2017 8:00:00	2017	1000.949762	945.6181	1206.047	1300.814	1029.335
26Aug2017 9:00:00	2017	1094.07265	970.1597	1245.064	1400.067	1037.332
26Aug2017 10:00:00	2017	1158.921902	979.4824	1276.311	1500.189	1031.536
26Aug2017 11:00:00	2017	1203.6517	984.7678	1288.136	1548.615	1047.248
26Aug2017 12:00:00	2017	1227.377385	991.62	1281.979	1570.553	1065.315
26Aug2017 13:00:00	2017	1234.566162	1004.017	1291.67	1601.106	1086.632
26Aug2017 14:00:00	2017	1243.505683	1009.95	1292.499	1595.931	1100.966
26Aug2017 15:00:00	2017	1259.775704	1021.732	1293.088	1606.809	1117.822
26Aug2017 16:00:00	2017	1280.076377	1038.127	1301.533	1624.71	1135.515
26Aug2017 17:00:00	2017	1289.741942	1044.048	1306.053	1625.21	1111.125
26Aug2017 18:00:00	2017	1257.077885	1032.247	1288.87	1567.332	1103.913
26Aug2017 19:00:00	2017	1210.903181	1015.29	1259.621	1503.518	1081.585
26Aug2017 20:00:00	2017	1178.390888	1004.845	1245.087	1468.233	1065.287
26Aug2017 21:00:00	2017	1165.426021	992.8362	1278.279	1517.683	1078.251
26Aug2017 22:00:00	2017	1088.141183	965.3181	1250.618	1441.622	1073.182
26Aug2017 23:00:00	2017	1009.858928	932.5833	1206.922	1366.473	1094.03
27Aug2017 0:00:00	2017	933.0315533	912.1392	1184.987	1309.376	1083.357
27Aug2017 1:00:00	2017	873.1279911	888.8004	1174.638	1242.602	1093.157
27Aug2017 2:00:00	2017	835.1061997	876.8095	1154.992	1215.806	1067.384
27Aug2017 3:00:00	2017	817.0823941	870.4357	1138.963	1154.057	1064.007
27Aug2017 4:00:00	2017	810.4532716	864.251	1135.563	1154.657	1069.914
27Aug2017 5:00:00	2017	824.290045	868.3828	1140.962	1155.491	1056.678
27Aug2017 6:00:00	2017	844.1380063	872.6119	1139.835	1153.456	1033.557
27Aug2017 7:00:00	2017	870.9015495	880.3762	1131.775	1191.169	1017.118
27Aug2017 8:00:00	2017	953.7780332	910.5908	1163.064	1265.561	1071.849
27Aug2017 9:00:00	2017	1054.853503	924.1745	1205.68	1368.743	1095.036
27Aug2017 10:00:00	2017	1142.245019	952.7995	1237.24	1445.9	1074.955
27Aug2017 11:00:00	2017	1217.240007	977.3073	1271.797	1547.492	1093.334
27Aug2017 12:00:00	2017	1263.964425	983.5978	1307.577	1619.917	1119.108
27Aug2017 13:00:00	2017	1292.459275	998.7454	1322.613	1654.964	1132.977
27Aug2017 14:00:00	2017	1316.438689	1014.812	1324.233	1683.838	1150.874
27Aug2017 15:00:00	2017	1353.311547	1031.412	1297.144	1680.084	1156.1
27Aug2017 16:00:00	2017	1391.869001	1053.221	1325.209	1730.569	1156.267
27Aug2017 17:00:00	2017	1416.261951	1071.965	1337.297	1738.547	1154.143
27Aug2017 18:00:00	2017	1396.456889	1074.35	1331.466	1706.371	1151.958
27Aug2017 19:00:00	2017	1356.150747	1072.249	1319.045	1654.055	1157.062
27Aug2017 20:00:00	2017	1330.028306	1055.666	1324.042	1640.864	1175.528
27Aug2017 21:00:00	2017	1315.03474	1042.563	1329.786	1639.833	1157.841
27Aug2017 22:00:00	2017	1208.363031	994.2435	1283.11	1533.158	1145.65
27Aug2017 23:00:00	2017	1082.036993	943.7147	1235.232	1434.276	1110.796
28Aug2017 0:00:00	2017	985.0361035	920.9605	1207.415	1349.561	1074.997
28Aug2017 1:00:00	2017	923.2423008	898.4735	1181.177	1299.612	1052.78
28Aug2017 2:00:00	2017	891.4628556	885.0517	1176.865	1275.489	1053.937
28Aug2017 3:00:00	2017	880.2697624	879.1148	1162.082	1270.212	1046.816

28Aug2017 4:00:00	2017	899.2229454	877.2756	1160.404	1251.016	1032.25
28Aug2017 5:00:00	2017	973.2535059	888.9129	1176.986	1298.747	1027.127
28Aug2017 6:00:00	2017	1105.92099	919.0094	1203.023	1394.382	1027.318
28Aug2017 7:00:00	2017	1215.069684	946.7563	1241.274	1498.204	1054.316
28Aug2017 8:00:00	2017	1315.046374	984.8905	1286.775	1633.197	1129.838
28Aug2017 9:00:00	2017	1396.512291	1018.438	1313.724	1742.406	1148.004
28Aug2017 10:00:00	2017	1460.786356	1051.651	1342.875	1828.684	1170.796
28Aug2017 11:00:00	2017	1521.566557	1073.433	1364.638	1879.115	1172.682
28Aug2017 12:00:00	2017	1559.345742	1079.687	1373.228	1909.734	1168.496
28Aug2017 13:00:00	2017	1584.823543	1104.772	1382.931	1939.561	1167.875
28Aug2017 14:00:00	2017	1613.756617	1084.491	1390.095	1940.711	1156.645
28Aug2017 15:00:00	2017	1637.971646	1088.337	1392.799	1951.995	1155.037
28Aug2017 16:00:00	2017	1647.846788	1113.514	1408.734	1952.821	1169.233
28Aug2017 17:00:00	2017	1643.109705	1121.196	1403.62	1951.84	1156.056
28Aug2017 18:00:00	2017	1556.801149	1138.993	1370.941	1902.56	1115.145
28Aug2017 19:00:00	2017	1491.242937	1127.944	1346.643	1847.38	1087.951
28Aug2017 20:00:00	2017	1446.818315	1106.669	1337.296	1812.051	1092.399
28Aug2017 21:00:00	2017	1403.723546	1087.801	1331.319	1791.667	1103.847
28Aug2017 22:00:00	2017	1263.006212	1046.144	1280.964	1655.758	1080.685
28Aug2017 23:00:00	2017	1120.287169	1005.513	1227.561	1508.134	1036.873
29Aug2017 0:00:00	2017	1020.421515	973.5965	1203.988	1430.042	1024.17
29Aug2017 1:00:00	2017	957.4722584	949.3133	1185.151	1376.016	1016.535
29Aug2017 2:00:00	2017	916.416481	936.1159	1180.415	1334.698	1007.912
29Aug2017 3:00:00	2017	898.196626	931.0076	1172.871	1318.396	1005.758
29Aug2017 4:00:00	2017	906.2883552	931.7014	1166.27	1315.881	996.2183
29Aug2017 5:00:00	2017	981.0541164	939.1816	1159.822	1388.819	998.7592
29Aug2017 6:00:00	2017	1115.387135	972.2951	1180.929	1494.003	985.5555
29Aug2017 7:00:00	2017	1205.957089	997.5366	1170.916	1562.338	988.0016
29Aug2017 8:00:00	2017	1276.54749	1028.935	1206.644	1643.96	998.738
29Aug2017 9:00:00	2017	1345.410948	1054.923	1240.12	1712.132	1010.22
29Aug2017 10:00:00	2017	1400.622501	1079.651	1266.561	1779.143	1021.592
29Aug2017 11:00:00	2017	1449.546589	1096.778	1305.709	1867.253	1023.205
29Aug2017 12:00:00	2017	1481.899443	1100.636	1327.931	1914.456	1036.791
29Aug2017 13:00:00	2017	1517.562379	1114.565	1339.657	1945.507	1049.306
29Aug2017 14:00:00	2017	1544.361974	1125.244	1347.292	1938.901	1055.166
29Aug2017 15:00:00	2017	1570.685732	1128.898	1375.25	1985.497	1058.394
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29Aug2017 17:00:00	2017	1580.964497	1127.961	1395.869	1977.126	1064.881
29Aug2017 18:00:00	2017	1493.422123	1142.102	1354.174	1907.599	1060.756
29Aug2017 19:00:00	2017	1439.081539	1131.429	1334.185	1837.759	1057.141
29Aug2017 20:00:00	2017	1417.076461	1118.789	1342.923	1805.866	1055.806
29Aug2017 21:00:00	2017	1366.752872	1080.836	1334.224	1761.985	1077.28
29Aug2017 22:00:00	2017	1234.10287	1042.201	1277.481	1635.778	1056.538
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30Aug2017 7:00:00	2017	1215.205356	985.668	1229.297	1533.518	1020.271
30Aug2017 8:00:00	2017	1291.693917	1018.559	1259.188	1616.4	1031.224
30Aug2017 9:00:00	2017	1359.194308	1038.896	1283.441	1688.39	1042.272
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30Aug2017 11:00:00	2017	1504.521662	1084.948	1319.53	1778.643	1051.323
30Aug2017 12:00:00	2017	1573.630514	1045.304	1326.488	1804.911	1071.337
30Aug2017 13:00:00	2017	1614.146636	1062.51	1344.494	1843.765	1086.072
30Aug2017 14:00:00	2017	1651.341782	1084.452	1349.109	1853.461	1093.134
30Aug2017 15:00:00	2017	1682.073806	1092.354	1345.313	1861.942	1104.051
30Aug2017 16:00:00	2017	1659.290504	1101.884	1337.964	1865.685	1101.059
30Aug2017 17:00:00	2017	1635.7971	1108.58	1333.004	1854.756	1089.265
30Aug2017 18:00:00	2017	1555.360963	1128.964	1316.426	1794.441	1080.142
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30Aug2017 21:00:00	2017	1421.980319	1087.661	1307.673	1725.194	1122.136
30Aug2017 22:00:00	2017	1289.35847	1037.206	1268.82	1591.306	1116.337
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31Aug2017 0:00:00	2017	1055.958575	953.4487	1172.016	1368.973	1085.878
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31Aug2017 2:00:00	2017	946.0474472	910.4122	1132.958	1275.447	1081.423
31Aug2017 3:00:00	2017	928.1402374	904.978	1122.065	1260.937	1047.494
31Aug2017 4:00:00	2017	935.3082056	896.484	1132.493	1288.085	1059.138
31Aug2017 5:00:00	2017	1009.037584	910.6613	1150.806	1327.042	1071.636
31Aug2017 6:00:00	2017	1153.187082	938.6559	1180.325	1436.629	1072.809
31Aug2017 7:00:00	2017	1259.608955	975.5468	1223.291	1539.081	1066.489
31Aug2017 8:00:00	2017	1341.377049	1011.329	1253.816	1633.197	1091.125
31Aug2017 9:00:00	2017	1426.108586	1039.154	1274.886	1704.679	1112.867
31Aug2017 10:00:00	2017	1492.191094	1063.738	1307.453	1762.579	1129.505
31Aug2017 11:00:00	2017	1539.422277	1083.6	1335.021	1847.696	1140.43
31Aug2017 12:00:00	2017	1551.166685	1092.377	1347.431	1869.892	1147.361
31Aug2017 13:00:00	2017	1572.223916	1061.482	1352.205	1897.271	1170.74
31Aug2017 14:00:00	2017	1599.651284	1064.504	1317.213	1904.809	1190.941
31Aug2017 15:00:00	2017	1617.430178	1064.345	1309.069	1900.348	1197.271
31Aug2017 16:00:00	2017	1611.11602	1072.951	1315.171	1866.7	1212.431
31Aug2017 17:00:00	2017	1578.987507	1069.448	1309.689	1830.279	1223.796
31Aug2017 18:00:00	2017	1482.759158	1081.714	1282.107	1756.109	1195.441
31Aug2017 19:00:00	2017	1421.32689	1087.141	1261.99	1683.685	1174.399
31Aug2017 20:00:00	2017	1401.674445	1078.259	1292.895	1666.472	1187.193
31Aug2017 21:00:00	2017	1345.182983	1054.132	1284.548	1642.731	1190.129
31Aug2017 22:00:00	2017	1215.105632	1005.666	1240.077	1532.288	1159.222
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01Sep2017 0:00:00	2017	993.7380754	937.3175	1153.971	1321.956	1097.598
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01Sep2017 5:00:00	2017	956.6539712	902.1085	1155.429	1307.344	1105.601
01Sep2017 6:00:00	2017	1079.739491	928.1822	1181.135	1425.64	1089.534
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01Sep2017 14:00:00	2017	1518.648413	1031.871	1341.605	1772.542	1175.787
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01Sep2017 17:00:00	2017	1513.467654	1058.241	1367.054	1702.516	1193.395
01Sep2017 18:00:00	2017	1423.650329	1077.724	1339.036	1661.441	1167.865
01Sep2017 19:00:00	2017	1356.947513	1061.04	1312.122	1600.74	1143.753
01Sep2017 20:00:00	2017	1330.567662	1049.635	1312.536	1586.156	1118.647
01Sep2017 21:00:00	2017	1283.606266	1032.026	1306.712	1553.923	1114.746
01Sep2017 22:00:00	2017	1172.18244	993.5636	1256.817	1448.242	1105.811
01Sep2017 23:00:00	2017	1066.516747	968.0248	1189.994	1343.546	1080.952
02Sep2017 0:00:00	2017	983.4641338	936.2272	1166.484	1271.135	1070.063
02Sep2017 1:00:00	2017	921.8764292	906.5769	1128.636	1239.199	1071.208
02Sep2017 2:00:00	2017	878.3885315	890.8894	1123.037	1206.704	1078.881
02Sep2017 3:00:00	2017	854.6956727	884.2851	1153.885	1179.578	1070.445
02Sep2017 4:00:00	2017	849.5163117	880.4221	1144.358	1182.144	1067.44
02Sep2017 5:00:00	2017	867.9279337	884.8305	1159.08	1213.048	1060.579
02Sep2017 6:00:00	2017	901.5396472	900.1862	1171.114	1259.557	1095.67
02Sep2017 7:00:00	2017	933.9403	908.0621	1182.417	1301.48	1094.651
02Sep2017 8:00:00	2017	1012.380072	937.4285	1223.471	1360.93	1105.435
02Sep2017 9:00:00	2017	1099.802206	967.7032	1261.172	1445.522	1118.046
02Sep2017 10:00:00	2017	1180.982625	992.4986	1279.433	1510.232	1120.445
02Sep2017 11:00:00	2017	1242.467583	1018.784	1289.511	1546.86	1131.915
02Sep2017 12:00:00	2017	1290.55851	1037.856	1297.18	1551.325	1136.596
02Sep2017 13:00:00	2017	1326.770345	1060.498	1300.592	1556.955	1136.72
02Sep2017 14:00:00	2017	1362.299421	1082.762	1304.421	1541.243	1148.292
02Sep2017 15:00:00	2017	1397.173651	1101.062	1325.388	1552.256	1156.465
02Sep2017 16:00:00	2017	1420.944744	1118.674	1339.533	1570.551	1153.935
02Sep2017 17:00:00	2017	1429.23135	1123.547	1337.98	1568.222	1145.933
02Sep2017 18:00:00	2017	1389.825706	1111.062	1323.231	1554.031	1133.405
02Sep2017 19:00:00	2017	1336.550631	1086.706	1299.243	1512.079	1128.155
02Sep2017 20:00:00	2017	1324.760465	1075.219	1304.91	1528.708	1157.47
02Sep2017 21:00:00	2017	1294.956569	1055.389	1302.656	1529.323	1182.233
02Sep2017 22:00:00	2017	1176.010335	1015.454	1257.496	1453.022	1172.39
02Sep2017 23:00:00	2017	1059.009436	993.4588	1224.321	1381.262	1143.125
03Sep2017 0:00:00	2017	971.8449274	944.583	1209.768	1305.174	1087.708

03Sep2017 1:00:00	2017	910.5449463	908.2467	1193.363	1255.759	1088.264
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03Sep2017 3:00:00	2017	849.2053064	887.545	1167.004	1201.131	1054.349
03Sep2017 4:00:00	2017	845.4676913	888.0062	1159.317	1210.783	1069.115
03Sep2017 5:00:00	2017	862.9165953	890.2585	1163.136	1213.843	1057.503
03Sep2017 6:00:00	2017	888.1883297	898.2409	1166.602	1217.283	1064.62
03Sep2017 7:00:00	2017	906.5143484	903.6376	1165.454	1236.175	1061.207
03Sep2017 8:00:00	2017	971.983831	929.2311	1196.704	1313.89	1074.543
03Sep2017 9:00:00	2017	1050.858878	956.8515	1230.04	1396.058	1102.469
03Sep2017 10:00:00	2017	1109.048299	978.4187	1249.852	1435.205	1139.236
03Sep2017 11:00:00	2017	1139.193804	996.0777	1261.298	1483.097	1164.33
03Sep2017 12:00:00	2017	1152.091232	997.5539	1267.682	1506.689	1163.535
03Sep2017 13:00:00	2017	1163.502337	1000.753	1261.593	1483.6	1156.875
03Sep2017 14:00:00	2017	1181.142362	1012.321	1256.847	1476.5	1159.765
03Sep2017 15:00:00	2017	1207.28233	1024.52	1251.264	1478.725	1162.976
03Sep2017 16:00:00	2017	1227.487527	1030.685	1259.352	1478.238	1185.538
03Sep2017 17:00:00	2017	1217.45852	1028.442	1263.704	1495.178	1189.1
03Sep2017 18:00:00	2017	1169.097877	1008.415	1253.781	1482.24	1191.063
03Sep2017 19:00:00	2017	1134.358275	990.8339	1231.375	1453.686	1181.545
03Sep2017 20:00:00	2017	1128.08954	982.9106	1245.405	1478.188	1189.629
03Sep2017 21:00:00	2017	1101.435952	972.6905	1250.916	1482.816	1198.82
03Sep2017 22:00:00	2017	1037.751598	947.9487	1217.6	1389.846	1184.751
03Sep2017 23:00:00	2017	960.7295834	925.5261	1186.724	1321.029	1165.175
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04Sep2017 1:00:00	2017	853.0914689	880.4373	1124.034	1200.414	1177.884
04Sep2017 2:00:00	2017	825.3454067	868.4978	1123.979	1177.596	1158.566
04Sep2017 3:00:00	2017	811.4380094	865.209	1115.729	1143.155	1168.526
04Sep2017 4:00:00	2017	815.44361	866.366	1110.013	1139.293	1123.721
04Sep2017 5:00:00	2017	847.7002039	875.7302	1116.729	1148.864	1113.535
04Sep2017 6:00:00	2017	897.8039256	893.972	1122.093	1182.173	1092.836
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04Sep2017 8:00:00	2017	989.5700841	933.2303	1163.309	1277.379	1049.702
04Sep2017 9:00:00	2017	1067.083388	964.4349	1203.839	1353.093	1052.132
04Sep2017 10:00:00	2017	1136.478657	984.8693	1228.827	1450.999	1065.156
04Sep2017 11:00:00	2017	1177.087884	997.6072	1247.119	1502.798	1081.676
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04Sep2017 15:00:00	2017	1259.255859	1022.06	1288.847	1562.957	1138.122
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04Sep2017 18:00:00	2017	1296.171698	1035.704	1291.19	1588.003	1144.286
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04Sep2017 20:00:00	2017	1253.239344	1011.747	1284.706	1589.079	1135.197
04Sep2017 21:00:00	2017	1211.736883	993.9936	1280.07	1560.18	1137.37
04Sep2017 22:00:00	2017	1090.820062	947.4643	1222.655	1408.72	1114.346
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05Sep2017 5:00:00	2017	910.1851231	894.1303	1167.527	1252.246	1075.404
05Sep2017 6:00:00	2017	1068.930202	930.0205	1204.837	1386.706	1088.171
05Sep2017 7:00:00	2017	1185.866384	969.5232	1252.424	1512.25	1078.28
05Sep2017 8:00:00	2017	1225.193138	990.8902	1289.401	1580.006	1077.1
05Sep2017 9:00:00	2017	1280.989767	1007.199	1323.722	1634.594	1076.701
05Sep2017 10:00:00	2017	1350.954669	1025.455	1338.923	1688.758	1085.032
05Sep2017 11:00:00	2017	1401.318404	1033.572	1353.152	1743.066	1086.549
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05Sep2017 16:00:00	2017	1542.741442	1037.534	1373.67	1864.2	1159.678
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05Sep2017 18:00:00	2017	1452.110138	1068.365	1355.716	1813.994	1158.222
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05Sep2017 20:00:00	2017	1378.728305	1058.704	1323.133	1737.04	1147.608
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05Sep2017 22:00:00	2017	1158.881787	988.2247	1238.901	1538.048	1122.43
05Sep2017 23:00:00	2017	1028.24538	949.1092	1195.284	1414.592	1084.792
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06Sep2017 5:00:00	2017	943.2665282	898.022	1178.247	1279.722	1077.181
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06Sep2017 10:00:00	2017	1407.826513	1014.77	1312.043	1746.66	1111.194
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06Sep2017 16:00:00	2017	1641.404338	1049.262	1334.602	1935.352	1160.384
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06Sep2017 21:00:00	2017	1373.66088	1022.334	1306.343	1726.553	1139.232
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07Sep2017 7:00:00	2017	1237.191853	965.5621	1203.199	1525.343	997.4055
07Sep2017 8:00:00	2017	1271.679674	984.1505	1228.138	1607.747	1004.401
07Sep2017 9:00:00	2017	1322.207611	1004.064	1270.986	1707.492	1011.196
07Sep2017 10:00:00	2017	1391.098749	1029.585	1291.07	1778.19	1037.335
07Sep2017 11:00:00	2017	1450.607034	1045.012	1309.8	1884.08	1086.222
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07Sep2017 21:00:00	2017	1359.081929	1060.806	1314.425	1808.308	1205.275
07Sep2017 22:00:00	2017	1208.820546	1009.379	1260.709	1665.634	1174.24
07Sep2017 23:00:00	2017	1075.95838	966.0492	1222.729	1528.567	1140.121
08Sep2017 0:00:00	2017	982.7633897	932.9349	1186.316	1394.924	1127.446
08Sep2017 1:00:00	2017	923.4660509	904.7834	1168.517	1321.97	1118.536
08Sep2017 2:00:00	2017	891.079777	891.4309	1157.254	1284.068	1132.305
08Sep2017 3:00:00	2017	874.5951425	882.9079	1145.515	1249.155	1132.695
08Sep2017 4:00:00	2017	887.9171148	881.5524	1154.476	1231.333	1101.996
08Sep2017 5:00:00	2017	962.2577613	894.848	1171.733	1291.151	1104.913
08Sep2017 6:00:00	2017	1117.634409	928.6298	1209.768	1411.89	1099.803
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08Sep2017 18:00:00	2017	1379.452396	1053.047	1286.821	1716.492	1145.639
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09Sep2017 4:00:00	2017	836.6558001	859.0498	1127.363	1208.593	1070.743
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09Sep2017 17:00:00	2017	1289.32716	1057.764	1287.777	1538.734	964.5051
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09Sep2017 19:00:00	2017	1218.514369	1022.812	1271.745	1463.851	989.3301
09Sep2017 20:00:00	2017	1238.604412	1033.33	1295.831	1505.766	1038.193
09Sep2017 21:00:00	2017	1194.022883	1011.69	1285.266	1478.296	1042.147
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10Sep2017 1:00:00	2017	890.4694033	908.9618	1177.438	1236.48	1005.48
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10Sep2017 13:00:00	2017	1198.821549	997.142	1270.381	1526.645	1013.234
10Sep2017 14:00:00	2017	1216.753912	1003.97	1271.068	1515.114	1011.11
10Sep2017 15:00:00	2017	1242.164927	1013.853	1273.204	1522.064	1007.441
10Sep2017 16:00:00	2017	1279.950884	1027.296	1284.024	1547.581	1017.119
10Sep2017 17:00:00	2017	1305.885081	1035.08	1295.462	1578.607	1020.179
10Sep2017 18:00:00	2017	1282.193437	1023.459	1280.756	1566.03	1025.221
10Sep2017 19:00:00	2017	1249.226316	1011.07	1258.28	1520.602	1026.584
10Sep2017 20:00:00	2017	1267.499427	1016.414	1255.029	1551.034	1042.284

10Sep2017 21:00:00	2017	1212.424456	979.7155	1210.24	1496.395	1035.285
10Sep2017 22:00:00	2017	1089.179421	946.733	1199.982	1377.828	1024.063
10Sep2017 23:00:00	2017	970.5860487	912.2872	1173.81	1275.089	1051.145
11Sep2017 0:00:00	2017	893.4070218	889.4767	1145.689	1173.398	1075.798
11Sep2017 1:00:00	2017	845.9106161	874.5292	1128.503	1155.96	1071.027
11Sep2017 2:00:00	2017	823.9281751	862.2382	1129.839	1122.759	1075.179
11Sep2017 3:00:00	2017	821.59317	859.6357	1120.172	1132.658	1090.677
11Sep2017 4:00:00	2017	843.8511878	859.058	1117.031	1148.03	1081.521
11Sep2017 5:00:00	2017	926.2986673	870.0239	1116.915	1210.988	1084.258
11Sep2017 6:00:00	2017	1090.128201	910.2607	1161.03	1348.581	1080.983
11Sep2017 7:00:00	2017	1209.384644	948.8901	1202.526	1459.501	1072.832
11Sep2017 8:00:00	2017	1261.173393	977.7281	1234.04	1522.918	1074.356
11Sep2017 9:00:00	2017	1306.136908	1004.397	1245.289	1588.898	1071.411
11Sep2017 10:00:00	2017	1355.822178	1021.183	1262.768	1659.411	1084.034
11Sep2017 11:00:00	2017	1395.421861	1033.693	1274.953	1721.936	1113.6
11Sep2017 12:00:00	2017	1428.110209	1046.526	1270.539	1751.775	1156.546
11Sep2017 13:00:00	2017	1461.897436	1045.201	1270.884	1786.497	1166.331
11Sep2017 14:00:00	2017	1486.358525	1052.837	1282.729	1815.368	1173.358
11Sep2017 15:00:00	2017	1522.74123	1069.053	1296.023	1847.818	1159.83
11Sep2017 16:00:00	2017	1539.914423	1083.537	1316.056	1868.67	1158.03
11Sep2017 17:00:00	2017	1528.103027	1092.224	1308.261	1838.613	1152.215
11Sep2017 18:00:00	2017	1447.871347	1070.502	1279.039	1762.752	1142.715
11Sep2017 19:00:00	2017	1404.823321	1053.493	1263.309	1736.49	1146.367
11Sep2017 20:00:00	2017	1405.902423	1056.323	1309.562	1741.673	1154.642
11Sep2017 21:00:00	2017	1320.944607	1024.661	1278.954	1643.804	1134.49
11Sep2017 22:00:00	2017	1175.808592	970.3538	1230.645	1525.437	1113.386
11Sep2017 23:00:00	2017	1047.16962	922.3875	1188.151	1411.422	1090.765
12Sep2017 0:00:00	2017	962.9248525	895.2626	1144.139	1304.187	1079.579
12Sep2017 1:00:00	2017	909.2740624	878.1149	1130.958	1245.558	1070.546
12Sep2017 2:00:00	2017	876.8430618	869.0774	1106.807	1211.502	1077.552
12Sep2017 3:00:00	2017	866.2538243	863.5784	1094.666	1180.136	1075.142
12Sep2017 4:00:00	2017	877.3830283	856.7277	1096.189	1171.967	1078.424
12Sep2017 5:00:00	2017	953.7745021	863.8333	1109.861	1229.017	1086.794
12Sep2017 6:00:00	2017	1116.118198	892.87	1148.596	1376.279	1096.767
12Sep2017 7:00:00	2017	1230.97972	937.0455	1194.695	1496.533	1098.741
12Sep2017 8:00:00	2017	1267.918185	959.7152	1225.253	1553.532	1083.717
12Sep2017 9:00:00	2017	1315.055052	979.4248	1249.663	1593.865	1091.626
12Sep2017 10:00:00	2017	1347.241178	987.8244	1260.485	1645.622	1095.857
12Sep2017 11:00:00	2017	1380.35926	992.2229	1263.983	1664.622	1088.833
12Sep2017 12:00:00	2017	1388.523647	1003.468	1269.729	1666.185	1096.079
12Sep2017 13:00:00	2017	1402.340954	1012.321	1273.922	1678.601	1098.162
12Sep2017 14:00:00	2017	1417.580673	1016.331	1289.133	1667.003	1061.054
12Sep2017 15:00:00	2017	1428.030784	1017.54	1281.822	1665.522	1030.782
12Sep2017 16:00:00	2017	1438.436117	1031.702	1314.763	1670.942	1072.532
12Sep2017 17:00:00	2017	1430.098188	1044.818	1315.196	1669.731	1090.592
12Sep2017 18:00:00	2017	1341.849877	1030.09	1278.28	1608.599	1090.671
12Sep2017 19:00:00	2017	1302.768376	1021.657	1272.599	1590.879	1082.15

12Sep2017 20:00:00	2017	1282.655676	1020.42	1285.484	1625.218	1108.587
12Sep2017 21:00:00	2017	1192.106123	987.9341	1254.306	1560.225	1095.018
12Sep2017 22:00:00	2017	1067.679245	941.2084	1221.088	1441.597	1077.04
12Sep2017 23:00:00	2017	956.8651247	905.9954	1187.321	1340.825	1055.686
13Sep2017 0:00:00	2017	885.9836454	883.621	1157.782	1276.216	1047.544
13Sep2017 1:00:00	2017	844.9463515	874.573	1136.636	1185.077	1048.873
13Sep2017 2:00:00	2017	825.8433057	869.8179	1133.642	1161.947	1050.036
13Sep2017 3:00:00	2017	818.4324506	869.0872	1129.404	1154.988	1044.642
13Sep2017 4:00:00	2017	837.0780294	872.7259	1129.882	1175.093	1042.362
13Sep2017 5:00:00	2017	912.2721694	890.4863	1144.413	1229.205	1050.653
13Sep2017 6:00:00	2017	1079.885457	929.8238	1187.873	1375.011	1045.141
13Sep2017 7:00:00	2017	1235.823897	976.3816	1234.711	1527.283	1041.578
13Sep2017 8:00:00	2017	1285.414067	992.5821	1245.366	1568.263	1054.491
13Sep2017 9:00:00	2017	1311.984817	1013.019	1260.607	1633.239	1068.125
13Sep2017 10:00:00	2017	1329.32713	1013.116	1261.677	1695.499	1088.645
13Sep2017 11:00:00	2017	1348.67815	1010.608	1266.395	1710.999	1093.139
13Sep2017 12:00:00	2017	1351.063226	1010.718	1273.051	1704.471	1101.978
13Sep2017 13:00:00	2017	1349.112665	1017.395	1263.377	1699.721	1102.839
13Sep2017 14:00:00	2017	1341.607307	1017.534	1263.234	1696.694	1106.244
13Sep2017 15:00:00	2017	1334.863905	1018.708	1288.698	1697.792	1116.232
13Sep2017 16:00:00	2017	1349.654725	1023.188	1295.029	1705.759	1104.638
13Sep2017 17:00:00	2017	1353.339895	1024.294	1287.201	1694.123	1073.06
13Sep2017 18:00:00	2017	1295.138984	1014.465	1263.343	1615.873	1038.668
13Sep2017 19:00:00	2017	1285.229094	1015.556	1233.46	1571.734	1049.057
13Sep2017 20:00:00	2017	1287.241478	1017.55	1272.565	1609.676	1093.571
13Sep2017 21:00:00	2017	1204.725292	989.7876	1243.098	1535.504	1094.127
13Sep2017 22:00:00	2017	1084.231441	962.6912	1199.946	1423.646	1057.143
13Sep2017 23:00:00	2017	974.376464	925.0668	1164.391	1303.686	1038.37
14Sep2017 0:00:00	2017	898.5365968	900.7782	1151.545	1216.099	1084.136
14Sep2017 1:00:00	2017	854.9354036	883.5834	1141.507	1204.878	1077.981
14Sep2017 2:00:00	2017	833.4142444	871.7464	1145.545	1187.888	1081.243
14Sep2017 3:00:00	2017	825.7115785	870.1551	1148.697	1178.172	1093.613
14Sep2017 4:00:00	2017	849.591592	876.3554	1149.204	1174.618	1099.474
14Sep2017 5:00:00	2017	929.472899	897.8185	1171.412	1247.946	1095.314
14Sep2017 6:00:00	2017	1100.071978	946.8222	1212.928	1399.95	1084.872
14Sep2017 7:00:00	2017	1241.183989	982.5191	1258.675	1536.685	1087.836
14Sep2017 8:00:00	2017	1269.577156	996.0719	1295.875	1608.404	1092.303
14Sep2017 9:00:00	2017	1295.181891	1010.01	1306.413	1638.561	1091.069
14Sep2017 10:00:00	2017	1313.983831	1022.467	1304.967	1678.701	1089.281
14Sep2017 11:00:00	2017	1326.037245	1016.129	1293.912	1689.461	1078.608
14Sep2017 12:00:00	2017	1322.790654	1008.034	1264.581	1648.653	1070.96
14Sep2017 13:00:00	2017	1319.747516	1014.665	1280.072	1656.147	1082.823
14Sep2017 14:00:00	2017	1313.034685	1011.963	1279.666	1669.117	1073.344
14Sep2017 15:00:00	2017	1312.008851	1016.275	1268.079	1667.595	1042.474
14Sep2017 16:00:00	2017	1317.299384	1026.96	1306.552	1650.915	1048.435
14Sep2017 17:00:00	2017	1324.547446	1028.508	1288.359	1644.148	1045.383
14Sep2017 18:00:00	2017	1273.070194	1017.245	1283.438	1617.958	1033.308

14Sep2017 19:00:00	2017	1245.218538	1016.088	1288.907	1627.31	1043.735
14Sep2017 20:00:00	2017	1270.415027	1031.329	1316.647	1654.932	1079.661
14Sep2017 21:00:00	2017	1199.804234	1008.999	1300.207	1580.486	1090.07
14Sep2017 22:00:00	2017	1080.791647	969.1311	1259.695	1457.145	1079.07
14Sep2017 23:00:00	2017	969.5781221	933.2911	1222.822	1369.27	1064.186
15Sep2017 0:00:00	2017	899.2743642	920.3933	1201.273	1292.68	1053.555
15Sep2017 1:00:00	2017	857.8317734	902.583	1193.933	1254.556	1030.097
15Sep2017 2:00:00	2017	837.3630255	891.6263	1193.271	1230.549	1040.182
15Sep2017 3:00:00	2017	831.1476103	887.3519	1187.99	1198.706	1043.304
15Sep2017 4:00:00	2017	851.0402813	893.8827	1195.879	1214.352	1035.706
15Sep2017 5:00:00	2017	924.4546043	914.1216	1189.264	1262.16	1034.222
15Sep2017 6:00:00	2017	1085.70573	960.5516	1182.876	1377.731	1044.344
15Sep2017 7:00:00	2017	1225.665008	985.7398	1217.305	1486.762	1067.657
15Sep2017 8:00:00	2017	1272.01337	1007.263	1266.476	1550.81	1094.833
15Sep2017 9:00:00	2017	1304.807336	1037.031	1284.304	1594.817	1103.223
15Sep2017 10:00:00	2017	1320.655404	1045.091	1288.005	1620.733	1087.366
15Sep2017 11:00:00	2017	1325.397477	1042.239	1293.152	1628.305	1025.984
15Sep2017 12:00:00	2017	1323.914237	1033.853	1289.785	1619.077	996.9281
15Sep2017 13:00:00	2017	1324.151266	1028.237	1293.287	1618.143	984.1571
15Sep2017 14:00:00	2017	1313.319245	1025.126	1291.91	1607.714	980.0979
15Sep2017 15:00:00	2017	1304.083149	1024.418	1282.058	1622.478	984.4741
15Sep2017 16:00:00	2017	1295.610882	1024.282	1271.7	1615.617	991.0902
15Sep2017 17:00:00	2017	1283.781301	1020.703	1257.513	1596.915	990.5599
15Sep2017 18:00:00	2017	1218.125753	1009.472	1230.925	1510.352	983.6861
15Sep2017 19:00:00	2017	1192.44062	999.8416	1220.37	1496.153	987.7953
15Sep2017 20:00:00	2017	1224.906391	1010.41	1243.715	1575.937	1001.072
15Sep2017 21:00:00	2017	1173.051586	994.0691	1218.274	1529.232	998.9054
15Sep2017 22:00:00	2017	1081.184556	964.4775	1183.709	1422.487	995.7605
15Sep2017 23:00:00	2017	985.8148645	935.4211	1147.21	1344.196	1011.934
16Sep2017 0:00:00	2017	917.0241746	907.356	1134.182	1234.754	993.412
16Sep2017 1:00:00	2017	870.617224	890.5328	1132.557	1194.803	990.131
16Sep2017 2:00:00	2017	844.3410959	884.1885	1126.178	1171.962	995.0386
16Sep2017 3:00:00	2017	834.8404579	879.9707	1125.227	1162.362	994.3609
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16Sep2017 5:00:00	2017	865.6559681	883.8965	1131.846	1186.538	986.2087
16Sep2017 6:00:00	2017	921.8075304	899.0985	1151.896	1266.072	988.1702
16Sep2017 7:00:00	2017	977.9755858	918.5829	1162.756	1301.692	988.5649
16Sep2017 8:00:00	2017	1049.232795	945.4164	1188.064	1367.199	995.9073
16Sep2017 9:00:00	2017	1113.383665	966.0028	1214.285	1448.293	1000.875
16Sep2017 10:00:00	2017	1150.778983	972.3931	1225.554	1493.569	1002.324
16Sep2017 11:00:00	2017	1171.385531	974.677	1226.075	1521.018	994.97
16Sep2017 12:00:00	2017	1174.446364	969.5208	1221.309	1530.779	990.4278
16Sep2017 13:00:00	2017	1162.485826	963.2574	1222.482	1519.003	996.3119
16Sep2017 14:00:00	2017	1153.495632	960.4188	1212.259	1493.521	1004.695
16Sep2017 15:00:00	2017	1147.522323	960.452	1213.188	1478.483	1005.713
16Sep2017 16:00:00	2017	1151.950825	964.3838	1220.74	1509.774	997.0594
16Sep2017 17:00:00	2017	1160.365622	968.3272	1221.203	1516.821	997.0878

16Sep2017 18:00:00	2017	1135.75333	958.9396	1199.997	1481.63	979.6513
16Sep2017 19:00:00	2017	1124.655976	958.1186	1215.238	1478.045	1000.482
16Sep2017 20:00:00	2017	1153.867211	971.9032	1275.059	1549.51	1030.045
16Sep2017 21:00:00	2017	1108.632081	955.0072	1246.796	1478.464	1037.717
16Sep2017 22:00:00	2017	1041.588841	927.6181	1210.122	1404.264	993.5101
16Sep2017 23:00:00	2017	958.3376135	899.0722	1171.528	1312.214	972.7088
17Sep2017 0:00:00	2017	889.5390772	877.2682	1154.486	1248.145	1019.195
17Sep2017 1:00:00	2017	847.2207654	856.3423	1101.06	1208.834	1034.869
17Sep2017 2:00:00	2017	823.5325715	847.7185	1083.416	1191.393	1037.281
17Sep2017 3:00:00	2017	812.7479022	842.5448	1088.907	1179.75	1037.137
17Sep2017 4:00:00	2017	814.9141103	848.8125	1128.848	1195.851	1038.613
17Sep2017 5:00:00	2017	835.6433984	861.5497	1141.839	1211.13	1030.634
17Sep2017 6:00:00	2017	879.9107968	875.3158	1155.777	1227.768	1017.271
17Sep2017 7:00:00	2017	920.165938	884.2715	1155.694	1245.238	1024.209
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17Sep2017 9:00:00	2017	1039.570854	920.2809	1149.749	1371.131	1006.147
17Sep2017 10:00:00	2017	1091.264151	930.0475	1171.6	1431.336	1000.226
17Sep2017 11:00:00	2017	1125.278748	931.1351	1187.133	1474.186	935.5484
17Sep2017 12:00:00	2017	1151.474735	934.4291	1190.171	1495.172	965.7907
17Sep2017 13:00:00	2017	1163.495	937.5809	1194.266	1534.402	976.859
17Sep2017 14:00:00	2017	1164.915519	939.1058	1207.125	1525.882	975.5998
17Sep2017 15:00:00	2017	1174.084448	943.0879	1211.114	1548.906	982.1851
17Sep2017 16:00:00	2017	1199.184703	956.866	1242.056	1577.557	989.8092
17Sep2017 17:00:00	2017	1220.253988	965.5272	1256.248	1595.406	984.0764
17Sep2017 18:00:00	2017	1192.14023	960.9062	1238.491	1558.674	960.3482
17Sep2017 19:00:00	2017	1192.473516	962.0232	1238.821	1562.919	1015.283
17Sep2017 20:00:00	2017	1223.957999	974.9613	1252.198	1605.152	1036.493
17Sep2017 21:00:00	2017	1156.392956	954.5127	1231.042	1535.621	1032.892
17Sep2017 22:00:00	2017	1044.525717	922.3959	1185.015	1403.778	1013.288
17Sep2017 23:00:00	2017	939.3672009	884.403	1147.321	1305.885	997.804
18Sep2017 0:00:00	2017	872.5754804	865.2665	1128.591	1234.048	987.966
18Sep2017 1:00:00	2017	832.4882624	855.2334	1121.687	1206.843	987.1195
18Sep2017 2:00:00	2017	813.119231	850.4848	1121.689	1195.491	991.8461
18Sep2017 3:00:00	2017	810.1161567	850.9321	1125.647	1210.918	984.4822
18Sep2017 4:00:00	2017	833.7998043	856.0519	1130.638	1223.938	984.7698
18Sep2017 5:00:00	2017	919.4633813	877.8064	1153.703	1295.491	984.4049
18Sep2017 6:00:00	2017	1090.966158	921.5202	1201.143	1423.154	998.6169
18Sep2017 7:00:00	2017	1235.388825	971.96	1254.874	1552.633	1015.015
18Sep2017 8:00:00	2017	1275.505525	994.0945	1281.452	1617.072	1023.422
18Sep2017 9:00:00	2017	1308.13909	1008.605	1292.925	1645.945	1023.308
18Sep2017 10:00:00	2017	1335.295974	1010.708	1285.09	1691.009	1015.251
18Sep2017 11:00:00	2017	1368.841528	1017.191	1240.112	1674	1006.932
18Sep2017 12:00:00	2017	1378.517638	1018.588	1247.776	1681.389	993.6324
18Sep2017 13:00:00	2017	1372.43342	1007.356	1243.321	1670.088	1000.204
18Sep2017 14:00:00	2017	1371.526903	995.1598	1249.572	1664.151	1016.079
18Sep2017 15:00:00	2017	1378.6347	1002.582	1266.006	1679.271	1017.719
18Sep2017 16:00:00	2017	1379.827889	1016.148	1274.274	1699.206	1022.306

18Sep2017 17:00:00	2017	1376.799046	1015.713	1275.494	1689.454	1022.434
18Sep2017 18:00:00	2017	1308.579972	1009.053	1257.788	1630.033	1015.519
18Sep2017 19:00:00	2017	1285.524224	1010.817	1268.306	1638.576	1016.743
18Sep2017 20:00:00	2017	1295.349594	1018.75	1285.527	1671.35	1032.681
18Sep2017 21:00:00	2017	1205.161307	990.1165	1250.478	1578.139	1013.027
18Sep2017 22:00:00	2017	1080.355599	949.1903	1235.801	1482.757	994.9044
18Sep2017 23:00:00	2017	971.1095972	914.1027	1205.84	1380.931	960.7917
19Sep2017 0:00:00	2017	902.3111881	894.4273	1182.426	1306.779	968.5859
19Sep2017 1:00:00	2017	858.6449648	880.1783	1174.091	1268.635	967.232
19Sep2017 2:00:00	2017	836.1962288	872.5035	1239.426	1251.289	958.4824
19Sep2017 3:00:00	2017	832.5005312	870.5762	1240.818	1234.643	963.7538
19Sep2017 4:00:00	2017	856.8815835	873.5514	1253.602	1254.782	960.9284
19Sep2017 5:00:00	2017	939.6791435	886.8677	1252.038	1316.188	969.5845
19Sep2017 6:00:00	2017	1110.505362	939.8209	1304.631	1471.408	986.6225
19Sep2017 7:00:00	2017	1241.236994	967.1962	1346.536	1648.23	1044.015
19Sep2017 8:00:00	2017	1259.513772	980.2936	1307.357	1666.515	983.4568
19Sep2017 9:00:00	2017	1283.990556	984.1669	1309.34	1702.81	991.6075
19Sep2017 10:00:00	2017	1311.145547	986.5163	1303.618	1727.614	999.2273
19Sep2017 11:00:00	2017	1328.417059	990.4006	1305.358	1739.807	1007.726
19Sep2017 12:00:00	2017	1334.715007	986.7135	1318.274	1730.018	989.1074
19Sep2017 13:00:00	2017	1338.718891	992.2611	1325.695	1725.374	961.6115
19Sep2017 14:00:00	2017	1341.716347	990.1393	1331.144	1712.174	953.6625
19Sep2017 15:00:00	2017	1344.458724	990.8775	1325.565	1704.788	949.2602
19Sep2017 16:00:00	2017	1348.786856	999.1878	1331.977	1723.812	978.2182
19Sep2017 17:00:00	2017	1346.139059	1000.792	1319.891	1715.666	1017.076
19Sep2017 18:00:00	2017	1281.459689	987.1887	1300.689	1680.016	1020.629
19Sep2017 19:00:00	2017	1268.318088	987.9057	1326.464	1682.095	1016.002
19Sep2017 20:00:00	2017	1288.899511	1006.744	1356.789	1708.373	1012.739
19Sep2017 21:00:00	2017	1207.276315	988.781	1347.719	1633.67	1002.276
19Sep2017 22:00:00	2017	1083.268332	950.1435	1314.195	1519.666	975.527
19Sep2017 23:00:00	2017	974.248818	913.5075	1273.617	1399.389	941.6234
20Sep2017 0:00:00	2017	900.9882436	889.6993	1244.805	1310.173	927.6807
20Sep2017 1:00:00	2017	861.8105607	877.1468	1233.198	1269.628	940.2147
20Sep2017 2:00:00	2017	844.0504729	873.1956	1231.354	1234.314	950.3476
20Sep2017 3:00:00	2017	842.2727045	872.0406	1228.635	1224.174	933.7147
20Sep2017 4:00:00	2017	864.5485421	874.4761	1220.958	1232.083	922.9208
20Sep2017 5:00:00	2017	949.4434153	892.5453	1216.521	1302.734	934.284
20Sep2017 6:00:00	2017	1123.515441	933.1037	1265.011	1445.145	952.8919
20Sep2017 7:00:00	2017	1257.904579	974.6547	1269.742	1622.455	1010.267
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20Sep2017 9:00:00	2017	1304.890206	984.4491	1297.412	1635.705	975.7868
20Sep2017 10:00:00	2017	1325.290969	986.801	1322.239	1680.998	990.3946
20Sep2017 11:00:00	2017	1335.452925	989.8206	1265.265	1703.192	1001.15
20Sep2017 12:00:00	2017	1337.965125	981.6671	1245.601	1686.696	1000.4
20Sep2017 13:00:00	2017	1335.634949	983.6425	1248.803	1697.188	999.7253
20Sep2017 14:00:00	2017	1333.69508	980.4357	1247.373	1666.984	999.2465
20Sep2017 15:00:00	2017	1332.44585	983.2774	1255.143	1673.044	995.7496

20Sep2017 16:00:00	2017	1354.6563	994.3491	1279.936	1699.689	998.3994
20Sep2017 17:00:00	2017	1356.423192	996.604	1271.858	1706.046	992.9684
20Sep2017 18:00:00	2017	1301.67835	990.8909	1260.466	1698.592	987.5694
20Sep2017 19:00:00	2017	1292.914858	1004.814	1288.967	1697.181	1003.96
20Sep2017 20:00:00	2017	1295.4132	1013.385	1308.955	1676.234	999.3921
20Sep2017 21:00:00	2017	1217.90615	988.6011	1275.871	1598.436	987.3949
20Sep2017 22:00:00	2017	1102.073706	949.7452	1227.679	1472.991	978.0604
20Sep2017 23:00:00	2017	995.5314194	926.8303	1184.901	1384.511	949.5787
21Sep2017 0:00:00	2017	923.9848402	906.6722	1157.792	1307.131	953.25
21Sep2017 1:00:00	2017	878.7610382	891.3417	1144.793	1267.264	945.5252
21Sep2017 2:00:00	2017	857.6644987	883.5938	1137.066	1249.167	941.517
21Sep2017 3:00:00	2017	852.1812352	878.8587	1122.838	1217.216	923.5085
21Sep2017 4:00:00	2017	872.9901255	876.8489	1122.929	1229.833	919.4148
21Sep2017 5:00:00	2017	954.4075666	898.6794	1129.607	1277.175	939.0809
21Sep2017 6:00:00	2017	1124.047591	945.5875	1198.954	1426.493	984.9675
21Sep2017 7:00:00	2017	1269.329847	964.9405	1279.994	1579.521	1029.275
21Sep2017 8:00:00	2017	1300.15813	976.3027	1287.465	1618.574	1010.239
21Sep2017 9:00:00	2017	1332.589998	989.1236	1277.449	1672.763	1013.631
21Sep2017 10:00:00	2017	1354.986694	996.7604	1277.125	1696.068	1013.656
21Sep2017 11:00:00	2017	1372.601185	1000.217	1277.755	1706.703	1036.355
21Sep2017 12:00:00	2017	1372.232128	986.6703	1266.94	1702.229	1067.178
21Sep2017 13:00:00	2017	1365.052914	979.9782	1260.383	1697.732	1078.914
21Sep2017 14:00:00	2017	1357.219737	1000.284	1260.743	1715.126	1091.447
21Sep2017 15:00:00	2017	1355.252751	1004.842	1276.044	1703.435	1101.209
21Sep2017 16:00:00	2017	1365.763189	1012.504	1287.59	1728.059	1104.416
21Sep2017 17:00:00	2017	1369.657441	1024.021	1282.517	1711.942	1083.242
21Sep2017 18:00:00	2017	1325.282805	1015.451	1287.433	1693.482	1075.485
21Sep2017 19:00:00	2017	1325.284111	1021.937	1300.959	1721.749	1082.362
21Sep2017 20:00:00	2017	1312.962068	1024.056	1305.548	1719.361	1086.497
21Sep2017 21:00:00	2017	1227.619737	999.8613	1277.006	1619.688	1074.906
21Sep2017 22:00:00	2017	1113.897159	962.6365	1231.682	1515.713	1061.022
21Sep2017 23:00:00	2017	1004.144059	923.7678	1186.45	1399.987	1042.05
22Sep2017 0:00:00	2017	932.5531818	899.2946	1152.413	1320.634	1044.326
22Sep2017 1:00:00	2017	889.1314241	887.1386	1141.353	1260.296	1049.11
22Sep2017 2:00:00	2017	864.885394	881.6802	1138.159	1237.432	1044.936
22Sep2017 3:00:00	2017	857.4221832	878.5231	1131.357	1212.025	1074.53
22Sep2017 4:00:00	2017	875.6396478	884.1267	1140.772	1209.568	1077.386
22Sep2017 5:00:00	2017	947.0861321	895.8638	1150.665	1264.532	1097.316
22Sep2017 6:00:00	2017	1098.799059	932.1847	1186.57	1402.93	1076.707
22Sep2017 7:00:00	2017	1230.960433	963.8453	1235.554	1557.501	1073.777
22Sep2017 8:00:00	2017	1283.420611	978.5985	1269.816	1599.284	1071.084
22Sep2017 9:00:00	2017	1327.968912	1001.425	1284.295	1631.186	1077.801
22Sep2017 10:00:00	2017	1358.815695	1013.837	1296.119	1651.273	1078.702
22Sep2017 11:00:00	2017	1369.102429	1018.56	1303.033	1662.387	1076.589
22Sep2017 12:00:00	2017	1368.150596	1010.977	1296.062	1651.395	1076.1
22Sep2017 13:00:00	2017	1360.855003	1001.357	1293.647	1666.67	1060.451
22Sep2017 14:00:00	2017	1344.64373	957.4527	1274.142	1661.166	1052.299

22Sep2017 15:00:00	2017	1327.690103	958.912	1262.847	1645.024	1075.237
22Sep2017 16:00:00	2017	1315.776006	959.6579	1265.817	1641.812	1071.985
22Sep2017 17:00:00	2017	1315.109705	957.6505	1274.902	1652.764	1064.74
22Sep2017 18:00:00	2017	1262.13629	945.7963	1272.144	1621.979	1064.196
22Sep2017 19:00:00	2017	1262.755101	949.361	1289.785	1630.627	1080.223
22Sep2017 20:00:00	2017	1252.167262	956.9161	1303.162	1639.389	1088.476
22Sep2017 21:00:00	2017	1187.852664	935.7795	1278.734	1577.952	1079.436
22Sep2017 22:00:00	2017	1097.011688	908.4602	1242.73	1481.192	1071.038
22Sep2017 23:00:00	2017	999.4927885	891.9604	1209.521	1378.95	1072.281
23Sep2017 0:00:00	2017	928.1286486	873.5192	1181.61	1312.802	1072.387
23Sep2017 1:00:00	2017	879.4575859	856.7425	1161.957	1259.08	1064.596
23Sep2017 2:00:00	2017	852.5347034	852.4671	1145.327	1231.352	1064.272
23Sep2017 3:00:00	2017	840.5710986	851.0968	1137.103	1211.432	1055.918
23Sep2017 4:00:00	2017	846.380143	850.2438	1140.742	1211.4	1055.755
23Sep2017 5:00:00	2017	874.4160465	843.8508	1144.437	1218.823	1059.127
23Sep2017 6:00:00	2017	933.3571916	861.9243	1154.721	1250.511	1064.944
23Sep2017 7:00:00	2017	1004.673783	888.3889	1172.823	1292.301	1048.619
23Sep2017 8:00:00	2017	1070.934756	920.3361	1206.207	1352.111	1043.756
23Sep2017 9:00:00	2017	1133.261282	935.7541	1232.445	1418.963	1046.895
23Sep2017 10:00:00	2017	1163.236472	942.1772	1248.477	1459.01	1062.933
23Sep2017 11:00:00	2017	1180.744073	943.0887	1250.649	1472.218	1065.469
23Sep2017 12:00:00	2017	1178.895458	937.1257	1248.573	1474.33	1077.523
23Sep2017 13:00:00	2017	1165.299692	929.8095	1238.31	1466.981	1080.227
23Sep2017 14:00:00	2017	1153.597779	919.2951	1231.507	1467.703	1087.219
23Sep2017 15:00:00	2017	1145.552504	891.8002	1232.527	1479.666	1085.24
23Sep2017 16:00:00	2017	1147.428627	890.7342	1241.251	1488.763	1088.543
23Sep2017 17:00:00	2017	1159.17951	893.5324	1241.811	1498.952	1085.358
23Sep2017 18:00:00	2017	1134.556202	889.3057	1234.348	1492.18	1072.217
23Sep2017 19:00:00	2017	1146.042795	895.7929	1248.436	1518.343	1085.161
23Sep2017 20:00:00	2017	1161.515045	904.9513	1267.444	1560.463	1099.869
23Sep2017 21:00:00	2017	1112.709965	889.8894	1246.431	1524.72	1099.22
23Sep2017 22:00:00	2017	1045.697076	864.0955	1212.841	1453.027	1090.582
23Sep2017 23:00:00	2017	967.5571253	837.8678	1171.863	1347.706	1090.075
24Sep2017 0:00:00	2017	897.741621	816.623	1153.525	1274.36	1083.399
24Sep2017 1:00:00	2017	850.047212	803.556	1140.334	1227.587	1072.498
24Sep2017 2:00:00	2017	825.5442742	796.2362	1131.862	1193.559	1072.497
24Sep2017 3:00:00	2017	812.1314219	793.7175	1114.066	1174.859	1079.013
24Sep2017 4:00:00	2017	814.9356172	797.395	1122.131	1173.995	1075.629
24Sep2017 5:00:00	2017	834.838023	803.3906	1131.936	1185.788	1071.846
24Sep2017 6:00:00	2017	876.5487258	815.0947	1150.265	1223.876	1071.581
24Sep2017 7:00:00	2017	923.7863956	828.61	1156.356	1273.365	1062.947
24Sep2017 8:00:00	2017	981.508222	844.1636	1179.464	1346.819	1053.635
24Sep2017 9:00:00	2017	1044.888683	857.4539	1198.21	1430.853	1059.378
24Sep2017 10:00:00	2017	1089.008461	881.9832	1219.98	1453.93	1061.685
24Sep2017 11:00:00	2017	1120.635432	895.6395	1229.082	1506.535	1061.635
24Sep2017 12:00:00	2017	1142.467882	902.2914	1239.415	1513.573	1048.518
24Sep2017 13:00:00	2017	1153.783574	904.2238	1233.802	1519.11	1053.68

24Sep2017 14:00:00	2017	1158.490677	898.9574	1227.211	1518.387	1063.145
24Sep2017 15:00:00	2017	1167.19996	900.8588	1228.953	1531.021	1074.708
24Sep2017 16:00:00	2017	1188.895649	915.5699	1248.838	1572.699	1039.131
24Sep2017 17:00:00	2017	1210.753351	925.4599	1261.808	1595.483	1046.524
24Sep2017 18:00:00	2017	1191.323072	920.1804	1248.413	1569.586	1045.889
24Sep2017 19:00:00	2017	1205.476714	931.4364	1273.356	1604.744	1063.55
24Sep2017 20:00:00	2017	1214.237539	940.9412	1276.282	1599.288	1045.577
24Sep2017 21:00:00	2017	1150.059909	919.0322	1228.434	1501.25	1048.826
24Sep2017 22:00:00	2017	1042.332403	886.7299	1178.862	1412.612	1004.979
24Sep2017 23:00:00	2017	940.934482	851.7594	1128.421	1293.321	996.2612
25Sep2017 0:00:00	2017	871.6708795	825.7628	1108.559	1216.833	987.0907
25Sep2017 1:00:00	2017	833.417487	810.1505	1112.066	1193.22	972.3604
25Sep2017 2:00:00	2017	817.3937107	806.2649	1114.822	1167.66	981.1004
25Sep2017 3:00:00	2017	813.7216088	805.7033	1119.884	1176.179	985.607
25Sep2017 4:00:00	2017	835.9850305	808.9902	1126.742	1203.996	982.2121
25Sep2017 5:00:00	2017	921.5499394	828.8461	1151.44	1268.978	977.7976
25Sep2017 6:00:00	2017	1093.192346	875.141	1205.469	1433.316	982.1037
25Sep2017 7:00:00	2017	1241.198572	933.0237	1267.61	1588.168	992.3647
25Sep2017 8:00:00	2017	1265.644563	957.7163	1295.673	1624.35	984.5683
25Sep2017 9:00:00	2017	1295.46843	973.5938	1313.035	1659.622	990.6936
25Sep2017 10:00:00	2017	1333.408969	976.4202	1319.543	1711.71	987.8937
25Sep2017 11:00:00	2017	1377.379576	970.4531	1322.187	1739.018	994.2326
25Sep2017 12:00:00	2017	1396.956642	968.0989	1317.461	1750.069	990.7365
25Sep2017 13:00:00	2017	1408.535949	972.9736	1308.885	1756.349	1006.798
25Sep2017 14:00:00	2017	1409.926662	969.103	1316.588	1762.952	1007.261
25Sep2017 15:00:00	2017	1411.478382	966.082	1318.032	1772.999	995.4446
25Sep2017 16:00:00	2017	1412.973371	985.559	1328.611	1780.458	1003.029
25Sep2017 17:00:00	2017	1411.156495	995.4735	1321.109	1749.591	1014.087
25Sep2017 18:00:00	2017	1346.574586	979.3646	1288.839	1689.519	998.5767
25Sep2017 19:00:00	2017	1351.28172	977.7232	1286.669	1708.104	1008.38
25Sep2017 20:00:00	2017	1330.718463	979.2321	1291.637	1713.466	1020.372
25Sep2017 21:00:00	2017	1222.112462	949.8392	1260.09	1624.102	1005.317
25Sep2017 22:00:00	2017	1095.243397	907.5194	1215.304	1478.7	998.7818
25Sep2017 23:00:00	2017	977.7167782	876.8261	1159.578	1319.034	983.4396
26Sep2017 0:00:00	2017	901.6812176	851.3296	1137.022	1253.96	970.8627
26Sep2017 1:00:00	2017	856.3447643	842.0324	1112.798	1218.481	974.7509
26Sep2017 2:00:00	2017	830.6589537	834.1566	1108.81	1192.798	961.7832
26Sep2017 3:00:00	2017	826.1846682	831.9465	1114.863	1170.179	950.3307
26Sep2017 4:00:00	2017	845.829949	841.5445	1118.284	1164.539	954.4285
26Sep2017 5:00:00	2017	925.8542979	860.5768	1140.014	1240.523	943.7375
26Sep2017 6:00:00	2017	1105.720414	900.6225	1203.581	1436.462	936.9249
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26Sep2017 8:00:00	2017	1278.793134	974.789	1273.424	1622.597	935.4598
26Sep2017 9:00:00	2017	1306.293342	987.8651	1262.022	1651.843	937.8798
26Sep2017 10:00:00	2017	1348.999338	993.1951	1256.595	1699.837	930.4054
26Sep2017 11:00:00	2017	1372.671457	998.3415	1274.048	1727.952	938.7586
26Sep2017 12:00:00	2017	1389.782922	999.8403	1279.151	1744.033	943.0912

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26Sep2017 15:00:00	2017	1418.7259	965.8966	1280.528	1736.055	922.2727
26Sep2017 16:00:00	2017	1418.751101	989.3908	1281.265	1735.719	934.0171
26Sep2017 17:00:00	2017	1410.655042	984.4812	1279.417	1714.859	968.6522
26Sep2017 18:00:00	2017	1337.541927	967.9809	1269.512	1650.849	984.9731
26Sep2017 19:00:00	2017	1326.911218	976.1011	1288.773	1669.881	984.7419
26Sep2017 20:00:00	2017	1322.185481	981.3955	1309.705	1686.882	989.5703
26Sep2017 21:00:00	2017	1234.893011	949.0573	1287.004	1602.65	976.7693
26Sep2017 22:00:00	2017	1108.629933	908.5775	1242.689	1472.754	959.7405
26Sep2017 23:00:00	2017	991.0128684	873.5227	1197.055	1378.072	961.9423
27Sep2017 0:00:00	2017	915.3097455	851.4196	1174.196	1313.091	963.3061
27Sep2017 1:00:00	2017	868.1477721	837.2604	1160.248	1264.355	966.5008
27Sep2017 2:00:00	2017	840.8871446	832.0949	1163.204	1239.91	965.9447
27Sep2017 3:00:00	2017	831.5102354	827.5394	1156.995	1227.331	955.6685
27Sep2017 4:00:00	2017	850.7193005	821.8132	1150.946	1240.482	968.0078
27Sep2017 5:00:00	2017	932.8863637	834.1007	1155.697	1316.532	963.8643
27Sep2017 6:00:00	2017	1105.814423	880.5801	1208.051	1471.128	965.8566
27Sep2017 7:00:00	2017	1245.80243	925.6379	1258.792	1594.283	982.8134
27Sep2017 8:00:00	2017	1274.6129	939.531	1269.494	1641.364	968.9771
27Sep2017 9:00:00	2017	1307.954114	947.7018	1281.594	1657.626	970.9436
27Sep2017 10:00:00	2017	1349.974586	956.5174	1293.925	1694.535	964.3683
27Sep2017 11:00:00	2017	1389.570905	961.8912	1319.721	1738.877	957.9905
27Sep2017 12:00:00	2017	1414.541365	965.7003	1327.087	1751.829	971.2714
27Sep2017 13:00:00	2017	1427.257873	973.2763	1330.963	1782.511	997.2313
27Sep2017 14:00:00	2017	1432.191584	974.6664	1334.107	1788.824	994.5876
27Sep2017 15:00:00	2017	1439.023346	971.0755	1334.563	1796.848	989.8573
27Sep2017 16:00:00	2017	1449.751342	983.0141	1340.513	1806.322	986.1994
27Sep2017 17:00:00	2017	1437.974533	985.5506	1335.432	1783.338	990.0675
27Sep2017 18:00:00	2017	1357.813364	971.066	1317.649	1706.259	980.4675
27Sep2017 19:00:00	2017	1345.870533	973.606	1314.826	1723.192	993.883
27Sep2017 20:00:00	2017	1335.598796	976.574	1315.266	1715.792	1005.954
27Sep2017 21:00:00	2017	1241.071895	942.2474	1278.738	1619.276	1000.67
27Sep2017 22:00:00	2017	1111.418857	896.8405	1233.651	1486.956	985.7712
27Sep2017 23:00:00	2017	991.1643118	859.9371	1180.551	1394.927	953.3025
28Sep2017 0:00:00	2017	916.4490277	832.9756	1148.756	1282.335	946.4418
28Sep2017 1:00:00	2017	869.0730908	821.572	1139.928	1229.586	936.8037
28Sep2017 2:00:00	2017	841.6138011	816.8411	1138.257	1193.436	933.5567
28Sep2017 3:00:00	2017	834.9070106	814.4911	1144.847	1193.359	927.9658
28Sep2017 4:00:00	2017	852.6932183	816.1843	1148.449	1214.035	929.1603
28Sep2017 5:00:00	2017	931.3084726	832.2524	1159.555	1295.269	943.3342
28Sep2017 6:00:00	2017	1106.327232	868.7864	1210.919	1457.822	949.1512
28Sep2017 7:00:00	2017	1247.362262	915.5261	1267.737	1558.249	976.201
28Sep2017 8:00:00	2017	1266.388124	929.618	1282.691	1590.791	974.9366
28Sep2017 9:00:00	2017	1294.143382	935.933	1289.797	1651.251	942.184
28Sep2017 10:00:00	2017	1327.161593	950.2797	1297.606	1705.715	939.5674
28Sep2017 11:00:00	2017	1368.972379	960.8473	1302.797	1755.883	944.9886

28Sep2017 12:00:00	2017	1395.123797	966.6366	1317.075	1792.684	953.2922
28Sep2017 13:00:00	2017	1421.527375	976.3467	1319.497	1815.452	966.309
28Sep2017 14:00:00	2017	1433.082155	983.8862	1323.975	1828.484	987.5483
28Sep2017 15:00:00	2017	1443.864753	986.5268	1339.559	1820.557	1008.109
28Sep2017 16:00:00	2017	1452.046904	994.893	1340.418	1824.598	997.7099
28Sep2017 17:00:00	2017	1433.77744	995.1473	1308.775	1818.511	1002.164
28Sep2017 18:00:00	2017	1354.131432	981.0119	1286.507	1749.654	997.2452
28Sep2017 19:00:00	2017	1344.199176	981.2759	1281.876	1728.592	1006.168
28Sep2017 20:00:00	2017	1330.582549	981.8104	1284.824	1725.337	1002.627
28Sep2017 21:00:00	2017	1233.545397	959.0206	1252.515	1629.902	994.3373
28Sep2017 22:00:00	2017	1105.56885	925.9081	1219.234	1487.453	973.7591
28Sep2017 23:00:00	2017	986.8367437	895.0163	1177.271	1392.484	941.5189
29Sep2017 0:00:00	2017	907.5698377	860.0921	1152.234	1317.989	959.7197
29Sep2017 1:00:00	2017	859.2892698	843.5851	1126.255	1256.132	958.6791
29Sep2017 2:00:00	2017	834.225991	837.1191	1106.792	1244.29	930.9292
29Sep2017 3:00:00	2017	825.4124915	831.3111	1108.487	1232.171	918.7424
29Sep2017 4:00:00	2017	840.6546754	836.2875	1114.322	1252.159	916.6539
29Sep2017 5:00:00	2017	918.2741102	854.2752	1145.355	1304.565	933.3557
29Sep2017 6:00:00	2017	1083.704169	891.3871	1200.919	1453.304	954.8802
29Sep2017 7:00:00	2017	1228.109666	936.0356	1255.867	1580.763	948.7091
29Sep2017 8:00:00	2017	1257.106642	954.1451	1285.855	1602.565	948.0691
29Sep2017 9:00:00	2017	1292.79533	965.08	1304.2	1643.592	960.5206
29Sep2017 10:00:00	2017	1337.921519	979.968	1285.922	1686.455	928.072
29Sep2017 11:00:00	2017	1381.435218	999.5824	1303.96	1719.89	953.3181
29Sep2017 12:00:00	2017	1415.387218	997.9088	1321.131	1737.167	967.2051
29Sep2017 13:00:00	2017	1442.484841	1006.616	1331.568	1763.359	969.8678
29Sep2017 14:00:00	2017	1444.620008	1009.033	1305.407	1756.76	966.2854
29Sep2017 15:00:00	2017	1445.243689	1012.583	1323.581	1758.436	1025.782
29Sep2017 16:00:00	2017	1442.489184	1033.106	1334.341	1796.574	1051.568
29Sep2017 17:00:00	2017	1418.719534	1024.661	1322.028	1735.31	1043.074
29Sep2017 18:00:00	2017	1325.792845	1012.074	1299.851	1660.107	1019.07
29Sep2017 19:00:00	2017	1308.015398	1017.945	1317.805	1649.16	1007.61
29Sep2017 20:00:00	2017	1289.822727	1034.774	1318.638	1661.436	1017.205
29Sep2017 21:00:00	2017	1206.74222	1011.327	1242.904	1583.551	982.6338
29Sep2017 22:00:00	2017	1100.231084	977.7745	1190.475	1481.761	956.0509
29Sep2017 23:00:00	2017	996.425436	945.0167	1198.127	1376.43	983.4388
30Sep2017 0:00:00	2017	918.8221505	917.4254	1171.965	1301.442	983.1211
30Sep2017 1:00:00	2017	865.1151325	902.7168	1149.507	1240.131	973.0928
30Sep2017 2:00:00	2017	831.9337231	896.479	1144.982	1212.637	971.0071
30Sep2017 3:00:00	2017	818.1391228	892.151	1134.191	1187.789	959.2362
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30Sep2017 5:00:00	2017	844.3409311	900.409	1147.154	1216.461	972.5891
30Sep2017 6:00:00	2017	900.6240005	917.4325	1174.399	1262.519	1003.652
30Sep2017 7:00:00	2017	968.5040892	940.1669	1189.542	1319.932	1008.145
30Sep2017 8:00:00	2017	1039.836009	966.3851	1209.549	1379.002	987.7111
30Sep2017 9:00:00	2017	1121.064025	988.668	1224.757	1475.408	974.8551
30Sep2017 10:00:00	2017	1172.992923	1003.717	1238.684	1523.673	969.4587

30Sep2017 11:00:00	2017	1203.698646	1006.241	1242.677	1541.729	973.3051
30Sep2017 12:00:00	2017	1210.316058	1004.927	1245.588	1555.751	983.5863
30Sep2017 13:00:00	2017	1200.463363	1002.302	1265.514	1546.282	981.9702
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30Sep2017 15:00:00	2017	1179.283228	998.684	1264.551	1520.893	999.8733
30Sep2017 16:00:00	2017	1187.189362	1000.674	1266.378	1554.443	1021.592
30Sep2017 17:00:00	2017	1188.769385	999.3223	1260.889	1572.521	999.1331
30Sep2017 18:00:00	2017	1156.114882	990.8308	1254.507	1538.98	994.0638
30Sep2017 19:00:00	2017	1175.301107	998.7895	1280.905	1584.896	1002.103
30Sep2017 20:00:00	2017	1169.887443	995.4182	1287.115	1560.004	997.9427
30Sep2017 21:00:00	2017	1113.317681	972.6625	1272.575	1516.812	1001.744
30Sep2017 22:00:00	2017	1043.971854	943.7067	1236.942	1441.217	1004.335
30Sep2017 23:00:00	2017	961.3529473	914.9853	1179.464	1342.109	981.2712
01Oct2017 0:00:00	2017	891.5589509	890.7133	1138.185	1274.82	974.4106
01Oct2017 1:00:00	2017	841.7574616	876.8068	1133.926	1223.694	947.2542
01Oct2017 2:00:00	2017	816.357233	873.3432	1125.873	1193.014	947.8437
01Oct2017 3:00:00	2017	804.7394725	870.6157	1123.453	1186.042	934.957
01Oct2017 4:00:00	2017	805.456084	873.293	1123.539	1161.87	955.8419
01Oct2017 5:00:00	2017	825.6651242	884.1181	1135.522	1189.754	960.6433
01Oct2017 6:00:00	2017	869.4389212	897.1204	1151.658	1233.545	963.088
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01Oct2017 8:00:00	2017	992.7125948	940.5262	1213.66	1361.32	961.4735
01Oct2017 9:00:00	2017	1068.181084	962.8393	1250.639	1436.715	947.3943
01Oct2017 10:00:00	2017	1118.854082	982.1682	1263.349	1495.569	950.3422
01Oct2017 11:00:00	2017	1145.110598	986.9005	1252.829	1494.033	956.2632
01Oct2017 12:00:00	2017	1160.225626	989.2053	1248.569	1520.41	964.8417
01Oct2017 13:00:00	2017	1157.183251	981.4419	1237.925	1523.622	965.9232
01Oct2017 14:00:00	2017	1152.992672	978.3369	1223.581	1510.903	967.83
01Oct2017 15:00:00	2017	1163.182147	981.0251	1227.666	1549.445	976.972
01Oct2017 16:00:00	2017	1185.191779	993.1668	1257.969	1581.953	983.5453
01Oct2017 17:00:00	2017	1206.629433	997.9869	1265.368	1625.253	978.618
01Oct2017 18:00:00	2017	1194.916488	994.8332	1264.781	1621.027	982.2381
01Oct2017 19:00:00	2017	1232.759289	1013.244	1276.067	1649.024	1013.788
01Oct2017 20:00:00	2017	1235.238234	1010.912	1267.795	1594.71	1022.949
01Oct2017 21:00:00	2017	1169.831455	986.3517	1243.173	1505.292	1008.32
01Oct2017 22:00:00	2017	1067.419259	949.3645	1194.22	1408.515	1014.02
01Oct2017 23:00:00	2017	963.8654449	911.2499	1144.289	1316.582	1025.733
02Oct2017 0:00:00	2017	899.4710357	893.3148	1123.387	1222.564	1008.668
02Oct2017 1:00:00	2017	860.942777	887.1121	1184.539	1256.764	1001.825
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02Oct2017 5:00:00	2017	957.1158591	871.4152	1067.04	1299.129	1005.637
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02Oct2017 7:00:00	2017	1298.366763	845.0333	1203.271	1659.658	1053.875
02Oct2017 8:00:00	2017	1337.410853	747.3804	1220.574	1708.545	1030.31
02Oct2017 9:00:00	2017	1369.849065	752.7391	1231.069	1729.22	1021.307

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02Oct2017 12:00:00	2017	1420.973756	688.5738	1281.572	1785.313	1005.697
02Oct2017 13:00:00	2017	1415.604074	717.807	1255.832	1783.628	1020.211
02Oct2017 14:00:00	2017	1407.292955	719.9909	1269.855	1769.156	1017.998
02Oct2017 15:00:00	2017	1406.598664	734.5937	1273.309	1744.746	1012.835
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02Oct2017 17:00:00	2017	1427.301676	795.3898	1271.027	1728.007	1002.372
02Oct2017 18:00:00	2017	1357.774161	799.6433	1236.55	1665.216	990.8243
02Oct2017 19:00:00	2017	1376.233868	832.8721	1261.638	1708.698	999.2383
02Oct2017 20:00:00	2017	1356.41632	836.9496	1265.889	1709.455	1018.458
02Oct2017 21:00:00	2017	1263.917091	813.3004	1223.118	1629.596	1015.347
02Oct2017 22:00:00	2017	1139.396292	775.1892	1179.931	1486.846	1001.255
02Oct2017 23:00:00	2017	1028.863381	738.9083	1136.122	1380.695	1001.404
03Oct2017 0:00:00	2017	951.863515	712.1099	1112.255	1303.337	992.1515
03Oct2017 1:00:00	2017	908.6602112	700.7528	1105.075	1268.798	991.5138
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03Oct2017 3:00:00	2017	882.3023651	697.1105	1112.28	1250.933	976.3463
03Oct2017 4:00:00	2017	902.8029972	704.6084	1111.247	1260.917	990.7797
03Oct2017 5:00:00	2017	988.2189707	715.1321	1133.384	1327.913	988.3258
03Oct2017 6:00:00	2017	1160.204106	759.5687	1177.987	1493.512	995.4554
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03Oct2017 8:00:00	2017	1310.62487	811.1962	1244.004	1659.298	980.5287
03Oct2017 9:00:00	2017	1321.734539	822.9123	1244.935	1676.776	990.3668
03Oct2017 10:00:00	2017	1336.232595	835.8696	1243.428	1690.081	991.3483
03Oct2017 11:00:00	2017	1340.528981	835.3072	1232.218	1702.704	997.2808
03Oct2017 12:00:00	2017	1336.445975	830.6616	1227.197	1690.284	990.8415
03Oct2017 13:00:00	2017	1328.367902	831.4352	1230.778	1682.553	989.1755
03Oct2017 14:00:00	2017	1321.620412	837.0791	1225.933	1671.263	996.0154
03Oct2017 15:00:00	2017	1319.069549	840.0155	1244.231	1666.437	984.0107
03Oct2017 16:00:00	2017	1326.827704	849.5505	1230.035	1673.998	999.2906
03Oct2017 17:00:00	2017	1332.273882	852.0883	1213.995	1666.412	995.1453
03Oct2017 18:00:00	2017	1289.369056	854.2977	1204.586	1618.505	1003.98
03Oct2017 19:00:00	2017	1324.744753	890.7897	1264.945	1667.06	1015.09
03Oct2017 20:00:00	2017	1318.267885	900.8229	1272.833	1661.733	1025.577
03Oct2017 21:00:00	2017	1237.857691	882.4822	1259.803	1578.213	1022.458
03Oct2017 22:00:00	2017	1119.663959	843.8347	1221.479	1456.991	1008.192
03Oct2017 23:00:00	2017	1006.762036	816.2852	1189.843	1342.542	1002.006
04Oct2017 0:00:00	2017	935.262511	798.0089	1164.999	1268.227	995.1301
04Oct2017 1:00:00	2017	895.0381509	788.0994	1158.24	1248.91	979.7545
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04Oct2017 5:00:00	2017	978.0921848	807.974	1174.217	1334.345	1000.155
04Oct2017 6:00:00	2017	1152.494982	852.7158	1224.775	1496.38	1000.845
04Oct2017 7:00:00	2017	1296.439906	901.7641	1279.938	1626.967	1001.896
04Oct2017 8:00:00	2017	1304.933798	910.9544	1289.71	1669.177	985.408

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04Oct2017 13:00:00	2017	1346.253812	923.7303	1278.639	1719.525	945.1089
04Oct2017 14:00:00	2017	1341.641386	927.5569	1267.394	1695.477	929.2985
04Oct2017 15:00:00	2017	1344.033784	932.9905	1268.01	1691.275	941.4849
04Oct2017 16:00:00	2017	1349.237878	941.4879	1291.624	1712.715	949.066
04Oct2017 17:00:00	2017	1342.539723	941.1564	1290.659	1687.861	952.5674
04Oct2017 18:00:00	2017	1290.902558	943.8402	1277.831	1638.63	949.1965
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05Oct2017 17:00:00	2017	1368.298974	971.0163	1296.807	1745.868	983.0938
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06Oct2017 12:00:00	2017	1392.713861	935.1064	1314.287	1694.425	972.7133
06Oct2017 13:00:00	2017	1381.795281	935.7762	1312.112	1699.78	953.7136
06Oct2017 14:00:00	2017	1375.665201	929.5266	1319.858	1690.105	921.3516
06Oct2017 15:00:00	2017	1360.394557	934.4737	1318.943	1671.729	925.7667
06Oct2017 16:00:00	2017	1348.266187	934.4618	1309.174	1661.103	932.5368
06Oct2017 17:00:00	2017	1330.950288	928.191	1292.495	1639.978	939.9373
06Oct2017 18:00:00	2017	1267.288696	947.2111	1286.394	1597.799	956.7857
06Oct2017 19:00:00	2017	1286.442253	960.1957	1304.275	1648.56	962.6147
06Oct2017 20:00:00	2017	1258.585603	961.2041	1301.799	1622.328	969.2045
06Oct2017 21:00:00	2017	1189.867572	943.4076	1273.12	1534.283	964.819
06Oct2017 22:00:00	2017	1094.495663	912.4153	1238.061	1427.22	952.6186
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07Oct2017 1:00:00	2017	882.9603507	844.0202	1179.323	1240.196	916.2287
07Oct2017 2:00:00	2017	857.4412163	837.7626	1161.235	1210.15	913.354
07Oct2017 3:00:00	2017	846.0392653	835.2227	1155.573	1174.728	924.9726
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07Oct2017 10:00:00	2017	1167.403566	955.3037	1259.483	1557.393	962.5442
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07Oct2017 15:00:00	2017	1169.301149	932.7656	1247.205	1548.69	1018.074
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07Oct2017 17:00:00	2017	1172.112113	935.2757	1241.188	1542.567	1036.238
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07Oct2017 21:00:00	2017	1129.368444	938.345	1266.552	1522.82	1039.405
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07Oct2017 23:00:00	2017	983.6386807	883.1276	1197.295	1341.376	1030.766
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08Oct2017 1:00:00	2017	876.5431825	849.0958	1157.271	1197.677	1012.037
08Oct2017 2:00:00	2017	853.6800269	847.3908	1154.232	1162.836	1017.368
08Oct2017 3:00:00	2017	841.3227214	851.1395	1151.443	1152.573	1001.234
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08Oct2017 7:00:00	2017	975.2435698	890.1456	1196.01	1285.588	1025.314
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08Oct2017 10:00:00	2017	1148.389398	944.1845	1289.101	1489.626	985.6422
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08Oct2017 18:00:00	2017	1117.604354	934.9009	1278.936	1440.825	1034.309
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08Oct2017 20:00:00	2017	1149.094832	961.0199	1339.614	1510.479	1068.34
08Oct2017 21:00:00	2017	1115.276953	946.2617	1323.37	1476.421	1048.266
08Oct2017 22:00:00	2017	1054.831618	921.1374	1290.163	1411.731	1037.418
08Oct2017 23:00:00	2017	981.6143875	890.6778	1253.723	1336.599	1051.521
09Oct2017 0:00:00	2017	920.6522473	862.6566	1243.854	1302.07	1032.577
09Oct2017 1:00:00	2017	880.2396417	846.9318	1227.671	1255.812	1012.276
09Oct2017 2:00:00	2017	857.1319144	838.6063	1218.545	1222.702	1012.223
09Oct2017 3:00:00	2017	848.3556431	836.0838	1210.2	1222.549	1008.745
09Oct2017 4:00:00	2017	854.3887705	838.0561	1210.61	1207.131	1013.492
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09Oct2017 6:00:00	2017	942.0966738	857.6416	1215.541	1280.052	1009.642
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09Oct2017 12:00:00	2017	1207.932187	919.4432	1246.272	1515.796	977.111
09Oct2017 13:00:00	2017	1205.943848	925.5183	1252.669	1503.778	962.8109
09Oct2017 14:00:00	2017	1200.795394	927.1367	1251.336	1496.656	918.4527
09Oct2017 15:00:00	2017	1209.039257	931.212	1282.913	1501.652	916.2303
09Oct2017 16:00:00	2017	1226.503231	935.6388	1270.894	1511.849	898.8966
09Oct2017 17:00:00	2017	1237.582098	934.3242	1291.764	1518.921	893.5693
09Oct2017 18:00:00	2017	1194.96059	930.2835	1295.274	1513.203	894.9789
09Oct2017 19:00:00	2017	1237.908606	949.106	1324.424	1578.588	954.9276
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13Oct2017 2:00:00	2017	888.2500283	913.4182	1208.285	1227.593	991.689
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14Oct2017 22:00:00	2017	1078.199379	945.9225	1272.48	1473.471	1029.711
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15Oct2017 1:00:00	2017	880.6958185	875.0092	1202.382	1263.873	964.9228
15Oct2017 2:00:00	2017	852.9050571	868.2106	1198.767	1226.07	969.6899
15Oct2017 3:00:00	2017	842.7478142	866.623	1202.81	1213.249	966.6025
15Oct2017 4:00:00	2017	844.856082	869.2039	1205.459	1213.973	973.4299
15Oct2017 5:00:00	2017	870.8505842	876.6728	1216.14	1218.355	980.4057
15Oct2017 6:00:00	2017	915.5271215	890.6284	1226.369	1239.215	969.3707
15Oct2017 7:00:00	2017	978.1572982	908.8993	1253.547	1308.11	970.3786
15Oct2017 8:00:00	2017	1021.6944	922.0932	1267.98	1344.709	957.8445
15Oct2017 9:00:00	2017	1079.122759	933.3353	1271.024	1401.201	962.9175
15Oct2017 10:00:00	2017	1126.569657	937.5708	1258.261	1449.542	950.2272
15Oct2017 11:00:00	2017	1164.803399	936.4346	1263.72	1489.223	961.6858
15Oct2017 12:00:00	2017	1178.932537	931.0356	1259.08	1506.088	946.9879
15Oct2017 13:00:00	2017	1175.292558	927.0103	1267.831	1506.888	943.2136
15Oct2017 14:00:00	2017	1179.809345	926.0291	1275.714	1500.817	946.9101
15Oct2017 15:00:00	2017	1191.754894	926.2619	1281.727	1507.286	949.65
15Oct2017 16:00:00	2017	1219.321983	939.3387	1286.419	1531.721	947.9473
15Oct2017 17:00:00	2017	1246.370155	955.1132	1296.074	1563.785	956.7351
15Oct2017 18:00:00	2017	1240.238161	961.5681	1310.871	1581.291	972.2383
15Oct2017 19:00:00	2017	1282.860046	981.7836	1336.618	1632.399	965.3599
15Oct2017 20:00:00	2017	1241.580918	971.9811	1332.185	1606.043	954.885
15Oct2017 21:00:00	2017	1168.443419	945.1159	1323.344	1541.82	970.4062
15Oct2017 22:00:00	2017	1066.012199	911.2144	1283.005	1434.18	964.5077
15Oct2017 23:00:00	2017	967.920662	883.1611	1242.754	1312.128	935.9373
16Oct2017 0:00:00	2017	901.5003992	863.0215	1223.401	1229.96	943.0697
16Oct2017 1:00:00	2017	859.8279839	853.7059	1213.349	1188.781	960.9684
16Oct2017 2:00:00	2017	836.7281396	850.2667	1208.455	1189.802	957.3679

16Oct2017 3:00:00	2017	835.6490647	852.0406	1208.014	1173.456	957.5821
16Oct2017 4:00:00	2017	858.2183093	858.5448	1207.342	1214.536	963.3602
16Oct2017 5:00:00	2017	943.3361414	880.1834	1231.065	1292.682	980.5317
16Oct2017 6:00:00	2017	1111.895355	923.1578	1298.232	1479.169	1019.443
16Oct2017 7:00:00	2017	1272.055258	977.9894	1363.438	1641.284	1076.224
16Oct2017 8:00:00	2017	1309.411642	983.0293	1356.589	1640.089	1089.665
16Oct2017 9:00:00	2017	1325.878048	971.1459	1357.587	1661.574	1107.075
16Oct2017 10:00:00	2017	1331.791987	928.7157	1357.058	1676.714	1099.856
16Oct2017 11:00:00	2017	1359.226202	908.8883	1326.782	1682.874	1096.318
16Oct2017 12:00:00	2017	1376.391131	905.8094	1315.509	1691.948	1075.976
16Oct2017 13:00:00	2017	1377.910257	907.598	1311.743	1708.89	1026.15
16Oct2017 14:00:00	2017	1383.008483	906.2862	1324.62	1695.329	991.4039
16Oct2017 15:00:00	2017	1381.537313	915.9132	1356.823	1716.788	994.2602
16Oct2017 16:00:00	2017	1381.378926	923.1576	1373.956	1737.359	973.6612
16Oct2017 17:00:00	2017	1382.816927	926.9699	1370.956	1739.937	961.6808
16Oct2017 18:00:00	2017	1345.11147	930.4989	1371.216	1724.667	958.3059
16Oct2017 19:00:00	2017	1365.979537	951.1457	1381.722	1758.804	966.952
16Oct2017 20:00:00	2017	1320.501378	944.7849	1377.057	1705.792	968.5408
16Oct2017 21:00:00	2017	1230.494105	953.4302	1344.118	1607.168	958.9221
16Oct2017 22:00:00	2017	1106.416355	910.3339	1294.419	1467.137	958.2581
16Oct2017 23:00:00	2017	996.8545868	877.2435	1263.257	1366.974	941.209
17Oct2017 0:00:00	2017	918.0894543	854.725	1232.999	1272.999	943.8714
17Oct2017 1:00:00	2017	867.4546654	841.9869	1232.325	1221.426	943.6434
17Oct2017 2:00:00	2017	841.6287663	808.8955	1228.793	1197.62	941.4796
17Oct2017 3:00:00	2017	840.5040683	814.9521	1234.632	1193.248	945.4461
17Oct2017 4:00:00	2017	866.2843629	816.9584	1238.619	1236.013	944.4873
17Oct2017 5:00:00	2017	947.5518339	834.7765	1253.89	1302.321	951.7376
17Oct2017 6:00:00	2017	1120.049664	872.0014	1291.322	1447.809	952.5482
17Oct2017 7:00:00	2017	1283.736993	919.899	1325.589	1614.162	950.3616
17Oct2017 8:00:00	2017	1304.034842	923.4308	1316.838	1661.297	941.6192
17Oct2017 9:00:00	2017	1318.956463	906.7108	1312.922	1664.838	942.2764
17Oct2017 10:00:00	2017	1348.095	910.9525	1311.366	1676.441	945.5589
17Oct2017 11:00:00	2017	1384.335902	911.3296	1334.854	1676.469	934.2879
17Oct2017 12:00:00	2017	1400.981423	887.0189	1322.745	1674.218	933.2424
17Oct2017 13:00:00	2017	1405.733978	887.1685	1313.437	1687.703	938.0044
17Oct2017 14:00:00	2017	1401.145665	854.0889	1292.027	1677.099	938.3001
17Oct2017 15:00:00	2017	1392.398903	863.0133	1256.067	1654.696	939.6978
17Oct2017 16:00:00	2017	1377.610397	884.4206	1263.961	1676.248	953.1319
17Oct2017 17:00:00	2017	1360.792789	869.722	1179.482	1671.178	975.2507
17Oct2017 18:00:00	2017	1346.651476	833.1375	1185.654	1649.393	981.3366
17Oct2017 19:00:00	2017	1355.319616	827.3592	1194.496	1645.872	989.9101
17Oct2017 20:00:00	2017	1313.001174	843.6071	1194.961	1601.748	984.5021
17Oct2017 21:00:00	2017	1219.975152	837.0243	1176.199	1520.108	965.5017
17Oct2017 22:00:00	2017	1103.55964	811.1938	1122.994	1414.264	952.0415
17Oct2017 23:00:00	2017	995.5764294	787.172	1108.624	1309.503	944.263
18Oct2017 0:00:00	2017	925.3591955	766.1622	1126.562	1231.908	942.0319
18Oct2017 1:00:00	2017	885.8676355	754.83	1135.488	1203.35	935.1482

18Oct2017 2:00:00	2017	869.2654067	749.071	1136.898	1185.329	940.1506
18Oct2017 3:00:00	2017	860.738482	748.361	1138.101	1171.819	928.0808
18Oct2017 4:00:00	2017	881.6438343	753.2591	1146.006	1180.433	920.3071
18Oct2017 5:00:00	2017	973.2429995	767.1819	1167.306	1247.038	924.5951
18Oct2017 6:00:00	2017	1148.090626	792.4083	1202.207	1395.765	939.2438
18Oct2017 7:00:00	2017	1309.900489	850.7078	1270.119	1581.464	957.1351
18Oct2017 8:00:00	2017	1328.508224	857.1258	1276.602	1597.29	967.3118
18Oct2017 9:00:00	2017	1349.457228	861.5813	1269.079	1586.535	963.6721
18Oct2017 10:00:00	2017	1368.591554	866.5513	1270.563	1601.789	969.4973
18Oct2017 11:00:00	2017	1373.279067	861.5538	1267.115	1609.858	975.3651
18Oct2017 12:00:00	2017	1356.896143	852.339	1259.768	1590.633	971.354
18Oct2017 13:00:00	2017	1347.481635	848.4007	1254.685	1590.453	974.9933
18Oct2017 14:00:00	2017	1340.693288	849.4068	1251.671	1578.057	980.5712
18Oct2017 15:00:00	2017	1345.597802	855.8872	1266.185	1589.367	975.7383
18Oct2017 16:00:00	2017	1361.483347	881.5783	1329.905	1632.766	982.976
18Oct2017 17:00:00	2017	1368.997475	890.7695	1345.233	1662.346	998.4265
18Oct2017 18:00:00	2017	1349.763261	897.1247	1362.343	1678.393	1019.978
18Oct2017 19:00:00	2017	1363.438724	914.6996	1370.074	1697.52	1020.873
18Oct2017 20:00:00	2017	1315.286785	901.4038	1352.385	1632.259	1017.601
18Oct2017 21:00:00	2017	1227.211781	868.6626	1316.674	1537.089	1012.11
18Oct2017 22:00:00	2017	1111.714028	827.9706	1266.914	1417.444	998.8337
18Oct2017 23:00:00	2017	1000.176762	788.793	1221.107	1321.664	987.1955
19Oct2017 0:00:00	2017	923.8603824	768.2695	1223.826	1269.236	983.9974
19Oct2017 1:00:00	2017	882.9921008	763.2223	1216.333	1221.635	974.7333
19Oct2017 2:00:00	2017	861.8501634	755.792	1210.192	1192.377	969.6977
19Oct2017 3:00:00	2017	855.1125719	749.7731	1209.029	1184.459	965.0964
19Oct2017 4:00:00	2017	877.7392695	754.5212	1211.266	1193.219	960.5776
19Oct2017 5:00:00	2017	963.4033661	770.829	1228.86	1262.883	966.9258
19Oct2017 6:00:00	2017	1140.309302	808.5816	1270.126	1411.085	977.6034
19Oct2017 7:00:00	2017	1299.108942	859.7387	1323.762	1589.245	987.336
19Oct2017 8:00:00	2017	1319.393087	874.7472	1347.491	1611.52	993.6309
19Oct2017 9:00:00	2017	1328.922826	871.1789	1340.267	1614.57	990.9743
19Oct2017 10:00:00	2017	1336.810289	867.1575	1342.076	1623.528	986.0988
19Oct2017 11:00:00	2017	1349.320472	903.78	1346.166	1628.391	981.472
19Oct2017 12:00:00	2017	1356.316376	914.4388	1344.072	1623.725	970.4663
19Oct2017 13:00:00	2017	1377.950021	915.1322	1340.977	1643.209	968.4332
19Oct2017 14:00:00	2017	1370.957338	915.0201	1336.422	1612.691	980.4688
19Oct2017 15:00:00	2017	1360.54702	920.9495	1350.128	1615.97	999.9751
19Oct2017 16:00:00	2017	1361.844039	929.1176	1356.316	1622.414	1010.939
19Oct2017 17:00:00	2017	1356.729079	932.6732	1314.919	1603.864	1004.446
19Oct2017 18:00:00	2017	1338.444965	919.1477	1316.858	1618.65	1020.5
19Oct2017 19:00:00	2017	1353.563351	923.7915	1350.287	1636.842	1030.67
19Oct2017 20:00:00	2017	1305.237443	914.8464	1358.73	1605.866	1034.054
19Oct2017 21:00:00	2017	1215.087748	912.854	1326.279	1520.639	1034.209
19Oct2017 22:00:00	2017	1101.491658	884.2942	1284.851	1405.709	1024.872
19Oct2017 23:00:00	2017	999.3335976	849.589	1230.156	1301.118	1016.589
20Oct2017 0:00:00	2017	926.7399657	830.6237	1194.816	1235.841	1001.364

20Oct2017 1:00:00	2017	882.7083276	821.0025	1200.587	1194.602	990.5531
20Oct2017 2:00:00	2017	863.1127299	814.7774	1198.858	1173.077	994.2812
20Oct2017 3:00:00	2017	855.5425031	813.5692	1215.784	1191.819	1005.223
20Oct2017 4:00:00	2017	876.2748729	820.0317	1219.699	1205.803	1011.892
20Oct2017 5:00:00	2017	955.9970026	836.0231	1227.206	1246.421	1025.812
20Oct2017 6:00:00	2017	1120.451876	874.8184	1269.089	1390.742	1032.445
20Oct2017 7:00:00	2017	1287.405443	919.691	1310.972	1553.576	1046.2
20Oct2017 8:00:00	2017	1329.075417	925.8248	1335.236	1604.477	1061.073
20Oct2017 9:00:00	2017	1335.43363	931.619	1356.923	1622.821	1055.102
20Oct2017 10:00:00	2017	1349.761104	916.4036	1350.55	1640.364	1026.542
20Oct2017 11:00:00	2017	1353.292482	913.1069	1333.576	1650.08	1032.709
20Oct2017 12:00:00	2017	1351.733439	910.3858	1331.957	1637.646	1022.392
20Oct2017 13:00:00	2017	1349.972739	915.2452	1332.191	1633.105	1029.895
20Oct2017 14:00:00	2017	1337.992769	907.8529	1328.041	1607.505	1042.392
20Oct2017 15:00:00	2017	1341.487809	909.4522	1348.319	1583.399	1060.699
20Oct2017 16:00:00	2017	1348.707173	925.9109	1352.655	1573.899	1052.181
20Oct2017 17:00:00	2017	1343.467173	930.4141	1342.39	1564.42	1051.851
20Oct2017 18:00:00	2017	1326.278239	932.252	1395.511	1572.266	1062.169
20Oct2017 19:00:00	2017	1308.262873	929.3237	1438.618	1583.636	1075.614
20Oct2017 20:00:00	2017	1268.897553	919.7955	1431.107	1545.168	1081.61
20Oct2017 21:00:00	2017	1203.847464	900.0397	1395.206	1484.66	1071.472
20Oct2017 22:00:00	2017	1109.240975	874.0175	1364.799	1397.969	1048.776
20Oct2017 23:00:00	2017	1012.629547	844.427	1335.933	1315.992	1031.108
21Oct2017 0:00:00	2017	941.6170831	823.7092	1299.346	1230.013	1012.264
21Oct2017 1:00:00	2017	894.4379126	809.1929	1227.017	1183.024	1004.195
21Oct2017 2:00:00	2017	868.4679545	801.9506	1224.332	1171.579	1012.899
21Oct2017 3:00:00	2017	855.7622606	798.5047	1230.951	1175.575	1018.605
21Oct2017 4:00:00	2017	860.8513488	801.5167	1224.16	1172.412	1019.903
21Oct2017 5:00:00	2017	890.0907991	808.5869	1230.021	1199.55	1022.232
21Oct2017 6:00:00	2017	955.0226389	829.7654	1246.161	1262.585	1010.805
21Oct2017 7:00:00	2017	1043.397434	856.8753	1288.743	1356.272	1020.942
21Oct2017 8:00:00	2017	1107.165542	875.6678	1312.424	1413.139	1009.263
21Oct2017 9:00:00	2017	1156.577054	884.5917	1326.33	1458.73	989.5528
21Oct2017 10:00:00	2017	1186.210175	886.9369	1323.529	1488.217	983.347
21Oct2017 11:00:00	2017	1202.237779	881.7141	1316.876	1501.306	978.1793
21Oct2017 12:00:00	2017	1206.138313	877.6827	1310.975	1500.096	958.4044
21Oct2017 13:00:00	2017	1186.362645	873.3549	1293.961	1481.64	946.7407
21Oct2017 14:00:00	2017	1172.134789	867.972	1284.012	1464.033	939.2373
21Oct2017 15:00:00	2017	1163.081199	869.1476	1289.109	1457.787	941.7441
21Oct2017 16:00:00	2017	1170.40067	879.3258	1310.68	1467.051	955.7117
21Oct2017 17:00:00	2017	1193.334063	890.5916	1323.962	1488.91	980.5745
21Oct2017 18:00:00	2017	1219.082585	905.8427	1345.974	1544.072	1001.714
21Oct2017 19:00:00	2017	1236.000929	921.7017	1360.471	1574.642	1004.318
21Oct2017 20:00:00	2017	1195.852736	912.0857	1354.465	1538.865	1017.855
21Oct2017 21:00:00	2017	1144.601899	892.1395	1336.11	1482.435	1006.054
21Oct2017 22:00:00	2017	1072.743786	867.9558	1300.868	1410.867	986.2446
21Oct2017 23:00:00	2017	992.2404873	841.2556	1260.792	1333.803	975.1287

22Oct2017 0:00:00	2017	924.0414808	820.8641	1236.55	1259.335	976.6027
22Oct2017 1:00:00	2017	874.574868	803.4601	1221.899	1223.97	973.5362
22Oct2017 2:00:00	2017	847.4160062	791.2934	1214.616	1201.896	980.2729
22Oct2017 3:00:00	2017	835.2024706	792.0965	1214.792	1194.581	972.7548
22Oct2017 4:00:00	2017	836.9132624	795.614	1220.722	1192.758	955.2069
22Oct2017 5:00:00	2017	860.4851615	807.3895	1223.322	1207.862	939.0685
22Oct2017 6:00:00	2017	907.43232	826.0909	1230.361	1239.079	945.3928
22Oct2017 7:00:00	2017	974.4838888	849.5199	1259.765	1312.13	948.8143
22Oct2017 8:00:00	2017	1024.862836	864.7762	1282.18	1380.394	964.385
22Oct2017 9:00:00	2017	1083.487629	880.2168	1313.029	1428.984	962.5375
22Oct2017 10:00:00	2017	1131.21037	887.9113	1324.199	1467.571	993.4157
22Oct2017 11:00:00	2017	1164.624813	892.2266	1327.714	1492.605	1007.028
22Oct2017 12:00:00	2017	1181.72976	887.89	1329.973	1497.242	996.7084
22Oct2017 13:00:00	2017	1181.044782	886.3812	1299.591	1491.446	983.6563
22Oct2017 14:00:00	2017	1176.552406	887.1263	1293.661	1489.199	989.073
22Oct2017 15:00:00	2017	1179.886245	890.9048	1289.175	1500.478	984.8543
22Oct2017 16:00:00	2017	1208.079021	901.2793	1304.588	1525.476	978.3197
22Oct2017 17:00:00	2017	1241.347907	910.7866	1309.503	1564.321	971.3243
22Oct2017 18:00:00	2017	1260.554128	912.764	1334.758	1591.253	992.6884
22Oct2017 19:00:00	2017	1285.738676	923.3802	1366.762	1619.177	1002.849
22Oct2017 20:00:00	2017	1245.510586	916.2881	1372.909	1577.58	1008.474
22Oct2017 21:00:00	2017	1172.266846	895.4989	1344.837	1508.857	999.0779
22Oct2017 22:00:00	2017	1067.814929	863.7006	1297.869	1397.678	982.99
22Oct2017 23:00:00	2017	965.4785704	835.2487	1256.779	1277.863	984.7323
23Oct2017 0:00:00	2017	899.8663176	817.4356	1236.698	1213.752	997.1107
23Oct2017 1:00:00	2017	860.1005151	808.593	1232.093	1176.038	983.7384
23Oct2017 2:00:00	2017	844.8315231	807.1482	1230.467	1155.13	983.4383
23Oct2017 3:00:00	2017	843.1527495	807.9779	1225.892	1155.282	981.1699
23Oct2017 4:00:00	2017	865.9506737	815.7537	1235.569	1203.737	967.8321
23Oct2017 5:00:00	2017	958.6977899	839.4367	1262.157	1279.587	975.2091
23Oct2017 6:00:00	2017	1133.616925	886.1839	1318.448	1439.995	1002.034
23Oct2017 7:00:00	2017	1300.137053	942.9253	1388.554	1632.531	1007.603
23Oct2017 8:00:00	2017	1327.74454	947.0371	1411.362	1651.255	1003.881
23Oct2017 9:00:00	2017	1327.222713	926.2976	1403.048	1647.713	1000.731
23Oct2017 10:00:00	2017	1336.068268	907.9267	1401.049	1658.918	995.7868
23Oct2017 11:00:00	2017	1360.262106	891.2639	1400.143	1675.91	1000.843
23Oct2017 12:00:00	2017	1368.954533	871.5861	1391.701	1674.111	971.5763
23Oct2017 13:00:00	2017	1361.712366	872.5576	1363.23	1673.054	948.1065
23Oct2017 14:00:00	2017	1354.015077	884.9131	1366.302	1659.578	958.525
23Oct2017 15:00:00	2017	1351.851209	891.0921	1341.186	1636.213	947.1931
23Oct2017 16:00:00	2017	1358.253833	888.6418	1356.903	1638.892	980.8869
23Oct2017 17:00:00	2017	1366.985197	877.6275	1354.008	1636.599	978.6216
23Oct2017 18:00:00	2017	1364.333298	888.7328	1380.758	1656.243	999.7257
23Oct2017 19:00:00	2017	1370.261767	896.3671	1400.687	1674.282	996.4089
23Oct2017 20:00:00	2017	1314.91301	884.175	1396.36	1627.4	997.9845
23Oct2017 21:00:00	2017	1222.333469	902.7474	1362.95	1531.765	995.5235
23Oct2017 22:00:00	2017	1100.973478	868.2631	1308.531	1423.884	983.5249

23Oct2017 23:00:00	2017	989.7631352	834.8279	1271.485	1329.67	971.4665
24Oct2017 0:00:00	2017	921.6452202	813.8715	1245.752	1270.197	972.8052
24Oct2017 1:00:00	2017	878.8221403	803.2835	1234.219	1231.611	972.0656
24Oct2017 2:00:00	2017	857.5730451	795.4861	1225.877	1205.99	986.0101
24Oct2017 3:00:00	2017	852.0442684	792.0372	1224.232	1196.419	992.3416
24Oct2017 4:00:00	2017	874.2601405	795.4208	1227.401	1202.942	997.4376
24Oct2017 5:00:00	2017	958.3943797	816.3157	1252.432	1266.705	1011.44
24Oct2017 6:00:00	2017	1140.170253	856.7261	1266.828	1402.356	1021.192
24Oct2017 7:00:00	2017	1305.639582	900.837	1329.729	1582.634	1002.206
24Oct2017 8:00:00	2017	1340.981353	909.4366	1329.214	1623.888	967.0436
24Oct2017 9:00:00	2017	1350.704625	909.9984	1311.942	1621.712	953.4739
24Oct2017 10:00:00	2017	1375.069995	914.5787	1301.873	1646.021	914.6905
24Oct2017 11:00:00	2017	1388.22967	917.6695	1300.971	1675.73	903.9041
24Oct2017 12:00:00	2017	1390.581263	922.6611	1288.125	1680.482	920.2095
24Oct2017 13:00:00	2017	1377.997036	926.6372	1282.826	1686.254	910.5962
24Oct2017 14:00:00	2017	1368.324612	927.0769	1263.952	1675.633	905.0655
24Oct2017 15:00:00	2017	1368.045084	923.7571	1261.967	1683.536	915.4188
24Oct2017 16:00:00	2017	1377.097573	929.4253	1265.733	1693.237	915.0138
24Oct2017 17:00:00	2017	1385.376799	924.7468	1245.015	1705.584	946.8418
24Oct2017 18:00:00	2017	1373.591815	924.6873	1271.673	1711.322	1001.359
24Oct2017 19:00:00	2017	1373.090081	930.903	1271.456	1690.566	1033.764
24Oct2017 20:00:00	2017	1315.0203	921.9797	1296.738	1624.598	1022.038
24Oct2017 21:00:00	2017	1226.085762	900.5598	1318.974	1548.563	1010.499
24Oct2017 22:00:00	2017	1101.828842	860.835	1288.372	1436.887	1013.265
24Oct2017 23:00:00	2017	989.906189	827.0502	1260.269	1329.451	1002.144
25Oct2017 0:00:00	2017	916.1746083	806.7479	1248.301	1250.604	985.8764
25Oct2017 1:00:00	2017	876.0643494	794.997	1231.258	1185.203	998.3175
25Oct2017 2:00:00	2017	854.4346691	789.6723	1211.264	1156.875	989.3592
25Oct2017 3:00:00	2017	846.9610377	788.3741	1207.985	1171.649	1000.476
25Oct2017 4:00:00	2017	868.303335	794.8161	1228.608	1210.889	982.3505
25Oct2017 5:00:00	2017	949.1691642	815.3892	1246.122	1278.971	966.6256
25Oct2017 6:00:00	2017	1126.908663	857.9034	1295.152	1429.787	966.451
25Oct2017 7:00:00	2017	1294.674015	907.2013	1358.144	1600.726	966.3483
25Oct2017 8:00:00	2017	1328.06957	920.4841	1371.824	1665.128	936.9546
25Oct2017 9:00:00	2017	1335.511441	909.5532	1358.011	1654.324	934.6526
25Oct2017 10:00:00	2017	1360.356655	912.1225	1371.769	1679.848	933.2991
25Oct2017 11:00:00	2017	1382.214027	922.1718	1451.979	1694.923	946.3578
25Oct2017 12:00:00	2017	1387.076557	917.4982	1382.575	1692.936	955.8054
25Oct2017 13:00:00	2017	1361.903736	898.1795	1360.52	1685.167	961.3088
25Oct2017 14:00:00	2017	1343.786662	908.5326	1367.035	1691.031	951.6325
25Oct2017 15:00:00	2017	1354.067615	915.7829	1374.119	1705.311	950.1464
25Oct2017 16:00:00	2017	1377.811908	923.0489	1404.594	1745.144	953.3095
25Oct2017 17:00:00	2017	1392.421902	935.4623	1432.933	1770.752	951.7999
25Oct2017 18:00:00	2017	1395.652183	933.1325	1439.125	1781.978	995.8225
25Oct2017 19:00:00	2017	1388.112244	933.1518	1412.609	1747.939	1023.98
25Oct2017 20:00:00	2017	1334.190706	922.8224	1386.269	1692.275	1035.614
25Oct2017 21:00:00	2017	1246.284572	937.6898	1347.676	1602.526	1023.516

25Oct2017 22:00:00	2017	1129.812175	902.0632	1284.071	1475.627	991.2943
25Oct2017 23:00:00	2017	1017.30822	870.6092	1245.425	1364.145	1023.7
26Oct2017 0:00:00	2017	940.8358541	849.0992	1210.066	1296.09	999.2645
26Oct2017 1:00:00	2017	897.8631837	837.5634	1207.054	1253.424	976.3909
26Oct2017 2:00:00	2017	878.3438441	828.3946	1223.252	1205.54	984.8345
26Oct2017 3:00:00	2017	874.0027094	829.0777	1212.477	1194.833	1002.164
26Oct2017 4:00:00	2017	894.0962239	836.9839	1196.943	1207.344	1011.739
26Oct2017 5:00:00	2017	980.6841608	856.2082	1212.034	1282.835	1026.691
26Oct2017 6:00:00	2017	1152.863425	899.1408	1265.007	1444.807	1026.805
26Oct2017 7:00:00	2017	1327.935686	957.4341	1348.916	1626.356	1049.988
26Oct2017 8:00:00	2017	1352.639268	957.3559	1395.723	1681.05	1041.174
26Oct2017 9:00:00	2017	1355.729307	940.2874	1426.333	1688.51	1039.87
26Oct2017 10:00:00	2017	1380.982001	940.0119	1426.579	1705.657	1038.667
26Oct2017 11:00:00	2017	1378.040834	937.8812	1394.6	1712.069	1030.755
26Oct2017 12:00:00	2017	1367.857314	929.5383	1376.529	1706.257	1028.18
26Oct2017 13:00:00	2017	1371.158933	919.6625	1398.092	1709.796	1022.518
26Oct2017 14:00:00	2017	1363.211876	912.3762	1392.168	1694.187	1001.047
26Oct2017 15:00:00	2017	1360.577947	889.2627	1390.166	1689.022	1003.809
26Oct2017 16:00:00	2017	1350.390689	883.1177	1388.022	1685.67	1022.63
26Oct2017 17:00:00	2017	1348.720781	887.9948	1372.506	1675.459	1020.296
26Oct2017 18:00:00	2017	1355.476108	909.8542	1399.794	1721.536	1040.24
26Oct2017 19:00:00	2017	1368.258018	925.3279	1413.43	1736.114	1048.052
26Oct2017 20:00:00	2017	1328.839519	917.913	1391.375	1688.943	1011.552
26Oct2017 21:00:00	2017	1248.976675	930.3887	1373.84	1611.266	1002.268
26Oct2017 22:00:00	2017	1127.300441	897.6309	1335.747	1490.022	989.5524
26Oct2017 23:00:00	2017	1020.369193	862.731	1287.212	1379.767	996.2092
27Oct2017 0:00:00	2017	947.4510088	843.858	1247.543	1296.664	976.7739
27Oct2017 1:00:00	2017	901.8471112	833.791	1213.175	1221.755	934.5753
27Oct2017 2:00:00	2017	878.2635586	828.1504	1220.589	1211.268	939.8934
27Oct2017 3:00:00	2017	871.4712367	829.6111	1221.43	1215.346	944.0939
27Oct2017 4:00:00	2017	887.5787639	836.5728	1227.271	1229.888	942.6085
27Oct2017 5:00:00	2017	961.13022	850.5345	1240.735	1286.822	912.1025
27Oct2017 6:00:00	2017	1129.474705	883.0253	1285.508	1441.679	907.226
27Oct2017 7:00:00	2017	1291.958379	938.3262	1328.533	1604.059	935.5122
27Oct2017 8:00:00	2017	1332.909648	949.4459	1333.1	1654.965	952.6239
27Oct2017 9:00:00	2017	1332.012609	942.6287	1341.658	1655.573	953.7892
27Oct2017 10:00:00	2017	1330.651829	944.1213	1357.917	1671.453	958.2211
27Oct2017 11:00:00	2017	1336.476684	940.4227	1354.951	1701.221	947.3606
27Oct2017 12:00:00	2017	1346.92849	929.4861	1347.865	1686.842	943.1975
27Oct2017 13:00:00	2017	1353.652821	927.2667	1346.861	1701.685	953.9776
27Oct2017 14:00:00	2017	1352.805654	923.5608	1344.599	1692.726	945.0458
27Oct2017 15:00:00	2017	1340.773238	926.725	1365.266	1687.268	984.595
27Oct2017 16:00:00	2017	1332.537322	923.3243	1366.073	1675.131	965.8603
27Oct2017 17:00:00	2017	1318.976097	916.5813	1353.356	1664.426	973.6868
27Oct2017 18:00:00	2017	1310.964914	928.0796	1369.842	1685.953	1014.458
27Oct2017 19:00:00	2017	1304.124157	934.8282	1376.266	1688.311	1023.812
27Oct2017 20:00:00	2017	1243.604159	926.3439	1367.631	1667.276	1007.609

27Oct2017 21:00:00	2017	1168.668505	908.6959	1346.531	1598.993	1015.124
27Oct2017 22:00:00	2017	1079.576317	885.1281	1317.037	1505.689	995.6611
27Oct2017 23:00:00	2017	987.1256122	855.3414	1254.818	1402.339	968.7881
28Oct2017 0:00:00	2017	919.1788889	830.9714	1227.792	1329.911	963.3711
28Oct2017 1:00:00	2017	873.5783363	816.6113	1240.773	1259.104	960.4167
28Oct2017 2:00:00	2017	847.9992894	809.5131	1235.845	1221.809	949.8433
28Oct2017 3:00:00	2017	836.1362428	807.8674	1229.131	1208.99	946.1646
28Oct2017 4:00:00	2017	836.1889077	808.5957	1238.597	1211.322	941.9293
28Oct2017 5:00:00	2017	866.6010157	818.9238	1250.847	1239.27	963.6884
28Oct2017 6:00:00	2017	925.7809361	836.9005	1277.363	1297.872	959.1439
28Oct2017 7:00:00	2017	1012.18595	860.5631	1308.443	1397.126	945.5195
28Oct2017 8:00:00	2017	1090.469005	881.4331	1323.373	1470.223	948.6289
28Oct2017 9:00:00	2017	1145.732083	893.117	1335.371	1543.583	922.5155
28Oct2017 10:00:00	2017	1184.257731	897.8602	1341.877	1552.112	929.5104
28Oct2017 11:00:00	2017	1210.078977	897.2694	1337.202	1565.889	918.5105
28Oct2017 12:00:00	2017	1219.667294	896.1472	1318.675	1549.271	887.4243
28Oct2017 13:00:00	2017	1212.812441	889.1119	1301.002	1548.14	917.1464
28Oct2017 14:00:00	2017	1211.011712	889.6312	1306.935	1545.482	925.6815
28Oct2017 15:00:00	2017	1199.64747	889.0083	1303.993	1540.6	920.7989
28Oct2017 16:00:00	2017	1199.804811	897.5152	1308.816	1570.617	916.556
28Oct2017 17:00:00	2017	1218.249433	904.2629	1311.179	1615.199	928.9565
28Oct2017 18:00:00	2017	1251.462222	913.3967	1327.097	1659.43	962.6432
28Oct2017 19:00:00	2017	1238.629019	917.4017	1333.339	1625.307	1001.808
28Oct2017 20:00:00	2017	1190.763157	905.653	1326.669	1605.957	1006.444
28Oct2017 21:00:00	2017	1127.274338	888.7976	1317.237	1532.039	977.916
28Oct2017 22:00:00	2017	1052.103361	862.3347	1272.407	1454.621	975.8381
28Oct2017 23:00:00	2017	976.192743	832.3329	1239.935	1377.06	963.8615
29Oct2017 0:00:00	2017	910.6902565	814.613	1225.268	1319.081	967.6311
29Oct2017 1:00:00	2017	865.8578793	806.7371	1232.267	1279.632	967.2896
29Oct2017 2:00:00	2017	838.7354981	802.8973	1232.295	1249.164	963.8246
29Oct2017 3:00:00	2017	826.1791754	806.2114	1226.062	1247.391	954.4011
29Oct2017 4:00:00	2017	833.2472577	807.4003	1214.513	1244.56	963.1451
29Oct2017 5:00:00	2017	857.5122031	817.437	1221.078	1251.53	982.8672
29Oct2017 6:00:00	2017	904.6336201	834.8623	1245.848	1307.454	976.2829
29Oct2017 7:00:00	2017	979.7157078	862.7485	1261.186	1373.602	968.4233
29Oct2017 8:00:00	2017	1042.648737	890.1977	1282.294	1401.874	975.463
29Oct2017 9:00:00	2017	1091.158745	902.0925	1304.316	1456.36	977.5995
29Oct2017 10:00:00	2017	1134.7947	915.137	1316.179	1511.304	980.6659
29Oct2017 11:00:00	2017	1171.40239	925.352	1330.227	1549.253	1004.826
29Oct2017 12:00:00	2017	1192.493792	929.7481	1331.477	1585.167	1044.26
29Oct2017 13:00:00	2017	1199.035697	922.9916	1314.299	1597.678	1035.132
29Oct2017 14:00:00	2017	1198.463998	919.951	1315.004	1626.256	1060.912
29Oct2017 15:00:00	2017	1211.999153	920.7617	1348.303	1647.179	1087.88
29Oct2017 16:00:00	2017	1227.180602	930.6511	1360.792	1678.777	1099.574
29Oct2017 17:00:00	2017	1255.619222	937.6092	1363.933	1705.458	1102.042
29Oct2017 18:00:00	2017	1304.659754	914.1886	1393.89	1762.376	1124.297
29Oct2017 19:00:00	2017	1312.490537	904.5336	1393.626	1740.691	1167.855

29Oct2017 20:00:00	2017	1268.720117	894.6187	1378.614	1695.321	1182.675
29Oct2017 21:00:00	2017	1195.896298	923.3656	1349.997	1628.899	1167.861
29Oct2017 22:00:00	2017	1090.233807	895.7273	1308.088	1495.979	1145.522
29Oct2017 23:00:00	2017	989.217078	863.8062	1282.746	1395.395	1164.283
30Oct2017 0:00:00	2017	917.9659235	845.3181	1259.494	1330.214	1155.429
30Oct2017 1:00:00	2017	877.6482917	839.4337	1253.009	1278.056	1166.335
30Oct2017 2:00:00	2017	864.7476242	836.4751	1255.857	1253.396	1161.56
30Oct2017 3:00:00	2017	858.8242586	840.0035	1263.594	1273.854	1154.318
30Oct2017 4:00:00	2017	882.4976472	848.1556	1268.556	1286.913	1166.369
30Oct2017 5:00:00	2017	969.9096787	870.5816	1284.051	1357.839	1172.147
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30Oct2017 7:00:00	2017	1316.404329	969.7591	1395.036	1706.098	1183.366
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30Oct2017 12:00:00	2017	1361.184426	928.7431	1413.642	1786.902	1134.444
30Oct2017 13:00:00	2017	1356.328352	935.3281	1379.282	1760.142	1131.923
30Oct2017 14:00:00	2017	1348.500738	916.6331	1389.529	1725.12	1123.886
30Oct2017 15:00:00	2017	1346.929913	908.9963	1391.717	1737.997	1118.06
30Oct2017 16:00:00	2017	1353.549962	914.0359	1383.418	1757.588	1125.866
30Oct2017 17:00:00	2017	1377.080085	919.6511	1385.17	1766.132	1129.251
30Oct2017 18:00:00	2017	1399.118237	931.6645	1409.686	1801.497	1126.794
30Oct2017 19:00:00	2017	1385.244506	931.2594	1411.063	1801.512	1118.648
30Oct2017 20:00:00	2017	1328.32889	917.6591	1394.675	1753.269	1078.044
30Oct2017 21:00:00	2017	1241.99844	947.6004	1358.387	1674.611	1056.799
30Oct2017 22:00:00	2017	1125.299688	921.9035	1319.326	1529.042	1055.509
30Oct2017 23:00:00	2017	1011.799456	887.526	1291.327	1442.49	1058.249
31Oct2017 0:00:00	2017	937.3386836	861.0559	1278.242	1356.861	1056.23
31Oct2017 1:00:00	2017	899.0055145	850.5991	1279.24	1310.91	1047.358
31Oct2017 2:00:00	2017	873.6271168	849.3554	1271.143	1284.784	1000.037
31Oct2017 3:00:00	2017	865.4924715	846.5399	1271.274	1283.446	985.2717
31Oct2017 4:00:00	2017	891.703954	854.0243	1269.019	1299.404	987.5789
31Oct2017 5:00:00	2017	976.9533692	871.416	1277.649	1365.506	1031.74
31Oct2017 6:00:00	2017	1151.864164	920.1315	1332.415	1524.435	1045.614
31Oct2017 7:00:00	2017	1309.820088	960.9225	1419.711	1699.078	1039.946
31Oct2017 8:00:00	2017	1353.373505	928.7628	1450.485	1730.427	1001.256
31Oct2017 9:00:00	2017	1349.6745	919.1224	1464.477	1721.59	984.8914
31Oct2017 10:00:00	2017	1357.311419	915.6867	1464.656	1742.45	982.0396
31Oct2017 11:00:00	2017	1355.318616	916.9021	1471.979	1753.887	996.2177
31Oct2017 12:00:00	2017	1355.519706	910.3655	1465.758	1743.59	1045.478
31Oct2017 13:00:00	2017	1361.053935	908.125	1434.662	1749.804	1050.582
31Oct2017 14:00:00	2017	1368.289818	906.9631	1427.899	1756.737	1043.63
31Oct2017 15:00:00	2017	1383.797684	913.3308	1434.865	1765.381	1048.296
31Oct2017 16:00:00	2017	1408.584673	928.6741	1449.019	1797.699	1037.333
31Oct2017 17:00:00	2017	1423.001699	933.1897	1432.797	1788.36	1050.298
31Oct2017 18:00:00	2017	1395.809465	920.8089	1431.344	1779.188	1071.491

31Oct2017 19:00:00	2017	1351.916233	907.2926	1419.399	1736.135	1067.018
31Oct2017 20:00:00	2017	1310.368668	925.2937	1393.078	1712.318	1055.902
31Oct2017 21:00:00	2017	1230.012494	947.3626	1369.703	1631.296	1073.678
31Oct2017 22:00:00	2017	1113.792008	913.0057	1360.321	1520.837	1066.562
31Oct2017 23:00:00	2017	1008.336515	876.5354	1325.788	1426.236	1057.216
01Nov2017 0:00:00	2017	941.1711681	860.8533	1287.432	1353.701	1047.033
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01Nov2017 3:00:00	2017	884.5909799	842.6413	1275.923	1313.718	1054.919
01Nov2017 4:00:00	2017	911.0832182	849.164	1282.003	1320.35	1056.405
01Nov2017 5:00:00	2017	995.7641108	872.8137	1297.126	1367.662	1069.76
01Nov2017 6:00:00	2017	1168.378845	919.8746	1334.086	1521.98	1055.116
01Nov2017 7:00:00	2017	1318.58728	967.5897	1380.375	1687.27	1061.344
01Nov2017 8:00:00	2017	1373.010606	993.1487	1415.956	1752.688	1065.053
01Nov2017 9:00:00	2017	1374.084238	998.5189	1444.017	1730.246	1073.567
01Nov2017 10:00:00	2017	1387.666435	1005.082	1466.564	1767.007	1086.514
01Nov2017 11:00:00	2017	1399.212218	1003.529	1448.304	1813.124	1087.455
01Nov2017 12:00:00	2017	1393.756302	998.2263	1398.719	1791.503	1087.783
01Nov2017 13:00:00	2017	1385.819116	1003.521	1443.464	1803.403	1087.862
01Nov2017 14:00:00	2017	1379.197153	1005.77	1456.659	1794.778	1099.004
01Nov2017 15:00:00	2017	1392.768474	1011.255	1452.134	1799.869	1118.805
01Nov2017 16:00:00	2017	1411.400082	1016.903	1464.467	1821.937	1113.052
01Nov2017 17:00:00	2017	1439.854004	993.4581	1471.601	1851.984	1119.427
01Nov2017 18:00:00	2017	1456.068708	998.5359	1500.063	1886.094	1129.446
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01Nov2017 20:00:00	2017	1370.805488	990.3452	1462.592	1770.623	1130.137
01Nov2017 21:00:00	2017	1283.694357	972.0854	1428.859	1690.479	1105.56
01Nov2017 22:00:00	2017	1162.444717	942.4697	1383.296	1576.264	1044.015
01Nov2017 23:00:00	2017	1055.554311	914.7494	1347.27	1468.274	1007.241
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02Nov2017 1:00:00	2017	945.0879902	889.9267	1322.971	1364.825	1026.103
02Nov2017 2:00:00	2017	928.1704021	881.918	1324.319	1351.047	1017.348
02Nov2017 3:00:00	2017	925.2903045	886.5458	1333.303	1367.478	1019.642
02Nov2017 4:00:00	2017	948.4265996	890.0123	1333.35	1367.236	993.9992
02Nov2017 5:00:00	2017	1034.817461	915.2675	1356.651	1440.77	1022.197
02Nov2017 6:00:00	2017	1205.567727	950.8547	1404.641	1593.172	1006.707
02Nov2017 7:00:00	2017	1359.343439	1011.131	1469.6	1792.304	1017.474
02Nov2017 8:00:00	2017	1407.215208	1029.234	1504.748	1837.456	1018.875
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02Nov2017 10:00:00	2017	1431.331748	1029.655	1512.453	1838.379	1010.048
02Nov2017 11:00:00	2017	1439.847559	1031.789	1502.832	1866.87	1011.053
02Nov2017 12:00:00	2017	1437.920671	1026.483	1491.664	1846.542	1011.648
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02Nov2017 14:00:00	2017	1430.946514	1029.124	1486.238	1826.783	1047.862
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02Nov2017 17:00:00	2017	1466.599321	1037.599	1492.315	1875.828	1082.428

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02Nov2017 19:00:00	2017	1470.526459	1044.556	1498.461	1907.723	1116.189
02Nov2017 20:00:00	2017	1423.455356	1027.077	1483.911	1875.311	1079.002
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02Nov2017 22:00:00	2017	1216.799959	967.1626	1396.159	1639.952	1048.216
02Nov2017 23:00:00	2017	1097.823514	934.8036	1358.783	1543.907	1034.4
03Nov2017 0:00:00	2017	1026.381313	926.172	1335.061	1457.811	1029.943
03Nov2017 1:00:00	2017	987.8672645	914.4355	1318.006	1408.704	1034.023
03Nov2017 2:00:00	2017	969.5465765	913.1225	1317.312	1383.273	1030.626
03Nov2017 3:00:00	2017	962.0436734	914.9894	1312.483	1360.604	1019.828
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03Nov2017 9:00:00	2017	1430.241241	1034.858	1501.3	1829.715	1071.608
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03Nov2017 11:00:00	2017	1457.786814	1042.882	1495.718	1867.695	1070.796
03Nov2017 12:00:00	2017	1451.152347	1040.652	1475.326	1861.711	1075.448
03Nov2017 13:00:00	2017	1443.342789	1028.582	1489.962	1841.042	1078.318
03Nov2017 14:00:00	2017	1437.955692	1037.831	1486.153	1831.777	1075.451
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03Nov2017 17:00:00	2017	1451.52817	1042.14	1440.308	1813.994	1101.609
03Nov2017 18:00:00	2017	1471.067048	1049.566	1476.828	1872.653	1105.456
03Nov2017 19:00:00	2017	1448.752383	1047.014	1476.291	1848.561	1104.727
03Nov2017 20:00:00	2017	1392.21933	1031.37	1469.401	1807.938	1112.651
03Nov2017 21:00:00	2017	1318.714464	1012.671	1432.006	1731.44	1108.453
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05Nov2017 10:00:00	2017	1241.269552	975.4808	1405.495	1663.509	1148.378
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05Nov2017 13:00:00	2017	1256.943068	974.1752	1404.291	1650.85	1156.87
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05Nov2017 17:00:00	2017	1452.529357	1044.906	1470.604	1933.195	1202.887
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09Nov2017 21:00:00	2017	1304.115551	992.9871	1440.65	1724.953	1186.128
09Nov2017 22:00:00	2017	1178.883594	955.9337	1395.912	1635.402	1185.838
09Nov2017 23:00:00	2017	1073.403712	920.1068	1358.825	1520.067	1157.926
10Nov2017 0:00:00	2017	1004.427061	894.5303	1332.89	1419.402	1139.951
10Nov2017 1:00:00	2017	958.8596274	882.818	1323.646	1371.811	1134.144
10Nov2017 2:00:00	2017	936.9828892	873.6123	1313.396	1345.952	1119.574
10Nov2017 3:00:00	2017	926.9077575	869.6879	1310.544	1348.756	1127.133
10Nov2017 4:00:00	2017	948.7365374	876.1542	1319.877	1367.517	1137.168
10Nov2017 5:00:00	2017	1019.154012	894.0029	1344.052	1438.241	1124.438
10Nov2017 6:00:00	2017	1167.531489	925.3694	1402.237	1571.073	1117.995
10Nov2017 7:00:00	2017	1304.412022	962.4042	1450.703	1703.31	1114.76
10Nov2017 8:00:00	2017	1327.64656	977.7181	1465.064	1753.136	1119.456
10Nov2017 9:00:00	2017	1343.75807	983.9531	1470.919	1790.842	1105.938
10Nov2017 10:00:00	2017	1354.302478	978.4742	1460.229	1788.245	1101.674
10Nov2017 11:00:00	2017	1358.566409	976.0339	1470.18	1796.997	1103.756
10Nov2017 12:00:00	2017	1358.843544	973.2166	1468.432	1787.459	1132.331
10Nov2017 13:00:00	2017	1357.180265	971.6244	1464.457	1784.764	1134.83

10Nov2017 14:00:00	2017	1346.501609	959.933	1457.454	1771.938	1124.271
10Nov2017 15:00:00	2017	1335.308869	959.4539	1455.945	1783.761	1131.072
10Nov2017 16:00:00	2017	1359.117166	976.8702	1482.985	1814.693	1147.443
10Nov2017 17:00:00	2017	1453.412221	1025.117	1537.081	1912.984	1149.371
10Nov2017 18:00:00	2017	1411.647951	1018.369	1505.25	1861.573	1158.774
10Nov2017 19:00:00	2017	1358.14646	1010.623	1489.724	1809.869	1138.417
10Nov2017 20:00:00	2017	1302.242302	997.2135	1474.214	1763.317	1115.244
10Nov2017 21:00:00	2017	1227.661463	973.2997	1414.599	1681.735	1152.362
10Nov2017 22:00:00	2017	1133.83043	940.7942	1375.127	1596.093	1154.301
10Nov2017 23:00:00	2017	1041.747261	912.9719	1348.455	1507.944	1142.872
11Nov2017 0:00:00	2017	977.6413857	895.9927	1327.419	1442.317	1137.731
11Nov2017 1:00:00	2017	932.4688748	882.8848	1318.321	1386.695	1156.053
11Nov2017 2:00:00	2017	906.3463617	877.0649	1303.179	1357.822	1160.443
11Nov2017 3:00:00	2017	899.277738	877.9173	1303.274	1348.281	1135.503
11Nov2017 4:00:00	2017	906.8494451	881.9085	1308.16	1350.017	1116.065
11Nov2017 5:00:00	2017	936.1886489	892.7131	1316.594	1366.822	1109.745
11Nov2017 6:00:00	2017	989.3729701	915.4109	1329.108	1419.338	1119.312
11Nov2017 7:00:00	2017	1056.530031	938.852	1351.433	1487.148	1114.257
11Nov2017 8:00:00	2017	1114.731093	956.1919	1389.462	1554.094	1127.756
11Nov2017 9:00:00	2017	1167.321703	963.935	1400.366	1592.934	1107.813
11Nov2017 10:00:00	2017	1191.183861	960.8696	1404.8	1611.984	1106.775
11Nov2017 11:00:00	2017	1200.241155	955.7146	1402.309	1624.088	1096.797
11Nov2017 12:00:00	2017	1198.547533	948.7076	1398.14	1615.647	1086.653
11Nov2017 13:00:00	2017	1184.085752	939.6836	1396.314	1625.04	1107.899
11Nov2017 14:00:00	2017	1171.094412	936.3804	1399.986	1600.156	1098.99
11Nov2017 15:00:00	2017	1185.343975	940.1621	1411.927	1586.776	1078.116
11Nov2017 16:00:00	2017	1239.285582	972.6053	1446.43	1662.49	1084.342
11Nov2017 17:00:00	2017	1343.05974	1020.144	1491.392	1779.48	1110.562
11Nov2017 18:00:00	2017	1320.348574	1009.066	1482.218	1743.86	1106.773
11Nov2017 19:00:00	2017	1273.135718	997.654	1458.131	1702.413	1096.086
11Nov2017 20:00:00	2017	1230.462394	985.2138	1441.156	1664.71	1110.743
11Nov2017 21:00:00	2017	1173.379962	967.0885	1421.672	1600.899	1098.504
11Nov2017 22:00:00	2017	1101.68938	936.0859	1390.744	1527.307	1087.632
11Nov2017 23:00:00	2017	1022.027945	897.9644	1355.999	1461.503	1088.835
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12Nov2017 1:00:00	2017	917.8835638	861.6674	1322.737	1369.106	1106.901
12Nov2017 2:00:00	2017	890.2344578	851.842	1313.426	1342.5	1108.123
12Nov2017 3:00:00	2017	881.6604929	844.4461	1308.246	1333.365	1113.381
12Nov2017 4:00:00	2017	884.8981402	838.6135	1306.911	1339.978	1111.621
12Nov2017 5:00:00	2017	910.4576325	834.7047	1301.696	1345.011	1092.177
12Nov2017 6:00:00	2017	960.3000698	851.1564	1289.975	1341.524	1090.184
12Nov2017 7:00:00	2017	1025.874683	867.9028	1321.132	1406.219	1080.789
12Nov2017 8:00:00	2017	1078.253807	880.2841	1335.594	1449.188	1049.769
12Nov2017 9:00:00	2017	1136.89234	897.1486	1358.273	1522.072	1047.596
12Nov2017 10:00:00	2017	1170.919525	899.6544	1367.383	1571.158	1086.885
12Nov2017 11:00:00	2017	1185.850324	894.6118	1374.414	1606.552	1106.088
12Nov2017 12:00:00	2017	1191.593923	884.6328	1372.522	1623.052	1120.524

12Nov2017 13:00:00	2017	1184.445455	876.2759	1364.963	1621.492	1132.195
12Nov2017 14:00:00	2017	1180.952631	875.828	1373.271	1637.108	1136.61
12Nov2017 15:00:00	2017	1181.070019	889.9727	1385.522	1668.721	1148.374
12Nov2017 16:00:00	2017	1249.84769	928.8537	1426.4	1748.379	1158.559
12Nov2017 17:00:00	2017	1378.975433	980.4427	1493.597	1841.61	1188.382
12Nov2017 18:00:00	2017	1359.673385	977.6376	1483.231	1835.745	1220.28
12Nov2017 19:00:00	2017	1301.72321	959.8037	1453.955	1771.977	1234.455
12Nov2017 20:00:00	2017	1254.45142	947.442	1435.291	1734.83	1234.735
12Nov2017 21:00:00	2017	1190.067395	931.7555	1408.72	1665.555	1231.695
12Nov2017 22:00:00	2017	1096.179448	904.5689	1379.338	1547.291	1220.636
12Nov2017 23:00:00	2017	1007.168841	875.1498	1348.664	1468.087	1228.923
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13Nov2017 3:00:00	2017	891.5667821	843.5852	1301.823	1339.32	1215.548
13Nov2017 4:00:00	2017	914.1379719	850.274	1311.025	1338.717	1208.484
13Nov2017 5:00:00	2017	978.1690347	872.7856	1334.105	1414.954	1221.851
13Nov2017 6:00:00	2017	1110.477226	913.0274	1381.085	1505.393	1208.296
13Nov2017 7:00:00	2017	1238.107	940.173	1424.485	1619.95	1210.541
13Nov2017 8:00:00	2017	1267.628988	929.7365	1446.09	1661.382	1226.408
13Nov2017 9:00:00	2017	1288.867576	944.5429	1463.654	1731.372	1212.956
13Nov2017 10:00:00	2017	1312.856821	963.4716	1466.788	1777.714	1199.623
13Nov2017 11:00:00	2017	1323.910113	971.2386	1473.395	1807.586	1194.028
13Nov2017 12:00:00	2017	1323.522739	963.7389	1471.45	1800.567	1172.972
13Nov2017 13:00:00	2017	1322.168383	961.897	1473.352	1824.381	1178.162
13Nov2017 14:00:00	2017	1318.093269	960.6346	1475.799	1823.531	1200.023
13Nov2017 15:00:00	2017	1326.61374	967.9992	1482.266	1813.499	1211.031
13Nov2017 16:00:00	2017	1393.818925	995.8906	1487.017	1897.303	1213.031
13Nov2017 17:00:00	2017	1499.174042	1050.367	1532.886	1947.2	1245.144
13Nov2017 18:00:00	2017	1451.400618	1041.341	1495.425	1907.812	1301.377
13Nov2017 19:00:00	2017	1392.018467	1031.779	1474.029	1835.172	1282.839
13Nov2017 20:00:00	2017	1331.853944	1015.277	1457.398	1768.082	1282.184
13Nov2017 21:00:00	2017	1236.432365	993.0892	1446.603	1674.739	1292.935
13Nov2017 22:00:00	2017	1119.828848	956.6125	1416.271	1561.42	1280.983
13Nov2017 23:00:00	2017	1015.408627	920.9693	1391.982	1454.839	1206.881
14Nov2017 0:00:00	2017	951.9676281	895.2204	1345.196	1394.246	1192.24
14Nov2017 1:00:00	2017	921.23433	886.1241	1322.198	1365.252	1174.431
14Nov2017 2:00:00	2017	912.5407882	886.1452	1328.176	1367.65	1172.3
14Nov2017 3:00:00	2017	916.4242276	891.1749	1329.044	1353.648	1164.551
14Nov2017 4:00:00	2017	945.6827953	903.779	1335.584	1394.682	1163.929
14Nov2017 5:00:00	2017	1031.110215	929.5043	1345.792	1442.506	1168.155
14Nov2017 6:00:00	2017	1200.310153	982.3246	1382.063	1605.838	1146.882
14Nov2017 7:00:00	2017	1354.425702	1030.963	1436.7	1760.004	1159.952
14Nov2017 8:00:00	2017	1378.837198	1033.134	1441.113	1786.375	1156.217
14Nov2017 9:00:00	2017	1393.472036	1026.966	1424.188	1808.5	1144.205
14Nov2017 10:00:00	2017	1412.318267	1020.916	1424.738	1825.817	1168.151
14Nov2017 11:00:00	2017	1419.492323	1026.347	1447.136	1856.176	1167.125

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14Nov2017 13:00:00	2017	1419.08932	1038.466	1463.924	1847.947	1144.843
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14Nov2017 17:00:00	2017	1556.852996	1039.732	1562.273	1968.587	1215.137
14Nov2017 18:00:00	2017	1509.819359	1015.86	1531.059	1947.78	1223.912
14Nov2017 19:00:00	2017	1451.121131	1040.556	1510.886	1877.862	1224.64
14Nov2017 20:00:00	2017	1393.008939	1038.375	1491.595	1829.783	1221.369
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15Nov2017 0:00:00	2017	1006.017069	948.6343	1382.864	1487.997	1160.872
15Nov2017 1:00:00	2017	967.3466056	927.0895	1355.576	1460.646	1189.753
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15Nov2017 8:00:00	2017	1391.458132	1052.377	1497.734	1844.912	1240.728
15Nov2017 9:00:00	2017	1401.836361	1053.383	1486.937	1877.58	1231.038
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15Nov2017 13:00:00	2017	1402.659836	1009.499	1432.4	1872.85	1298.564
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15Nov2017 19:00:00	2017	1442.149772	1033.037	1488.687	1894.435	1268.749
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16Nov2017 1:00:00	2017	964.4366514	909.8179	1380.828	1408.808	1179.67
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16Nov2017 3:00:00	2017	947.4663646	902.8613	1360.758	1385.182	1189.233
16Nov2017 4:00:00	2017	972.0845915	905.6861	1346.301	1397.614	1185.465
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16Nov2017 7:00:00	2017	1367.434178	1020.073	1451.296	1796.118	1190.203
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16Nov2017 13:00:00	2017	1406.81534	1044.614	1402.858	1842.455	1107.163
16Nov2017 14:00:00	2017	1396.303369	1032.891	1426.488	1840.006	1124.69
16Nov2017 15:00:00	2017	1409.781577	1011.098	1447.343	1866.275	1140.691
16Nov2017 16:00:00	2017	1459.371454	1008.71	1484.87	1930.335	1148.798
16Nov2017 17:00:00	2017	1557.636941	1039.134	1520.851	2015.79	1171.403
16Nov2017 18:00:00	2017	1521.030467	1042.416	1494.679	1949.869	1221.171
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16Nov2017 20:00:00	2017	1421.521542	1045.861	1453.081	1840.648	1224.588
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17Nov2017 3:00:00	2017	985.6672574	923.3516	1304.815	1376.947	1154.408
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17Nov2017 12:00:00	2017	1450.59581	1000.603	1440.233	1785.699	1220.971
17Nov2017 13:00:00	2017	1437.528153	1020.063	1455.135	1800.557	1217.927
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17Nov2017 16:00:00	2017	1453.279855	1031.205	1504.211	1852.322	1264.034
17Nov2017 17:00:00	2017	1535.833173	1044.591	1534.099	1936.442	1281.117
17Nov2017 18:00:00	2017	1489.813362	1034.776	1499.19	1887.963	1272.843
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17Nov2017 20:00:00	2017	1390.260292	1030.764	1465.004	1770.497	1311.106
17Nov2017 21:00:00	2017	1318.978037	1007.793	1440.08	1709.038	1285.301
17Nov2017 22:00:00	2017	1214.704843	987.1728	1401.124	1623.229	1287.267
17Nov2017 23:00:00	2017	1120.925952	955.6648	1376.169	1517.941	1269.328
18Nov2017 0:00:00	2017	1051.331571	930.6954	1345.92	1406.909	1253.202
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18Nov2017 3:00:00	2017	963.5392067	907.4279	1319.202	1344.259	1259.054
18Nov2017 4:00:00	2017	961.605953	907.9809	1320.403	1347.702	1227.954
18Nov2017 5:00:00	2017	989.5555126	916.1953	1328.596	1368.509	1213.185
18Nov2017 6:00:00	2017	1044.427856	933.7562	1357.376	1455.45	1231.255
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18Nov2017 12:00:00	2017	1271.891392	980.0295	1406.023	1677.451	1229.788
18Nov2017 13:00:00	2017	1258.126455	975.6067	1404.772	1681.612	1232.084
18Nov2017 14:00:00	2017	1246.271207	970.2021	1405.875	1677.532	1228.159
18Nov2017 15:00:00	2017	1237.875171	971.9474	1424.163	1678.586	1226.577
18Nov2017 16:00:00	2017	1266.154495	990.1767	1450.115	1744.438	1235.397
18Nov2017 17:00:00	2017	1381.027492	1023.466	1450.117	1795.795	1233.88
18Nov2017 18:00:00	2017	1351.620701	1015.295	1421.887	1727.831	1229.893
18Nov2017 19:00:00	2017	1301.224077	995.7134	1398.479	1674.03	1221.526
18Nov2017 20:00:00	2017	1254.089171	982.7959	1380.821	1632.667	1232.363
18Nov2017 21:00:00	2017	1200.208855	962.8321	1370.088	1583.184	1211.533
18Nov2017 22:00:00	2017	1127.911634	937.6117	1373.211	1506.477	1193.054
18Nov2017 23:00:00	2017	1048.598897	910.0334	1346.759	1426.115	1171.292
19Nov2017 0:00:00	2017	981.939835	891.7413	1319.204	1356.51	1179.632
19Nov2017 1:00:00	2017	935.2695717	879.0464	1304.08	1307.467	1180.6
19Nov2017 2:00:00	2017	906.4708629	872.2097	1282.545	1269.416	1201.268
19Nov2017 3:00:00	2017	895.2342171	872.7114	1269.525	1296.313	1192.81
19Nov2017 4:00:00	2017	895.5087317	875.56	1295.937	1299.794	1188.741
19Nov2017 5:00:00	2017	918.6608987	883.2922	1293.523	1330.566	1195.072
19Nov2017 6:00:00	2017	961.351504	900.1179	1313.199	1383.159	1209.534
19Nov2017 7:00:00	2017	1027.595327	923.1098	1331.81	1455.526	1199.946
19Nov2017 8:00:00	2017	1076.497028	941.68	1354.786	1451.787	1211.904
19Nov2017 9:00:00	2017	1136.593151	955.7521	1377.349	1513.943	1224.254
19Nov2017 10:00:00	2017	1180.141206	955.1811	1378.495	1539.753	1199.644
19Nov2017 11:00:00	2017	1196.211913	961.7573	1384.211	1562.058	1197.902
19Nov2017 12:00:00	2017	1207.675877	953.0347	1387.334	1569.903	1200.742
19Nov2017 13:00:00	2017	1201.692599	948.8152	1386.426	1614.56	1200.888
19Nov2017 14:00:00	2017	1204.794627	951.5451	1393.051	1630.076	1199.601
19Nov2017 15:00:00	2017	1220.218399	960.7784	1401.412	1649.096	1223.476
19Nov2017 16:00:00	2017	1294.080176	989.4932	1432.562	1748.233	1236.635
19Nov2017 17:00:00	2017	1411.401294	1026.272	1481.818	1851.759	1247.735
19Nov2017 18:00:00	2017	1389.450166	1016.255	1450.747	1808.625	1251.276
19Nov2017 19:00:00	2017	1346.030769	1003.739	1421.226	1737.918	1231.009
19Nov2017 20:00:00	2017	1294.597426	989.073	1412.379	1689.865	1224.317
19Nov2017 21:00:00	2017	1214.64786	959.7645	1376.987	1614.998	1228.122
19Nov2017 22:00:00	2017	1109.688039	924.8308	1333.091	1529.461	1201.717
19Nov2017 23:00:00	2017	1009.88196	892.6388	1298.542	1423.321	1195.065
20Nov2017 0:00:00	2017	946.6543239	876.2174	1287.693	1379.181	1155.992
20Nov2017 1:00:00	2017	911.2318682	866.6639	1290.192	1371.068	1158.241
20Nov2017 2:00:00	2017	898.5346849	863.7726	1303.704	1354.113	1175.322
20Nov2017 3:00:00	2017	904.3673444	867.8474	1286.37	1344.916	1177.556
20Nov2017 4:00:00	2017	931.117707	868.7143	1293.326	1379.434	1168.58
20Nov2017 5:00:00	2017	1015.431112	892.1904	1316.824	1461.843	1149.257
20Nov2017 6:00:00	2017	1183.625811	937.877	1371.961	1618.615	1158.158
20Nov2017 7:00:00	2017	1339.170187	988.9448	1448.604	1792.308	1183.14
20Nov2017 8:00:00	2017	1358.978025	971.3784	1460.406	1773.118	1209.683

20Nov2017 9:00:00	2017	1370.674688	960.7639	1443.588	1778.919	1228.246
20Nov2017 10:00:00	2017	1391.013062	961.5692	1448.837	1812.161	1239.371
20Nov2017 11:00:00	2017	1416.064493	964.0915	1449.3	1808.341	1226.99
20Nov2017 12:00:00	2017	1427.495166	957.2978	1447.658	1808.529	1223.743
20Nov2017 13:00:00	2017	1428.815717	964.25	1446.062	1838.841	1227.657
20Nov2017 14:00:00	2017	1431.16219	973.2747	1448.063	1821.655	1226.447
20Nov2017 15:00:00	2017	1446.447293	978.5416	1453.224	1828.814	1246.174
20Nov2017 16:00:00	2017	1511.54506	1004.579	1494.942	1922.162	1260.42
20Nov2017 17:00:00	2017	1584.737089	1029.334	1544.281	2035.406	1274.731
20Nov2017 18:00:00	2017	1525.142387	1008.135	1533.942	2005.027	1273.962
20Nov2017 19:00:00	2017	1473.881662	996.7866	1518.87	1968.251	1262.844
20Nov2017 20:00:00	2017	1411.440915	984.5488	1498.588	1926.657	1231.435
20Nov2017 21:00:00	2017	1319.971561	958.7963	1457.145	1831.838	1224.536
20Nov2017 22:00:00	2017	1189.745664	972.6023	1405.687	1698.865	1225.145
20Nov2017 23:00:00	2017	1083.816507	948.8993	1373.122	1578.067	1215.876
21Nov2017 0:00:00	2017	1014.382413	926.9674	1341.589	1510.608	1198.594
21Nov2017 1:00:00	2017	977.2600589	917.6966	1322.703	1470.141	1188.558
21Nov2017 2:00:00	2017	959.9050236	912.0765	1307.165	1457.973	1192.776
21Nov2017 3:00:00	2017	957.435317	911.3496	1323.556	1457.716	1183.896
21Nov2017 4:00:00	2017	984.4501123	918.8792	1331.236	1483.704	1200.488
21Nov2017 5:00:00	2017	1070.104166	939.4667	1364.142	1547.537	1219.911
21Nov2017 6:00:00	2017	1237.78924	982.2145	1412.702	1704.566	1221.361
21Nov2017 7:00:00	2017	1396.289742	1036.715	1478.943	1849.071	1235.068
21Nov2017 8:00:00	2017	1419.34245	1030.234	1486.254	1905.685	1217.41
21Nov2017 9:00:00	2017	1425.394038	1035.479	1476.049	1924.804	1204.773
21Nov2017 10:00:00	2017	1433.720613	1035.853	1472.661	1940.312	1216.842
21Nov2017 11:00:00	2017	1444.749786	1025.524	1472.028	1954.03	1206.434
21Nov2017 12:00:00	2017	1441.700179	1019.995	1462.301	1943.419	1175.837
21Nov2017 13:00:00	2017	1442.337391	1020.527	1462.504	1943.229	1156.017
21Nov2017 14:00:00	2017	1440.260068	1017.943	1465.62	1937.17	1156.729
21Nov2017 15:00:00	2017	1454.263647	1025.226	1471.518	1913.644	1213.736
21Nov2017 16:00:00	2017	1518.502885	1038.907	1509.085	1985.328	1220.302
21Nov2017 17:00:00	2017	1590.557493	1041.461	1519.529	2066.622	1235.997
21Nov2017 18:00:00	2017	1537.716909	1020.302	1508.591	2026.436	1212.627
21Nov2017 19:00:00	2017	1479.182647	1023.843	1503.537	1978.053	1206.167
21Nov2017 20:00:00	2017	1416.961797	1018.976	1444.182	1881.781	1201.765
21Nov2017 21:00:00	2017	1325.081403	996.8376	1367.08	1790.609	1201.822
21Nov2017 22:00:00	2017	1197.57294	952.7014	1340.63	1679.344	1188.979
21Nov2017 23:00:00	2017	1085.717147	917.5938	1347.827	1558.06	1176.765
22Nov2017 0:00:00	2017	1011.792797	894.1339	1314.313	1482.05	1169.39
22Nov2017 1:00:00	2017	967.8852551	883.7942	1320.594	1464.273	1178.664
22Nov2017 2:00:00	2017	944.3108867	876.5988	1323.321	1437.568	1176.826
22Nov2017 3:00:00	2017	938.0884803	874.4109	1320.591	1410.547	1173.895
22Nov2017 4:00:00	2017	962.211327	876.7569	1327.555	1424.729	1124.196
22Nov2017 5:00:00	2017	1044.23134	893.5783	1346.004	1492.552	1143.638
22Nov2017 6:00:00	2017	1211.623635	931.4375	1385.738	1636.777	1156.118
22Nov2017 7:00:00	2017	1361.355354	977.8444	1437.532	1805.588	1174.969

22Nov2017 8:00:00	2017	1373.402632	978.4592	1443.278	1817.528	1173.285
22Nov2017 9:00:00	2017	1374.140164	985.0303	1435.424	1812.602	1176.646
22Nov2017 10:00:00	2017	1385.721734	991.7351	1417.712	1794.405	1192.956
22Nov2017 11:00:00	2017	1388.967047	992.3408	1411.303	1796.77	1187.334
22Nov2017 12:00:00	2017	1379.385677	979.5228	1398.938	1793.296	1192.258
22Nov2017 13:00:00	2017	1375.483516	976.3716	1384.99	1785.996	1202.831
22Nov2017 14:00:00	2017	1369.875928	963.0647	1389.865	1789.326	1195.155
22Nov2017 15:00:00	2017	1374.011037	961.7188	1406.836	1816.548	1202.317
22Nov2017 16:00:00	2017	1419.651487	971.7953	1470.37	1925.178	1217.058
22Nov2017 17:00:00	2017	1514.083409	991.2391	1497.198	2005.034	1199.127
22Nov2017 18:00:00	2017	1460.993329	989.8626	1476.636	1951.113	1196.39
22Nov2017 19:00:00	2017	1408.872	993.0595	1447.887	1862.327	1171.668
22Nov2017 20:00:00	2017	1353.928018	974.9643	1420.867	1787.626	1145.238
22Nov2017 21:00:00	2017	1267.84559	952.1665	1367.136	1690.511	1134.004
22Nov2017 22:00:00	2017	1143.84817	913.0596	1323.001	1561.385	1105.243
22Nov2017 23:00:00	2017	1036.426283	878.8102	1292.093	1453.335	1110.014
23Nov2017 0:00:00	2017	964.6731532	868.7933	1278.369	1397.831	1109.054
23Nov2017 1:00:00	2017	922.5877984	856.1983	1262.78	1351.828	1114.978
23Nov2017 2:00:00	2017	900.0773099	833.2269	1257.622	1328.769	1160.995
23Nov2017 3:00:00	2017	892.6149671	829.4119	1256.539	1332.379	1152.148
23Nov2017 4:00:00	2017	916.8825801	829.0087	1270.886	1368.351	1115.198
23Nov2017 5:00:00	2017	998.9526173	843.0737	1271.566	1425.733	1126.49
23Nov2017 6:00:00	2017	1171.950675	884.1792	1309.04	1571.608	1139.524
23Nov2017 7:00:00	2017	1325.036117	937.2629	1370.997	1738.159	1153.186
23Nov2017 8:00:00	2017	1333.546213	943.7614	1401.079	1779.098	1140.855
23Nov2017 9:00:00	2017	1346.232007	946.6667	1421.801	1824.862	1121.985
23Nov2017 10:00:00	2017	1370.603057	951.7416	1408.152	1842.434	1122.084
23Nov2017 11:00:00	2017	1380.131538	942.6488	1411.164	1842.149	1118.454
23Nov2017 12:00:00	2017	1375.234885	936.6355	1412.527	1822.713	1113.54
23Nov2017 13:00:00	2017	1376.696626	944.9158	1419.125	1841.019	1121.247
23Nov2017 14:00:00	2017	1384.902212	958.946	1417.341	1815.99	1099.756
23Nov2017 15:00:00	2017	1398.117499	963.8396	1424.473	1821.134	1117.661
23Nov2017 16:00:00	2017	1450.081383	989.3332	1461.459	1870.504	1139.651
23Nov2017 17:00:00	2017	1505.712803	1015.563	1487.896	1937.575	1159.616
23Nov2017 18:00:00	2017	1456.527552	1000.665	1466.232	1909.507	1166.149
23Nov2017 19:00:00	2017	1411.085463	987.4531	1453.806	1864.614	1159.937
23Nov2017 20:00:00	2017	1352.339947	973.6779	1420.548	1802.456	1154.255
23Nov2017 21:00:00	2017	1268.043552	951.7243	1389.251	1725.659	1169.684
23Nov2017 22:00:00	2017	1145.425691	910.4739	1334.64	1589.436	1160.005
23Nov2017 23:00:00	2017	1036.381092	878.9187	1295.791	1475.912	1139.536
24Nov2017 0:00:00	2017	963.4509747	862.2442	1272.715	1399.236	1135.829
24Nov2017 1:00:00	2017	921.4332807	851.4663	1268.825	1351.137	1158.949
24Nov2017 2:00:00	2017	894.1529392	843.7018	1268.367	1314.629	1133.913
24Nov2017 3:00:00	2017	893.8270469	842.9616	1270.975	1323.444	1097.027
24Nov2017 4:00:00	2017	918.0035399	847.0926	1278.285	1349.802	1119.009
24Nov2017 5:00:00	2017	1000.11729	870.3869	1301.353	1429.822	1173.39
24Nov2017 6:00:00	2017	1163.836001	901.0894	1343.027	1575.66	1182.07

24Nov2017 7:00:00	2017	1321.284177	954.789	1370.775	1715.228	1164.936
24Nov2017 8:00:00	2017	1369.098645	969.4271	1389.764	1786.426	1158.436
24Nov2017 9:00:00	2017	1369.236041	982.1987	1371.925	1772.207	1148.718
24Nov2017 10:00:00	2017	1362.456355	972.8762	1366.271	1796.885	1158.774
24Nov2017 11:00:00	2017	1358.533801	964.2647	1363.983	1786.747	1155.434
24Nov2017 12:00:00	2017	1351.830407	953.8828	1356.069	1769.464	1151.996
24Nov2017 13:00:00	2017	1348.116851	950.0404	1343.284	1741.3	1151.47
24Nov2017 14:00:00	2017	1341.149497	956.1605	1350.173	1725.564	1168.657
24Nov2017 15:00:00	2017	1346.131128	960.3543	1362.595	1757.033	1175.686
24Nov2017 16:00:00	2017	1390.84182	985.4026	1380.159	1806.536	1192.058
24Nov2017 17:00:00	2017	1453.619167	1014.996	1384.143	1864.56	1195.874
24Nov2017 18:00:00	2017	1396.647987	1005.178	1360.549	1801.31	1166.464
24Nov2017 19:00:00	2017	1349.974088	991.0623	1381.998	1766.122	1158.767
24Nov2017 20:00:00	2017	1297.885498	979.0623	1402.356	1716.216	1171.463
24Nov2017 21:00:00	2017	1231.113742	957.2918	1378.019	1654.702	1167.246
24Nov2017 22:00:00	2017	1135.443542	922.8252	1342.663	1558.967	1157.848
24Nov2017 23:00:00	2017	1044.296128	895.0457	1296.967	1443.943	1141.037
25Nov2017 0:00:00	2017	969.9552426	859.8068	1250.317	1362.507	1140.982
25Nov2017 1:00:00	2017	920.4041018	846.7326	1248.308	1342.05	1130.38
25Nov2017 2:00:00	2017	891.3336121	845.3498	1253.243	1298.252	1123.038
25Nov2017 3:00:00	2017	880.4189133	844.0473	1254.811	1300.424	1130.664
25Nov2017 4:00:00	2017	886.2570655	848.9046	1254.564	1281.342	1145.107
25Nov2017 5:00:00	2017	919.8825862	860.4981	1261.464	1311.873	1152.509
25Nov2017 6:00:00	2017	979.3466305	876.8745	1287.101	1403.19	1152.147
25Nov2017 7:00:00	2017	1065.420555	908.1678	1317.468	1493.19	1126.924
25Nov2017 8:00:00	2017	1132.284907	930.4397	1342.197	1559.943	1142.605
25Nov2017 9:00:00	2017	1176.341633	938.7529	1351.705	1609.692	1160.476
25Nov2017 10:00:00	2017	1215.829245	938.1778	1348.596	1626.012	1216.238
25Nov2017 11:00:00	2017	1238.674477	935.0134	1344.135	1635.402	1207.102
25Nov2017 12:00:00	2017	1236.187263	935.8094	1342.09	1622.676	1189.456
25Nov2017 13:00:00	2017	1233.350171	935.1029	1335.137	1616.344	1181.297
25Nov2017 14:00:00	2017	1211.699902	936.4911	1330.26	1606.867	1171.563
25Nov2017 15:00:00	2017	1201.624609	944.1437	1344.008	1598.114	1195.239
25Nov2017 16:00:00	2017	1257.842609	972.6274	1383.392	1703.765	1222.781
25Nov2017 17:00:00	2017	1349.672563	1004.318	1436.721	1803.771	1225.611
25Nov2017 18:00:00	2017	1319.397372	989.9712	1425.147	1753.952	1220.863
25Nov2017 19:00:00	2017	1276.115248	974.2349	1407.815	1744.244	1199.04
25Nov2017 20:00:00	2017	1233.014122	958.9146	1391.838	1691.374	1165.006
25Nov2017 21:00:00	2017	1178.130593	938.8384	1373.356	1645.735	1157.729
25Nov2017 22:00:00	2017	1106.652116	902.141	1333.414	1578.526	1151.19
25Nov2017 23:00:00	2017	1021.698936	864.1514	1293.736	1495.97	1139.599
26Nov2017 0:00:00	2017	953.510435	844.916	1279.516	1402.601	1129.144
26Nov2017 1:00:00	2017	908.3527842	835.4226	1278.412	1339.305	1135.014
26Nov2017 2:00:00	2017	875.3571987	833.518	1273.407	1309.682	1127.11
26Nov2017 3:00:00	2017	864.7106116	830.4139	1279.071	1295.749	1145.336
26Nov2017 4:00:00	2017	872.2280238	831.8344	1284.559	1305.637	1154.149
26Nov2017 5:00:00	2017	898.6764321	840.4279	1302.531	1342.574	1144.386

26Nov2017 6:00:00	2017	946.263565	856.5933	1319.347	1400.596	1150.536
26Nov2017 7:00:00	2017	1014.723064	880.1477	1343.358	1468.217	1145.032
26Nov2017 8:00:00	2017	1067.96883	893.8974	1332.134	1520.115	1171.385
26Nov2017 9:00:00	2017	1119.786546	902.1727	1342.499	1589.975	1164.403
26Nov2017 10:00:00	2017	1160.768154	896.7065	1351.218	1639.803	1142.923
26Nov2017 11:00:00	2017	1188.851696	893.2864	1368.157	1678.411	1150.777
26Nov2017 12:00:00	2017	1205.540666	896.8936	1385.712	1691.176	1136.962
26Nov2017 13:00:00	2017	1206.998485	900.4678	1379.895	1688.631	1133.219
26Nov2017 14:00:00	2017	1202.113136	903.8628	1370.014	1693.19	1128.684
26Nov2017 15:00:00	2017	1217.392669	918.9787	1373.015	1681.089	1117.746
26Nov2017 16:00:00	2017	1295.151688	948.4536	1412.165	1792.015	1126.628
26Nov2017 17:00:00	2017	1382.493179	981.7575	1419.896	1855.812	1142.623
26Nov2017 18:00:00	2017	1354.083785	974.6887	1414.086	1811.375	1154.034
26Nov2017 19:00:00	2017	1306.403515	954.9301	1419.679	1789.749	1143.06
26Nov2017 20:00:00	2017	1265.56692	936.234	1420.025	1754.217	1135.07
26Nov2017 21:00:00	2017	1200.027851	915.3023	1391.224	1677.749	1119.341
26Nov2017 22:00:00	2017	1092.484446	879.9676	1353.172	1563.387	1098.91
26Nov2017 23:00:00	2017	991.5958936	852.9881	1313.988	1440.299	1070.885
27Nov2017 0:00:00	2017	919.8288117	837.2077	1287.311	1350.66	1061.206
27Nov2017 1:00:00	2017	881.1427239	832.6413	1275.083	1316.223	1061.247
27Nov2017 2:00:00	2017	867.5945851	832.6054	1275.272	1286.777	1077.518
27Nov2017 3:00:00	2017	868.7168793	832.5336	1274.457	1309.189	1064.542
27Nov2017 4:00:00	2017	896.0580232	842.5022	1276.2	1309.949	1061.66
27Nov2017 5:00:00	2017	984.7627667	862.6488	1302.698	1370.976	1085.828
27Nov2017 6:00:00	2017	1156.268263	906.7754	1347.254	1510.951	1084.335
27Nov2017 7:00:00	2017	1317.865037	968.1568	1436.837	1685.257	1138.968
27Nov2017 8:00:00	2017	1346.969949	979.8546	1471.689	1728.098	1133.65
27Nov2017 9:00:00	2017	1349.245815	979.827	1466.102	1758.884	1136.358
27Nov2017 10:00:00	2017	1367.644829	978.2301	1461.194	1788.478	1150.945
27Nov2017 11:00:00	2017	1381.924534	973.7008	1455.705	1795.166	1160.644
27Nov2017 12:00:00	2017	1382.293415	972.3707	1446.179	1777.964	1158.21
27Nov2017 13:00:00	2017	1379.90637	973.4388	1441.516	1775.03	1128.729
27Nov2017 14:00:00	2017	1372.751673	972.9631	1444.736	1763.353	1063.703
27Nov2017 15:00:00	2017	1381.952512	980.1857	1454.961	1824.961	1071.994
27Nov2017 16:00:00	2017	1456.131245	1022.308	1492.459	1906.292	1123.1
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27Nov2017 19:00:00	2017	1433.599933	1020.573	1471.817	1878.107	1103.513
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27Nov2017 22:00:00	2017	1158.57285	928.2658	1356.295	1594.039	1084.833
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28Nov2017 1:00:00	2017	937.1101658	842.7952	1290.327	1394.18	1092.274
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28Nov2017 5:00:00	2017	1022.785492	863.7736	1274.535	1430.635	1157.171
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28Nov2017 9:00:00	2017	1367.355707	969.5316	1410.615	1758.624	1107.092
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05Dec2017 22:00:00	2017	1180.085818	953.7272	1409.57	1561.568	1184.262
05Dec2017 23:00:00	2017	1060.554542	913.7059	1377.176	1469.8	1179.73
06Dec2017 0:00:00	2017	982.3773182	890.3091	1365.413	1415.841	1147.779

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06Dec2017 3:00:00	2017	919.2977671	882.2598	1348.616	1316.544	1143.737
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06Dec2017 6:00:00	2017	1205.260694	960.5609	1412.841	1557.4	1160.291
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07Dec2017 11:00:00	2017	1378.941503	951.6875	1415.383	1764.34	1101.998
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07Dec2017 14:00:00	2017	1357.724996	932.5419	1479.88	1761.76	1120.829
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11Dec2017 1:00:00	2017	889.0920561	829.5925	1324.729	1318.902	1151.875
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14Dec2017 11:00:00	2017	1392.576416	970.0506	1495.791	1785.176	1211.19
14Dec2017 12:00:00	2017	1381.798898	958.0489	1470.323	1779.262	1215.635
14Dec2017 13:00:00	2017	1369.399226	955.9524	1468.568	1790.008	1212.175
14Dec2017 14:00:00	2017	1369.887241	960.1902	1482.58	1786.833	1210.434
14Dec2017 15:00:00	2017	1383.779936	968.6659	1507.088	1813.924	1222.018
14Dec2017 16:00:00	2017	1464.45399	990.8585	1563.192	1907.316	1244.554
14Dec2017 17:00:00	2017	1531.786619	1001.315	1567.571	1967.271	1246.333
14Dec2017 18:00:00	2017	1473.606674	990.7433	1544.333	1874.112	1246.61
14Dec2017 19:00:00	2017	1427.516803	999.3438	1532.659	1825.719	1240.365
14Dec2017 20:00:00	2017	1378.004603	979.9241	1502.574	1771.26	1227.389
14Dec2017 21:00:00	2017	1293.129325	954.4939	1460.4	1679.701	1200.907
14Dec2017 22:00:00	2017	1169.54723	908.5826	1387.032	1544.029	1227.511
14Dec2017 23:00:00	2017	1058.385902	880.243	1354.921	1435.643	1222.196
15Dec2017 0:00:00	2017	975.3513449	871.6599	1341.216	1353.034	1185.207
15Dec2017 1:00:00	2017	929.2597468	855.8314	1330.174	1300.739	1185.389
15Dec2017 2:00:00	2017	905.0460714	843.9552	1306.97	1288.797	1153.769
15Dec2017 3:00:00	2017	898.2144421	839.2801	1305.496	1291.698	1139.825
15Dec2017 4:00:00	2017	915.4550508	840.6343	1315.177	1309.2	1145.069
15Dec2017 5:00:00	2017	990.4456759	861.9643	1327.503	1389.035	1141.289
15Dec2017 6:00:00	2017	1149.985456	889.1474	1326.749	1508.1	1158.946
15Dec2017 7:00:00	2017	1311.588619	936.4606	1394.832	1688.144	1179.679
15Dec2017 8:00:00	2017	1368.651757	960.759	1439.078	1753.065	1179.984
15Dec2017 9:00:00	2017	1366.30951	958.2356	1434.07	1740.861	1116.005
15Dec2017 10:00:00	2017	1369.82566	956.2482	1454.752	1749.722	1140.844
15Dec2017 11:00:00	2017	1375.027365	946.5502	1472.492	1766.737	1130.253
15Dec2017 12:00:00	2017	1371.155692	943.8441	1467.141	1745.854	1147.74
15Dec2017 13:00:00	2017	1368.574741	955.1155	1466.81	1734.458	1167.903
15Dec2017 14:00:00	2017	1362.812565	960.7029	1473.457	1735.398	1166.729
15Dec2017 15:00:00	2017	1365.585543	968.5013	1466.77	1727.904	1190.018
15Dec2017 16:00:00	2017	1414.10547	984.5061	1534.131	1829.609	1231.665
15Dec2017 17:00:00	2017	1486.193775	1000.638	1577.658	1901.268	1282.418
15Dec2017 18:00:00	2017	1425.780176	988.2356	1533.39	1844.016	1274.917
15Dec2017 19:00:00	2017	1375.7172	977.7391	1509.692	1804.732	1281.093

15Dec2017 20:00:00	2017	1327.290145	962.8991	1499.909	1756.791	1283.485
15Dec2017 21:00:00	2017	1260.111244	942.6075	1491.051	1686.319	1283.01
15Dec2017 22:00:00	2017	1162.100945	914.3812	1450.387	1600.037	1282.744
15Dec2017 23:00:00	2017	1060.811014	881.134	1402.088	1503.991	1263.688
16Dec2017 0:00:00	2017	982.7829778	849.2742	1364.187	1419.106	1266.483
16Dec2017 1:00:00	2017	932.5208028	832.7638	1353.831	1355.579	1271.542
16Dec2017 2:00:00	2017	904.0211395	829.7164	1350.393	1327.88	1248.036
16Dec2017 3:00:00	2017	893.4487415	830.7037	1347.499	1316.167	1208.377
16Dec2017 4:00:00	2017	897.8535995	835.053	1349.65	1318.315	1201.835
16Dec2017 5:00:00	2017	931.8833525	843.8892	1357.316	1326.643	1215.206
16Dec2017 6:00:00	2017	996.6214921	868.9574	1371.15	1387.501	1199.918
16Dec2017 7:00:00	2017	1087.280411	906.0441	1399.409	1475.326	1189.566
16Dec2017 8:00:00	2017	1173.818883	941.4026	1439.329	1567.451	1172.146
16Dec2017 9:00:00	2017	1217.629386	956.1928	1457.374	1613.624	1185.218
16Dec2017 10:00:00	2017	1244.034831	960.199	1471.445	1644.243	1181.624
16Dec2017 11:00:00	2017	1257.048864	956.4082	1474.186	1640.365	1194.304
16Dec2017 12:00:00	2017	1254.164682	953.6139	1463.332	1647.987	1181.46
16Dec2017 13:00:00	2017	1239.887015	950.0894	1452.271	1648.861	1168.764
16Dec2017 14:00:00	2017	1227.305607	939.0762	1446.96	1638.346	1171.253
16Dec2017 15:00:00	2017	1232.602035	938.2545	1447.941	1632.912	1192.566
16Dec2017 16:00:00	2017	1314.076006	960.2958	1503.412	1729.538	1203.884
16Dec2017 17:00:00	2017	1411.082397	997.3478	1539.59	1782.416	1213.687
16Dec2017 18:00:00	2017	1379.145928	987.4259	1519.759	1737.392	1203.15
16Dec2017 19:00:00	2017	1334.820249	976.3512	1500.982	1683.813	1196.68
16Dec2017 20:00:00	2017	1291.717788	966.4644	1514.289	1644.888	1242.515
16Dec2017 21:00:00	2017	1242.392537	947.8731	1495.111	1596.066	1248.615
16Dec2017 22:00:00	2017	1167.576563	918.0517	1450.471	1511.001	1256.621
16Dec2017 23:00:00	2017	1078.690254	885.7372	1436.088	1451.005	1256.113
17Dec2017 0:00:00	2017	1002.23408	861.2868	1418.349	1376.362	1258.224
17Dec2017 1:00:00	2017	950.4638817	848.9666	1400.186	1317.479	1247.652
17Dec2017 2:00:00	2017	919.4995279	842.4487	1389.455	1282.745	1250.111
17Dec2017 3:00:00	2017	904.5405493	838.9148	1386.837	1268.296	1245.504
17Dec2017 4:00:00	2017	902.2965547	840.4361	1386.346	1267.413	1248.012
17Dec2017 5:00:00	2017	924.7425731	847.1968	1397.055	1298.59	1258.777
17Dec2017 6:00:00	2017	967.0129338	861.4199	1408.45	1356.542	1252.641
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17Dec2017 8:00:00	2017	1109.087654	921.992	1456.105	1493.164	1196.655
17Dec2017 9:00:00	2017	1164.696868	934.7951	1471.217	1555.959	1203.36
17Dec2017 10:00:00	2017	1208.273601	937.4346	1477.992	1598.791	1198.475
17Dec2017 11:00:00	2017	1234.915928	940.9984	1485.702	1630.716	1197.772
17Dec2017 12:00:00	2017	1245.420893	943.4617	1486.158	1639.805	1197.584
17Dec2017 13:00:00	2017	1246.829331	944.5049	1467.786	1632.356	1219.616
17Dec2017 14:00:00	2017	1253.875357	946.2793	1466.918	1632.405	1197.843
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17Dec2017 16:00:00	2017	1323.213229	970.1856	1539.205	1796.029	1214.63
17Dec2017 17:00:00	2017	1425.839265	1006.116	1579.76	1855.868	1229.904
17Dec2017 18:00:00	2017	1397.969149	1006.852	1567.074	1786.801	1225.389

17Dec2017 19:00:00	2017	1359.263209	993.3812	1548.613	1753.919	1215.541
17Dec2017 20:00:00	2017	1314.456529	975.5541	1515.609	1680.358	1215.154
17Dec2017 21:00:00	2017	1245.261691	946.0873	1482.347	1623.222	1180.518
17Dec2017 22:00:00	2017	1136.067219	905.5224	1440.406	1505.995	1166.635
17Dec2017 23:00:00	2017	1026.373114	868.5828	1397.586	1418.329	1163.02
18Dec2017 0:00:00	2017	951.1782859	847.6075	1371.474	1327.589	1166.487
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18Dec2017 3:00:00	2017	892.1051943	820.9596	1359.428	1278.084	1306.154
18Dec2017 4:00:00	2017	916.542299	828.939	1379.56	1337.89	1269.268
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18Dec2017 7:00:00	2017	1329.684748	975.6973	1498.308	1726.891	1297.521
18Dec2017 8:00:00	2017	1389.212475	999.2521	1513.1	1803.426	1306.557
18Dec2017 9:00:00	2017	1392.349011	1004.542	1522.03	1777.327	1293.808
18Dec2017 10:00:00	2017	1401.944395	1015.965	1524.535	1770.841	1323.621
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18Dec2017 12:00:00	2017	1400.537543	1012.203	1516.566	1759.822	1367.39
18Dec2017 13:00:00	2017	1394.434038	1007.187	1523.093	1766.767	1360.216
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18Dec2017 15:00:00	2017	1395.180075	993.9769	1561.981	1808.488	1395.966
18Dec2017 16:00:00	2017	1473.466132	1026.967	1589.147	1878.239	1431.016
18Dec2017 17:00:00	2017	1571.812857	1064.223	1600.02	1933.886	1448.447
18Dec2017 18:00:00	2017	1525.086732	1057.105	1578.735	1888.952	1418.913
18Dec2017 19:00:00	2017	1479.919292	1067.695	1571.549	1862.199	1371.033
18Dec2017 20:00:00	2017	1425.899442	1049.147	1531.547	1819.616	1349.394
18Dec2017 21:00:00	2017	1338.531758	1017.189	1491.957	1751.95	1319.007
18Dec2017 22:00:00	2017	1215.561562	975.7029	1454.438	1633.94	1307.032
18Dec2017 23:00:00	2017	1093.842418	939.7952	1429.734	1499.859	1316.56
19Dec2017 0:00:00	2017	1011.543067	912.8516	1407.827	1432.629	1304.252
19Dec2017 1:00:00	2017	969.2414062	900.642	1395.794	1358.781	1282.362
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19Dec2017 3:00:00	2017	944.5037595	901.337	1391.923	1328.401	1310.217
19Dec2017 4:00:00	2017	969.7076102	909.0566	1398.711	1341.232	1294.998
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19Dec2017 9:00:00	2017	1418.863491	1030.185	1572.068	1827.032	1342.565
19Dec2017 10:00:00	2017	1436.268566	1033.084	1573.221	1840.459	1337.122
19Dec2017 11:00:00	2017	1454.04575	1032.727	1580.283	1859.559	1320.972
19Dec2017 12:00:00	2017	1449.818281	1020.033	1571.101	1851.728	1324.825
19Dec2017 13:00:00	2017	1455.273066	1010.6	1557.016	1858.275	1326.304
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19Dec2017 15:00:00	2017	1458.869071	1008.325	1554.497	1825.021	1256.008
19Dec2017 16:00:00	2017	1531.815514	1008.695	1623.513	1919.419	1280.572
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19Dec2017 18:00:00	2017	1539.40537	1038.689	1617.184	1890.569	1304.581
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19Dec2017 20:00:00	2017	1448.241441	1021.921	1576.425	1815.485	1275.307
19Dec2017 21:00:00	2017	1363.167874	1004.038	1521.559	1726.317	1236.332
19Dec2017 22:00:00	2017	1238.816451	977.1103	1470.032	1597.771	1196.755
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20Dec2017 22:00:00	2017	1263.873096	978.4449	1529.552	1673.357	1290.104
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21Dec2017 0:00:00	2017	1055.06271	913.7899	1454.681	1450.691	1266.627
21Dec2017 1:00:00	2017	1004.462771	894.4399	1430.952	1391.953	1262.263
21Dec2017 2:00:00	2017	983.4533512	886.2333	1419.425	1375.154	1264.501
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21Dec2017 6:00:00	2017	1217.008563	943.2523	1485.698	1583.59	1277.907
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21Dec2017 13:00:00	2017	1418.307055	988.2742	1586.014	1805.633	1251.177
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21Dec2017 22:00:00	2017	1244.236634	964.1471	1528.905	1677.75	1290.792
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22Dec2017 9:00:00	2017	1422.734517	1020.089	1590.004	1827.467	1212.266
22Dec2017 10:00:00	2017	1436.862108	1018.553	1574.114	1845.749	1185.312
22Dec2017 11:00:00	2017	1438.714174	1013.754	1560.139	1838.853	1187.191
22Dec2017 12:00:00	2017	1410.00279	1020.871	1546.931	1784.682	1202.412
22Dec2017 13:00:00	2017	1386.874346	1017.536	1538.491	1778.978	1208.115
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22Dec2017 15:00:00	2017	1383.955342	1019.696	1563.809	1769.532	1204.899
22Dec2017 16:00:00	2017	1447.889385	1046.966	1618.475	1871.361	1233.77
22Dec2017 17:00:00	2017	1536.821385	1082.042	1651.537	1938.376	1256.299
22Dec2017 18:00:00	2017	1490.897103	1073.297	1634.64	1900.726	1253.928
22Dec2017 19:00:00	2017	1448.333853	1058.886	1617.044	1842.32	1248.162
22Dec2017 20:00:00	2017	1404.621637	1043.013	1597.531	1785.316	1241.731
22Dec2017 21:00:00	2017	1340.002223	1015.217	1565.374	1707.825	1227.257
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23Dec2017 1:00:00	2017	1025.893293	903.8875	1424.69	1365.362	1181.25
23Dec2017 2:00:00	2017	996.9406133	898.4148	1415.278	1343.399	1178.745
23Dec2017 3:00:00	2017	981.5065248	895.9806	1417.974	1349.937	1171.759
23Dec2017 4:00:00	2017	986.9102022	893.2456	1420.606	1366.563	1163.434
23Dec2017 5:00:00	2017	1014.937936	900.6557	1433.002	1389.712	1168.075
23Dec2017 6:00:00	2017	1061.552345	917.5921	1451.395	1445.345	1164.983
23Dec2017 7:00:00	2017	1131.062392	946.8868	1476.411	1527.086	1169.087
23Dec2017 8:00:00	2017	1212.585644	973.5002	1517.346	1611.421	1170.273
23Dec2017 9:00:00	2017	1260.736688	985.8651	1529.301	1647.224	1173.362
23Dec2017 10:00:00	2017	1289.881636	992.4648	1545.894	1689.807	1218.99
23Dec2017 11:00:00	2017	1297.223786	988.7543	1560.909	1710.638	1210.815
23Dec2017 12:00:00	2017	1302.523569	983.6102	1561.264	1718.389	1191.222
23Dec2017 13:00:00	2017	1299.768677	972.3987	1550.032	1709.786	1196.749
23Dec2017 14:00:00	2017	1294.124693	970.5936	1551.695	1708.93	1193.623
23Dec2017 15:00:00	2017	1294.804877	976.42	1563.888	1730.858	1226.187

23Dec2017 16:00:00	2017	1364.855844	1001.325	1603.478	1813.295	1228.788
23Dec2017 17:00:00	2017	1441.806087	1036.601	1626.511	1861.91	1239.943
23Dec2017 18:00:00	2017	1413.351359	1027.694	1587.223	1802.005	1265.21
23Dec2017 19:00:00	2017	1380.173852	1011.778	1579.106	1774.647	1261.515
23Dec2017 20:00:00	2017	1346.822407	999.4533	1578.291	1759.724	1253.097
23Dec2017 21:00:00	2017	1299.018933	981.6331	1555.838	1704.963	1235.071
23Dec2017 22:00:00	2017	1218.50876	951.5051	1523.071	1651.271	1229.958
23Dec2017 23:00:00	2017	1126.6159	920.5068	1490.746	1571.685	1220.826
24Dec2017 0:00:00	2017	1047.007324	898.997	1463.364	1498.654	1225.649
24Dec2017 1:00:00	2017	993.2779657	879.2868	1446.023	1425.708	1243.867
24Dec2017 2:00:00	2017	962.7429111	876.1477	1438.258	1400.31	1251.031
24Dec2017 3:00:00	2017	948.6846818	873.6428	1437.145	1381.96	1254.547
24Dec2017 4:00:00	2017	949.4237899	870.8712	1441.48	1380.541	1237.236
24Dec2017 5:00:00	2017	974.1689189	880.0646	1448.463	1398.372	1233.982
24Dec2017 6:00:00	2017	1017.500578	898.6292	1465.151	1440.583	1245.506
24Dec2017 7:00:00	2017	1084.020423	927.1378	1497.47	1516.683	1250.307
24Dec2017 8:00:00	2017	1156.438102	961.5751	1537.784	1604.7	1233.876
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24Dec2017 10:00:00	2017	1245.55562	989.6586	1542.911	1663.491	1222.429
24Dec2017 11:00:00	2017	1270.339071	991.6034	1553.185	1677.658	1220.848
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24Dec2017 14:00:00	2017	1292.892506	984.0043	1534.386	1668.133	1214.111
24Dec2017 15:00:00	2017	1303.108205	990.6029	1532.982	1682.987	1218.67
24Dec2017 16:00:00	2017	1366.683517	1017.934	1575.269	1789.601	1216.506
24Dec2017 17:00:00	2017	1420.85835	1042.827	1596.383	1865.491	1237.749
24Dec2017 18:00:00	2017	1366.06806	1025.134	1568.289	1797.081	1197.708
24Dec2017 19:00:00	2017	1312.840526	1006.792	1558.917	1742.007	1165.284
24Dec2017 20:00:00	2017	1275.867953	992.9056	1552.375	1710.819	1175.89
24Dec2017 21:00:00	2017	1244.468504	980.6737	1544.725	1684.289	1190.395
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24Dec2017 23:00:00	2017	1129.055788	942.7747	1497.136	1562.104	1164.146
25Dec2017 0:00:00	2017	1061.640941	934.2528	1476.244	1487.199	1165.988
25Dec2017 1:00:00	2017	1005.357538	919.2543	1462.121	1430.722	1198.866
25Dec2017 2:00:00	2017	977.6900371	911.1412	1454.254	1396.173	1205.018
25Dec2017 3:00:00	2017	965.246265	906.4984	1453.544	1383.674	1212.441
25Dec2017 4:00:00	2017	969.9216389	914.3304	1453.275	1388.912	1214.317
25Dec2017 5:00:00	2017	991.8432316	927.4592	1469.176	1399.869	1237.437
25Dec2017 6:00:00	2017	1033.681431	939.5913	1481.286	1438.834	1185.119
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25Dec2017 13:00:00	2017	1281.17732	980.6108	1535.462	1652.758	1202.158
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26Dec2017 0:00:00	2017	1068.999899	940.9807	1497.473	1481.92	1266.313
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26Dec2017 4:00:00	2017	1011.678218	905.9019	1479.543	1450.873	1152.8
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26Dec2017 17:00:00	2017	1499.104402	1018.075	1654.571	1917.36	1186.996
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26Dec2017 22:00:00	2017	1262.128535	983.6559	1528.92	1662.272	1196.16
26Dec2017 23:00:00	2017	1174.548419	947.1643	1500.858	1567.681	1176.024
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27Dec2017 4:00:00	2017	1050.094623	916.9857	1475.213	1407.822	1159.389
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27Dec2017 10:00:00	2017	1424.394245	1053.402	1637.054	1896.743	1162.994
27Dec2017 11:00:00	2017	1446.872628	1056.591	1653.534	1893.944	1161.238
27Dec2017 12:00:00	2017	1454.623037	1049.873	1641.718	1899.345	1145.453
27Dec2017 13:00:00	2017	1446.394365	1043.171	1628.401	1893.287	1126.973

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27Dec2017 16:00:00	2017	1507.240975	1017.691	1669.333	1968.971	1156.759
27Dec2017 17:00:00	2017	1593.089315	1056.597	1708.912	2047.824	1159.546
27Dec2017 18:00:00	2017	1554.189155	1058.596	1686.559	2000.666	1169.522
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27Dec2017 21:00:00	2017	1384.794234	1052.95	1624.945	1836.928	1172.083
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28Dec2017 10:00:00	2017	1459.025319	1087.512	1623.417	1892.223	1174.664
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28Dec2017 13:00:00	2017	1461.741403	1073.55	1630.154	1899.85	1143.643
28Dec2017 14:00:00	2017	1455.336143	1068.892	1634.307	1893.99	1146.229
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29Dec2017 1:00:00	2017	1098.907039	949.773	1543.27	1591.64	1173.006
29Dec2017 2:00:00	2017	1076.395909	944.1861	1518.579	1572.542	1182.772
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29Dec2017 7:00:00	2017	1314.622528	1028.109	1598.694	1759.95	1133.715
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29Dec2017 18:00:00	2017	1583.610398	1085.421	1702.92	2043.464	1153.589
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29Dec2017 23:00:00	2017	1251.910567	1014.724	1571.421	1725.07	1180.613
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30Dec2017 20:00:00	2017	1472.253018	1068.971	1615.998	1915.298	1221.771
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31Dec2017 8:00:00	2017	1261.633197	1017.017	1513.39	1679.727	1213.827
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31Dec2017 20:00:00	2017	1416.36382	1063.231	1585.824	1789.15	1247.951
31Dec2017 21:00:00	2017	1368.141418	1048.837	1570.516	1753.169	1249.344
31Dec2017 22:00:00	2017	1310.698379	1023.185	1552.152	1711.595	1236.646
31Dec2017 23:00:00	2017	1255.930279	1002.827	1531.929	1657.878	1232.822
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01Jan2018 1:00:00	2018	1160.416028	959.0291	1491.759	1568.265	1209.646
01Jan2018 2:00:00	2018	1123.977862	950.7536	1465.572	1541.882	1208.038
01Jan2018 3:00:00	2018	1094.718586	945.9242	1464.157	1523.248	1203.197
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01Jan2018 5:00:00	2018	1099.001101	953.9126	1498.716	1525.502	1263.554
01Jan2018 6:00:00	2018	1129.293368	965.0388	1502.543	1553.602	1263.888
01Jan2018 7:00:00	2018	1160.540706	970.5918	1467.767	1565.775	1234.565
01Jan2018 8:00:00	2018	1186.190794	965.3548	1463.791	1574.993	1227.547
01Jan2018 9:00:00	2018	1207.402554	979.314	1462.544	1590.873	1206.605
01Jan2018 10:00:00	2018	1247.943493	990.0048	1473.325	1634.597	1201.732
01Jan2018 11:00:00	2018	1276.126203	981.4239	1476.68	1667.201	1199.472
01Jan2018 12:00:00	2018	1290.451311	982.7039	1488.056	1682.763	1153.359
01Jan2018 13:00:00	2018	1284.46511	980.7977	1496.171	1717.053	1131.007
01Jan2018 14:00:00	2018	1279.923776	975.1808	1512.309	1715.335	1133.381
01Jan2018 15:00:00	2018	1286.658555	985.4721	1527.065	1740.667	1135.614
01Jan2018 16:00:00	2018	1372.287798	1011.94	1564.206	1828.689	1202.192
01Jan2018 17:00:00	2018	1480.144794	1029.432	1610.794	1928.174	1251.399
01Jan2018 18:00:00	2018	1448.534519	1012.417	1594.639	1877.681	1242.302
01Jan2018 19:00:00	2018	1403.19699	1028.194	1572.898	1835.023	1228.552
01Jan2018 20:00:00	2018	1359.272587	1017.351	1548.992	1777.023	1226.941
01Jan2018 21:00:00	2018	1289.129261	995.4004	1503.878	1680.619	1227.913
01Jan2018 22:00:00	2018	1197.442301	964.7655	1459.531	1581.553	1215.875
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02Jan2018 1:00:00	2018	995.0806858	893.7548	1397.537	1404.13	1175.492
02Jan2018 2:00:00	2018	975.0674956	888.4123	1389.532	1378.041	1165.598
02Jan2018 3:00:00	2018	969.7880269	884.8456	1386.955	1367.573	1169.732
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02Jan2018 5:00:00	2018	1058.668147	901.8529	1399.125	1438.183	1156.725
02Jan2018 6:00:00	2018	1183.37393	943.862	1437.602	1558.259	1176.072
02Jan2018 7:00:00	2018	1296.945044	984.3339	1480.645	1681.23	1200.145
02Jan2018 8:00:00	2018	1356.412069	1004.621	1502.436	1748.038	1207.851
02Jan2018 9:00:00	2018	1366.64008	1008.058	1498.257	1744.876	1225.565
02Jan2018 10:00:00	2018	1385.785011	1010.338	1496.437	1795.891	1237.321

02Jan2018 11:00:00	2018	1403.526352	1011.703	1494.701	1796.638	1230.384
02Jan2018 12:00:00	2018	1403.968985	1003.923	1490.749	1788.2	1220.728
02Jan2018 13:00:00	2018	1395.020671	999.8918	1497.512	1796.826	1210.877
02Jan2018 14:00:00	2018	1385.680024	978.3157	1492.102	1768.232	1201.623
02Jan2018 15:00:00	2018	1386.381956	985.1599	1485.22	1776.054	1225.313
02Jan2018 16:00:00	2018	1444.544125	983.3239	1539.499	1846.018	1249.253
02Jan2018 17:00:00	2018	1551.90232	1010.659	1592.845	1934.291	1261.288
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02Jan2018 20:00:00	2018	1409.494816	1023.036	1557.714	1798.172	1223.884
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03Jan2018 0:00:00	2018	1027.181019	897.5513	1414.846	1450.407	1187.343
03Jan2018 1:00:00	2018	980.440782	885.9281	1397.304	1421.784	1181.145
03Jan2018 2:00:00	2018	955.4012218	880.1733	1389.757	1381.723	1179.691
03Jan2018 3:00:00	2018	949.8890099	879.7943	1393.38	1379.646	1173.362
03Jan2018 4:00:00	2018	969.7264783	879.4741	1397.084	1380.42	1149.192
03Jan2018 5:00:00	2018	1041.600387	895.1577	1427.238	1448.731	1161.105
03Jan2018 6:00:00	2018	1176.061052	925.5075	1465.17	1566.114	1159.957
03Jan2018 7:00:00	2018	1301.557449	967.5929	1513.924	1689.613	1170.268
03Jan2018 8:00:00	2018	1366.547343	987.7011	1546.383	1790.132	1183.747
03Jan2018 9:00:00	2018	1374.709339	980.9011	1539.458	1790.019	1193.024
03Jan2018 10:00:00	2018	1387.67687	976.6933	1527.9	1807.086	1195.438
03Jan2018 11:00:00	2018	1400.780528	975.5063	1519.21	1828.496	1187.636
03Jan2018 12:00:00	2018	1397.341962	964.8471	1509.352	1820.25	1188.69
03Jan2018 13:00:00	2018	1392.028119	961.1837	1503.032	1806.009	1169.917
03Jan2018 14:00:00	2018	1381.55487	962.8411	1516.411	1791.732	1190.172
03Jan2018 15:00:00	2018	1384.16177	942.7904	1509.06	1801.244	1201.598
03Jan2018 16:00:00	2018	1429.665727	956.6408	1539.237	1871.368	1215.871
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03Jan2018 18:00:00	2018	1498.519514	991.8823	1577.849	1897.67	1223.231
03Jan2018 19:00:00	2018	1443.829153	1006.605	1555.689	1837.518	1214.466
03Jan2018 20:00:00	2018	1391.371352	1002.685	1528.074	1761.169	1217.114
03Jan2018 21:00:00	2018	1311.923198	977.2879	1501.458	1680.664	1204.324
03Jan2018 22:00:00	2018	1200.296558	938.9773	1464.982	1548.529	1194.438
03Jan2018 23:00:00	2018	1099.818013	912.1742	1426.643	1467.126	1176.243
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04Jan2018 1:00:00	2018	980.3169775	884.1546	1388.372	1325.245	1143.059
04Jan2018 2:00:00	2018	959.5726777	876.1464	1380.806	1314.653	1138.512
04Jan2018 3:00:00	2018	951.2677986	877.5409	1382.464	1344.786	1152.389
04Jan2018 4:00:00	2018	973.2997688	885.3946	1390.358	1361.476	1157.675
04Jan2018 5:00:00	2018	1046.019501	905.7003	1407.527	1419.744	1173.48
04Jan2018 6:00:00	2018	1181.726416	939.6961	1448.688	1525.821	1202.248
04Jan2018 7:00:00	2018	1304.281854	983.8969	1501.788	1673.606	1218.712
04Jan2018 8:00:00	2018	1366.157026	992.3176	1532.419	1771.717	1234.985
04Jan2018 9:00:00	2018	1373.714662	991.4881	1529.907	1761.556	1233.628

04Jan2018 10:00:00	2018	1388.965124	988.0021	1523.632	1783.604	1227.029
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04Jan2018 16:00:00	2018	1427.170259	967.8723	1549.924	1849.289	1254.292
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04Jan2018 22:00:00	2018	1207.899919	947.3055	1478.872	1647.359	1253.333
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05Jan2018 5:00:00	2018	1043.497925	896.3343	1397.455	1429.905	1196.216
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09Jan2018 13:00:00	2018	1462.214483	1005.936	1588.646	1888.061	1178.267
09Jan2018 14:00:00	2018	1463.453425	1013.571	1587.299	1888.906	1183.936
09Jan2018 15:00:00	2018	1491.387338	1007.038	1627.148	1929.459	1187.736
09Jan2018 16:00:00	2018	1549.983414	1018.237	1658.514	1992.812	1207.156
09Jan2018 17:00:00	2018	1641.857339	1053.457	1707.883	2085.33	1271.783
09Jan2018 18:00:00	2018	1603.019129	1043.163	1705.888	2093.16	1288.651
09Jan2018 19:00:00	2018	1550.197051	1034.953	1700.366	2062.206	1268.13
09Jan2018 20:00:00	2018	1493.401785	1061.026	1682.664	2010.71	1265.593
09Jan2018 21:00:00	2018	1403.12479	1036.369	1637.703	1916.61	1257.549
09Jan2018 22:00:00	2018	1284.271054	999.5748	1589.486	1806.232	1256.715
09Jan2018 23:00:00	2018	1179.802594	983.2192	1559.885	1688.39	1241.188
10Jan2018 0:00:00	2018	1114.894313	964.5227	1539.354	1611.187	1261.394
10Jan2018 1:00:00	2018	1078.346735	953.2739	1533.767	1574.95	1262.551
10Jan2018 2:00:00	2018	1064.11083	953.2759	1539.886	1550.516	1264.595
10Jan2018 3:00:00	2018	1059.233312	955.5524	1537.916	1545.657	1273.491
10Jan2018 4:00:00	2018	1084.960183	962.663	1529.693	1569.034	1271.34
10Jan2018 5:00:00	2018	1163.130212	981.7764	1536.69	1630.62	1280.763
10Jan2018 6:00:00	2018	1317.7625	1021.488	1569.288	1741.799	1282.527

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10Jan2018 10:00:00	2018	1525.227672	1077.537	1649.19	1982.518	1172.987
10Jan2018 11:00:00	2018	1547.673716	1068.698	1655.064	1996.017	1179.456
10Jan2018 12:00:00	2018	1552.1172	1055.136	1633.225	1923.484	1174.935
10Jan2018 13:00:00	2018	1546.156564	1054.016	1623.755	1950.591	1156.32
10Jan2018 14:00:00	2018	1542.575843	1065.024	1604.422	1946.548	1170.172
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10Jan2018 18:00:00	2018	1660.609179	1076.589	1666.479	2064.434	1197.67
10Jan2018 19:00:00	2018	1611.895457	1083.569	1647.97	2002.362	1193.854
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10Jan2018 23:00:00	2018	1226.614581	1004.7	1559.099	1706.46	1156.71
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11Jan2018 1:00:00	2018	1131.234236	973.843	1530.455	1587.29	1174.711
11Jan2018 2:00:00	2018	1114.463506	970.8483	1532.548	1586.377	1169.436
11Jan2018 3:00:00	2018	1110.674273	976.5485	1535.876	1565.785	1171.626
11Jan2018 4:00:00	2018	1133.420783	984.8733	1538.573	1598.133	1171.512
11Jan2018 5:00:00	2018	1207.156387	1010.431	1548.331	1660.562	1178.47
11Jan2018 6:00:00	2018	1358.653466	1051.676	1583.96	1775.537	1193.995
11Jan2018 7:00:00	2018	1503.262604	1104.126	1643.372	1941.351	1197.185
11Jan2018 8:00:00	2018	1548.788195	1097.093	1689.382	1992.838	1198.583
11Jan2018 9:00:00	2018	1545.396392	1097.916	1693.129	1978.864	1198.442
11Jan2018 10:00:00	2018	1554.375864	1096.746	1706.959	1993.575	1193.071
11Jan2018 11:00:00	2018	1557.901724	1092.99	1705.703	1997.602	1187.643
11Jan2018 12:00:00	2018	1552.954151	1081.992	1696.508	1984.531	1196.795
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11Jan2018 15:00:00	2018	1567.459752	1068.468	1697.015	1987.975	1226.193
11Jan2018 16:00:00	2018	1614.117185	1072.26	1732.264	2044.338	1191.158
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11Jan2018 21:00:00	2018	1478.294673	1075.752	1680.934	1878.701	1189.337
11Jan2018 22:00:00	2018	1359.552729	1036.545	1634.938	1765.572	1189.064
11Jan2018 23:00:00	2018	1253.540365	1021.379	1597.164	1692.202	1189.693
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12Jan2018 3:00:00	2018	1115.35783	975.5224	1519.5	1543.997	1139.273
12Jan2018 4:00:00	2018	1135.063764	984.9588	1535.422	1559.565	1147.268
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12Jan2018 9:00:00	2018	1533.83144	1040.792	1708.695	2004.61	1193.021
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12Jan2018 16:00:00	2018	1564.854463	1027.432	1663.242	2045.199	1214.581
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13Jan2018 0:00:00	2018	1128.997198	926.2584	1463.009	1592.491	1319.971
13Jan2018 1:00:00	2018	1075.530405	910.3062	1445.17	1542.581	1303.313
13Jan2018 2:00:00	2018	1041.358662	901.8094	1461.192	1507.252	1309.02
13Jan2018 3:00:00	2018	1026.767976	898.3701	1451.319	1497.724	1291.765
13Jan2018 4:00:00	2018	1022.805602	895.1137	1446.416	1492.828	1306.277
13Jan2018 5:00:00	2018	1043.881727	901.9015	1440.541	1503.782	1282.321
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15Jan2018 2:00:00	2018	973.6397527	895.5495	1444.849	1443.434	1172.509
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18Jan2018 4:00:00	2018	942.772454	898.3779	1355.314	1343.899	963.5179
18Jan2018 5:00:00	2018	1019.791841	909.698	1362.673	1419.191	1018.974
18Jan2018 6:00:00	2018	1184.543355	949.5997	1404.147	1561.563	1057.429
18Jan2018 7:00:00	2018	1342.062042	999.8736	1461.81	1754.228	1051.359
18Jan2018 8:00:00	2018	1382.035101	1017.402	1490.173	1793.219	1046.164
18Jan2018 9:00:00	2018	1374.708257	1012.824	1475.445	1776.267	1047.934
18Jan2018 10:00:00	2018	1380.791743	1011.087	1477.705	1794.05	1032.224
18Jan2018 11:00:00	2018	1382.734362	1016.237	1504.616	1805.497	1040.74
18Jan2018 12:00:00	2018	1372.742196	1000.305	1496.488	1786.462	1048.725
18Jan2018 13:00:00	2018	1363.468477	998.6575	1497.779	1793.558	1042.064
18Jan2018 14:00:00	2018	1361.687146	1001.635	1487.797	1741.304	1034.265
18Jan2018 15:00:00	2018	1365.767721	1006.309	1491.045	1748.203	1014.219
18Jan2018 16:00:00	2018	1400.13776	1021.974	1493.094	1780.245	1048.942
18Jan2018 17:00:00	2018	1488.598205	1053.007	1526.184	1893.424	1075.214
18Jan2018 18:00:00	2018	1467.161856	1047.921	1515.699	1846.251	1078.586
18Jan2018 19:00:00	2018	1420.476807	1029.454	1497.935	1797.309	1070.921
18Jan2018 20:00:00	2018	1368.284335	1017.195	1479.163	1753.643	1061.981
18Jan2018 21:00:00	2018	1287.407679	984.7339	1456.501	1677.124	1060.639
18Jan2018 22:00:00	2018	1171.26959	947.0409	1429.683	1576.541	1058.242
18Jan2018 23:00:00	2018	1066.288172	921.7953	1405.593	1495.576	1018.1
19Jan2018 0:00:00	2018	996.1764908	897.6357	1388.463	1410.406	1023.951
19Jan2018 1:00:00	2018	958.1238715	881.7229	1370.817	1373.097	1070.921
19Jan2018 2:00:00	2018	936.654705	879.1615	1368.472	1349.81	1073.853
19Jan2018 3:00:00	2018	929.2987494	890.6683	1341.698	1316.243	1053.39
19Jan2018 4:00:00	2018	956.6304047	894.7719	1340.347	1329.427	1027.901
19Jan2018 5:00:00	2018	1037.990221	907.5001	1356.277	1394.934	1022.623
19Jan2018 6:00:00	2018	1193.845663	935.6439	1412.385	1557.077	1040.004
19Jan2018 7:00:00	2018	1352.990085	988.9903	1478.328	1711.808	1034.339
19Jan2018 8:00:00	2018	1392.872867	1010.285	1510.567	1731.414	1060.235
19Jan2018 9:00:00	2018	1391.601631	1003.677	1511.179	1735.015	1064.715
19Jan2018 10:00:00	2018	1389.677292	995.2504	1505.327	1735.453	1052.452
19Jan2018 11:00:00	2018	1396.039673	990.6352	1502.626	1742.245	1059.585
19Jan2018 12:00:00	2018	1387.100408	978.6648	1490.249	1733.144	1041.061
19Jan2018 13:00:00	2018	1376.186478	970.1071	1489.399	1717.785	1035.406
19Jan2018 14:00:00	2018	1364.691271	964.8191	1476.155	1718.733	1039.726
19Jan2018 15:00:00	2018	1360.597093	960.1933	1469.913	1712.061	1054.977
19Jan2018 16:00:00	2018	1383.477144	972.4991	1480.264	1751.748	1075.573
19Jan2018 17:00:00	2018	1460.983568	1009.658	1517.718	1832.674	1082.84
19Jan2018 18:00:00	2018	1437.387406	1007.066	1499.298	1797.482	1070.036
19Jan2018 19:00:00	2018	1387.542681	991.3805	1481.822	1753.564	1061.187
19Jan2018 20:00:00	2018	1331.028075	979.3727	1471.077	1729.364	1061.306
19Jan2018 21:00:00	2018	1262.610389	959.2255	1446.421	1663.067	1061.911
19Jan2018 22:00:00	2018	1162.852186	933.3296	1421.386	1562.791	1062.908
19Jan2018 23:00:00	2018	1068.362723	905.724	1370.564	1455.512	1050.353
20Jan2018 0:00:00	2018	1002.234766	882.3155	1320.491	1376.281	1047.175
20Jan2018 1:00:00	2018	955.603549	868.821	1300.788	1303.443	1042.61

20Jan2018 2:00:00	2018	928.0100273	863.3888	1319.86	1321.59	1028.821
20Jan2018 3:00:00	2018	918.2634888	865.3999	1320.494	1310.936	1016.297
20Jan2018 4:00:00	2018	921.4132122	865.6381	1312.65	1315.479	1007.642
20Jan2018 5:00:00	2018	947.6477965	870.7208	1331.966	1347.36	1009.225
20Jan2018 6:00:00	2018	1006.583007	886.2806	1354.976	1406.871	1007.542
20Jan2018 7:00:00	2018	1088.262625	920.1469	1391.509	1503.909	1036.582
20Jan2018 8:00:00	2018	1165.784123	943.8933	1429.472	1584.696	1048.129
20Jan2018 9:00:00	2018	1217.400359	959.4525	1443.346	1621.452	1056.911
20Jan2018 10:00:00	2018	1245.697137	958.1756	1434.636	1655.662	1062.042
20Jan2018 11:00:00	2018	1254.100642	945.8911	1429.384	1677.367	1064.292
20Jan2018 12:00:00	2018	1247.434063	937.1607	1438.584	1685.672	1071.638
20Jan2018 13:00:00	2018	1235.576492	926.9231	1431.688	1672.954	1074.725
20Jan2018 14:00:00	2018	1229.253554	933.539	1417.472	1636.063	1051.76
20Jan2018 15:00:00	2018	1233.092239	944.946	1426.362	1618.246	1054.004
20Jan2018 16:00:00	2018	1258.733312	963.7224	1444.363	1664.279	1079.387
20Jan2018 17:00:00	2018	1349.586338	999.0673	1479.334	1765.675	1099.152
20Jan2018 18:00:00	2018	1353.826919	994.0137	1473.379	1757.597	1098.417
20Jan2018 19:00:00	2018	1309.195919	981.3339	1467.037	1708.596	1113.796
20Jan2018 20:00:00	2018	1263.849577	967.4786	1455.075	1694.753	1140.426
20Jan2018 21:00:00	2018	1211.805579	951.7045	1434.843	1639.259	1135.298
20Jan2018 22:00:00	2018	1137.0524	926.3586	1418.078	1566.022	1139.187
20Jan2018 23:00:00	2018	1055.293195	899.8299	1390.213	1474.832	1121.993
21Jan2018 0:00:00	2018	988.7429985	877.8521	1366.533	1414.189	1113.217
21Jan2018 1:00:00	2018	946.0325046	865.8356	1353.602	1354.676	1110.496
21Jan2018 2:00:00	2018	918.7670563	857.7435	1337.975	1301.868	1146.162
21Jan2018 3:00:00	2018	909.0715118	863.0361	1338.729	1294.141	1110.2
21Jan2018 4:00:00	2018	912.1999084	868.1015	1334.598	1285.474	1094.148
21Jan2018 5:00:00	2018	935.9035227	871.7866	1335.653	1288.734	1100.214
21Jan2018 6:00:00	2018	981.7265478	889.86	1348.445	1338.812	1106.84
21Jan2018 7:00:00	2018	1046.538855	911.5388	1384.641	1420.945	1110.232
21Jan2018 8:00:00	2018	1102.179467	924.6178	1409.524	1503.918	1125.572
21Jan2018 9:00:00	2018	1149.756568	940.1806	1414.083	1530.476	1143.129
21Jan2018 10:00:00	2018	1187.892934	944.1422	1424.174	1592.496	1130.246
21Jan2018 11:00:00	2018	1209.6602	932.8248	1429.916	1614.704	1103.241
21Jan2018 12:00:00	2018	1216.881821	923.9289	1431.71	1635.193	1098.921
21Jan2018 13:00:00	2018	1210.7327	910.8106	1421.931	1654.912	1095.641
21Jan2018 14:00:00	2018	1205.864811	918.4753	1417.741	1619.155	1109.963
21Jan2018 15:00:00	2018	1224.401571	923.6545	1424.413	1635.26	1112.277
21Jan2018 16:00:00	2018	1286.454013	949.8235	1462.079	1722.764	1121.443
21Jan2018 17:00:00	2018	1398.663118	995.8289	1515.721	1853.018	1141.555
21Jan2018 18:00:00	2018	1390.156411	1001.348	1513.333	1843.543	1144.355
21Jan2018 19:00:00	2018	1346.043619	988.7479	1490.57	1814.819	1157.957
21Jan2018 20:00:00	2018	1297.548818	969.4044	1463.076	1719.606	1188.242
21Jan2018 21:00:00	2018	1218.496424	947.4586	1431.498	1643.946	1162.611
21Jan2018 22:00:00	2018	1115.042398	913.8431	1389.485	1545.527	1123.267
21Jan2018 23:00:00	2018	1018.154019	881.7532	1359.152	1438.474	1104.117
22Jan2018 0:00:00	2018	959.3243794	866.2693	1333.31	1355.266	1075.669

22Jan2018 1:00:00	2018	923.0803571	860.0728	1323.82	1315.554	1061.176
22Jan2018 2:00:00	2018	905.5398142	855.6975	1318.099	1313.231	1072.737
22Jan2018 3:00:00	2018	902.6379141	856.9861	1320.495	1315.764	1087.749
22Jan2018 4:00:00	2018	929.2639435	868.2504	1324.255	1326.953	1096.897
22Jan2018 5:00:00	2018	1012.809766	887.452	1353.437	1392.574	1099.31
22Jan2018 6:00:00	2018	1180.792869	928.1727	1414.416	1577.247	1109.632
22Jan2018 7:00:00	2018	1342.876205	981.6688	1493.312	1776.182	1117.337
22Jan2018 8:00:00	2018	1383.250978	998.48	1520.448	1834.772	1128.372
22Jan2018 9:00:00	2018	1374.657418	995.6173	1513.002	1814.76	1126.881
22Jan2018 10:00:00	2018	1385.651449	995.1725	1507.768	1850.601	1123.223
22Jan2018 11:00:00	2018	1391.337555	988.1041	1506.742	1854.267	1130.514
22Jan2018 12:00:00	2018	1391.072482	973.4073	1480.083	1816.218	1124.602
22Jan2018 13:00:00	2018	1386.214579	972.8852	1464.258	1799.901	1131.063
22Jan2018 14:00:00	2018	1375.186148	974.2747	1452.3	1786.86	1146.876
22Jan2018 15:00:00	2018	1378.503462	979.4504	1464.214	1789.367	1122.482
22Jan2018 16:00:00	2018	1407.706923	995.3631	1487.138	1809.835	1139.465
22Jan2018 17:00:00	2018	1506.528068	1035.545	1539.343	1904.52	1164.198
22Jan2018 18:00:00	2018	1486.147269	1033.868	1531.66	1875.323	1176.216
22Jan2018 19:00:00	2018	1434.35793	1017.105	1504.456	1830.027	1171.96
22Jan2018 20:00:00	2018	1379.955294	1000.58	1494.573	1789.615	1170.614
22Jan2018 21:00:00	2018	1291.628035	973.5211	1458.098	1700.924	1145.715
22Jan2018 22:00:00	2018	1169.459835	936.202	1417.986	1585.501	1118.974
22Jan2018 23:00:00	2018	1066.11768	907.8349	1381.108	1487.641	1113.837
23Jan2018 0:00:00	2018	997.4375529	890.3508	1360.224	1390.286	1070.485
23Jan2018 1:00:00	2018	958.615764	883.7195	1364.088	1380.37	1069.309
23Jan2018 2:00:00	2018	940.0356119	882.3304	1359.689	1357.826	1073.151
23Jan2018 3:00:00	2018	937.1392469	884.7033	1353.042	1350.263	1056.41
23Jan2018 4:00:00	2018	962.4128582	893.7665	1353.839	1366.425	1059.851
23Jan2018 5:00:00	2018	1048.039703	916.0803	1357.407	1438.689	1084.513
23Jan2018 6:00:00	2018	1216.364526	957.4366	1413.875	1575.341	1128.228
23Jan2018 7:00:00	2018	1373.805847	1010.804	1457.812	1715.873	1137.153
23Jan2018 8:00:00	2018	1404.327431	1028.241	1465.924	1760.981	1143.926
23Jan2018 9:00:00	2018	1383.992149	1022.872	1454.627	1747.34	1154.776
23Jan2018 10:00:00	2018	1388.88385	1012.613	1447.52	1760.512	1153.615
23Jan2018 11:00:00	2018	1390.798266	1005.165	1466.487	1766.395	1147.769
23Jan2018 12:00:00	2018	1384.222833	994.1585	1450.333	1746.184	1130.218
23Jan2018 13:00:00	2018	1378.494256	995.5752	1446.693	1755.961	1120.532
23Jan2018 14:00:00	2018	1366.601019	997.7485	1449.606	1739.957	1111.191
23Jan2018 15:00:00	2018	1374.954788	1005.147	1465.956	1749.841	1127.849
23Jan2018 16:00:00	2018	1421.772285	1025.951	1504.974	1806.663	1100.897
23Jan2018 17:00:00	2018	1513.640048	1061.025	1546.453	1890.316	1147.571
23Jan2018 18:00:00	2018	1488.85926	1059.387	1539.806	1852.953	1161.499
23Jan2018 19:00:00	2018	1442.079381	1042.013	1524.201	1809.691	1166.775
23Jan2018 20:00:00	2018	1384.539149	1022.702	1496.007	1766.24	1162.446
23Jan2018 21:00:00	2018	1299.321977	997.6876	1467.286	1697.556	1139.046
23Jan2018 22:00:00	2018	1174.830657	960.5681	1426.621	1580.664	1124.732
23Jan2018 23:00:00	2018	1067.285204	923.1733	1382.759	1483.298	1103.718

24Jan2018 0:00:00	2018	998.205255	897.1676	1359.12	1405.256	1098.668
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24Jan2018 2:00:00	2018	940.3381376	877.3807	1327.102	1351.472	1105.566
24Jan2018 3:00:00	2018	934.0808948	879.6317	1346.306	1350.49	1095.77
24Jan2018 4:00:00	2018	957.8530693	886.8806	1336.978	1325.305	1094.387
24Jan2018 5:00:00	2018	1039.586681	902.9556	1345.748	1379.371	1099.938
24Jan2018 6:00:00	2018	1205.095768	945.2669	1391.193	1524.474	1122.688
24Jan2018 7:00:00	2018	1360.255832	996.6568	1460.636	1707.624	1116.528
24Jan2018 8:00:00	2018	1396.64159	1014.977	1493.294	1782.184	1117.362
24Jan2018 9:00:00	2018	1385.57686	1009.699	1485.297	1773.132	1095.387
24Jan2018 10:00:00	2018	1392.875158	996.2737	1476.084	1778.4	1117.485
24Jan2018 11:00:00	2018	1384.558665	986.6834	1466.821	1783.832	1113.446
24Jan2018 12:00:00	2018	1376.32099	973.9981	1464.895	1777.453	1128.702
24Jan2018 13:00:00	2018	1368.726514	982.3658	1470.132	1782.918	1127.058
24Jan2018 14:00:00	2018	1359.620716	983.6105	1471.993	1785.372	1128.038
24Jan2018 15:00:00	2018	1361.468257	967.6304	1479.79	1798.578	1128.822
24Jan2018 16:00:00	2018	1392.074232	986.7665	1516.996	1847.169	1152.848
24Jan2018 17:00:00	2018	1486.298517	1024.681	1571.838	1936.26	1168.223
24Jan2018 18:00:00	2018	1473.989024	1010.672	1567.697	1903.412	1186.053
24Jan2018 19:00:00	2018	1426.488103	998.4002	1556.741	1853.859	1159.502
24Jan2018 20:00:00	2018	1372.960694	987.5207	1534.976	1775.157	1127.873
24Jan2018 21:00:00	2018	1290.724261	969.3845	1498.901	1679.893	1120.246
24Jan2018 22:00:00	2018	1172.070916	933.7848	1456.282	1559.175	1106.967
24Jan2018 23:00:00	2018	1067.094822	903.2812	1413.39	1449.093	1095.271
25Jan2018 0:00:00	2018	999.6843362	878.8497	1396.213	1369.904	1070.507
25Jan2018 1:00:00	2018	957.0180639	870.2361	1389.888	1343.443	1055.092
25Jan2018 2:00:00	2018	939.211204	866.3116	1381.898	1316.416	1073.541
25Jan2018 3:00:00	2018	936.1271505	867.8631	1383.789	1321.593	1070.91
25Jan2018 4:00:00	2018	961.8911682	871.9524	1397.661	1370.499	1060.707
25Jan2018 5:00:00	2018	1043.59774	892.0524	1415.731	1436.957	1109.426
25Jan2018 6:00:00	2018	1204.72055	928.4405	1453.472	1564.952	1139.889
25Jan2018 7:00:00	2018	1359.258771	978.7735	1501.504	1718.505	1126.436
25Jan2018 8:00:00	2018	1394.446328	996.2872	1516.887	1783.927	1126.447
25Jan2018 9:00:00	2018	1398.184693	996.7137	1536.779	1800.887	1110.59
25Jan2018 10:00:00	2018	1409.139277	993.1194	1539.356	1819.505	1129.101
25Jan2018 11:00:00	2018	1424.244735	977.6621	1555.618	1812.686	1120.486
25Jan2018 12:00:00	2018	1423.906821	960.5526	1546.939	1803.645	1123.43
25Jan2018 13:00:00	2018	1422.730328	965.0434	1550.438	1812.755	1134.526
25Jan2018 14:00:00	2018	1425.783245	964.1875	1556.498	1826.99	1141.474
25Jan2018 15:00:00	2018	1442.058631	973.316	1565.456	1864.793	1134.082
25Jan2018 16:00:00	2018	1456.029762	989.2685	1573.375	1904.526	1146.442
25Jan2018 17:00:00	2018	1528.033502	1023.63	1602.738	1971.269	1159.949
25Jan2018 18:00:00	2018	1507.054169	1029.73	1600.725	1927.897	1153.237
25Jan2018 19:00:00	2018	1453.568139	1009.019	1515.666	1816.561	1086.149
25Jan2018 20:00:00	2018	1402.201309	996.11	1500.44	1761.257	1078.466
25Jan2018 21:00:00	2018	1319.339602	970.6536	1496.907	1708.796	1109.864
25Jan2018 22:00:00	2018	1205.563095	925.6514	1500.752	1631.99	1129.098

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26Jan2018 0:00:00	2018	1029.167606	876.8018	1437.341	1453.867	1093.264
26Jan2018 1:00:00	2018	989.8607882	879.2355	1430.544	1418.345	1106.931
26Jan2018 2:00:00	2018	968.3000829	876.6371	1423.453	1399.715	1104.394
26Jan2018 3:00:00	2018	964.284535	879.3144	1405.243	1393.228	1108.356
26Jan2018 4:00:00	2018	987.6329025	877.9743	1407.517	1404.382	1090.317
26Jan2018 5:00:00	2018	1065.473646	896.0294	1429.419	1467.136	1099.44
26Jan2018 6:00:00	2018	1213.716659	938.7632	1473.349	1602.232	1119.524
26Jan2018 7:00:00	2018	1358.863213	990.3349	1537.108	1747.527	1138.981
26Jan2018 8:00:00	2018	1406.411745	1013.179	1551.657	1799.805	1141.605
26Jan2018 9:00:00	2018	1418.237261	1020.13	1553.647	1809.397	1142.02
26Jan2018 10:00:00	2018	1429.392448	1021.895	1544.071	1832.031	1161.003
26Jan2018 11:00:00	2018	1429.107111	1015.181	1553.711	1849.737	1143.858
26Jan2018 12:00:00	2018	1422.419411	997.3042	1555.085	1851.617	1111.309
26Jan2018 13:00:00	2018	1412.873618	988.214	1542.624	1856.757	1104.599
26Jan2018 14:00:00	2018	1405.733725	994.7454	1529.111	1849.932	1102.965
26Jan2018 15:00:00	2018	1409.360047	992.9237	1515.705	1840.715	1110.034
26Jan2018 16:00:00	2018	1430.433813	1005.405	1529.939	1844.312	1123.395
26Jan2018 17:00:00	2018	1491.433964	1032.06	1589.409	1929.121	1156.883
26Jan2018 18:00:00	2018	1483.184159	1044.704	1581.582	1915.039	1216.652
26Jan2018 19:00:00	2018	1431.614881	1034.205	1564.435	1865.512	1211.756
26Jan2018 20:00:00	2018	1385.186083	1035.552	1572.001	1816.442	1206.599
26Jan2018 21:00:00	2018	1319.164258	1014.079	1548.689	1746.96	1202.46
26Jan2018 22:00:00	2018	1227.181155	981.8261	1514.036	1659.516	1190.971
26Jan2018 23:00:00	2018	1133.684664	951.2117	1482.475	1593.05	1172.364
27Jan2018 0:00:00	2018	1067.328496	949.6201	1455.98	1499.44	1156.087
27Jan2018 1:00:00	2018	1023.453834	940.4654	1437.564	1465.95	1149.652
27Jan2018 2:00:00	2018	999.2403085	936.8779	1420.292	1426.304	1139.915
27Jan2018 3:00:00	2018	991.0482421	934.5092	1397.222	1399.705	1141.18
27Jan2018 4:00:00	2018	999.7838324	934.798	1385.724	1374.806	1144.553
27Jan2018 5:00:00	2018	1030.206989	944.614	1399.622	1416.514	1156.751
27Jan2018 6:00:00	2018	1081.749488	958.7018	1422.199	1496.523	1135.667
27Jan2018 7:00:00	2018	1162.923688	980.4236	1493.268	1568.469	1114.064
27Jan2018 8:00:00	2018	1235.89326	1005.727	1539.366	1642.198	1115.402
27Jan2018 9:00:00	2018	1285.961412	1020.361	1552.481	1693.128	1101.387
27Jan2018 10:00:00	2018	1334.047591	1028.211	1557.248	1715.691	1113.021
27Jan2018 11:00:00	2018	1353.676368	1023.766	1549.306	1722.53	1117.712
27Jan2018 12:00:00	2018	1361.214996	1019.597	1541.472	1713.144	1135.18
27Jan2018 13:00:00	2018	1359.739112	1039.344	1541.229	1686.429	1160.979
27Jan2018 14:00:00	2018	1350.655674	1044.825	1556.573	1736.901	1158.145
27Jan2018 15:00:00	2018	1343.777168	1055.951	1565.227	1745.651	1155.835
27Jan2018 16:00:00	2018	1363.896941	1067.95	1584.718	1763.913	1163.782
27Jan2018 17:00:00	2018	1441.333945	1097.395	1627.666	1877.673	1177.003
27Jan2018 18:00:00	2018	1437.684945	1094.146	1616.39	1845.831	1181.291
27Jan2018 19:00:00	2018	1393.969984	1076.96	1588.693	1798.078	1182.891
27Jan2018 20:00:00	2018	1346.153911	1061.949	1571.503	1751.301	1176.726
27Jan2018 21:00:00	2018	1288.266845	1025.346	1555.216	1692.029	1177.29

27Jan2018 22:00:00	2018	1217.586639	995.0741	1529.764	1622.326	1174.57
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28Jan2018 0:00:00	2018	1078.027708	954.3126	1494.424	1504.596	1160.642
28Jan2018 1:00:00	2018	1034.88569	945.748	1488.424	1462.048	1163.817
28Jan2018 2:00:00	2018	1013.838843	940.9798	1483.488	1462.508	1157.863
28Jan2018 3:00:00	2018	1003.253185	938.6679	1479.97	1445.374	1143.28
28Jan2018 4:00:00	2018	1007.686408	946.0201	1478.652	1441.443	1144.078
28Jan2018 5:00:00	2018	1030.938346	955.7079	1472.298	1450.879	1147.015
28Jan2018 6:00:00	2018	1073.459141	976.496	1476.839	1460.25	1134.868
28Jan2018 7:00:00	2018	1136.125826	990.777	1503.237	1527.16	1138.079
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28Jan2018 9:00:00	2018	1234.231657	1021.986	1535.069	1616.516	1108.555
28Jan2018 10:00:00	2018	1287.516553	1042.903	1547.341	1662.481	1113.048
28Jan2018 11:00:00	2018	1321.916126	1054.103	1551.911	1681.569	1110.235
28Jan2018 12:00:00	2018	1335.971457	1052.707	1547.12	1674.505	1092.042
28Jan2018 13:00:00	2018	1343.947265	1050.202	1540.512	1665.427	1078.383
28Jan2018 14:00:00	2018	1351.393311	1042.74	1548.082	1681.022	1079.72
28Jan2018 15:00:00	2018	1368.569504	1045.207	1562.425	1714.172	1086.659
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28Jan2018 17:00:00	2018	1495.471671	1094.508	1656.772	1931.286	1152.811
28Jan2018 18:00:00	2018	1499.665705	1098.806	1648.443	1944.107	1169.613
28Jan2018 19:00:00	2018	1455.27241	1082.816	1629.836	1904.559	1161.424
28Jan2018 20:00:00	2018	1406.14242	1060.583	1614.155	1867.273	1156.016
28Jan2018 21:00:00	2018	1328.840869	1031.894	1590.043	1790.701	1150.767
28Jan2018 22:00:00	2018	1224.677249	982.5856	1542.95	1656.506	1145.228
28Jan2018 23:00:00	2018	1124.72921	966.7026	1500.242	1566.991	1136.404
29Jan2018 0:00:00	2018	1063.547377	949.6583	1481.539	1499.844	1127.846
29Jan2018 1:00:00	2018	1030.229972	935.1129	1473.175	1480.555	1120.412
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29Jan2018 5:00:00	2018	1102.294262	951.5871	1485.939	1562.991	1099.849
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29Jan2018 7:00:00	2018	1404.236677	1033.581	1614.661	1865.583	1115.242
29Jan2018 8:00:00	2018	1439.848703	1034.799	1629.971	1883.885	1122.256
29Jan2018 9:00:00	2018	1436.969321	1031.391	1626.114	1878.115	1074.098
29Jan2018 10:00:00	2018	1452.574278	1028.197	1628.733	1904.683	1076.303
29Jan2018 11:00:00	2018	1457.730722	1022.541	1631.961	1934.64	1073.702
29Jan2018 12:00:00	2018	1442.378457	1008.57	1629.333	1952.271	1068.539
29Jan2018 13:00:00	2018	1411.634753	998.7124	1619.153	1939.703	1059.637
29Jan2018 14:00:00	2018	1392.041917	991.0853	1611.401	1934.835	1068.901
29Jan2018 15:00:00	2018	1387.09779	1004.354	1614.62	1951.671	1105.007
29Jan2018 16:00:00	2018	1416.415025	1020.093	1630.56	1970.758	1131.389
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29Jan2018 19:00:00	2018	1432.317024	1009.446	1626.582	1950.387	1156.672
29Jan2018 20:00:00	2018	1375.825565	993.6297	1619.845	1882.226	1137.689

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30Jan2018 1:00:00	2018	943.6938176	881.8136	1466.04	1452.497	1113.269
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30Jan2018 4:00:00	2018	953.9180026	883.5537	1441.481	1456.291	1119.596
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30Jan2018 7:00:00	2018	1340.34174	996.2866	1564.94	1796.263	1122.169
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30Jan2018 14:00:00	2018	1361.130696	995.7015	1590.118	1814.377	1127.341
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30Jan2018 17:00:00	2018	1469.421712	1050.42	1646.143	1945.908	1211.047
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30Jan2018 19:00:00	2018	1431.772216	1043.626	1588.665	1902.401	1164.265
30Jan2018 20:00:00	2018	1379.008975	1028.352	1567.325	1847.38	1149.999
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30Jan2018 22:00:00	2018	1175.502636	962.6687	1529.94	1689.549	1125.166
30Jan2018 23:00:00	2018	1077.682757	931.6636	1491.184	1588.583	1112.02
31Jan2018 0:00:00	2018	1015.744875	911.597	1477.073	1529.801	1153.921
31Jan2018 1:00:00	2018	977.0501069	904.2394	1464.272	1496.101	1157.188
31Jan2018 2:00:00	2018	960.1716088	901.0261	1460.68	1478.036	1145.807
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31Jan2018 5:00:00	2018	1072.439336	927.5378	1501.4	1575.854	1172.281
31Jan2018 6:00:00	2018	1242.898627	966.4008	1549.709	1724.767	1182.641
31Jan2018 7:00:00	2018	1405.44398	1022.185	1617.487	1886.999	1213.982
31Jan2018 8:00:00	2018	1448.985603	1048.491	1642.435	1916.874	1201.576
31Jan2018 9:00:00	2018	1458.449489	1069.567	1644.193	1919.301	1182.955
31Jan2018 10:00:00	2018	1477.309554	1079.092	1644.303	1937.45	1165.033
31Jan2018 11:00:00	2018	1486.043028	1082.835	1648.621	1936.26	1169.504
31Jan2018 12:00:00	2018	1485.687224	1073.293	1644.414	1933.62	1173.131
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31Jan2018 14:00:00	2018	1482.121665	1057.556	1616.468	1953.447	1166.805
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04Feb2018 15:00:00	2018	1365.657873	998.4911	1565.683	1737.401	1299.168
04Feb2018 16:00:00	2018	1406.188411	987.2222	1593.452	1812.739	1299.22
04Feb2018 17:00:00	2018	1467.338493	1003.676	1639.749	1912.313	1305.771

04Feb2018 18:00:00	2018	1479.755598	996.3383	1645.755	1932.351	1270.95
04Feb2018 19:00:00	2018	1436.599428	983.8883	1637.417	1886.771	1254.146
04Feb2018 20:00:00	2018	1390.188977	977.9426	1622.283	1832.993	1249.889
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04Feb2018 22:00:00	2018	1223.631807	966.226	1532.144	1637.391	1243.848
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05Feb2018 3:00:00	2018	1007.952259	913.0589	1488.024	1435.068	1228.186
05Feb2018 4:00:00	2018	1036.830053	923.52	1492.753	1461.298	1174.374
05Feb2018 5:00:00	2018	1119.713377	946.6431	1511.254	1528.908	1182.928
05Feb2018 6:00:00	2018	1280.850672	993.5583	1559.475	1670.028	1193.475
05Feb2018 7:00:00	2018	1430.742927	1038.95	1623.57	1837.683	1236.904
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05Feb2018 9:00:00	2018	1444.112014	1035.21	1653.134	1877.879	1240.601
05Feb2018 10:00:00	2018	1461.041419	1044.359	1649.647	1864.972	1283.218
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05Feb2018 12:00:00	2018	1458.040904	1023.056	1611.251	1849.898	1339.8
05Feb2018 13:00:00	2018	1450.985242	1019.627	1593.839	1827.613	1335.51
05Feb2018 14:00:00	2018	1441.114457	1017.911	1593.234	1809.443	1312.508
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05Feb2018 18:00:00	2018	1596.77632	1077.579	1653	1958.47	1344.471
05Feb2018 19:00:00	2018	1558.041448	1063.543	1643.986	1915.704	1341.788
05Feb2018 20:00:00	2018	1502.477881	1054.603	1630.112	1854.918	1346.157
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06Feb2018 1:00:00	2018	1058.601627	972.1527	1488.11	1501.334	1267.743
06Feb2018 2:00:00	2018	1039.414095	967.8896	1487.833	1475.084	1266.361
06Feb2018 3:00:00	2018	1037.002589	967.7055	1479.486	1467.503	1258.276
06Feb2018 4:00:00	2018	1059.021435	975.8492	1472.882	1471.573	1213.706
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06Feb2018 6:00:00	2018	1291.713395	1032.662	1522.231	1654.642	1238.494
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06Feb2018 8:00:00	2018	1450.313432	1072.069	1596.831	1826.262	1289.698
06Feb2018 9:00:00	2018	1456.528159	1073.854	1588.463	1826.813	1272.606
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06Feb2018 11:00:00	2018	1463.924461	1065.834	1580.292	1836.994	1275.798
06Feb2018 12:00:00	2018	1451.144513	1057.695	1550.771	1824.176	1276.842
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07Feb2018 0:00:00	2018	1090.157829	944.3514	1487.062	1490.153	1248.087
07Feb2018 1:00:00	2018	1050.827097	931.622	1474.029	1444.29	1251.202
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07Feb2018 3:00:00	2018	1022.811733	930.3613	1468.006	1440.735	1247.405
07Feb2018 4:00:00	2018	1045.266883	935.1394	1469.951	1455.982	1242.317
07Feb2018 5:00:00	2018	1121.823578	955.83	1476.214	1542.044	1257.816
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07Feb2018 19:00:00	2018	1537.700617	1043.25	1630.365	1915.489	1284.237
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07Feb2018 21:00:00	2018	1396.958976	1048.226	1582.471	1783.487	1298.43
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07Feb2018 23:00:00	2018	1170.419142	985.3538	1477.415	1570.405	1283.332
08Feb2018 0:00:00	2018	1099.651437	972.7867	1476.935	1510.95	1238.944
08Feb2018 1:00:00	2018	1062.088667	965.9956	1489.147	1463.748	1221.502
08Feb2018 2:00:00	2018	1045.004431	954.6092	1495.685	1462.073	1222.277
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08Feb2018 9:00:00	2018	1493.485483	1069.708	1619.996	1888.921	1241.072
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13Feb2018 7:00:00	2018	1380.127342	1031.997	1472.335	1752.994	1227.547
13Feb2018 8:00:00	2018	1377.015921	1031.924	1460.4	1757.221	1191.93
13Feb2018 9:00:00	2018	1378.448837	1022.599	1429.589	1754.558	1158.535
13Feb2018 10:00:00	2018	1393.521814	1004.951	1416.763	1759.967	1163.746
13Feb2018 11:00:00	2018	1402.823287	982.7472	1392.402	1775.995	1196.594
13Feb2018 12:00:00	2018	1398.502397	965.9595	1400.444	1785.507	1207.447
13Feb2018 13:00:00	2018	1388.546798	964.1649	1420.903	1816.413	1167.92
13Feb2018 14:00:00	2018	1373.377528	973.2741	1399.716	1824.628	1176.539
13Feb2018 15:00:00	2018	1369.199888	975.3996	1388.316	1790.612	1205.315
13Feb2018 16:00:00	2018	1380.285542	1000.899	1422.076	1793.177	1218.082
13Feb2018 17:00:00	2018	1419.152946	1018.172	1450.426	1869.004	1230.962
13Feb2018 18:00:00	2018	1461.27434	1048.47	1511.976	1925.926	1237.909
13Feb2018 19:00:00	2018	1427.680405	1045.483	1520.206	1892.072	1235.359
13Feb2018 20:00:00	2018	1384.717464	1028.37	1495.747	1809.472	1231.462
13Feb2018 21:00:00	2018	1300.503234	1002.632	1461.04	1742.191	1235.913
13Feb2018 22:00:00	2018	1177.523252	969.4861	1417.278	1600.234	1218.051
13Feb2018 23:00:00	2018	1072.906646	950.6124	1384.34	1487.337	1180.369
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14Feb2018 2:00:00	2018	942.435466	916.4396	1336.556	1360.875	1179.439
14Feb2018 3:00:00	2018	938.3090819	914.5943	1335.209	1353.912	1172.998
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14Feb2018 5:00:00	2018	1043.201032	946.662	1373.965	1473.773	1207.958
14Feb2018 6:00:00	2018	1211.183254	982.3703	1403.002	1617.073	1193.185
14Feb2018 7:00:00	2018	1357.281261	1028.137	1456.429	1787.879	1204.61
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14Feb2018 9:00:00	2018	1386.121331	1038.508	1482.819	1842.049	1214.759
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14Feb2018 11:00:00	2018	1447.73776	1052.027	1487.685	1887.687	1211.837
14Feb2018 12:00:00	2018	1449.760472	1043.385	1487.293	1898.465	1172.734

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14Feb2018 15:00:00	2018	1452.535659	1077.162	1480.537	1871	1154.749
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14Feb2018 19:00:00	2018	1497.560733	1097.643	1553.385	1913.149	1307.14
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15Feb2018 1:00:00	2018	1046.179065	975.5749	1442.569	1495.113	1279.942
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15Feb2018 11:00:00	2018	1457.477531	1075.894	1524.209	1875.11	1238.445
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15Feb2018 14:00:00	2018	1432.29302	1058.61	1475.037	1853.151	1196.517
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15Feb2018 19:00:00	2018	1496.241286	1083.653	1587.342	1940.59	1259.132
15Feb2018 20:00:00	2018	1444.271039	1095.524	1573.818	1885.446	1252.101
15Feb2018 21:00:00	2018	1361.797148	1070.632	1539.325	1804.277	1242.653
15Feb2018 22:00:00	2018	1244.100744	1028.034	1496.134	1682.005	1229.617
15Feb2018 23:00:00	2018	1138.118096	998.9889	1455.707	1570.676	1217.531
16Feb2018 0:00:00	2018	1065.296682	974.3223	1433.547	1531.672	1170.926
16Feb2018 1:00:00	2018	1014.806781	959.8387	1419.272	1491.286	1174.206
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16Feb2018 5:00:00	2018	1075.047868	970.0671	1432.196	1506.435	1266.223
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16Feb2018 9:00:00	2018	1388.094056	1052.671	1492.844	1803.102	1266.352
16Feb2018 10:00:00	2018	1419.277914	1042.483	1499.737	1841.996	1299.358
16Feb2018 11:00:00	2018	1428.708966	1034.805	1495.055	1839.561	1291.677

16Feb2018 12:00:00	2018	1414.97128	1028.993	1491.554	1838.815	1291.545
16Feb2018 13:00:00	2018	1402.330344	1023.446	1469.585	1830.551	1292.062
16Feb2018 14:00:00	2018	1377.249049	1019.473	1483.081	1836.819	1308.732
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16Feb2018 16:00:00	2018	1388.539058	1038.774	1496.238	1757.08	1313.218
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16Feb2018 18:00:00	2018	1446.945912	1077.459	1549.374	1886.981	1340.913
16Feb2018 19:00:00	2018	1408.235269	1070.469	1551.855	1866.068	1312.109
16Feb2018 20:00:00	2018	1357.331292	1063.159	1556.276	1812.348	1320.38
16Feb2018 21:00:00	2018	1285.970951	1043.316	1541.636	1738.821	1322.595
16Feb2018 22:00:00	2018	1200.929739	1014.038	1525.439	1684.289	1312.867
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17Feb2018 0:00:00	2018	1046.411375	963.7522	1432.122	1495.811	1227.532
17Feb2018 1:00:00	2018	1001.703761	950.3164	1422.641	1446.017	1231.201
17Feb2018 2:00:00	2018	975.6427899	943.9017	1415.478	1409.589	1270.723
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17Feb2018 5:00:00	2018	1001.746462	945.7	1422.394	1435.982	1266.274
17Feb2018 6:00:00	2018	1056.330481	964.2471	1425.615	1491.643	1265.717
17Feb2018 7:00:00	2018	1129.151212	986.8956	1450.172	1576.523	1272.694
17Feb2018 8:00:00	2018	1189.20732	1008.773	1458.757	1608.087	1272.461
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17Feb2018 16:00:00	2018	1326.260249	1058.474	1505.388	1694.876	1249.428
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17Feb2018 18:00:00	2018	1405.129002	1095.123	1568.479	1794.569	1349.559
17Feb2018 19:00:00	2018	1373.09813	1081.56	1558.893	1760.549	1331.478
17Feb2018 20:00:00	2018	1329.640176	1065.381	1566.405	1734.959	1323.832
17Feb2018 21:00:00	2018	1276.724993	1052.89	1550.683	1681.509	1313.442
17Feb2018 22:00:00	2018	1205.270412	1028.397	1529.506	1637.526	1316.839
17Feb2018 23:00:00	2018	1126.090321	993.5101	1513.763	1579.629	1310.553
18Feb2018 0:00:00	2018	1067.180217	972.4983	1493.675	1504.088	1292.235
18Feb2018 1:00:00	2018	1021.984171	960.5952	1482.016	1467.598	1287.465
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18Feb2018 9:00:00	2018	1219.07629	1025.166	1494.418	1633.082	1285.629
18Feb2018 10:00:00	2018	1259.725273	1034.08	1505.286	1659.722	1282.836

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19Feb2018 21:00:00	2018	1348.955898	1073.492	1581.363	1714.978	1219.704
19Feb2018 22:00:00	2018	1246.663213	1040.754	1541.788	1611.261	1212.716
19Feb2018 23:00:00	2018	1147.395264	1006.527	1506.5	1547.34	1193.478
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20Feb2018 12:00:00	2018	1459.356081	1061.247	1590.58	1864.898	1237.268
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20Feb2018 23:00:00	2018	1158.134744	1004.123	1497.459	1612.709	1155.72
21Feb2018 0:00:00	2018	1094.768072	975.5218	1501.5	1557.756	1164.561
21Feb2018 1:00:00	2018	1058.551128	965.4939	1495.702	1502.747	1165.053
21Feb2018 2:00:00	2018	1043.237719	959.7831	1490.76	1478.262	1166.248
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21Feb2018 20:00:00	2018	1460.070062	1068.695	1623.683	1837.603	1165.587
21Feb2018 21:00:00	2018	1375.182433	1046.311	1597.806	1757.066	1161.599
21Feb2018 22:00:00	2018	1261.982512	1016.415	1548.118	1657.215	1143.042
21Feb2018 23:00:00	2018	1162.689934	990.5768	1519.188	1566.553	1119.887
22Feb2018 0:00:00	2018	1091.344048	970.632	1500.726	1489.535	1116.891
22Feb2018 1:00:00	2018	1042.699997	955.7276	1487.257	1444.371	1109.303
22Feb2018 2:00:00	2018	1020.071486	953.6759	1479.534	1419.124	1107.603
22Feb2018 3:00:00	2018	1017.24588	957.3844	1482.093	1411.269	1122.019
22Feb2018 4:00:00	2018	1042.371373	964.1751	1482.241	1426.681	1116.103
22Feb2018 5:00:00	2018	1117.296532	981.7998	1489.954	1493.084	1110.987
22Feb2018 6:00:00	2018	1273.447938	1014.78	1532.554	1631.317	1140.52
22Feb2018 7:00:00	2018	1407.840894	1047.57	1576.906	1765.768	1144.321
22Feb2018 8:00:00	2018	1415.578329	1050.245	1567.868	1778.361	1134.329

22Feb2018 9:00:00	2018	1438.848355	1066.56	1562.007	1814.881	1139.038
22Feb2018 10:00:00	2018	1447.787866	1063.27	1565.34	1810.799	1143.626
22Feb2018 11:00:00	2018	1448.959108	1051.349	1557.186	1828.014	1136.949
22Feb2018 12:00:00	2018	1436.902377	1032.323	1545.605	1823.694	1124.534
22Feb2018 13:00:00	2018	1426.716047	1027.436	1527.827	1791.348	1102.268
22Feb2018 14:00:00	2018	1415.993704	1026.171	1523.834	1766.065	1096.533
22Feb2018 15:00:00	2018	1413.419978	1026.263	1529.184	1754.079	1095.356
22Feb2018 16:00:00	2018	1429.599134	1043.923	1554.547	1770.948	1104.098
22Feb2018 17:00:00	2018	1463.436931	1067.896	1570.481	1801.657	1126.737
22Feb2018 18:00:00	2018	1500.980221	1084.636	1601.724	1860.094	1146.46
22Feb2018 19:00:00	2018	1495.545854	1086.352	1611.139	1856.324	1154.093
22Feb2018 20:00:00	2018	1447.597177	1083.963	1602.819	1830.697	1152.995
22Feb2018 21:00:00	2018	1368.857198	1062.2	1559.549	1763.612	1144.849
22Feb2018 22:00:00	2018	1252.349316	1028.051	1506.541	1648.988	1143.046
22Feb2018 23:00:00	2018	1149.909877	995.9123	1474.001	1520.718	1130.8
23Feb2018 0:00:00	2018	1082.193068	965.5536	1459.013	1447.604	1141.548
23Feb2018 1:00:00	2018	1048.143777	955.5665	1466.084	1424.372	1147.816
23Feb2018 2:00:00	2018	1035.240861	956.1491	1465.972	1432.313	1141.79
23Feb2018 3:00:00	2018	1034.479119	958.9919	1468.953	1434.726	1150.88
23Feb2018 4:00:00	2018	1061.470665	968.2701	1475.889	1415.237	1155.19
23Feb2018 5:00:00	2018	1135.988769	987.613	1483.769	1492.787	1155.521
23Feb2018 6:00:00	2018	1285.052695	1014.378	1529.86	1655.432	1166.37
23Feb2018 7:00:00	2018	1411.400131	1053.2	1572.643	1794.553	1163.59
23Feb2018 8:00:00	2018	1424.910516	1065.89	1598.666	1810.233	1149.674
23Feb2018 9:00:00	2018	1436.792483	1065.695	1603.902	1830.684	1149.58
23Feb2018 10:00:00	2018	1440.14233	1055.738	1589.597	1866.425	1151.701
23Feb2018 11:00:00	2018	1441.320043	1048.481	1573.718	1869.184	1154.331
23Feb2018 12:00:00	2018	1429.796954	1032.934	1556.181	1839.381	1141.588
23Feb2018 13:00:00	2018	1417.973863	1025.376	1559.491	1819.394	1140.569
23Feb2018 14:00:00	2018	1404.697927	1020.797	1561.921	1799.921	1157.854
23Feb2018 15:00:00	2018	1405.333893	1025.538	1561.845	1791.867	1152.026
23Feb2018 16:00:00	2018	1417.939888	1047.566	1576.37	1815.95	1160.271
23Feb2018 17:00:00	2018	1437.577646	1065.734	1578.433	1817.548	1167.061
23Feb2018 18:00:00	2018	1457.342923	1078.328	1606.604	1831.471	1162.831
23Feb2018 19:00:00	2018	1431.369012	1070.834	1606.228	1836.903	1166.339
23Feb2018 20:00:00	2018	1383.955233	1056.68	1589.331	1789.522	1176.251
23Feb2018 21:00:00	2018	1310.578376	1035.411	1538.928	1714.889	1179.58
23Feb2018 22:00:00	2018	1216.258291	1007.368	1507.04	1629.474	1174.925
23Feb2018 23:00:00	2018	1118.853488	975.6871	1473.329	1529.526	1158.257
24Feb2018 0:00:00	2018	1049.113595	949.2611	1451.854	1473.431	1139.047
24Feb2018 1:00:00	2018	1004.539147	928.212	1418.647	1416.468	1129.986
24Feb2018 2:00:00	2018	978.864751	919.5412	1419.539	1369.909	1116.967
24Feb2018 3:00:00	2018	967.2736242	922.7014	1415.384	1367.926	1102.201
24Feb2018 4:00:00	2018	972.0156034	932.0148	1431.888	1353.143	1098.977
24Feb2018 5:00:00	2018	1004.149298	941.9082	1438.766	1392.108	1102.499
24Feb2018 6:00:00	2018	1062.972817	960.7681	1465.614	1452.149	1101.114
24Feb2018 7:00:00	2018	1132.949009	979.5267	1466.61	1488.584	1095.131

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24Feb2018 10:00:00	2018	1261.809208	1002.925	1490.105	1631.158	1096.302
24Feb2018 11:00:00	2018	1276.282466	993.0225	1495.392	1621.336	1094.131
24Feb2018 12:00:00	2018	1275.815057	988.1644	1500.529	1651.346	1079.141
24Feb2018 13:00:00	2018	1259.100654	979.474	1500.94	1654.038	1069.957
24Feb2018 14:00:00	2018	1237.087401	974.3926	1493.533	1621.233	1062.523
24Feb2018 15:00:00	2018	1231.161805	969.9837	1493.23	1632.472	1070.403
24Feb2018 16:00:00	2018	1239.826759	979.2968	1502.256	1614.207	1085.427
24Feb2018 17:00:00	2018	1278.106854	996.88	1516.302	1648.697	1091.045
24Feb2018 18:00:00	2018	1342.957946	1022.19	1554.835	1724.881	1131.31
24Feb2018 19:00:00	2018	1343.285172	1025.103	1564.666	1730.652	1111.929
24Feb2018 20:00:00	2018	1303.95824	1022.077	1549.547	1688.199	1102.163
24Feb2018 21:00:00	2018	1252.931154	1006.028	1528.425	1658.083	1070.134
24Feb2018 22:00:00	2018	1178.928042	984.6705	1503.204	1572.721	1051.111
24Feb2018 23:00:00	2018	1097.377399	957.712	1472.312	1498.156	1054.083
25Feb2018 0:00:00	2018	1032.679168	935.7701	1445.217	1398.114	1048.912
25Feb2018 1:00:00	2018	985.3019714	922.4908	1431.365	1349.521	1099.048
25Feb2018 2:00:00	2018	958.9101652	920.4342	1420.86	1323.79	1098.903
25Feb2018 3:00:00	2018	946.8183976	923.1111	1425.65	1360.204	1083.949
25Feb2018 4:00:00	2018	948.4607742	926.8216	1432.685	1371.211	1089.704
25Feb2018 5:00:00	2018	970.9386154	934.254	1436.046	1365.188	1097.082
25Feb2018 6:00:00	2018	1016.612226	950.5386	1458.489	1399.674	1098.012
25Feb2018 7:00:00	2018	1073.388553	960.9771	1467.348	1448.07	1090.736
25Feb2018 8:00:00	2018	1121.057782	974.5851	1481.245	1493.414	1093.226
25Feb2018 9:00:00	2018	1163.213208	979.0035	1490.188	1549.741	1122.17
25Feb2018 10:00:00	2018	1203.696851	982.1106	1496.164	1581.578	1120.017
25Feb2018 11:00:00	2018	1226.197748	975.8809	1491.353	1597.062	1117.293
25Feb2018 12:00:00	2018	1236.283352	968.8016	1490.314	1603.48	1145.597
25Feb2018 13:00:00	2018	1232.434239	963.3607	1477.741	1625.004	1108.104
25Feb2018 14:00:00	2018	1228.042257	960.5395	1469.214	1633.768	1110.849
25Feb2018 15:00:00	2018	1230.229851	968.188	1467.042	1633.377	1112.507
25Feb2018 16:00:00	2018	1258.98156	990.0369	1494.981	1700.36	1116.594
25Feb2018 17:00:00	2018	1312.039475	1012.528	1533.117	1754.86	1128.71
25Feb2018 18:00:00	2018	1375.544511	1030.606	1567.924	1805.628	1144.201
25Feb2018 19:00:00	2018	1374.694554	1039.426	1567.459	1809.981	1127.029
25Feb2018 20:00:00	2018	1329.193315	1029.676	1545.534	1775.842	1125.495
25Feb2018 21:00:00	2018	1256.018619	1003.168	1513.377	1688.433	1122.151
25Feb2018 22:00:00	2018	1156.07775	969.596	1460.076	1557.931	1114.73
25Feb2018 23:00:00	2018	1060.171407	940.6903	1412.861	1461.632	1101.437
26Feb2018 0:00:00	2018	1000.150362	925.063	1396.658	1376.858	1082.102
26Feb2018 1:00:00	2018	967.2006532	922.272	1395.644	1328.324	1061.833
26Feb2018 2:00:00	2018	949.3036854	924.8506	1390.403	1324.05	1056.902
26Feb2018 3:00:00	2018	952.3671179	927.9756	1394.497	1359.843	1060.596
26Feb2018 4:00:00	2018	980.019957	936.9879	1406.622	1365.76	1048.453
26Feb2018 5:00:00	2018	1067.04336	954.0941	1425.111	1467.527	1071.63
26Feb2018 6:00:00	2018	1235.574784	988.6768	1478.909	1622.769	1070.029

26Feb2018 7:00:00	2018	1365.416126	1039.166	1541.423	1736.459	1094.455
26Feb2018 8:00:00	2018	1381.343756	1051.327	1562.755	1766.246	1100.78
26Feb2018 9:00:00	2018	1396.386039	1047.058	1568.252	1792.159	1102.238
26Feb2018 10:00:00	2018	1401.039737	1037.355	1567.224	1788.081	1106.721
26Feb2018 11:00:00	2018	1402.904016	1025.912	1561.121	1814.497	1086.535
26Feb2018 12:00:00	2018	1397.748489	1008.211	1535.297	1805.067	1070.958
26Feb2018 13:00:00	2018	1388.947382	1000.548	1520.7	1785.811	1076.851
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26Feb2018 17:00:00	2018	1429.507128	1031.314	1562.805	1791.601	1116.79
26Feb2018 18:00:00	2018	1457.953123	1056.5	1597.242	1849.965	1134.747
26Feb2018 19:00:00	2018	1454.377138	1063.351	1594.644	1841.298	1111.161
26Feb2018 20:00:00	2018	1403.842886	1049.499	1582.98	1807.322	1107.628
26Feb2018 21:00:00	2018	1316.335259	1025.822	1562.757	1741.14	1106.042
26Feb2018 22:00:00	2018	1195.117154	989.306	1508.104	1623.008	1105.201
26Feb2018 23:00:00	2018	1090.445611	957.6106	1492.522	1500.24	1111.644
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27Feb2018 1:00:00	2018	996.4093321	929.0698	1470.151	1398.973	1124.077
27Feb2018 2:00:00	2018	978.5835448	923.686	1462.724	1379.936	1122.014
27Feb2018 3:00:00	2018	975.2462645	924.1454	1455.537	1366.778	1115.118
27Feb2018 4:00:00	2018	998.3251453	932.1225	1461.719	1378.181	1102.985
27Feb2018 5:00:00	2018	1079.934004	951.4946	1480.675	1424.972	1109.617
27Feb2018 6:00:00	2018	1243.108017	990.2755	1524.955	1570.847	1104.223
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27Feb2018 8:00:00	2018	1389.185301	1031.9	1570.028	1696.008	1084.695
27Feb2018 9:00:00	2018	1402.109734	1034.274	1570.423	1723.214	1078.211
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27Feb2018 11:00:00	2018	1399.039674	1021.785	1558.798	1742.111	1033.948
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27Feb2018 14:00:00	2018	1383.742833	991.3618	1510.476	1685.167	1061.858
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27Feb2018 18:00:00	2018	1461.125977	1040.137	1587.749	1815.035	1138.539
27Feb2018 19:00:00	2018	1456.725269	1041.776	1607.328	1838.196	1146.303
27Feb2018 20:00:00	2018	1412.177452	1037.156	1597.785	1807.104	1146.961
27Feb2018 21:00:00	2018	1323.476313	1009.753	1567.135	1729.712	1150.983
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28Feb2018 0:00:00	2018	1032.328839	914.7873	1447.336	1405.659	1130.432
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28Feb2018 9:00:00	2018	1384.198353	1014.925	1561.99	1749.091	1116.614
28Feb2018 10:00:00	2018	1388.843223	1016.612	1553.335	1789.521	1104.151
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28Feb2018 20:00:00	2018	1402.114046	1045.676	1597.613	1771.859	1178.31
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01Mar2018 9:00:00	2018	1414.19042	1042.886	1566.494	1791.896	1174.849
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02Mar2018 14:00:00	2018	1422.925004	1024.468	1575.754	1841.706	1155.143
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02Mar2018 16:00:00	2018	1422.32991	1030.513	1603.354	1838.431	1182.623
02Mar2018 17:00:00	2018	1443.239325	1028.452	1612.966	1863.273	1184.755
02Mar2018 18:00:00	2018	1461.205496	1040.238	1634.32	1873.695	1202.484
02Mar2018 19:00:00	2018	1444.513042	1033.88	1625.809	1849.215	1203.08
02Mar2018 20:00:00	2018	1389.080006	1034.58	1589.362	1783.58	1203.508
02Mar2018 21:00:00	2018	1313.309307	1049.088	1544.191	1712.906	1205.076
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03Mar2018 7:00:00	2018	1130.081439	994.8638	1431.484	1492.413	1111.064
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04Mar2018 2:00:00	2018	989.5068864	954.425	1388.222	1350.797	1135.548
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11Mar2018 5:00:00	2018	949.23655	918.418	1426.852	1341.711	1149.991
11Mar2018 6:00:00	2018	985.8043482	936.5148	1432.994	1362.533	1132.015
11Mar2018 7:00:00	2018	1034.19674	959.5007	1450.851	1402.239	1119.863
11Mar2018 8:00:00	2018	1066.470833	970.6902	1448.846	1440.76	1080.642
11Mar2018 9:00:00	2018	1116.040524	979.8004	1456.601	1498.048	1058.714
11Mar2018 10:00:00	2018	1160.818473	976.0014	1459.034	1538.672	1070.009
11Mar2018 11:00:00	2018	1193.229771	969.9817	1449.087	1559.028	1060.256
11Mar2018 12:00:00	2018	1209.038511	971.0073	1451.969	1591.673	1056.271
11Mar2018 13:00:00	2018	1206.714603	964.6745	1446.801	1591.098	1058.013
11Mar2018 14:00:00	2018	1197.442206	959.4164	1442.748	1587.955	1093.829
11Mar2018 15:00:00	2018	1195.468952	956.3667	1440.101	1573.981	1090.399
11Mar2018 16:00:00	2018	1214.558234	959.6616	1428.026	1568.707	1086.76
11Mar2018 17:00:00	2018	1239.93739	978.2891	1442.216	1594.341	1075.674
11Mar2018 18:00:00	2018	1239.573565	985.0856	1446.338	1568.386	1103.091
11Mar2018 19:00:00	2018	1260.728872	1007.035	1470.12	1635.722	1140.087
11Mar2018 20:00:00	2018	1310.870466	1030.296	1502.028	1693.025	1113.24
11Mar2018 21:00:00	2018	1263.594249	1021.009	1477.072	1633.636	1139.858
11Mar2018 22:00:00	2018	1168.820273	993.1667	1436.191	1535.672	1153.185
11Mar2018 23:00:00	2018	1062.584668	960.7963	1402.219	1429.408	1136.409
12Mar2018 0:00:00	2018	989.0740244	940.6276	1389.16	1352.648	1140.496

12Mar2018 1:00:00	2018	951.2587036	929.5079	1378.392	1323.605	1128.613
12Mar2018 2:00:00	2018	931.9857509	920.3558	1385.521	1324.424	1135.942
12Mar2018 3:00:00	2018	927.7107649	921.4266	1388.255	1329.41	1136.18
12Mar2018 4:00:00	2018	953.4478102	930.0693	1393.767	1353.077	1116.358
12Mar2018 5:00:00	2018	1031.169062	955.5981	1403.59	1422.951	1120.064
12Mar2018 6:00:00	2018	1195.041	1002.863	1459.737	1570.796	1115.893
12Mar2018 7:00:00	2018	1346.775208	1054.834	1527.039	1752.752	1127.762
12Mar2018 8:00:00	2018	1364.955381	1069.642	1539.036	1772.442	1127.132
12Mar2018 9:00:00	2018	1373.651195	1071.83	1520.71	1757.585	1128.262
12Mar2018 10:00:00	2018	1379.508829	1060.871	1511.773	1772.001	1116.407
12Mar2018 11:00:00	2018	1390.129474	1047.984	1511.37	1795.522	1125.937
12Mar2018 12:00:00	2018	1385.169674	1034.86	1506.875	1781.283	1106.143
12Mar2018 13:00:00	2018	1380.040435	1034.086	1505.718	1778.715	1108.471
12Mar2018 14:00:00	2018	1372.468354	1030.934	1492.297	1771.048	1118.334
12Mar2018 15:00:00	2018	1360.909513	1027.406	1476.901	1770.341	1103.913
12Mar2018 16:00:00	2018	1360.995563	1035.582	1487.744	1773.121	1094.63
12Mar2018 17:00:00	2018	1368.070728	1042.802	1480.504	1747.926	1090.18
12Mar2018 18:00:00	2018	1320.774398	1040.684	1459.812	1680.688	1101.746
12Mar2018 19:00:00	2018	1324.594308	1060.115	1470.713	1711.229	1108.044
12Mar2018 20:00:00	2018	1365.672027	1083.781	1509.671	1759.288	1139.051
12Mar2018 21:00:00	2018	1298.106666	1061.23	1481.861	1696.994	1136.652
12Mar2018 22:00:00	2018	1180.83609	1025.696	1454.149	1574.878	1126.554
12Mar2018 23:00:00	2018	1072.20723	989.3168	1417.219	1474.512	1112.001
13Mar2018 0:00:00	2018	999.7446366	968.0667	1395.406	1388.778	1087.906
13Mar2018 1:00:00	2018	960.9237029	958.0684	1386.013	1342.902	1098.583
13Mar2018 2:00:00	2018	941.5182614	951.0124	1370.692	1308.903	1107.142
13Mar2018 3:00:00	2018	939.6396751	951.343	1369.61	1287.948	1104.104
13Mar2018 4:00:00	2018	960.1829689	957.1437	1376.09	1320.884	1102.819
13Mar2018 5:00:00	2018	1039.267019	975.4413	1390.067	1396.307	1068.849
13Mar2018 6:00:00	2018	1206.171562	1020.688	1443.001	1557.929	1073.368
13Mar2018 7:00:00	2018	1357.118056	1075.377	1506.662	1713.964	1105.017
13Mar2018 8:00:00	2018	1362.73031	1074.291	1516.873	1745.863	1095.912
13Mar2018 9:00:00	2018	1360.872559	1061.2	1484.295	1751.302	1104.684
13Mar2018 10:00:00	2018	1366.985808	1048.89	1471.299	1762.423	1114.208
13Mar2018 11:00:00	2018	1374.051374	1032.412	1452.837	1759.808	1103.504
13Mar2018 12:00:00	2018	1370.271879	1013.311	1452.795	1739.706	1093.113
13Mar2018 13:00:00	2018	1362.237231	1018.505	1442.103	1740.33	1098.068
13Mar2018 14:00:00	2018	1352.762951	1016.191	1448.944	1740.736	1113.295
13Mar2018 15:00:00	2018	1348.419634	1012.52	1452.388	1731.973	1116.623
13Mar2018 16:00:00	2018	1346.659137	1016.629	1452.068	1709.905	1122.622
13Mar2018 17:00:00	2018	1353.817246	1018.211	1436.166	1713.187	1120.863
13Mar2018 18:00:00	2018	1307.096651	1017.241	1444.548	1691.149	1147.72
13Mar2018 19:00:00	2018	1315.616414	1037.485	1473.529	1722.364	1152.765
13Mar2018 20:00:00	2018	1346.092826	1056.604	1516.158	1773.422	1149.612
13Mar2018 21:00:00	2018	1280.326116	1039.973	1497.709	1703.818	1135.253
13Mar2018 22:00:00	2018	1169.476893	1008.385	1460.516	1595.58	1148.599
13Mar2018 23:00:00	2018	1062.737831	978.6296	1407.083	1481.94	1145.315

14Mar2018 0:00:00	2018	992.4869013	954.6674	1408.885	1427.889	1136.529
14Mar2018 1:00:00	2018	950.3668217	943.5434	1393.879	1384.664	1124.81
14Mar2018 2:00:00	2018	933.1762072	935.9108	1354.793	1359.421	1112.122
14Mar2018 3:00:00	2018	930.2720877	933.9843	1366.811	1370.938	1121.105
14Mar2018 4:00:00	2018	953.3619025	937.3506	1404.844	1386.496	1140.56
14Mar2018 5:00:00	2018	1030.920718	957.8537	1405.382	1449.291	1155.373
14Mar2018 6:00:00	2018	1199.524524	999.3246	1441.846	1589.925	1163.122
14Mar2018 7:00:00	2018	1351.646059	1058.264	1515.42	1761.46	1171.81
14Mar2018 8:00:00	2018	1364.287722	1066.445	1515.392	1754.409	1150.645
14Mar2018 9:00:00	2018	1371.341032	1073.355	1515.768	1775.602	1091.117
14Mar2018 10:00:00	2018	1376.711231	1071.786	1482.258	1760.13	1074.696
14Mar2018 11:00:00	2018	1380.837294	1061.869	1464.389	1760.586	1057.092
14Mar2018 12:00:00	2018	1370.362063	1050.761	1442.997	1729.228	1047.369
14Mar2018 13:00:00	2018	1370.336025	1045.085	1449.877	1711.514	1097.173
14Mar2018 14:00:00	2018	1357.387189	1039.236	1454.075	1710.053	1118.043
14Mar2018 15:00:00	2018	1351.003608	1032.79	1473.871	1745.215	1118.738
14Mar2018 16:00:00	2018	1355.65577	1033.548	1481.166	1762.005	1108.964
14Mar2018 17:00:00	2018	1363.232238	1030.589	1489.988	1732.108	1117.034
14Mar2018 18:00:00	2018	1339.429033	1014.619	1469.415	1700.785	1130.011
14Mar2018 19:00:00	2018	1349.843233	1023.553	1479.749	1719.376	1144.733
14Mar2018 20:00:00	2018	1380.426707	1038.734	1504.076	1766.06	1166.885
14Mar2018 21:00:00	2018	1313.58082	1017.883	1486.888	1699.458	1165.974
14Mar2018 22:00:00	2018	1197.281125	989.5886	1455.414	1584.755	1152.25
14Mar2018 23:00:00	2018	1087.109306	960.3889	1403.263	1479.026	1134.386
15Mar2018 0:00:00	2018	1013.388385	938.9641	1384.348	1402.983	1128.858
15Mar2018 1:00:00	2018	969.5092797	928.1747	1380.222	1354.651	1132.432
15Mar2018 2:00:00	2018	944.7701608	922.1597	1365.416	1326.92	1138.028
15Mar2018 3:00:00	2018	941.9060468	923.208	1366.47	1318.169	1134.995
15Mar2018 4:00:00	2018	960.7402852	924.6752	1367.401	1311.79	1129.798
15Mar2018 5:00:00	2018	1037.695011	940.6078	1382.02	1425.186	1135.153
15Mar2018 6:00:00	2018	1201.711461	987.505	1429.127	1569.349	1136.371
15Mar2018 7:00:00	2018	1360.403119	1043.429	1492.146	1735.731	1145.006
15Mar2018 8:00:00	2018	1393.5904	1055.635	1510.315	1776.103	1116.379
15Mar2018 9:00:00	2018	1410.957597	1065.283	1519.974	1800.802	1130.925
15Mar2018 10:00:00	2018	1432.006556	1065.02	1502.533	1821.718	1124.153
15Mar2018 11:00:00	2018	1440.045865	1064.224	1503.159	1831.886	1122.047
15Mar2018 12:00:00	2018	1433.809249	1056.807	1498.524	1802.441	1113.763
15Mar2018 13:00:00	2018	1432.045332	1052.986	1502.983	1792.705	1060.499
15Mar2018 14:00:00	2018	1413.680937	1060.339	1509.414	1762.724	1050.203
15Mar2018 15:00:00	2018	1414.92617	1057.192	1519.237	1729.521	1049.534
15Mar2018 16:00:00	2018	1426.448232	1059.446	1533.085	1750.833	1061.371
15Mar2018 17:00:00	2018	1431.764711	1060.802	1523.849	1742.662	1081.068
15Mar2018 18:00:00	2018	1385.121048	1052.724	1519.421	1718.733	1090.994
15Mar2018 19:00:00	2018	1380.227744	1060.497	1519.076	1728.308	1081.617
15Mar2018 20:00:00	2018	1388.541121	1069.374	1532.474	1758.495	1101.984
15Mar2018 21:00:00	2018	1309.889355	1035.146	1504.417	1696.276	1117.831
15Mar2018 22:00:00	2018	1196.244307	1009.975	1455.687	1574.221	1112.404

15Mar2018 23:00:00	2018	1082.227578	975.3702	1414.675	1477.135	1093.692
16Mar2018 0:00:00	2018	1008.919275	941.2415	1396.941	1401.398	1096.659
16Mar2018 1:00:00	2018	967.0233699	926.9265	1394.169	1363.209	1084.12
16Mar2018 2:00:00	2018	944.0348065	921.8981	1386.433	1324.811	1083.008
16Mar2018 3:00:00	2018	944.4525197	934.9385	1364.453	1308.524	1067.793
16Mar2018 4:00:00	2018	962.2128366	944.5479	1397.519	1359.434	1071.466
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16Mar2018 6:00:00	2018	1195.051483	996.6835	1451.246	1563.265	1098.249
16Mar2018 7:00:00	2018	1339.124731	1039.816	1494.244	1678.579	1100.808
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16Mar2018 9:00:00	2018	1369.976902	1059.879	1506.531	1704.914	1098.955
16Mar2018 10:00:00	2018	1380.523087	1052.613	1507.4	1734.014	1100.712
16Mar2018 11:00:00	2018	1378.286548	1035.173	1494.72	1724.399	1092.867
16Mar2018 12:00:00	2018	1371.175782	1017.744	1480.062	1697.297	1081.755
16Mar2018 13:00:00	2018	1364.297885	1018.212	1482.004	1721.214	1088.978
16Mar2018 14:00:00	2018	1348.441645	1021.162	1460.655	1682.708	1097.86
16Mar2018 15:00:00	2018	1334.004246	1015.122	1455.095	1680.848	1086.962
16Mar2018 16:00:00	2018	1326.483172	1014.291	1460.469	1665.683	1075.411
16Mar2018 17:00:00	2018	1320.940892	1014.249	1456.221	1629.682	1068.114
16Mar2018 18:00:00	2018	1284.921838	1019.533	1441.422	1582.644	1067.076
16Mar2018 19:00:00	2018	1289.133723	1035.054	1462.152	1600.842	1069.628
16Mar2018 20:00:00	2018	1314.035328	1049.242	1487.977	1657.764	1088.12
16Mar2018 21:00:00	2018	1262.295703	1027.677	1471.249	1609.52	1076.772
16Mar2018 22:00:00	2018	1177.68017	998.8534	1447.865	1542.496	1069.829
16Mar2018 23:00:00	2018	1081.56868	969.8723	1421.071	1460.44	1066.911
17Mar2018 0:00:00	2018	1006.59293	945.2756	1405.763	1387.657	1060.685
17Mar2018 1:00:00	2018	956.3235133	931.4738	1390.921	1352.599	1049.511
17Mar2018 2:00:00	2018	927.7583454	925.6616	1380.487	1327.708	1047.887
17Mar2018 3:00:00	2018	915.7490234	921.6949	1371.982	1313.074	1055.548
17Mar2018 4:00:00	2018	918.8068963	924.5832	1368.04	1308.167	1052.536
17Mar2018 5:00:00	2018	946.4354222	931.7641	1368.979	1333.838	1040.811
17Mar2018 6:00:00	2018	1000.596289	951.7803	1385.428	1384.569	1045.522
17Mar2018 7:00:00	2018	1074.268313	982.2208	1413.72	1460.695	1044.759
17Mar2018 8:00:00	2018	1136.737884	1003.218	1450.663	1524.323	1048.664
17Mar2018 9:00:00	2018	1206.850888	1024.813	1474.638	1578.277	1050.36
17Mar2018 10:00:00	2018	1241.883255	1032.151	1489.673	1624.659	1064.373
17Mar2018 11:00:00	2018	1249.267628	1025.572	1491.203	1660.094	1058.674
17Mar2018 12:00:00	2018	1248.194426	1013.314	1489.335	1648.694	1053.297
17Mar2018 13:00:00	2018	1243.12996	1002.067	1481.569	1629.449	1055.909
17Mar2018 14:00:00	2018	1227.830757	990.224	1470.452	1629.797	1065.851
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17Mar2018 16:00:00	2018	1221.749637	986.0852	1456.412	1605.742	1033.643
17Mar2018 17:00:00	2018	1228.994982	997.2909	1447.733	1611.588	1031.987
17Mar2018 18:00:00	2018	1219.83623	997.416	1442.894	1565.815	1034.035
17Mar2018 19:00:00	2018	1234.885781	1006.76	1460.147	1593.447	1041.888
17Mar2018 20:00:00	2018	1245.094685	1020.618	1494.291	1637.398	1059.569
17Mar2018 21:00:00	2018	1198.39797	1009.53	1466.284	1600.538	1082.622

17Mar2018 22:00:00	2018	1129.641296	984.3918	1437.787	1510.463	1079.69
17Mar2018 23:00:00	2018	1049.025828	950.2907	1410.093	1439.362	1070.398
18Mar2018 0:00:00	2018	983.3086607	926.6698	1392.604	1381.375	1071.368
18Mar2018 1:00:00	2018	937.4878993	914.6215	1399.457	1356.238	1057.419
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18Mar2018 4:00:00	2018	905.0769117	904.5271	1389	1303.3	1059.953
18Mar2018 5:00:00	2018	930.3964438	913.344	1391.46	1321.605	1063.264
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18Mar2018 7:00:00	2018	1034.464614	948.9189	1414.737	1414.268	1050.076
18Mar2018 8:00:00	2018	1083.243703	961.0535	1418.02	1437.752	1052.423
18Mar2018 9:00:00	2018	1147.279747	973.0643	1415.79	1459.77	1061.594
18Mar2018 10:00:00	2018	1194.847459	974.213	1423.64	1517.951	1071.059
18Mar2018 11:00:00	2018	1225.588204	983.4473	1437.547	1551.451	1073.982
18Mar2018 12:00:00	2018	1238.797315	990.3668	1451.334	1579.725	1076.845
18Mar2018 13:00:00	2018	1237.250051	985.5038	1465.813	1587.169	1076.801
18Mar2018 14:00:00	2018	1234.280611	979.9046	1461.912	1574.861	1081.548
18Mar2018 15:00:00	2018	1235.83626	976.062	1459.337	1590.002	1065.982
18Mar2018 16:00:00	2018	1255.812622	984.8735	1471.317	1617.382	1064.822
18Mar2018 17:00:00	2018	1284.301724	995.6157	1487.514	1662.57	1074.367
18Mar2018 18:00:00	2018	1275.406038	999.496	1486.39	1620.597	1080.403
18Mar2018 19:00:00	2018	1285.133317	1016.282	1487.437	1658.438	1093.94
18Mar2018 20:00:00	2018	1309.016553	1036.898	1506.646	1682.942	1102.344
18Mar2018 21:00:00	2018	1251.412235	1014.873	1485.934	1629.44	1108.35
18Mar2018 22:00:00	2018	1148.430127	983.6073	1442.63	1549.626	1115.315
18Mar2018 23:00:00	2018	1044.970078	952.7421	1408.617	1443.43	1107.501
19Mar2018 0:00:00	2018	976.2873171	931.625	1380.666	1345.426	1098.844
19Mar2018 1:00:00	2018	937.3806091	924.0068	1363.216	1291.652	1094.994
19Mar2018 2:00:00	2018	920.7654724	918.0956	1349.827	1277.553	1091.901
19Mar2018 3:00:00	2018	919.2985721	918.141	1354.665	1284.876	1081.948
19Mar2018 4:00:00	2018	939.9902976	924.3328	1365.329	1300.953	1078.979
19Mar2018 5:00:00	2018	1018.775552	947.0726	1383.134	1368.038	1074.921
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19Mar2018 9:00:00	2018	1362.909	1051.096	1528.12	1737.987	1101.399
19Mar2018 10:00:00	2018	1371.430504	1055.621	1523.49	1764.439	1101.365
19Mar2018 11:00:00	2018	1381.355471	1036.931	1525.991	1773.273	1069.636
19Mar2018 12:00:00	2018	1378.714073	1009.293	1515.287	1761.694	1060.673
19Mar2018 13:00:00	2018	1371.720364	993.6867	1516.094	1792.152	1029.55
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19Mar2018 17:00:00	2018	1360.418934	1001.836	1495.247	1766.798	1010.177
19Mar2018 18:00:00	2018	1311.447417	994.3056	1481.456	1712.686	1014.926
19Mar2018 19:00:00	2018	1308.788149	1003.036	1488.892	1717.422	1036.772
19Mar2018 20:00:00	2018	1352.570219	1026.662	1521.525	1743.551	1058.311

19Mar2018 21:00:00	2018	1296.663755	1007.89	1491.767	1674.092	1048.21
19Mar2018 22:00:00	2018	1181.238953	975.1894	1434.703	1568.425	1040.462
19Mar2018 23:00:00	2018	1064.806913	940.0952	1386.261	1447.525	1035.887
20Mar2018 0:00:00	2018	996.2927976	912.6628	1364.03	1371.405	1037.537
20Mar2018 1:00:00	2018	959.4651984	902.8277	1337.715	1327.717	1080.745
20Mar2018 2:00:00	2018	941.467677	898.8141	1337.425	1311.536	1095.211
20Mar2018 3:00:00	2018	935.5251618	899.4942	1357.847	1293.897	1069.839
20Mar2018 4:00:00	2018	956.3935813	908.3297	1373.876	1347.741	1085.003
20Mar2018 5:00:00	2018	1035.062461	922.6913	1371.704	1422.053	1100.003
20Mar2018 6:00:00	2018	1204.11911	960.0435	1411.184	1556.87	1100.784
20Mar2018 7:00:00	2018	1344.178302	995.6227	1462.23	1689.07	1112.018
20Mar2018 8:00:00	2018	1359.345632	996.844	1475.09	1699.622	1110.605
20Mar2018 9:00:00	2018	1360.723128	1013.846	1476.399	1703.493	1119.107
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20Mar2018 11:00:00	2018	1366.640979	987.2863	1462.989	1698.763	1110.399
20Mar2018 12:00:00	2018	1364.03631	965.4975	1426.66	1708.852	1099.86
20Mar2018 13:00:00	2018	1359.196956	960.8482	1430.87	1692.35	1093.555
20Mar2018 14:00:00	2018	1347.640922	953.1692	1420.108	1701.629	1085.453
20Mar2018 15:00:00	2018	1345.243597	948.4264	1416.497	1692.406	1094.375
20Mar2018 16:00:00	2018	1351.144926	956.2492	1417.669	1676.36	1096.109
20Mar2018 17:00:00	2018	1354.508198	959.954	1410.71	1654.3	1093.564
20Mar2018 18:00:00	2018	1310.362891	958.525	1402.367	1595.992	1098.278
20Mar2018 19:00:00	2018	1303.514037	974.4217	1421.936	1660.533	1098.327
20Mar2018 20:00:00	2018	1342.299249	997.3942	1479.408	1723.924	1117.243
20Mar2018 21:00:00	2018	1284.198701	971.5645	1461.625	1665.677	1122.124
20Mar2018 22:00:00	2018	1167.070795	937.7671	1425.505	1546.442	1130.96
20Mar2018 23:00:00	2018	1059.097022	912.0773	1389.757	1427.573	1140.185
21Mar2018 0:00:00	2018	985.6531	896.5038	1383.119	1356.073	1136.459
21Mar2018 1:00:00	2018	945.7486025	891.2508	1383.799	1313.281	1149.096
21Mar2018 2:00:00	2018	927.8701782	888.7735	1381.086	1278.76	1148.545
21Mar2018 3:00:00	2018	922.6206479	890.0524	1378.208	1263.522	1143.151
21Mar2018 4:00:00	2018	943.2928432	900.2398	1369.751	1269.592	1153.102
21Mar2018 5:00:00	2018	1024.42609	922.891	1383.896	1325.419	1151.05
21Mar2018 6:00:00	2018	1196.951515	964.6485	1437.51	1474.513	1152.371
21Mar2018 7:00:00	2018	1338.874422	1005.259	1480.546	1609.605	1158.232
21Mar2018 8:00:00	2018	1351.617893	1012.102	1491.239	1636.048	1141.059
21Mar2018 9:00:00	2018	1365.526647	1010.304	1488.769	1666.902	1148.362
21Mar2018 10:00:00	2018	1374.79593	999.7979	1476.673	1677.574	1155.713
21Mar2018 11:00:00	2018	1376.104088	989.8594	1467.91	1708.6	1139.983
21Mar2018 12:00:00	2018	1366.09457	976.6477	1468.284	1703.748	1136.775
21Mar2018 13:00:00	2018	1362.203521	980.2117	1479.726	1700.958	1133.384
21Mar2018 14:00:00	2018	1347.088328	977.4505	1464.08	1689.879	1103.908
21Mar2018 15:00:00	2018	1335.016861	974.9892	1451.481	1688.601	1089.208
21Mar2018 16:00:00	2018	1347.45414	982.2626	1470.838	1691.946	1091.572
21Mar2018 17:00:00	2018	1354.802002	980.4003	1461.066	1683.867	1104.199
21Mar2018 18:00:00	2018	1310.095535	974.4884	1449.615	1646.821	1099.344
21Mar2018 19:00:00	2018	1302.555438	986.5762	1469.043	1654.018	1093.257

21Mar2018 20:00:00	2018	1339.389084	1010.273	1513.75	1724.545	1149.534
21Mar2018 21:00:00	2018	1279.447343	999.7818	1508.731	1677.386	1163.931
21Mar2018 22:00:00	2018	1173.202814	965.7999	1463.157	1561.293	1147.273
21Mar2018 23:00:00	2018	1068.43964	934.5745	1420.843	1456.295	1127.997
22Mar2018 0:00:00	2018	994.5850958	912.7793	1408.52	1374.904	1102.369
22Mar2018 1:00:00	2018	952.7536437	902.9101	1395.463	1330.646	1105.576
22Mar2018 2:00:00	2018	933.8824273	900.1883	1394.16	1305.31	1104.996
22Mar2018 3:00:00	2018	926.9027185	900.7792	1384.541	1268.069	1102.411
22Mar2018 4:00:00	2018	951.5706124	908.3478	1387.308	1280.856	1107.274
22Mar2018 5:00:00	2018	1030.737939	928.674	1395.895	1358.176	1110.004
22Mar2018 6:00:00	2018	1196.102333	970.9971	1445.754	1524.133	1118.162
22Mar2018 7:00:00	2018	1335.799867	1019.345	1508.73	1659.484	1125.832
22Mar2018 8:00:00	2018	1372.752658	1031.051	1539.606	1724.556	1089.08
22Mar2018 9:00:00	2018	1398.947033	1029.667	1547.292	1761.18	1108.53
22Mar2018 10:00:00	2018	1417.482548	1019.605	1540.814	1770.525	1095.131
22Mar2018 11:00:00	2018	1423.940155	1011.661	1540.18	1787.555	1106.453
22Mar2018 12:00:00	2018	1415.538649	1002.278	1511.808	1769.409	1109.251
22Mar2018 13:00:00	2018	1411.735968	999.0917	1515.389	1763.275	1094.571
22Mar2018 14:00:00	2018	1413.553982	993.1803	1501.985	1747.421	1078.972
22Mar2018 15:00:00	2018	1409.824818	992.3509	1502.733	1739.753	1083.661
22Mar2018 16:00:00	2018	1416.155175	1005.954	1508.319	1760.285	1094.307
22Mar2018 17:00:00	2018	1413.438014	1008.679	1523.167	1742.092	1115.269
22Mar2018 18:00:00	2018	1370.371408	1003.799	1499.28	1713.757	1120.127
22Mar2018 19:00:00	2018	1363.114274	1012.499	1518.834	1727.774	1136.208
22Mar2018 20:00:00	2018	1377.652233	1019.973	1551.594	1761.59	1174.924
22Mar2018 21:00:00	2018	1305.220475	998.7266	1516.338	1685.463	1164.233
22Mar2018 22:00:00	2018	1196.656164	968.8972	1483.224	1566.938	1138.783
22Mar2018 23:00:00	2018	1092.450864	938.5536	1448.363	1465.737	1134.221
23Mar2018 0:00:00	2018	1015.307696	913.6176	1433.417	1394.648	1132.536
23Mar2018 1:00:00	2018	970.6626792	896.1771	1426.405	1351.976	1116.44
23Mar2018 2:00:00	2018	949.0771492	890.2584	1419.629	1330.413	1109.103
23Mar2018 3:00:00	2018	939.5920912	882.1413	1409.371	1320.703	1108.578
23Mar2018 4:00:00	2018	959.7834425	887.1913	1408.322	1317.694	1090.214
23Mar2018 5:00:00	2018	1032.853652	900.2065	1415.887	1384.259	1085.113
23Mar2018 6:00:00	2018	1190.486926	942.2733	1446.957	1524.322	1085.721
23Mar2018 7:00:00	2018	1311.45371	988.4822	1505.021	1696.176	1106.426
23Mar2018 8:00:00	2018	1343.142459	999.1975	1531.532	1744.051	1115.287
23Mar2018 9:00:00	2018	1361.168355	991.9616	1531.514	1760.387	1127.648
23Mar2018 10:00:00	2018	1375.192055	977.9087	1502.743	1799.405	1121.188
23Mar2018 11:00:00	2018	1382.315754	967.3119	1502.72	1800.64	1104.621
23Mar2018 12:00:00	2018	1374.381606	955.5269	1449.88	1747.719	1089.367
23Mar2018 13:00:00	2018	1363.165027	940.9607	1445.627	1749.164	1063.906
23Mar2018 14:00:00	2018	1348.126783	931.7623	1463.126	1717.887	1050.99
23Mar2018 15:00:00	2018	1329.517602	940.9599	1444.621	1695.614	1033.223
23Mar2018 16:00:00	2018	1316.309791	943.9304	1442.306	1667.141	1018.344
23Mar2018 17:00:00	2018	1312.690382	949.4231	1446.728	1639.731	1008.81
23Mar2018 18:00:00	2018	1263.624718	951.6483	1456.542	1605.226	998.3275

23Mar2018 19:00:00	2018	1254.168255	959.8767	1461.152	1605.413	1001.591
23Mar2018 20:00:00	2018	1291.616011	979.2403	1511.419	1677.162	1089.207
23Mar2018 21:00:00	2018	1253.423733	964.2605	1500.269	1644.992	1106.186
23Mar2018 22:00:00	2018	1169.387254	945.8913	1461.649	1575.293	1088.012
23Mar2018 23:00:00	2018	1075.800519	918.6934	1425.349	1472.12	1078.114
24Mar2018 0:00:00	2018	1003.121939	894.2772	1405.108	1391.685	1056.218
24Mar2018 1:00:00	2018	956.9908457	879.915	1401.034	1345.811	1033.596
24Mar2018 2:00:00	2018	929.0618634	869.3673	1399.693	1304.304	1024.027
24Mar2018 3:00:00	2018	918.9562172	871.4956	1395.304	1319.17	1025.105
24Mar2018 4:00:00	2018	922.9069483	874.4157	1393.577	1312.3	1041.477
24Mar2018 5:00:00	2018	953.8950479	883.1997	1399.014	1302.304	1067.375
24Mar2018 6:00:00	2018	1013.410606	902.8462	1393.488	1363.09	1077.365
24Mar2018 7:00:00	2018	1079.556874	931.8977	1394.999	1423.679	1051.951
24Mar2018 8:00:00	2018	1149.263889	957.0788	1415.224	1475.38	1009.544
24Mar2018 9:00:00	2018	1220.179847	970.3825	1432.911	1533.497	987.7569
24Mar2018 10:00:00	2018	1262.41592	967.5034	1450.501	1630.879	994.5865
24Mar2018 11:00:00	2018	1270.555806	957.8312	1437.939	1594.916	982.9474
24Mar2018 12:00:00	2018	1258.958323	954.0259	1430.724	1572.191	978.9006
24Mar2018 13:00:00	2018	1245.531913	943.6216	1418.713	1544.869	996.9751
24Mar2018 14:00:00	2018	1226.424121	935.0808	1401.129	1545.411	1002.71
24Mar2018 15:00:00	2018	1209.005778	938.7329	1400.592	1546.445	1011.347
24Mar2018 16:00:00	2018	1214.062667	952.1186	1417.888	1568.547	1015.302
24Mar2018 17:00:00	2018	1230.690981	960.8306	1425.694	1574.866	1033.235
24Mar2018 18:00:00	2018	1212.73268	956.6235	1409.327	1531.526	1015.901
24Mar2018 19:00:00	2018	1207.106951	960.9901	1402.873	1543.16	1019.238
24Mar2018 20:00:00	2018	1238.394361	977.8278	1457.837	1622.935	1057.531
24Mar2018 21:00:00	2018	1205.983796	965.639	1469.548	1613.149	1069.123
24Mar2018 22:00:00	2018	1138.836235	939.0467	1437.199	1544.902	1038.724
24Mar2018 23:00:00	2018	1058.068218	908.5949	1409.504	1462.898	1018.965
25Mar2018 0:00:00	2018	992.0980601	887.0992	1393.74	1385.893	1018.558
25Mar2018 1:00:00	2018	946.7021869	877.5197	1383.701	1316.325	1020.813
25Mar2018 2:00:00	2018	923.6475755	874.0177	1382.87	1299.672	1013.989
25Mar2018 3:00:00	2018	912.9731537	869.6849	1353.841	1287.786	988.2944
25Mar2018 4:00:00	2018	918.7005632	872.3576	1370.146	1306.554	983.8513
25Mar2018 5:00:00	2018	943.8321334	885.011	1391.848	1325.152	999.6943
25Mar2018 6:00:00	2018	993.2845254	902.7052	1413.455	1355.703	1016.951
25Mar2018 7:00:00	2018	1042.265947	908.4123	1408.977	1410.29	1015.795
25Mar2018 8:00:00	2018	1087.039564	932.7541	1421.17	1464.121	1006.966
25Mar2018 9:00:00	2018	1140.148083	943.5453	1451.364	1528.462	1020.933
25Mar2018 10:00:00	2018	1176.290541	943.8393	1463.223	1576.672	1021.181
25Mar2018 11:00:00	2018	1193.990693	943.7995	1461.307	1581.15	1030.179
25Mar2018 12:00:00	2018	1197.798103	935.0786	1463.08	1586.288	1031.577
25Mar2018 13:00:00	2018	1191.508623	927.065	1453.37	1571.467	1031.27
25Mar2018 14:00:00	2018	1182.274549	918.1468	1434.675	1537.907	1011.79
25Mar2018 15:00:00	2018	1179.738619	909.9383	1412.039	1521.65	1014.004
25Mar2018 16:00:00	2018	1200.433876	915.4779	1419.018	1546.361	1009.91
25Mar2018 17:00:00	2018	1229.535893	920.6745	1419.948	1606.003	994.5055

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25Mar2018 19:00:00	2018	1212.698034	937.5022	1432.166	1617.444	1020.687
25Mar2018 20:00:00	2018	1263.468123	976.9885	1487.064	1677.051	1030.806
25Mar2018 21:00:00	2018	1229.335931	965.7646	1483.288	1609.263	1037.692
25Mar2018 22:00:00	2018	1135.892806	929.7436	1444.749	1534.882	1030.328
25Mar2018 23:00:00	2018	1034.904553	898.1656	1400.903	1438.594	1010.908
26Mar2018 0:00:00	2018	968.1677814	878.7859	1378.377	1383.426	998.2376
26Mar2018 1:00:00	2018	934.7430158	869.3178	1367.504	1344.39	985.1782
26Mar2018 2:00:00	2018	920.0235519	870.159	1371.323	1319.798	986.402
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26Mar2018 4:00:00	2018	941.0397246	877.5004	1373.967	1343.229	983.2927
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26Mar2018 11:00:00	2018	1365.773111	976.6558	1516.111	1664.157	948.5652
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26Mar2018 13:00:00	2018	1358.684193	968.3633	1496.699	1644.496	942.0053
26Mar2018 14:00:00	2018	1349.612461	960.0168	1467.972	1630.044	947.0493
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26Mar2018 16:00:00	2018	1341.68973	962.3486	1473.015	1652.035	956.6587
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26Mar2018 19:00:00	2018	1279.809554	967.9089	1458.384	1630.046	1005.068
26Mar2018 20:00:00	2018	1317.032969	991.9575	1492.318	1682.342	1008.807
26Mar2018 21:00:00	2018	1262.206013	973.1018	1481.941	1659.487	1003.396
26Mar2018 22:00:00	2018	1149.510159	936.5441	1459.162	1559.134	995.2654
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27Mar2018 10:00:00	2018	1349.406168	972.8286	1568.446	1734.774	1052.464
27Mar2018 11:00:00	2018	1358.820966	982.2779	1572.052	1739.775	1047.654
27Mar2018 12:00:00	2018	1356.989686	962.6286	1543.522	1743.464	1035.755
27Mar2018 13:00:00	2018	1348.672372	945.5506	1522.678	1715.744	1028.397
27Mar2018 14:00:00	2018	1343.562692	935.0201	1512.014	1707.089	1023.674
27Mar2018 15:00:00	2018	1334.595477	928.8441	1483.128	1706.734	999.4559
27Mar2018 16:00:00	2018	1335.320021	944.9221	1481.717	1698.983	1008.667

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27Mar2018 18:00:00	2018	1303.424361	947.7546	1450.114	1676.101	989.9924
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27Mar2018 20:00:00	2018	1310.986974	979.3007	1528.274	1725.717	1036.666
27Mar2018 21:00:00	2018	1259.42924	968.7789	1519.939	1682.304	1038.624
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28Mar2018 0:00:00	2018	970.2883384	880.8594	1415.396	1391.411	1028.915
28Mar2018 1:00:00	2018	931.4718171	867.8307	1407.4	1345.414	1032.309
28Mar2018 2:00:00	2018	913.616534	863.3949	1407.202	1327.65	1031.468
28Mar2018 3:00:00	2018	905.5964251	863.9001	1405.638	1308.374	1022.439
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28Mar2018 9:00:00	2018	1353.301818	1004.182	1454.47	1666.71	973.4206
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28Mar2018 11:00:00	2018	1377.466067	995.2746	1444.323	1691.874	995.4501
28Mar2018 12:00:00	2018	1371.356837	980.3033	1456.536	1698.382	1013.136
28Mar2018 13:00:00	2018	1361.409658	966.0152	1469.072	1685.365	1001.805
28Mar2018 14:00:00	2018	1352.837675	952.0637	1463.578	1667.65	1007.92
28Mar2018 15:00:00	2018	1347.690319	963.9964	1458.288	1657.139	1000.614
28Mar2018 16:00:00	2018	1350.931255	976.7717	1466.692	1651.384	1008.248
28Mar2018 17:00:00	2018	1353.72266	986.7069	1477.192	1663.664	1007.181
28Mar2018 18:00:00	2018	1306.749421	974.9394	1472.936	1627.75	991.1181
28Mar2018 19:00:00	2018	1282.964553	983.2495	1474.528	1626.757	1010.123
28Mar2018 20:00:00	2018	1322.343565	999.1142	1511.689	1685.338	1049.541
28Mar2018 21:00:00	2018	1277.602262	986.6526	1495.14	1645.847	1071.293
28Mar2018 22:00:00	2018	1170.176769	953.4878	1456.181	1554.511	1059.33
28Mar2018 23:00:00	2018	1065.316915	916.3344	1415.735	1455.796	1048.45
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29Mar2018 1:00:00	2018	951.7560714	878.8557	1382.708	1318.145	1028.551
29Mar2018 2:00:00	2018	931.0624032	867.9685	1379.266	1309.804	1033.084
29Mar2018 3:00:00	2018	928.300304	871.7799	1367.637	1314.164	1034.234
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29Mar2018 12:00:00	2018	1379.195018	980.5959	1507.862	1702.197	1023.773
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29Mar2018 14:00:00	2018	1378.437092	981.2935	1512.959	1678.207	1012.047
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30Mar2018 4:00:00	2018	955.5461471	897.9949	1425.89	1336.446	1086.504
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30Mar2018 20:00:00	2018	1265.433724	1008.361	1540.981	1619.186	1117.885
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31Mar2018 1:00:00	2018	984.7817026	923.7625	1466.317	1400.917	1077.719
31Mar2018 2:00:00	2018	960.3656621	918.643	1466.162	1401.986	1084.891
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31Mar2018 5:00:00	2018	986.2559932	932.7551	1479.937	1412.91	1079.408
31Mar2018 6:00:00	2018	1040.784557	952.8289	1463.53	1435.991	1056.598
31Mar2018 7:00:00	2018	1078.951583	966.9773	1467.174	1449.279	1047.085
31Mar2018 8:00:00	2018	1138.348644	990.042	1474.89	1500.396	1040.398
31Mar2018 9:00:00	2018	1196.178507	1003.572	1488.128	1525.09	1037.554
31Mar2018 10:00:00	2018	1228.752501	998.8189	1504.762	1555.748	1053.48
31Mar2018 11:00:00	2018	1243.368317	987.4871	1530.867	1564.151	1070.575
31Mar2018 12:00:00	2018	1246.421179	983.5336	1518.532	1584.289	1060.125
31Mar2018 13:00:00	2018	1232.769087	975.8547	1494.404	1567.247	1058.297
31Mar2018 14:00:00	2018	1219.252443	960.9114	1489.657	1552.391	1067.553

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31Mar2018 17:00:00	2018	1228.609356	967.5793	1474.827	1519.287	1055.687
31Mar2018 18:00:00	2018	1204.24084	970.157	1445.565	1491.975	1021.09
31Mar2018 19:00:00	2018	1204.669621	981.9753	1464.857	1526.099	1017.688
31Mar2018 20:00:00	2018	1250.519928	1010.976	1541.915	1614.808	1079.696
31Mar2018 21:00:00	2018	1242.086342	1011.017	1554.061	1605.494	1085.094
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01Apr2018 1:00:00	2018	1009.626814	922.2682	1451.473	1382.818	1076.36
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01Apr2018 3:00:00	2018	970.2775827	921.1762	1449.025	1351.922	1061.071
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06Apr2018 6:00:00	2018	1236.386873	977.5606	1587.995	1542.297	1126.449
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06Apr2018 8:00:00	2018	1392.162745	976.016	1606.791	1665.069	1082.531
06Apr2018 9:00:00	2018	1419.809631	976.0237	1605.038	1703.877	1088.975
06Apr2018 10:00:00	2018	1433.549416	970.0944	1596.164	1719.119	1093.933
06Apr2018 11:00:00	2018	1436.239494	965.6366	1597.388	1725.006	1099.664

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06Apr2018 14:00:00	2018	1419.394486	935.8529	1550.781	1676.923	1114.072
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14Apr2018 18:00:00	2018	1138.073749	867.2254	1360.844	1401.45	1041.333
14Apr2018 19:00:00	2018	1111.692093	863.8206	1352.13	1395.989	1040.076
14Apr2018 20:00:00	2018	1132.658021	874.1463	1384.351	1421.629	1058.602
14Apr2018 21:00:00	2018	1147.397778	881.8407	1398.945	1437.269	1076.358
14Apr2018 22:00:00	2018	1087.504805	863.0129	1390.886	1371.559	1080.11
14Apr2018 23:00:00	2018	1005.366174	839.0608	1373.464	1296.786	1010.054
15Apr2018 0:00:00	2018	942.5438039	820.9218	1351.595	1211.02	1002.567
15Apr2018 1:00:00	2018	895.5135052	806.9987	1342.318	1179.28	978.0823
15Apr2018 2:00:00	2018	868.5415944	800.9606	1335.902	1156.117	972.7275
15Apr2018 3:00:00	2018	857.9070371	799.2501	1317.071	1131.105	971.522
15Apr2018 4:00:00	2018	861.5186662	800.3989	1305.245	1133.256	960.2813
15Apr2018 5:00:00	2018	885.2441445	806.07	1310.294	1166.265	954.1326
15Apr2018 6:00:00	2018	921.2138421	818.8817	1324.77	1191.226	931.6412
15Apr2018 7:00:00	2018	957.3074515	831.4695	1328.242	1220.902	921.126
15Apr2018 8:00:00	2018	1032.395007	858.3574	1338.988	1277.102	934.4397
15Apr2018 9:00:00	2018	1095.364152	877.6348	1361.453	1321.387	946.0839
15Apr2018 10:00:00	2018	1128.772742	878.0958	1394.095	1354.646	956.0302
15Apr2018 11:00:00	2018	1156.322711	873.6866	1397.343	1409.16	995.0766
15Apr2018 12:00:00	2018	1170.757445	869.0733	1397.589	1420.008	1022.744
15Apr2018 13:00:00	2018	1160.90561	861.9123	1402.106	1407.159	1043.445
15Apr2018 14:00:00	2018	1153.005896	858.6685	1397.897	1404.457	1051.08
15Apr2018 15:00:00	2018	1154.494222	856.4146	1401.042	1426.509	1021.632
15Apr2018 16:00:00	2018	1174.477426	863.0385	1409.523	1474.409	980.8499
15Apr2018 17:00:00	2018	1200.051603	877.389	1421.588	1493.81	980.7861
15Apr2018 18:00:00	2018	1176.509718	875.544	1416.051	1470.199	987.2796
15Apr2018 19:00:00	2018	1161.947844	877.9168	1420.222	1456.386	1018.513
15Apr2018 20:00:00	2018	1192.729517	895.7516	1443.231	1479.373	995.3731
15Apr2018 21:00:00	2018	1194.010523	894.758	1448.869	1505.156	1003.823
15Apr2018 22:00:00	2018	1100.409971	859.7628	1404.622	1412.42	995.9739
15Apr2018 23:00:00	2018	997.9876409	830.0071	1371.912	1295.746	967.8412
16Apr2018 0:00:00	2018	924.8057168	815.5821	1345.622	1208.548	964.9471
16Apr2018 1:00:00	2018	889.4833875	805.2081	1336.231	1170.362	1001.318
16Apr2018 2:00:00	2018	871.9226937	804.1558	1329.034	1162.666	1052.662
16Apr2018 3:00:00	2018	871.4411584	802.1942	1331.078	1140.339	1053.111
16Apr2018 4:00:00	2018	893.448579	812.3086	1333.52	1164.65	1052.517
16Apr2018 5:00:00	2018	976.1617184	836.7263	1324.898	1223.06	1043.618
16Apr2018 6:00:00	2018	1139.584456	880.5921	1370.093	1374.505	1069.545

16Apr2018 7:00:00	2018	1266.772397	924.1795	1377.919	1490.501	1043.566
16Apr2018 8:00:00	2018	1307.228332	945.0348	1381.953	1549.823	1055.935
16Apr2018 9:00:00	2018	1340.47293	957.7592	1443.124	1602.908	1060.733
16Apr2018 10:00:00	2018	1367.882144	963.0781	1483.134	1630.449	1086.383
16Apr2018 11:00:00	2018	1383.413659	963.1187	1463.514	1645.7	1089.255
16Apr2018 12:00:00	2018	1381.285287	955.0969	1452.245	1632.951	1088.628
16Apr2018 13:00:00	2018	1371.360486	952.3577	1461.448	1663.39	1092.197
16Apr2018 14:00:00	2018	1356.222918	944.7627	1470.875	1692.75	1089.934
16Apr2018 15:00:00	2018	1357.083176	941.0685	1471.757	1681.205	1086.172
16Apr2018 16:00:00	2018	1368.89394	947.8035	1477.433	1722.831	1088.644
16Apr2018 17:00:00	2018	1372.328209	951.4818	1483.91	1709.114	1102.762
16Apr2018 18:00:00	2018	1311.389265	938.481	1456.709	1650.331	1112.375
16Apr2018 19:00:00	2018	1276.248606	927.5851	1448.001	1611.694	1124.899
16Apr2018 20:00:00	2018	1285.462113	933.9274	1459.382	1606.275	1095.372
16Apr2018 21:00:00	2018	1255.369871	923.1391	1457.677	1594.511	1052.349
16Apr2018 22:00:00	2018	1137.427887	883.5933	1407.671	1475.968	1035.973
16Apr2018 23:00:00	2018	1030.235471	843.5611	1362.673	1351.374	1017.603
17Apr2018 0:00:00	2018	958.8722882	825.0138	1329.246	1296.226	981.7009
17Apr2018 1:00:00	2018	920.1631042	818.9665	1315.811	1228.944	970.8487
17Apr2018 2:00:00	2018	902.8536885	816.8366	1317.5	1198.003	983.0847
17Apr2018 3:00:00	2018	898.6085628	818.8066	1320.525	1162.7	986.3405
17Apr2018 4:00:00	2018	918.9029384	823.2752	1316.928	1174.647	974.6829
17Apr2018 5:00:00	2018	1002.932717	841.9585	1297.025	1215.599	979.0241
17Apr2018 6:00:00	2018	1160.890579	877.8914	1358.102	1365.785	992.8821
17Apr2018 7:00:00	2018	1263.197827	907.4091	1408.794	1482.104	997.0367
17Apr2018 8:00:00	2018	1301.7365	918.0193	1423.997	1540.818	995.436
17Apr2018 9:00:00	2018	1320.665829	919.7187	1433.143	1553.566	1006.401
17Apr2018 10:00:00	2018	1324.567238	917.3373	1448.022	1606.538	1009.682
17Apr2018 11:00:00	2018	1332.398802	915.617	1444.79	1619.983	1016.212
17Apr2018 12:00:00	2018	1330.9275	905.5264	1462.855	1635.107	1014.024
17Apr2018 13:00:00	2018	1326.151517	903.6277	1453.074	1656.263	999.5063
17Apr2018 14:00:00	2018	1316.35924	898.0838	1445.2	1640.372	989.3843
17Apr2018 15:00:00	2018	1320.776385	892.6037	1439.771	1635.097	971.9039
17Apr2018 16:00:00	2018	1325.882538	901.7519	1441.181	1647.048	969.3314
17Apr2018 17:00:00	2018	1329.325974	907.3112	1423.699	1631.071	969.7967
17Apr2018 18:00:00	2018	1272.191245	903.0802	1393.832	1579.702	972.7762
17Apr2018 19:00:00	2018	1232.764167	900.6205	1387.331	1536.498	968.9472
17Apr2018 20:00:00	2018	1247.645914	912.608	1415.364	1562.366	978.0954
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17Apr2018 22:00:00	2018	1139.294255	886.7081	1394.599	1464.184	987.2537
17Apr2018 23:00:00	2018	1032.916216	856.4351	1350.097	1368.062	989.2351
18Apr2018 0:00:00	2018	958.8939013	829.5841	1322.788	1280.325	1046.595
18Apr2018 1:00:00	2018	921.5024569	820.8823	1331.002	1256.399	1053.713
18Apr2018 2:00:00	2018	904.8556218	819.2619	1332.371	1212.902	1052.532
18Apr2018 3:00:00	2018	896.2570707	822.1436	1326.587	1195.187	1062.712
18Apr2018 4:00:00	2018	918.4318471	829.7749	1325.506	1197.586	1065.47
18Apr2018 5:00:00	2018	1004.056249	848.7355	1334.044	1253.478	1075.972

18Apr2018 6:00:00	2018	1157.182024	881.6678	1353.692	1357.418	1071.001
18Apr2018 7:00:00	2018	1262.249991	914.871	1387.242	1472.935	1058.526
18Apr2018 8:00:00	2018	1295.36552	919.6124	1402.481	1530.398	1055.655
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18Apr2018 11:00:00	2018	1333.757064	910.7787	1377.693	1580.75	1025.573
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18Apr2018 14:00:00	2018	1317.167445	894.8957	1401.065	1575.895	1014.158
18Apr2018 15:00:00	2018	1320.378604	890.217	1395.377	1572.448	1018.289
18Apr2018 16:00:00	2018	1317.390785	899.098	1403.565	1576.581	1015.288
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18Apr2018 21:00:00	2018	1233.540522	920.6301	1391.051	1465.328	1048.193
18Apr2018 22:00:00	2018	1125.328291	890.8718	1352.154	1363.743	1040.349
18Apr2018 23:00:00	2018	1020.332833	860.3242	1320.052	1263.333	1031.116
19Apr2018 0:00:00	2018	944.9634186	840.2082	1304.122	1209.951	1015.813
19Apr2018 1:00:00	2018	911.2914216	827.7601	1317.494	1185.109	1012.788
19Apr2018 2:00:00	2018	888.8037022	822.0751	1299.24	1168.268	1012.081
19Apr2018 3:00:00	2018	886.0542826	825.237	1296.52	1161.834	1015.825
19Apr2018 4:00:00	2018	912.1189227	831.0971	1304.905	1178.181	1022.139
19Apr2018 5:00:00	2018	988.377025	855.2549	1335.499	1248.983	1034.57
19Apr2018 6:00:00	2018	1138.16937	887.3906	1353.031	1347.422	1029.128
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19Apr2018 12:00:00	2018	1335.220603	891.9695	1405.817	1555.442	1017.273
19Apr2018 13:00:00	2018	1329.248682	893.7532	1411.962	1556.943	995.3919
19Apr2018 14:00:00	2018	1321.473536	890.9091	1416.087	1553.764	985.8955
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19Apr2018 16:00:00	2018	1314.373044	892.0836	1419.271	1568.677	1063.639
19Apr2018 17:00:00	2018	1309.90966	893.1106	1416.671	1553.661	1053.339
19Apr2018 18:00:00	2018	1247.144215	884.2195	1393.987	1498.341	1047.003
19Apr2018 19:00:00	2018	1209.089314	884.9823	1379.863	1464.439	1050.975
19Apr2018 20:00:00	2018	1218.301978	892.7063	1317.379	1433.284	1068.914
19Apr2018 21:00:00	2018	1222.677138	901.1209	1352.372	1461.225	1053.391
19Apr2018 22:00:00	2018	1122.503719	867.7641	1373.98	1386.204	1014.012
19Apr2018 23:00:00	2018	1018.534552	830.9114	1326.446	1277.156	1001.112
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20Apr2018 3:00:00	2018	879.1205525	789.871	1269.533	1131.604	1009.241
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20Apr2018 5:00:00	2018	975.5890648	811.7635	1285.825	1191.872	1012.524
20Apr2018 6:00:00	2018	1110.030309	843.5253	1318.088	1301.212	982.6931
20Apr2018 7:00:00	2018	1214.314157	879.7027	1357.705	1419.244	975.0206
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20Apr2018 9:00:00	2018	1305.555856	896.3593	1402.357	1529.093	1027.253
20Apr2018 10:00:00	2018	1325.416985	895.3235	1412.286	1544.741	1025.11
20Apr2018 11:00:00	2018	1334.557062	895.0531	1421.888	1573.771	1017.544
20Apr2018 12:00:00	2018	1335.157092	884.8836	1432.948	1571.638	1017.68
20Apr2018 13:00:00	2018	1329.613599	880.5256	1437.629	1581.081	1015.52
20Apr2018 14:00:00	2018	1318.367173	873.7631	1431.248	1561.786	1026.57
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20Apr2018 17:00:00	2018	1271.782664	864.6298	1387.203	1516.108	1020.656
20Apr2018 18:00:00	2018	1214.37732	853.5607	1372.32	1459.13	998.1265
20Apr2018 19:00:00	2018	1180.852267	841.6588	1362.886	1417.481	989.3482
20Apr2018 20:00:00	2018	1178.544189	855.7756	1370.266	1396.515	994.3413
20Apr2018 21:00:00	2018	1176.256566	861.7714	1396.842	1439.917	1012.352
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21Apr2018 0:00:00	2018	929.8307147	792.6848	1306.384	1201.492	994.5487
21Apr2018 1:00:00	2018	886.221562	779.2719	1291.238	1136.598	993.11
21Apr2018 2:00:00	2018	861.1333102	776.1701	1278.976	1138.624	1008.04
21Apr2018 3:00:00	2018	844.2091194	777.1964	1267.944	1119.653	1004.832
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21Apr2018 5:00:00	2018	883.5349431	781.5595	1267.895	1123.21	1012.976
21Apr2018 6:00:00	2018	926.9646114	795.1489	1277.713	1170.319	1011.213
21Apr2018 7:00:00	2018	983.7872072	815.1825	1292.855	1228.569	968.4423
21Apr2018 8:00:00	2018	1068.827103	848.876	1329.544	1312.379	974.1702
21Apr2018 9:00:00	2018	1136.571187	868.1896	1353.43	1403.545	986.9329
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21Apr2018 15:00:00	2018	1158.21045	869.808	1382.853	1486.535	991.8912
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21Apr2018 20:00:00	2018	1107.08305	860.1784	1353.602	1418.389	1024.754
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22Apr2018 3:00:00	2018	841.3781236	799.3115	1276.387	1108.947	980.9253

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22Apr2018 14:00:00	2018	1133.772203	851.0158	1357.178	1411.498	948.789
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22Apr2018 16:00:00	2018	1157.430364	870.2111	1367.371	1417.584	1014.46
22Apr2018 17:00:00	2018	1178.883778	881.8045	1367.979	1444.709	1012.402
22Apr2018 18:00:00	2018	1158.660595	880.2797	1360.656	1412.244	1009.113
22Apr2018 19:00:00	2018	1141.186077	879.9895	1359.406	1411.368	1001.429
22Apr2018 20:00:00	2018	1143.550929	886.2281	1367.115	1382.674	1012.268
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22Apr2018 23:00:00	2018	965.7454341	835.3091	1348.565	1253.64	1069.384
23Apr2018 0:00:00	2018	898.8046705	823.0945	1314.46	1174.183	1052.621
23Apr2018 1:00:00	2018	862.1428967	814.4982	1319.613	1154.56	1029.437
23Apr2018 2:00:00	2018	846.7448643	813.9462	1318.947	1141.99	1025.713
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23Apr2018 5:00:00	2018	946.3739742	836.5366	1330.339	1223.816	1030.88
23Apr2018 6:00:00	2018	1097.138875	881.1881	1370.123	1341.942	1018.091
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23Apr2018 9:00:00	2018	1291.445426	930.5434	1427.886	1588.479	1008.311
23Apr2018 10:00:00	2018	1312.396021	934.6402	1428.414	1607.523	1048.749
23Apr2018 11:00:00	2018	1329.672304	929.3017	1417.784	1582.864	1058.056
23Apr2018 12:00:00	2018	1330.99964	918.3907	1385.666	1584.472	1068.652
23Apr2018 13:00:00	2018	1327.431406	921.4772	1379.08	1580.961	1072.905
23Apr2018 14:00:00	2018	1322.544912	910.1086	1405.127	1570.79	1068.899
23Apr2018 15:00:00	2018	1316.788908	897.9275	1401.832	1574.307	1069.545
23Apr2018 16:00:00	2018	1322.30951	907.1102	1403.855	1585.92	1059.825
23Apr2018 17:00:00	2018	1324.345493	908.9652	1393.899	1576.505	1035.535
23Apr2018 18:00:00	2018	1264.657008	898.7609	1377.823	1537.267	1029.147
23Apr2018 19:00:00	2018	1224.884091	894.2496	1356.656	1496.919	1020.157
23Apr2018 20:00:00	2018	1206.368783	897.4181	1365.681	1491.1	1022.585
23Apr2018 21:00:00	2018	1206.550638	902.7314	1387.646	1490.99	1040.822
23Apr2018 22:00:00	2018	1098.965559	869.9251	1344.318	1385.565	1048.311
23Apr2018 23:00:00	2018	988.0337343	836.5858	1284.599	1244.105	1072.343
24Apr2018 0:00:00	2018	913.4151744	811.592	1280.664	1170.839	1078.57
24Apr2018 1:00:00	2018	879.0546755	799.9961	1277.463	1152.598	1090.374
24Apr2018 2:00:00	2018	860.5999784	796.3009	1274.104	1107.696	1092.022

24Apr2018 3:00:00	2018	858.470694	796.6921	1273.377	1104.697	1088.539
24Apr2018 4:00:00	2018	880.3271358	803.9701	1275.287	1126.098	1087.432
24Apr2018 5:00:00	2018	964.6686407	822.8398	1291.655	1205.66	1080.68
24Apr2018 6:00:00	2018	1099.294907	852.6344	1313.382	1318.972	1041.584
24Apr2018 7:00:00	2018	1213.286514	884.5965	1353.706	1441.615	1043.071
24Apr2018 8:00:00	2018	1258.64763	891.8617	1383.589	1510.576	1050.163
24Apr2018 9:00:00	2018	1286.248943	883.7974	1396.418	1563.844	1067.363
24Apr2018 10:00:00	2018	1313.109832	884.3998	1390.439	1592.949	1113.471
24Apr2018 11:00:00	2018	1339.824021	877.9024	1358.455	1589.244	1127.601
24Apr2018 12:00:00	2018	1349.727079	871.5417	1332.14	1553.485	1120.747
24Apr2018 13:00:00	2018	1354.056453	871.4263	1333.482	1565.25	1115.778
24Apr2018 14:00:00	2018	1358.435312	864.0995	1300.633	1576.228	1103.026
24Apr2018 15:00:00	2018	1355.955598	864.6051	1326.007	1589.851	1092.579
24Apr2018 16:00:00	2018	1359.500277	873.1322	1331.342	1599.235	1087.709
24Apr2018 17:00:00	2018	1352.775474	874.6218	1331.584	1595.487	1088.798
24Apr2018 18:00:00	2018	1284.085487	872.0114	1320.298	1523.351	1090.084
24Apr2018 19:00:00	2018	1239.498927	870.4287	1325.014	1516.155	1095.901
24Apr2018 20:00:00	2018	1216.657916	861.0802	1358.052	1512.089	1118.121
24Apr2018 21:00:00	2018	1207.726456	861.7567	1364.046	1475.296	1141.02
24Apr2018 22:00:00	2018	1097.278203	841.9258	1324.96	1361.528	1134.359
24Apr2018 23:00:00	2018	982.5342838	812.7535	1285.744	1264.232	1119.454
25Apr2018 0:00:00	2018	907.2099757	785.127	1269.127	1191.78	1101.625
25Apr2018 1:00:00	2018	861.7776596	774.7821	1270.932	1165.152	1098.811
25Apr2018 2:00:00	2018	841.5835349	773.0104	1266.886	1146.162	1102.791
25Apr2018 3:00:00	2018	838.7720449	776.4189	1276.843	1129.767	1109.284
25Apr2018 4:00:00	2018	860.4835666	784.2728	1272.785	1110.707	1112.418
25Apr2018 5:00:00	2018	940.0491702	806.1701	1278.033	1185.17	1114.7
25Apr2018 6:00:00	2018	1092.487654	845.6369	1310.718	1289.23	1089.619
25Apr2018 7:00:00	2018	1208.991765	886.1686	1361.592	1452.574	1078.978
25Apr2018 8:00:00	2018	1262.116394	912.3594	1372.076	1522.556	1072.33
25Apr2018 9:00:00	2018	1295.904999	921.7155	1387.056	1555.431	1052.568
25Apr2018 10:00:00	2018	1313.632127	916.7041	1404.54	1589.14	1062.613
25Apr2018 11:00:00	2018	1329.305827	917.5213	1379.097	1608.702	1048.053
25Apr2018 12:00:00	2018	1329.563895	915.835	1387.291	1580.382	1015.899
25Apr2018 13:00:00	2018	1329.492683	913.4566	1412.983	1605.121	1067.949
25Apr2018 14:00:00	2018	1323.746225	915.4407	1428.156	1629.189	1075.748
25Apr2018 15:00:00	2018	1324.233173	908.7262	1421.451	1644.897	1078.086
25Apr2018 16:00:00	2018	1333.439012	910.7859	1422.371	1640.225	1091.298
25Apr2018 17:00:00	2018	1331.696673	913.713	1414.508	1610.849	1065.088
25Apr2018 18:00:00	2018	1264.877227	904.7373	1390.371	1524.406	1055.755
25Apr2018 19:00:00	2018	1222.839433	898.7841	1394.214	1496.1	1049.048
25Apr2018 20:00:00	2018	1201.271159	904.9797	1394.096	1460.909	1040.766
25Apr2018 21:00:00	2018	1201.931094	912.459	1412.177	1479.115	1069.942
25Apr2018 22:00:00	2018	1098.212743	881.7996	1369.101	1367.845	1060.635
25Apr2018 23:00:00	2018	987.6709806	847.0994	1321.354	1255.809	1049.591
26Apr2018 0:00:00	2018	909.9670655	825.7526	1295.304	1157.085	1030.444
26Apr2018 1:00:00	2018	868.8863651	819.4772	1283.983	1129.058	1013.462

26Apr2018 2:00:00	2018	850.4377549	812.5476	1275.865	1125.852	1016.85
26Apr2018 3:00:00	2018	845.2444347	810.5622	1269.396	1116.967	1021.267
26Apr2018 4:00:00	2018	863.9120697	814.4933	1284.659	1123.758	1016.676
26Apr2018 5:00:00	2018	943.3108249	833.9954	1294.103	1169.799	1027.207
26Apr2018 6:00:00	2018	1084.804698	862.5495	1319.878	1277.245	1011.639
26Apr2018 7:00:00	2018	1206.735443	898.5975	1372.351	1435.567	1013.569
26Apr2018 8:00:00	2018	1260.508345	914.3383	1397.852	1495.882	1006.388
26Apr2018 9:00:00	2018	1302.368909	919.042	1420.814	1560.042	1003.571
26Apr2018 10:00:00	2018	1339.466016	914.8854	1418.42	1595.185	998.3021
26Apr2018 11:00:00	2018	1366.473436	913.4375	1421.919	1611.051	984.8643
26Apr2018 12:00:00	2018	1375.918552	908.7295	1428.582	1650.667	993.5087
26Apr2018 13:00:00	2018	1385.9591	912.8517	1429.791	1668.249	995.7318
26Apr2018 14:00:00	2018	1390.83968	914.3524	1428.057	1662.224	999.3205
26Apr2018 15:00:00	2018	1395.16929	913.5489	1404.784	1629.517	994.2705
26Apr2018 16:00:00	2018	1398.048058	920.9624	1398.156	1625.884	990.3844
26Apr2018 17:00:00	2018	1385.55724	924.1466	1384.722	1601.079	979.2292
26Apr2018 18:00:00	2018	1309.824041	916.3807	1354.341	1515.865	967.0186
26Apr2018 19:00:00	2018	1261.256232	905.1067	1327.138	1486.058	968.7461
26Apr2018 20:00:00	2018	1234.935408	900.3829	1295.554	1452.665	978.1628
26Apr2018 21:00:00	2018	1231.375415	906.1281	1333.653	1472.413	998.8529
26Apr2018 22:00:00	2018	1122.380369	875.611	1324.321	1401.202	997.4003
26Apr2018 23:00:00	2018	1007.243616	840.9338	1300.047	1279.597	990.1706
27Apr2018 0:00:00	2018	923.509503	815.096	1271.097	1197.246	997.2776
27Apr2018 1:00:00	2018	873.120582	803.7437	1258.289	1175.56	977.5063
27Apr2018 2:00:00	2018	851.014449	795.6242	1238.329	1128.372	970.4526
27Apr2018 3:00:00	2018	842.8753917	793.5296	1225.763	1112.477	976.9813
27Apr2018 4:00:00	2018	858.8084179	799.8578	1244.174	1108.321	987.4404
27Apr2018 5:00:00	2018	931.5965671	825.3742	1253.802	1159.832	1001.376
27Apr2018 6:00:00	2018	1060.533344	854.9	1270.855	1255.665	973.1383
27Apr2018 7:00:00	2018	1189.82355	895.1074	1309.49	1408.007	955.0885
27Apr2018 8:00:00	2018	1250.851465	915.767	1354.803	1490.001	964.4419
27Apr2018 9:00:00	2018	1292.37621	922.0981	1383.598	1558.428	969.5447
27Apr2018 10:00:00	2018	1324.922049	920.2669	1397.376	1623.989	973.302
27Apr2018 11:00:00	2018	1354.995473	919.3596	1386.66	1634.627	989.6684
27Apr2018 12:00:00	2018	1369.363439	914.7454	1390.872	1644.267	1004.72
27Apr2018 13:00:00	2018	1383.291708	917.948	1391.843	1660.826	1000.562
27Apr2018 14:00:00	2018	1379.124662	915.5912	1396.714	1676.694	1017.072
27Apr2018 15:00:00	2018	1377.581244	915.419	1394.397	1673.978	1033.47
27Apr2018 16:00:00	2018	1370.205581	919.6348	1390.65	1654.895	1046.101
27Apr2018 17:00:00	2018	1357.51988	917.9535	1367.96	1641.072	1036.437
27Apr2018 18:00:00	2018	1280.797127	909.3124	1323.037	1580.318	1017.463
27Apr2018 19:00:00	2018	1234.991665	899.6698	1275.59	1492.832	1029.652
27Apr2018 20:00:00	2018	1198.562736	893.1882	1291.276	1446.156	1044.843
27Apr2018 21:00:00	2018	1193.659758	899.11	1315.568	1463.015	1064.853
27Apr2018 22:00:00	2018	1109.553954	869.9506	1308.499	1394.255	1047.899
27Apr2018 23:00:00	2018	1007.317712	838.3466	1267.042	1286.116	1064.026
28Apr2018 0:00:00	2018	924.4667006	812.9664	1240.997	1206.381	1060.248

28Apr2018 1:00:00	2018	874.3322004	801.8211	1220.383	1168.68	1058.114
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28Apr2018 3:00:00	2018	823.7995807	794.1141	1209.567	1121.841	1030.508
28Apr2018 4:00:00	2018	821.9651422	795.6938	1217.304	1114.987	1026.551
28Apr2018 5:00:00	2018	846.5229112	801.8174	1231.754	1115.302	1020.228
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28Apr2018 7:00:00	2018	943.7789321	819.6812	1210.617	1197.443	1009.003
28Apr2018 8:00:00	2018	1037.925875	841.2315	1249.511	1300.751	1008.715
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28Apr2018 12:00:00	2018	1238.484369	878.7606	1250.456	1440.433	1033.555
28Apr2018 13:00:00	2018	1237.396282	876.3937	1244.931	1450.859	1035.126
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28Apr2018 16:00:00	2018	1238.068142	919.7826	1318.863	1502.635	1035.575
28Apr2018 17:00:00	2018	1247.030368	926.9352	1320.192	1501.313	1026.988
28Apr2018 18:00:00	2018	1223.188971	921.281	1308.827	1462.446	1028.597
28Apr2018 19:00:00	2018	1194.365135	910.4591	1304.222	1414.454	1020.672
28Apr2018 20:00:00	2018	1166.266733	901.1569	1296.374	1408.372	997.5356
28Apr2018 21:00:00	2018	1174.755036	902.526	1308.076	1465.115	992.2885
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29Apr2018 3:00:00	2018	831.2596997	799.0611	1200.399	1126.595	1026.044
29Apr2018 4:00:00	2018	827.8873586	795.225	1186.744	1124.454	1018.393
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29Apr2018 6:00:00	2018	870.4283826	809.8617	1188.384	1127.329	1031.327
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29Apr2018 13:00:00	2018	1214.267509	898.9667	1292.571	1437.13	972.9856
29Apr2018 14:00:00	2018	1214.061307	892.8059	1285.862	1434.303	968.6533
29Apr2018 15:00:00	2018	1220.166263	900.6772	1293.495	1438.451	989.0364
29Apr2018 16:00:00	2018	1245.313267	914.7623	1323.806	1445.682	997.9215
29Apr2018 17:00:00	2018	1256.493553	926.4497	1336.598	1465.678	1000.489
29Apr2018 18:00:00	2018	1219.055795	916.4015	1334.561	1414.037	998.6503
29Apr2018 19:00:00	2018	1182.566645	910.5311	1327.285	1417.433	1004.054
29Apr2018 20:00:00	2018	1180.462047	911.291	1319.103	1410.726	1004.9
29Apr2018 21:00:00	2018	1171.528793	909.3941	1324.986	1438.873	1024.219
29Apr2018 22:00:00	2018	1076.635682	876.79	1295.2	1361.281	1017.394
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30Apr2018 9:00:00	2018	1290.065902	931.5512	1352.521	1531.329	996.7147
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30Apr2018 20:00:00	2018	1196.549579	884.8341	1331.269	1459.793	930.7158
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30Apr2018 22:00:00	2018	1094.456229	860.092	1310.527	1416.632	949.3771
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01May2018 3:00:00	2018	840.0514465	778.6517	1204.453	1125.138	955.9346
01May2018 4:00:00	2018	858.0671815	784.2874	1215.179	1139.296	971.3953
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02May2018 1:00:00	2018	871.3367582	787.5592	1223.024	1109.191	923.2474
02May2018 2:00:00	2018	854.7327962	779.991	1217.925	1096.325	927.5728
02May2018 3:00:00	2018	851.0920109	782.3409	1217.575	1093.4	940.1017
02May2018 4:00:00	2018	869.285615	789.2876	1227.295	1111.426	933.4612
02May2018 5:00:00	2018	948.1150615	808.437	1246.044	1169.482	933.0472
02May2018 6:00:00	2018	1074.808393	834.5328	1263.083	1261.213	924.3553
02May2018 7:00:00	2018	1197.318242	872.012	1309.066	1400.887	916.5662
02May2018 8:00:00	2018	1249.68577	880.795	1342.118	1474.853	922.8182
02May2018 9:00:00	2018	1280.57308	848.4707	1350.158	1531.634	910.6085
02May2018 10:00:00	2018	1317.913417	846.9226	1345.121	1564.178	915.4248
02May2018 11:00:00	2018	1341.874831	844.2075	1335.06	1571.609	913.3006
02May2018 12:00:00	2018	1351.218564	839.6739	1340.496	1572.13	909.5237
02May2018 13:00:00	2018	1359.756648	836.1844	1347.304	1596.955	905.0389
02May2018 14:00:00	2018	1364.353656	842.307	1345.677	1599.177	911.5024
02May2018 15:00:00	2018	1369.928003	843.2774	1344.72	1599.904	917.8262
02May2018 16:00:00	2018	1377.94738	838.1646	1347.034	1605.333	923.5775
02May2018 17:00:00	2018	1368.944993	835.1634	1351.48	1594.687	868.8055
02May2018 18:00:00	2018	1290.836097	826.6144	1317.666	1530.445	840.736
02May2018 19:00:00	2018	1242.241019	835.223	1307.89	1494.809	845.9844
02May2018 20:00:00	2018	1216.433504	878.8783	1289.404	1449.606	865.026
02May2018 21:00:00	2018	1213.585018	889.9325	1310.769	1456.923	905.5778
02May2018 22:00:00	2018	1113.971394	859.8492	1277.393	1368.348	893.8775
02May2018 23:00:00	2018	994.9634493	822.3588	1242.609	1243.37	894.4333
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03May2018 1:00:00	2018	863.928192	784.5525	1230.939	1129.83	913.2021
03May2018 2:00:00	2018	841.5491172	781.1064	1228.473	1107.562	896.9543
03May2018 3:00:00	2018	833.1189436	784.0593	1227.078	1100.639	896.7453
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03May2018 5:00:00	2018	926.3313256	812.6842	1241.463	1193.078	892.1411
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03May2018 7:00:00	2018	1188.592977	876.4439	1310.322	1434.236	886.7898
03May2018 8:00:00	2018	1246.131239	887.4412	1345.949	1528.857	903.5606
03May2018 9:00:00	2018	1292.544548	868.8637	1356.172	1564.322	906.6975
03May2018 10:00:00	2018	1330.74809	846.7946	1354.563	1603.814	906.0686
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03May2018 13:00:00	2018	1392.559272	852.9454	1362.001	1645.33	880.1996
03May2018 14:00:00	2018	1397.275388	854.4638	1340.058	1620.746	885.0688
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03May2018 18:00:00	2018	1304.66701	859.9702	1341.743	1529.756	865.0976
03May2018 19:00:00	2018	1255.808335	864.5635	1328.542	1488.753	867.8105
03May2018 20:00:00	2018	1224.732845	885.7749	1324.093	1452.326	868.9291
03May2018 21:00:00	2018	1215.031108	890.3707	1340.08	1436.566	890.4166

03May2018 22:00:00	2018	1114.528765	858.8389	1309.34	1358.135	890.5933
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04May2018 2:00:00	2018	841.6866553	780.9608	1195.603	1130.422	866.4694
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04May2018 4:00:00	2018	842.3214238	782.4295	1179.612	1129.092	874.754
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04May2018 7:00:00	2018	1182.050586	866.2313	1263.651	1404.212	871.2509
04May2018 8:00:00	2018	1250.913605	871.8593	1305.899	1476.825	873.329
04May2018 9:00:00	2018	1297.527399	870.8549	1351.457	1539.963	885.5095
04May2018 10:00:00	2018	1335.382188	874.8571	1365.552	1576.812	874.6092
04May2018 11:00:00	2018	1363.013744	879.4744	1364.828	1595.339	870.1757
04May2018 12:00:00	2018	1374.183342	869.92	1341.815	1609.529	874.2869
04May2018 13:00:00	2018	1378.599183	878.1218	1330.98	1608.653	890.4017
04May2018 14:00:00	2018	1374.18513	880.8731	1321.295	1595.664	890.9617
04May2018 15:00:00	2018	1366.038537	868.1773	1328.556	1596.755	870.6867
04May2018 16:00:00	2018	1355.267281	871.4224	1349.929	1607.419	864.622
04May2018 17:00:00	2018	1338.476228	870.2252	1344.333	1580.909	865.684
04May2018 18:00:00	2018	1253.08467	859.8603	1317.834	1526.25	877.8756
04May2018 19:00:00	2018	1206.670711	848.4234	1288.6	1492.501	871.3487
04May2018 20:00:00	2018	1172.411082	866.3649	1315.008	1444.026	875.0345
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04May2018 22:00:00	2018	1088.292559	863.5071	1311.541	1404.036	897.4814
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05May2018 0:00:00	2018	907.718628	808.8018	1273	1218.617	897.0214
05May2018 1:00:00	2018	858.4775389	795.8081	1246.172	1171.417	886.6797
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06May2018 8:00:00	2018	963.5481345	824.1525	1228.79	1245.893	934.6531
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10May2018 15:00:00	2018	1307.945297	909.3108	1417.427	1605.688	1067.987
10May2018 16:00:00	2018	1317.526121	918.1265	1427.038	1619.064	1056.169
10May2018 17:00:00	2018	1302.737496	916.5354	1415.818	1615.75	1038.096
10May2018 18:00:00	2018	1235.582949	907.0911	1388.619	1533.062	1048.813
10May2018 19:00:00	2018	1200.805344	912.184	1387.483	1499.801	1048.112
10May2018 20:00:00	2018	1184.672874	916.8995	1385.544	1480.607	1059.106
10May2018 21:00:00	2018	1180.35209	920.9361	1390.41	1471.013	1063.633
10May2018 22:00:00	2018	1091.754838	894.4131	1358.283	1391.205	1067.806
10May2018 23:00:00	2018	982.477312	859.951	1312.678	1303.922	1049.222
11May2018 0:00:00	2018	909.6272173	837.5028	1281.237	1225.795	1048.653
11May2018 1:00:00	2018	866.23182	827.5742	1266.557	1182.249	1042.187
11May2018 2:00:00	2018	842.5295718	824.1115	1268.718	1177.255	1038.305
11May2018 3:00:00	2018	834.55956	822.9999	1265.995	1155.483	1043.161
11May2018 4:00:00	2018	854.6086886	823.4246	1270.676	1182.281	1050.548
11May2018 5:00:00	2018	929.4590572	836.2699	1282.154	1232.004	1046.326
11May2018 6:00:00	2018	1070.930166	863.9267	1306.248	1335.078	1045.71
11May2018 7:00:00	2018	1207.648246	909.4232	1343.359	1466.176	1050.057
11May2018 8:00:00	2018	1265.171565	938.9576	1367.916	1491.91	1049.771
11May2018 9:00:00	2018	1299.165115	935.1629	1383.464	1529.054	1026.305
11May2018 10:00:00	2018	1326.11477	918.9672	1390.453	1550.565	1016.212
11May2018 11:00:00	2018	1333.73976	921.582	1408.548	1572.672	1018.3
11May2018 12:00:00	2018	1323.250798	914.6612	1387.791	1586.627	1028.085
11May2018 13:00:00	2018	1323.526617	909.6526	1389.142	1602.248	1039.185
11May2018 14:00:00	2018	1320.662947	899.1531	1391.681	1601.614	1058.035
11May2018 15:00:00	2018	1314.500938	892.663	1380.173	1606.69	1044.694
11May2018 16:00:00	2018	1308.655584	894.0434	1368.677	1603.128	1032.881
11May2018 17:00:00	2018	1294.623719	891.3603	1348.928	1602.388	1017.867

11May2018 18:00:00	2018	1224.619446	878.0671	1353.275	1564.239	1021.484
11May2018 19:00:00	2018	1182.803475	885.1964	1341.545	1524.715	1015.653
11May2018 20:00:00	2018	1147.750506	898.5022	1326.644	1456.141	999.2424
11May2018 21:00:00	2018	1141.99083	915.7474	1329.121	1441.64	1015.817
11May2018 22:00:00	2018	1089.464634	901.1861	1321.409	1416.687	1020.94
11May2018 23:00:00	2018	989.7013127	863.1769	1301.541	1305.053	971.5956
12May2018 0:00:00	2018	913.4447775	840.1246	1270.446	1206.333	960.3725
12May2018 1:00:00	2018	860.0792095	827.1196	1241.136	1130.519	968.8061
12May2018 2:00:00	2018	832.5990557	822.9323	1238.147	1099.495	954.0481
12May2018 3:00:00	2018	820.2931504	819.1968	1244.149	1090.006	898.7497
12May2018 4:00:00	2018	820.2538041	820.8826	1248.456	1085.307	898.6144
12May2018 5:00:00	2018	836.3317961	822.9466	1248.011	1079.466	929.676
12May2018 6:00:00	2018	864.6375871	818.9699	1244.256	1110.578	928.372
12May2018 7:00:00	2018	939.519507	846.6702	1270.477	1219.408	930.8784
12May2018 8:00:00	2018	1031.253006	867.5407	1314.21	1325.833	955.7472
12May2018 9:00:00	2018	1111.157503	890.0631	1342.756	1434.646	972.8298
12May2018 10:00:00	2018	1159.041154	897.5065	1362.591	1506.486	988.5319
12May2018 11:00:00	2018	1183.774938	898.1468	1364.237	1512.95	1006.45
12May2018 12:00:00	2018	1194.464234	894.2537	1364.025	1505.767	997.0003
12May2018 13:00:00	2018	1187.8475	892.1875	1361.88	1507.31	1005.121
12May2018 14:00:00	2018	1181.244601	895.145	1370.973	1512.065	1015.117
12May2018 15:00:00	2018	1183.139903	896.526	1382.321	1508.369	1023.026
12May2018 16:00:00	2018	1194.02779	903.1685	1384.422	1532.791	1030.635
12May2018 17:00:00	2018	1205.964256	908.6594	1387.511	1570.261	1057.486
12May2018 18:00:00	2018	1184.648361	909.2111	1375.544	1529.694	1056.548
12May2018 19:00:00	2018	1159.928549	908.5843	1371.721	1499.133	1064.078
12May2018 20:00:00	2018	1127.714396	901.0682	1352.055	1459.31	1046.251
12May2018 21:00:00	2018	1122.391631	900.9069	1354.918	1441.331	1039.897
12May2018 22:00:00	2018	1088.941265	887.5875	1350.749	1423.953	1038.354
12May2018 23:00:00	2018	996.9575655	854.5935	1316.493	1331.367	1012.355
13May2018 0:00:00	2018	915.3080678	824.4114	1281.837	1240.416	997.497
13May2018 1:00:00	2018	856.2636529	805.9466	1261.301	1180.971	985.9138
13May2018 2:00:00	2018	821.7718313	799.4803	1257.305	1144.05	985.4843
13May2018 3:00:00	2018	803.8937451	794.7604	1239.687	1091.849	991.7236
13May2018 4:00:00	2018	801.9856692	797.0426	1232.702	1084.522	985.2331
13May2018 5:00:00	2018	814.462175	801.0099	1231.367	1093.601	965.6654
13May2018 6:00:00	2018	827.7844336	799.865	1222.847	1083.936	948.9971
13May2018 7:00:00	2018	895.1898969	818.4283	1245.611	1159.047	950.4858
13May2018 8:00:00	2018	986.4134135	845.0219	1280.187	1260.811	987.5577
13May2018 9:00:00	2018	1072.919273	857.3071	1323.325	1339.904	1018.027
13May2018 10:00:00	2018	1131.452613	865.6555	1343.486	1421.282	1046.281
13May2018 11:00:00	2018	1163.492388	876.126	1357.555	1471.765	1050.795
13May2018 12:00:00	2018	1180.489664	882.6394	1371.061	1505.654	1057.983
13May2018 13:00:00	2018	1185.770519	878.191	1366.42	1507.796	1042.189
13May2018 14:00:00	2018	1190.460389	878.1385	1355.433	1497.048	1053.545
13May2018 15:00:00	2018	1202.761264	887.6765	1364.69	1509.698	1070.85
13May2018 16:00:00	2018	1223.0084	901.0172	1379.254	1535.991	1013.323

13May2018 17:00:00	2018	1238.892018	911.2947	1375.788	1579.212	1007.66
13May2018 18:00:00	2018	1218.773808	913.9954	1386.039	1528.241	1009.927
13May2018 19:00:00	2018	1198.903915	918.2635	1364.04	1517.685	1003.737
13May2018 20:00:00	2018	1176.890603	914.0224	1351.86	1489.876	1011.255
13May2018 21:00:00	2018	1170.465989	911.4167	1353.183	1454.926	1029.145
13May2018 22:00:00	2018	1108.736372	889.6891	1335.67	1419.29	1033.147
13May2018 23:00:00	2018	990.762101	850.5984	1284.152	1307.153	1013.047
14May2018 0:00:00	2018	903.313849	822.3673	1225.11	1206.97	999.8372
14May2018 1:00:00	2018	851.4026237	809.8907	1222.655	1173.592	991.6744
14May2018 2:00:00	2018	827.7987193	801.2247	1233.588	1166.113	991.6007
14May2018 3:00:00	2018	819.9961365	801.2793	1224.04	1150.982	993.5227
14May2018 4:00:00	2018	837.2226669	808.7969	1227.192	1154.025	985.0858
14May2018 5:00:00	2018	901.7693015	821.4284	1243.023	1197.675	981.8676
14May2018 6:00:00	2018	1031.56179	849.3845	1253.584	1299.038	967.8388
14May2018 7:00:00	2018	1177.270373	900.7345	1316.202	1473.727	986.6064
14May2018 8:00:00	2018	1256.082393	918.2723	1381.582	1578.234	1022.903
14May2018 9:00:00	2018	1317.64527	922.3538	1407.823	1650.491	1013.246
14May2018 10:00:00	2018	1379.76775	901.6359	1423.71	1717.414	1009.588
14May2018 11:00:00	2018	1437.387055	893.4918	1436.165	1749.116	1010.136
14May2018 12:00:00	2018	1470.37221	904.394	1445.137	1791.353	1036.514
14May2018 13:00:00	2018	1500.357357	920.3888	1463.844	1824.124	1090.176
14May2018 14:00:00	2018	1513.175897	923.7666	1465.053	1814.953	1159.749
14May2018 15:00:00	2018	1530.792149	914.0692	1448.916	1820.215	1088.664
14May2018 16:00:00	2018	1545.672096	925.0156	1440.132	1815.851	1072.283
14May2018 17:00:00	2018	1547.719334	936.2926	1408.853	1797.258	1061.355
14May2018 18:00:00	2018	1460.559209	928.7158	1390.718	1740.249	1049.245
14May2018 19:00:00	2018	1410.502233	929.5064	1365.913	1711.326	1042.169
14May2018 20:00:00	2018	1359.086447	933.3401	1347.957	1684.326	1053.39
14May2018 21:00:00	2018	1303.159675	927.945	1352.494	1644.855	1083.759
14May2018 22:00:00	2018	1205.20841	922.52	1308.069	1567.383	1158.22
14May2018 23:00:00	2018	1064.785872	894.6578	1259.176	1437.478	1167.894
15May2018 0:00:00	2018	968.1876346	857.4053	1239.14	1338.898	1165.908
15May2018 1:00:00	2018	911.2490102	843.813	1254.332	1286.332	1112.722
15May2018 2:00:00	2018	878.7709832	836.453	1255.141	1226.775	1142.96
15May2018 3:00:00	2018	863.40332	833.927	1247.065	1199.618	1122.131
15May2018 4:00:00	2018	878.2537847	834.1327	1227.605	1203.334	1123.241
15May2018 5:00:00	2018	938.5407642	846.5182	1203.824	1205.31	1112.799
15May2018 6:00:00	2018	1072.474779	870.3724	1208.308	1280.58	1089.768
15May2018 7:00:00	2018	1227.07354	893.2552	1252.429	1490.477	1084.325
15May2018 8:00:00	2018	1317.638818	895.4104	1275.936	1605.539	1093.211
15May2018 9:00:00	2018	1390.696549	916.7239	1302.308	1662.784	1113.909
15May2018 10:00:00	2018	1454.362504	926.3784	1311.55	1720.636	1107.231
15May2018 11:00:00	2018	1503.533797	948.2599	1317.46	1769.184	1117.292
15May2018 12:00:00	2018	1529.182674	947.7884	1313.643	1791.68	1061.222
15May2018 13:00:00	2018	1550.715677	954.2586	1346.834	1806.701	1062.176
15May2018 14:00:00	2018	1566.975656	968.2108	1349.853	1829.672	1111.923
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15May2018 16:00:00	2018	1600.108242	996.73	1375.699	1853.063	1135.843
15May2018 17:00:00	2018	1588.012674	1002.611	1373.273	1844.648	1062.57
15May2018 18:00:00	2018	1497.687911	998.4612	1352.243	1778.631	1037.112
15May2018 19:00:00	2018	1453.864947	994.3353	1325.512	1727.175	1020.475
15May2018 20:00:00	2018	1405.548442	977.8919	1321.662	1704.49	1027.903
15May2018 21:00:00	2018	1348.403166	954.736	1319.594	1649.961	1045.602
15May2018 22:00:00	2018	1256.70262	960.8759	1294.145	1582.083	1036.997
15May2018 23:00:00	2018	1105.511573	922.8661	1259.778	1429.567	1021.905
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16May2018 1:00:00	2018	938.5787145	863.446	1215.647	1246.018	1040.328
16May2018 2:00:00	2018	900.6561196	854.235	1213.983	1223.092	1038.606
16May2018 3:00:00	2018	881.6860328	849.8509	1229.045	1220.356	1052.212
16May2018 4:00:00	2018	889.8215624	850.3573	1240.695	1239.167	1063.527
16May2018 5:00:00	2018	948.932068	853.6274	1222.749	1286.107	1063.718
16May2018 6:00:00	2018	1081.829033	873.3922	1240.727	1381.033	1060.929
16May2018 7:00:00	2018	1235.838649	924.3268	1288.389	1516.127	1062.913
16May2018 8:00:00	2018	1327.812475	941.3986	1307.796	1614.051	1076.852
16May2018 9:00:00	2018	1392.144226	944.5326	1323.378	1676.466	1069.624
16May2018 10:00:00	2018	1453.762147	952.516	1342.087	1718.054	1078.381
16May2018 11:00:00	2018	1487.04924	962.3795	1357.816	1781.477	1078.32
16May2018 12:00:00	2018	1492.33791	970.3379	1355.296	1791.722	1083.033
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16May2018 16:00:00	2018	1541.923214	1015.625	1358.607	1786.052	1068.84
16May2018 17:00:00	2018	1531.646187	1013.97	1343.39	1754.012	1063.338
16May2018 18:00:00	2018	1449.164443	1004.902	1315.963	1653.712	1082.844
16May2018 19:00:00	2018	1393.845258	994.0108	1293.695	1613.679	1081.833
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16May2018 21:00:00	2018	1269.485521	997.9008	1314.377	1570.539	1082.297
16May2018 22:00:00	2018	1166.341032	964.7367	1283.871	1474.633	1091.768
16May2018 23:00:00	2018	1043.43202	905.2471	1199.431	1342.71	1089.857
17May2018 0:00:00	2018	952.1165537	873.8844	1161.586	1255.15	1096.461
17May2018 1:00:00	2018	894.2638401	858.854	1151.179	1213.984	1110.881
17May2018 2:00:00	2018	861.6185861	858.1788	1185.314	1191.249	1134.311
17May2018 3:00:00	2018	852.1722235	851.2809	1178.561	1163.546	1127.56
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17May2018 7:00:00	2018	1207.913692	940.0129	1296.302	1464.507	1063.52
17May2018 8:00:00	2018	1272.551216	970.4182	1336.421	1551.993	1070.342
17May2018 9:00:00	2018	1308.189368	976.6849	1344.558	1602.055	1016.366
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17May2018 15:00:00	2018	1337.119246	987.1553	1362.221	1643.872	1037.715
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18May2018 0:00:00	2018	913.3199765	859.402	1258.813	1245.555	1042.896
18May2018 1:00:00	2018	867.0498491	844.5102	1247.153	1195.344	1036.711
18May2018 2:00:00	2018	846.8702358	838.2987	1237.19	1164.947	1050.969
18May2018 3:00:00	2018	837.2850264	836.2134	1220.899	1147.942	1070.188
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18May2018 9:00:00	2018	1262.283229	935.586	1333.299	1587.049	1042.174
18May2018 10:00:00	2018	1286.955839	949.6926	1383.012	1641.332	1098.779
18May2018 11:00:00	2018	1308.339336	962.1231	1419.481	1691.204	1091.109
18May2018 12:00:00	2018	1310.556893	953.3778	1422.082	1663.618	1103.68
18May2018 13:00:00	2018	1306.728691	954.7385	1408.442	1651.806	1099.142
18May2018 14:00:00	2018	1290.433601	954.7752	1402.858	1651.416	1123.387
18May2018 15:00:00	2018	1274.96952	949.1977	1396.22	1618.156	1135.958
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18May2018 18:00:00	2018	1181.564644	928.4248	1356.358	1534.033	1134.412
18May2018 19:00:00	2018	1144.09517	923.1583	1342.279	1487.591	1138.361
18May2018 20:00:00	2018	1114.5002	918.951	1328.341	1445.842	1154.591
18May2018 21:00:00	2018	1096.839773	923.2435	1331.178	1429.62	1142.798
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19May2018 0:00:00	2018	901.0708401	862.9983	1261.225	1202.515	1123.294
19May2018 1:00:00	2018	854.9457316	848.2633	1244.436	1189.192	1107.29
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19May2018 7:00:00	2018	913.5361485	854.5751	1254.994	1202.905	1094.809
19May2018 8:00:00	2018	988.9949993	874.7373	1256.622	1281.865	1094.383
19May2018 9:00:00	2018	1059.680986	886.0575	1282.01	1361.862	1107.936
19May2018 10:00:00	2018	1097.964292	891.0702	1288.197	1404.793	1130.297
19May2018 11:00:00	2018	1118.805488	890.8927	1293.818	1427.268	1131.582
19May2018 12:00:00	2018	1124.914843	889.1598	1318.21	1453.481	1137.184
19May2018 13:00:00	2018	1118.674072	892.9201	1328.585	1464.147	1132.638

19May2018 14:00:00	2018	1108.072303	896.0961	1338.406	1457.721	1130.658
19May2018 15:00:00	2018	1100.890428	898.5821	1327.532	1453.063	1121.309
19May2018 16:00:00	2018	1103.335848	904.728	1338.061	1462.876	1130.108
19May2018 17:00:00	2018	1111.445006	910.8005	1333.468	1489.778	1142.813
19May2018 18:00:00	2018	1092.433932	908.537	1307.846	1489.736	1162.234
19May2018 19:00:00	2018	1065.086843	904.6643	1290.574	1458.654	1165.687
19May2018 20:00:00	2018	1041.646269	898.17	1280.212	1417.797	1169.072
19May2018 21:00:00	2018	1034.333626	900.7338	1284.256	1416.93	1159.747
19May2018 22:00:00	2018	1014.386959	896.1501	1297.608	1393.705	1170.261
19May2018 23:00:00	2018	942.0238601	871.5658	1279.994	1316.005	1151.539
20May2018 0:00:00	2018	877.2093392	850.6031	1258.085	1236.599	1126.879
20May2018 1:00:00	2018	835.4914711	835.8231	1241.909	1175.187	1113.303
20May2018 2:00:00	2018	806.7756188	824.1546	1232.905	1140.596	1134.027
20May2018 3:00:00	2018	797.7341291	821.1046	1231.21	1134.611	1095.117
20May2018 4:00:00	2018	795.9994004	822.9001	1238.888	1121.228	1076.469
20May2018 5:00:00	2018	798.1573393	824.4099	1220.876	1112.89	1081.263
20May2018 6:00:00	2018	810.5860996	828.8111	1207.398	1116.159	1070.736
20May2018 7:00:00	2018	858.9782994	842.2005	1226.364	1175.242	1051.057
20May2018 8:00:00	2018	924.7613555	855.4548	1197.604	1219.999	1066.116
20May2018 9:00:00	2018	984.0310478	857.9542	1157.096	1290.208	1099.073
20May2018 10:00:00	2018	1040.086916	858.9632	1203.842	1359.975	1132.357
20May2018 11:00:00	2018	1082.949976	872.4449	1235.456	1407.925	1139.832
20May2018 12:00:00	2018	1113.625162	880.1528	1269.371	1395.895	1132.016
20May2018 13:00:00	2018	1125.570368	885.8249	1301.91	1425.708	1132.85
20May2018 14:00:00	2018	1133.792269	889.6583	1318.25	1442.863	1148.256
20May2018 15:00:00	2018	1147.011899	896.41	1329.816	1470.26	1168.731
20May2018 16:00:00	2018	1166.436128	906.7471	1331.137	1488.398	1181.282
20May2018 17:00:00	2018	1174.728511	926.986	1343.972	1528.282	1169.244
20May2018 18:00:00	2018	1155.933127	937.0051	1339.065	1506.222	1171.395
20May2018 19:00:00	2018	1134.119883	936.7667	1346.667	1501.221	1158.734
20May2018 20:00:00	2018	1102.758177	929.6815	1337.812	1444.898	1161.583
20May2018 21:00:00	2018	1087.807056	922.2753	1326.57	1419.268	1148.701
20May2018 22:00:00	2018	1061.208074	909.0596	1318.852	1399.115	1147.4
20May2018 23:00:00	2018	974.9332824	877.9205	1283.921	1302.691	1127.507
21May2018 0:00:00	2018	900.6519939	848.9885	1253.525	1215.081	1119.888
21May2018 1:00:00	2018	852.4248683	833.0835	1230.2	1165.959	1114.054
21May2018 2:00:00	2018	821.0080521	826.0619	1223.134	1159.505	1126.852
21May2018 3:00:00	2018	807.7595743	824.4408	1221.037	1137.225	1121.103
21May2018 4:00:00	2018	806.8422787	827.0738	1221.861	1132.245	1111.385
21May2018 5:00:00	2018	820.5482383	824.5559	1203.554	1111.537	1103.339
21May2018 6:00:00	2018	843.8484025	830.3868	1200.31	1128.621	1083.54
21May2018 7:00:00	2018	900.7217698	854.1913	1218.219	1190.865	1072.364
21May2018 8:00:00	2018	982.2465831	879.8616	1260.466	1270.648	1096.241
21May2018 9:00:00	2018	1073.335264	906.6958	1296.086	1365.128	1118.184
21May2018 10:00:00	2018	1142.801577	923.4433	1321.021	1430.089	1147.773
21May2018 11:00:00	2018	1186.857496	937.0753	1345.124	1487.45	1157.25
21May2018 12:00:00	2018	1209.881706	950.1037	1357.698	1519.153	1149.257

21May2018 13:00:00	2018	1217.80079	955.55	1340.286	1531.888	1153.015
21May2018 14:00:00	2018	1227.11752	949.9808	1351.403	1569.849	1167.762
21May2018 15:00:00	2018	1249.096153	961.5691	1360.009	1594.822	1147.833
21May2018 16:00:00	2018	1288.083845	980.7601	1379.137	1624.055	1144.871
21May2018 17:00:00	2018	1321.35909	996.7738	1400.248	1647.826	1173.258
21May2018 18:00:00	2018	1300.037137	1001.048	1383.709	1657.981	1169.979
21May2018 19:00:00	2018	1276.443439	996.8053	1344.412	1589.881	1178.027
21May2018 20:00:00	2018	1241.136325	983.1151	1311.186	1573.738	1182.792
21May2018 21:00:00	2018	1206.035846	980.3252	1302.262	1519.537	1180.11
21May2018 22:00:00	2018	1136.077031	953.0062	1311.407	1490.246	1167.105
21May2018 23:00:00	2018	1017.889132	906.4875	1267.019	1341.789	1107.623
22May2018 0:00:00	2018	930.0332591	875.5616	1226.551	1256.771	1084.974
22May2018 1:00:00	2018	877.3290295	859.8057	1208.967	1176.966	1086.959
22May2018 2:00:00	2018	846.4567822	853.5001	1204.138	1166.422	1094.519
22May2018 3:00:00	2018	839.546845	851.293	1181.943	1138.456	1083.317
22May2018 4:00:00	2018	852.3854352	852.6309	1195.248	1142.038	1112.157
22May2018 5:00:00	2018	917.2043826	859.9507	1198.722	1165.223	1106.064
22May2018 6:00:00	2018	1048.191202	888.1032	1246.218	1309.76	1104.77
22May2018 7:00:00	2018	1189.610899	936.31	1317.964	1500.327	1123.36
22May2018 8:00:00	2018	1275.284707	952.1192	1387.369	1616.711	1144.051
22May2018 9:00:00	2018	1343.342314	941.3949	1431.492	1730.809	1137.581
22May2018 10:00:00	2018	1413.448252	938.2974	1449.606	1791.608	1165.183
22May2018 11:00:00	2018	1458.202402	949.79	1463.895	1851.754	1180.775
22May2018 12:00:00	2018	1479.660516	956.2828	1461.001	1897.776	1178.083
22May2018 13:00:00	2018	1499.930679	975.4236	1449.482	1887.655	1179.649
22May2018 14:00:00	2018	1515.333743	980.6667	1456.8	1885.792	1192.651
22May2018 15:00:00	2018	1531.327754	990.7755	1461.26	1895.685	1197.647
22May2018 16:00:00	2018	1544.620282	1008.583	1456.99	1890.847	1217.317
22May2018 17:00:00	2018	1536.271846	1013.547	1434.474	1896.075	1215.457
22May2018 18:00:00	2018	1452.166371	1006.813	1422.448	1874.546	1225.227
22May2018 19:00:00	2018	1402.770858	999.246	1414.847	1842.163	1226.609
22May2018 20:00:00	2018	1357.56446	984.2284	1392.173	1768.081	1211.579
22May2018 21:00:00	2018	1303.426675	965.9574	1372.425	1705.72	1193.517
22May2018 22:00:00	2018	1217.931026	945.2618	1331.969	1625.702	1185.729
22May2018 23:00:00	2018	1076.622471	942.9698	1260.003	1487.899	1161.288
23May2018 0:00:00	2018	975.2393384	911.2026	1220.507	1368.064	1102.153
23May2018 1:00:00	2018	912.7443147	890.8569	1207.131	1281.787	1079.808
23May2018 2:00:00	2018	879.1517205	879.0137	1204.572	1237.551	1075.156
23May2018 3:00:00	2018	862.2607882	877.1933	1201.889	1207.414	1087.046
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23May2018 5:00:00	2018	925.8075864	882.5891	1204.355	1246.553	1053.058
23May2018 6:00:00	2018	1056.802404	910.485	1240.059	1366.792	1052.562
23May2018 7:00:00	2018	1202.911246	957.2875	1298.147	1555.74	1067.143
23May2018 8:00:00	2018	1300.105035	980.251	1309.212	1679.288	1071.303
23May2018 9:00:00	2018	1369.130893	972.4153	1365.689	1780.081	1084.499
23May2018 10:00:00	2018	1432.473127	984.9561	1377.093	1844.122	1100.716
23May2018 11:00:00	2018	1479.927745	1000.306	1355.591	1853.776	1125.872

23May2018 12:00:00	2018	1503.104057	1004.555	1357.85	1865.653	1141.236
23May2018 13:00:00	2018	1524.308093	1024.405	1364.212	1891.859	1163.155
23May2018 14:00:00	2018	1543.036565	1037.462	1390.764	1913.143	1156.981
23May2018 15:00:00	2018	1562.399546	1044.32	1384.521	1918.575	1145.46
23May2018 16:00:00	2018	1580.790405	1063.356	1376.404	1940.623	1133.846
23May2018 17:00:00	2018	1566.808381	1076.218	1344.024	1927.565	1123.544
23May2018 18:00:00	2018	1477.206484	1068.487	1369.729	1885.754	1114.375
23May2018 19:00:00	2018	1420.317388	1057.394	1404.871	1879.756	1106.27
23May2018 20:00:00	2018	1370.200391	1039.557	1383.074	1840.032	1093.648
23May2018 21:00:00	2018	1317.160372	1029.15	1358.846	1765.184	1107.123
23May2018 22:00:00	2018	1230.677876	1012.365	1331.766	1688.238	1118.644
23May2018 23:00:00	2018	1094.513919	972.585	1276.546	1545.44	1100.08
24May2018 0:00:00	2018	988.5582101	932.188	1242.08	1425.191	1085.277
24May2018 1:00:00	2018	920.8282331	914.7032	1223.26	1346.776	1041.819
24May2018 2:00:00	2018	889.3037942	903.2669	1209.966	1301.558	1037.939
24May2018 3:00:00	2018	880.4990648	894.6022	1201.839	1273.119	1043.202
24May2018 4:00:00	2018	904.3227117	891.7519	1193.244	1272.157	1038.519
24May2018 5:00:00	2018	966.5073732	900.5918	1192.556	1287.404	1019.03
24May2018 6:00:00	2018	1095.843901	924.2936	1217.268	1402.211	1012.331
24May2018 7:00:00	2018	1238.830347	974.0237	1299.661	1583.874	1026.606
24May2018 8:00:00	2018	1318.622414	1009.264	1360.985	1712.712	1052.355
24May2018 9:00:00	2018	1380.006361	1029.556	1378.867	1796.87	1088.951
24May2018 10:00:00	2018	1451.078709	1041.84	1358.698	1847.292	1120.522
24May2018 11:00:00	2018	1514.661792	1039.568	1352.186	1899.463	1126.103
24May2018 12:00:00	2018	1534.005934	1020.951	1334.448	1900.321	1132.629
24May2018 13:00:00	2018	1546.713255	1037.258	1363.256	1936.612	1129.493
24May2018 14:00:00	2018	1522.029832	1052.17	1330.215	1929.224	1135.687
24May2018 15:00:00	2018	1543.547228	1062.978	1314.386	1916.102	1121.045
24May2018 16:00:00	2018	1561.118266	1075.629	1319.883	1909.901	1113.996
24May2018 17:00:00	2018	1563.898407	1075.442	1310.232	1861.285	1125.397
24May2018 18:00:00	2018	1484.006475	1064.376	1323.296	1750.819	1131.499
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24May2018 21:00:00	2018	1308.559429	1056.336	1314.18	1587.513	1113.291
24May2018 22:00:00	2018	1223.347838	1022.919	1317.203	1574.366	1111.548
24May2018 23:00:00	2018	1090.119588	974.1361	1261.97	1469.326	1090.671
25May2018 0:00:00	2018	986.3994828	943.2411	1220.496	1386.282	1080.637
25May2018 1:00:00	2018	925.1027515	924.3435	1205.353	1320.936	1075.549
25May2018 2:00:00	2018	891.5930165	912.485	1196.024	1265.461	1065.119
25May2018 3:00:00	2018	876.1385021	898.2556	1173.983	1248.672	1083.481
25May2018 4:00:00	2018	879.7235115	891.7602	1149.136	1238.627	1079.498
25May2018 5:00:00	2018	928.8694413	895.8137	1142.868	1242.019	1068.867
25May2018 6:00:00	2018	1050.969923	926.95	1165.254	1355.982	1056.497
25May2018 7:00:00	2018	1197.65508	978.2226	1254.571	1537.207	1080.947
25May2018 8:00:00	2018	1292.516024	1013.8	1276.633	1640.771	1098.036
25May2018 9:00:00	2018	1372.213262	1043.863	1313.78	1708.212	1121.855
25May2018 10:00:00	2018	1437.760109	1060.408	1333.14	1774.869	1140.321

25May2018 11:00:00	2018	1489.20284	1066.91	1347.269	1849.515	1140.51
25May2018 12:00:00	2018	1511.687762	1035.231	1353.575	1855.671	1138.663
25May2018 13:00:00	2018	1538.811649	1049.085	1293.63	1856.559	1143.203
25May2018 14:00:00	2018	1557.807344	1062.413	1277.679	1888.989	1140.477
25May2018 15:00:00	2018	1565.340417	1073.478	1299.663	1882.417	1020.598
25May2018 16:00:00	2018	1562.099144	1087.917	1354.457	1919.199	976.4781
25May2018 17:00:00	2018	1541.040034	1087.274	1367.672	1892.602	1020.043
25May2018 18:00:00	2018	1452.75786	1093.689	1371.888	1821.701	1050.051
25May2018 19:00:00	2018	1398.43082	1100.04	1373.017	1755.444	1064.878
25May2018 20:00:00	2018	1338.651596	1107.391	1345.029	1675.351	1063.544
25May2018 21:00:00	2018	1290.296791	1086.049	1326.021	1603.894	1066.243
25May2018 22:00:00	2018	1217.619164	1050.981	1276.679	1567.794	1076.165
25May2018 23:00:00	2018	1103.781682	1003.296	1237.839	1480.049	1064.067
26May2018 0:00:00	2018	1006.72709	975.2574	1270.527	1391.654	1074.783
26May2018 1:00:00	2018	940.0781382	953.0982	1269.668	1314.795	1086.366
26May2018 2:00:00	2018	897.427695	940.1877	1251.844	1275.544	1097.983
26May2018 3:00:00	2018	874.7569198	935.7764	1212.411	1230.3	1085.69
26May2018 4:00:00	2018	866.1614045	928.0187	1220.964	1210.991	1073.229
26May2018 5:00:00	2018	877.6119276	922.1471	1200.47	1188.367	1060.862
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26May2018 12:00:00	2018	1237.752077	1013.602	1296.078	1593.069	1063.053
26May2018 13:00:00	2018	1248.659218	1025.747	1301.833	1598.354	1087.283
26May2018 14:00:00	2018	1252.509635	1036.694	1293.429	1557.619	1117.522
26May2018 15:00:00	2018	1264.377421	1049.607	1297.272	1552.035	1104.921
26May2018 16:00:00	2018	1279.193652	1067.175	1308.219	1595.825	1106.379
26May2018 17:00:00	2018	1293.189238	1073.943	1320.805	1602.919	1108.001
26May2018 18:00:00	2018	1274.055578	1069.398	1299.264	1526.006	1102.799
26May2018 19:00:00	2018	1245.462729	1063.08	1284.595	1490.544	1085.759
26May2018 20:00:00	2018	1210.527435	1045.616	1279.167	1476.318	1081.954
26May2018 21:00:00	2018	1175.761579	1031.785	1264.003	1470.149	1084.566
26May2018 22:00:00	2018	1146.358739	1013.27	1265.679	1452.439	1090.732
26May2018 23:00:00	2018	1054.276601	968.2298	1225.58	1369.04	1064.641
27May2018 0:00:00	2018	960.9885793	936.3747	1207.052	1290.01	1072.371
27May2018 1:00:00	2018	897.9880927	907.4295	1158.022	1219.106	1071.906
27May2018 2:00:00	2018	858.8812036	896.6647	1157.67	1200.792	1093.94
27May2018 3:00:00	2018	838.5418882	889.3994	1154.413	1175.224	1105.101
27May2018 4:00:00	2018	828.5832883	890.7432	1154.622	1169.802	1094.638
27May2018 5:00:00	2018	820.7657149	882.7566	1146.653	1119.178	1070.945
27May2018 6:00:00	2018	838.1284352	888.8587	1147.196	1154.627	1065.609
27May2018 7:00:00	2018	901.3030657	914.9681	1171.781	1226.247	1060.936
27May2018 8:00:00	2018	986.9964885	938.4868	1216.817	1313.843	1066.976
27May2018 9:00:00	2018	1073.709432	964.1559	1251.815	1383.614	1075.132

27May2018 10:00:00	2018	1140.239186	986.9188	1265.856	1439.265	1088.754
27May2018 11:00:00	2018	1187.903612	1000.207	1269.396	1497.599	1096.54
27May2018 12:00:00	2018	1220.338573	1022.261	1294.392	1504.36	1093.937
27May2018 13:00:00	2018	1242.416986	1029.139	1305.009	1550.147	1092.511
27May2018 14:00:00	2018	1258.173161	1030.569	1307.263	1558.66	1077.104
27May2018 15:00:00	2018	1276.455872	1051.102	1313.077	1583.969	1064.738
27May2018 16:00:00	2018	1308.930764	1058.778	1318.714	1632.121	1065.896
27May2018 17:00:00	2018	1343.679038	1071.756	1335.359	1673.415	1075.844
27May2018 18:00:00	2018	1333.866312	1074.211	1331.257	1676.312	1079.71
27May2018 19:00:00	2018	1314.485239	1068.166	1312.324	1668.261	1070.42
27May2018 20:00:00	2018	1288.072596	1071.853	1318.87	1629.285	1070.145
27May2018 21:00:00	2018	1248.788206	1056.888	1314.601	1619.321	1048.055
27May2018 22:00:00	2018	1191.941571	1032.306	1296.159	1557.928	1053.585
27May2018 23:00:00	2018	1065.704073	983.831	1221.971	1433.461	1040.262
28May2018 0:00:00	2018	966.4018515	947.101	1203.274	1350.856	1020.354
28May2018 1:00:00	2018	907.8303384	925.9873	1193.294	1292.804	1024.541
28May2018 2:00:00	2018	874.7124236	912.6454	1183.546	1268.42	1047.867
28May2018 3:00:00	2018	861.0589928	907.9043	1180.428	1242.393	1040.403
28May2018 4:00:00	2018	871.8736418	906.8486	1182.041	1234.705	1044.253
28May2018 5:00:00	2018	922.3293908	906.732	1180.708	1249.189	1039.759
28May2018 6:00:00	2018	1059.621343	939.2957	1213.862	1370.16	1041.319
28May2018 7:00:00	2018	1219.268632	994.13	1334.075	1580.681	1056.296
28May2018 8:00:00	2018	1321.775717	1031.35	1395.281	1689.23	1105.658
28May2018 9:00:00	2018	1404.752809	1043.517	1407.716	1784.62	1112.409
28May2018 10:00:00	2018	1474.702905	1062.726	1377.825	1856.841	1111.399
28May2018 11:00:00	2018	1523.918124	1078.495	1388.331	1915.028	1127.583
28May2018 12:00:00	2018	1559.816809	1052.927	1430.128	1919.087	1154.341
28May2018 13:00:00	2018	1586.25596	1066.105	1380.759	1942.286	1155.595
28May2018 14:00:00	2018	1606.561658	1083.354	1341.016	1938.449	1167.47
28May2018 15:00:00	2018	1629.237671	1091.646	1339.505	1942.79	1181.266
28May2018 16:00:00	2018	1646.531143	1100.248	1336.342	1962.566	1162.641
28May2018 17:00:00	2018	1640.997636	1106.736	1336.552	1951.405	1158.087
28May2018 18:00:00	2018	1553.337679	1100.789	1348.67	1882.323	1157.353
28May2018 19:00:00	2018	1500.669946	1126.564	1339.1	1822.19	1151.402
28May2018 20:00:00	2018	1441.635968	1131.365	1304.779	1751.248	1151.504
28May2018 21:00:00	2018	1357.883594	1097.861	1294.679	1677.878	1138.979
28May2018 22:00:00	2018	1264.621336	1058.479	1276.275	1590.88	1133.227
28May2018 23:00:00	2018	1115.841872	1003.55	1219.682	1468.209	1116.929
29May2018 0:00:00	2018	1007.30117	960.6343	1182.953	1362.882	1098.098
29May2018 1:00:00	2018	937.1896895	947.0661	1162.111	1302.792	1092.257
29May2018 2:00:00	2018	898.8959001	928.8309	1153.242	1267.064	1092.88
29May2018 3:00:00	2018	882.2930313	928.4691	1144.124	1246.16	1093.238
29May2018 4:00:00	2018	886.8693471	931.0544	1138.855	1243.712	1081.086
29May2018 5:00:00	2018	943.3745923	934.1581	1128.151	1252.313	1080.24
29May2018 6:00:00	2018	1075.451172	959.1155	1158.33	1367.398	1071.191
29May2018 7:00:00	2018	1202.615375	999.4241	1203.373	1506.328	1080.583
29May2018 8:00:00	2018	1253.51067	1022.996	1238.358	1577.224	1110.956

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29May2018 11:00:00	2018	1318.405815	1047.631	1289.134	1690.449	1113.394
29May2018 12:00:00	2018	1323.589394	1051.379	1282.72	1693.823	1111.383
29May2018 13:00:00	2018	1334.421643	1052.948	1288.232	1708.176	1122.669
29May2018 14:00:00	2018	1337.061657	1047.276	1285.463	1714.012	1124.75
29May2018 15:00:00	2018	1338.109251	1055.69	1291.72	1721.347	1136.303
29May2018 16:00:00	2018	1343.511716	1069.967	1304.676	1711.517	1133.636
29May2018 17:00:00	2018	1333.811016	1073.285	1292.078	1718.101	1132.834
29May2018 18:00:00	2018	1260.660041	1078.034	1283.142	1642.351	1136.914
29May2018 19:00:00	2018	1220.960772	1067.425	1272.182	1580.494	1090.382
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29May2018 23:00:00	2018	981.7593128	983.3414	1159.503	1375.369	1050.928
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30May2018 7:00:00	2018	1158.154442	1003.059	1216.607	1501.215	1058.644
30May2018 8:00:00	2018	1225.900841	1025.986	1265.394	1586.422	1068.231
30May2018 9:00:00	2018	1263.791409	1029.801	1284.256	1631.279	1064.918
30May2018 10:00:00	2018	1287.769399	1032.803	1301.108	1666.311	1088.375
30May2018 11:00:00	2018	1310.847731	1036.422	1302.415	1681.993	1107.218
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30May2018 13:00:00	2018	1349.531433	1040.639	1307.475	1687.13	1064.853
30May2018 14:00:00	2018	1348.662861	1045.362	1293.474	1695.842	1055.47
30May2018 15:00:00	2018	1335.826095	1048.121	1297.578	1661.736	1049.566
30May2018 16:00:00	2018	1326.111624	1061.838	1295.336	1673.287	1054.307
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30May2018 20:00:00	2018	1195.910502	1029.417	1218.3	1527.289	1052.995
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30May2018 23:00:00	2018	971.8118351	953.2097	1206.58	1324.293	1034.904
31May2018 0:00:00	2018	894.7883995	927.6184	1176.963	1273.619	1025.606
31May2018 1:00:00	2018	850.4133922	912.7876	1154.514	1223.191	1025.593
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31May2018 6:00:00	2018	1035.92873	948.6588	1210.342	1349.969	1082.414
31May2018 7:00:00	2018	1173.725827	997.0052	1277.743	1505.133	1081.576

31May2018 8:00:00	2018	1240.63274	1020.483	1321.798	1591.831	1084.597
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31May2018 20:00:00	2018	1211.315979	993.4678	1242.489	1492.271	1064.413
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01Jun2018 2:00:00	2018	831.9508946	867.6855	1142.459	1190.251	1048.979
01Jun2018 3:00:00	2018	824.4753277	863.7806	1151.498	1205.381	1073.65
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02Jun2018 22:00:00	2018	1067.933377	882.4045	1224.512	1396.451	1047.822
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04Jun2018 17:00:00	2018	1397.371769	961.3908	1335.297	1714.066	1058.292
04Jun2018 18:00:00	2018	1319.927223	945.3835	1309.371	1637.059	1065.753
04Jun2018 19:00:00	2018	1261.967798	943.4091	1286.75	1580.349	1054.418
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05Jun2018 16:00:00	2018	1378.077979	987.879	1332.801	1701.701	1022.499
05Jun2018 17:00:00	2018	1376.2493	996.5851	1337.88	1685.351	1036.316
05Jun2018 18:00:00	2018	1308.809844	988.613	1306.069	1591.734	1022.108
05Jun2018 19:00:00	2018	1267.002048	984.1495	1289.382	1540.74	1024.058
05Jun2018 20:00:00	2018	1231.420231	972.4654	1264.994	1503.362	1024.732
05Jun2018 21:00:00	2018	1182.71965	960.0847	1247.738	1463.624	1021.985
05Jun2018 22:00:00	2018	1118.021549	942.562	1260.491	1429.601	1039.897
05Jun2018 23:00:00	2018	1004.621904	903.0356	1227.835	1332.767	991.7709
06Jun2018 0:00:00	2018	914.0935513	875.5795	1200.463	1245.495	982.0586
06Jun2018 1:00:00	2018	860.8263631	862.0472	1190.998	1217.761	976.6634
06Jun2018 2:00:00	2018	836.270851	854.593	1170.156	1176.992	1009.77
06Jun2018 3:00:00	2018	829.18148	849.1566	1148.242	1138.222	1054.213
06Jun2018 4:00:00	2018	842.9642934	852.6566	1160.911	1146.102	1049.498

06Jun2018 5:00:00	2018	899.0708089	857.4206	1155.071	1163.635	1056.389
06Jun2018 6:00:00	2018	1028.723719	881.1734	1182.287	1292.358	1053.663
06Jun2018 7:00:00	2018	1171.183545	927.1421	1248.69	1455.232	1053.376
06Jun2018 8:00:00	2018	1245.554702	940.2804	1246.388	1552.019	1017.043
06Jun2018 9:00:00	2018	1308.919986	945.7042	1246.54	1622.374	1000.583
06Jun2018 10:00:00	2018	1353.04444	964.9443	1261.903	1677.132	999.816
06Jun2018 11:00:00	2018	1382.932316	942.2216	1293.877	1715.041	1002.904
06Jun2018 12:00:00	2018	1395.140825	937.9213	1317.343	1730.895	1013.153
06Jun2018 13:00:00	2018	1411.956099	949.2948	1315.314	1743.364	1012.088
06Jun2018 14:00:00	2018	1434.918868	957.5134	1308.614	1739.083	1005.016
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06Jun2018 16:00:00	2018	1471.156081	991.2754	1341.532	1770.82	1049.789
06Jun2018 17:00:00	2018	1470.171114	997.7093	1330.293	1770.494	1048.479
06Jun2018 18:00:00	2018	1397.895252	995.1624	1320.472	1722.199	1039.17
06Jun2018 19:00:00	2018	1350.188633	1009.966	1314.461	1672.398	1031.483
06Jun2018 20:00:00	2018	1305.032262	1010.127	1301.948	1621.835	1039.874
06Jun2018 21:00:00	2018	1250.577626	996.6633	1277.146	1567.557	1035.415
06Jun2018 22:00:00	2018	1180.96192	977.9021	1269.592	1533.721	1043.787
06Jun2018 23:00:00	2018	1053.555238	938.0557	1227.188	1433.383	1034.423
07Jun2018 0:00:00	2018	950.8916049	908.932	1194.036	1326.14	1022.281
07Jun2018 1:00:00	2018	890.9401011	886.9255	1174.288	1284.222	1017.67
07Jun2018 2:00:00	2018	860.3669075	879.8036	1161.468	1232.848	1010.328
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07Jun2018 6:00:00	2018	1038.797425	907.5749	1176.432	1317.194	1011.468
07Jun2018 7:00:00	2018	1185.924863	948.3783	1242.064	1498.772	1016.052
07Jun2018 8:00:00	2018	1270.827722	968.7734	1288.172	1620.048	1007.33
07Jun2018 9:00:00	2018	1344.445125	1009.831	1283.993	1676.756	961.4964
07Jun2018 10:00:00	2018	1404.73857	1029.578	1285.557	1739.206	991.1305
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07Jun2018 12:00:00	2018	1480.167431	1020.434	1319.37	1772.151	1020.27
07Jun2018 13:00:00	2018	1499.639733	1020.244	1362.042	1821.916	1033.43
07Jun2018 14:00:00	2018	1511.866316	1006.765	1366.068	1856.523	1083.98
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07Jun2018 20:00:00	2018	1357.915907	1054.833	1311.949	1761.582	1105.323
07Jun2018 21:00:00	2018	1291.871935	1027.53	1295.44	1681.454	1086.494
07Jun2018 22:00:00	2018	1218.323137	999.3489	1292.914	1629.784	1083.223
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08Jun2018 1:00:00	2018	911.5187365	893.2931	1167.003	1323.81	1065.164
08Jun2018 2:00:00	2018	881.6990129	882.3203	1158.39	1282.495	1055.491
08Jun2018 3:00:00	2018	869.7460249	878.3459	1159.011	1245.445	1055.115

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08Jun2018 5:00:00	2018	929.8604419	883.5209	1149.924	1261.637	1038.868
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08Jun2018 10:00:00	2018	1469.675313	1035.82	1322.466	1766.396	1053.959
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08Jun2018 15:00:00	2018	1565.008516	1032.988	1289.31	1881.302	1150.325
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08Jun2018 19:00:00	2018	1410.025717	1032.495	1327.217	1793.186	1212.946
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08Jun2018 21:00:00	2018	1287.51116	985.4193	1278.608	1690.698	1180.397
08Jun2018 22:00:00	2018	1223.376058	989.2101	1264.95	1630.841	1172.348
08Jun2018 23:00:00	2018	1115.539377	974.3112	1230.575	1562.216	1154.088
09Jun2018 0:00:00	2018	1015.320597	936.076	1193.372	1436.827	1130.632
09Jun2018 1:00:00	2018	945.3802605	915.6498	1166.664	1359.636	1119.271
09Jun2018 2:00:00	2018	904.3467821	899.0499	1149.572	1314.166	1103.211
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09Jun2018 6:00:00	2018	896.3293889	883.3039	1123.869	1227.875	1065.712
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09Jun2018 18:00:00	2018	1279.987385	939.6383	1251.385	1624.559	1140.932
09Jun2018 19:00:00	2018	1230.869107	930.9727	1177.966	1570.75	1149.341
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10Jun2018 17:00:00	2018	1187.944487	905.2934	1279.099	1542.611	1136.416
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14Jun2018 7:00:00	2018	1173.930663	939.6052	1278.513	1449.551	1083.175
14Jun2018 8:00:00	2018	1244.012781	965.936	1339.057	1564.302	1089.454
14Jun2018 9:00:00	2018	1283.426838	992.8102	1353.689	1642.061	1092.406
14Jun2018 10:00:00	2018	1313.869573	1002.792	1332.427	1651.098	1098.109
14Jun2018 11:00:00	2018	1331.443508	1007.012	1330.847	1698.428	1095.765
14Jun2018 12:00:00	2018	1336.053185	1004.159	1355.261	1744.358	1083.793
14Jun2018 13:00:00	2018	1331.354104	988.9043	1333.615	1747.297	1094.519
14Jun2018 14:00:00	2018	1322.567614	991.6748	1343.799	1705.062	1106.935
14Jun2018 15:00:00	2018	1316.866085	984.9135	1334.3	1728.96	1075.932
14Jun2018 16:00:00	2018	1327.4048	987.6876	1367.157	1744.625	1101.509
14Jun2018 17:00:00	2018	1315.417079	987.4735	1348.937	1712.961	1122.341
14Jun2018 18:00:00	2018	1246.96468	961.7038	1342.202	1632.977	1100.818
14Jun2018 19:00:00	2018	1204.547751	942.7368	1310.689	1580.961	1103.644
14Jun2018 20:00:00	2018	1178.057949	930.0023	1296.312	1521.443	1107.291
14Jun2018 21:00:00	2018	1143.808947	931.766	1277.251	1478.991	1115.707
14Jun2018 22:00:00	2018	1083.471941	923.2952	1280.94	1446.307	1119.473
14Jun2018 23:00:00	2018	987.5337858	915.8113	1260.511	1372.034	1102.095
15Jun2018 0:00:00	2018	912.1929528	895.4447	1200.293	1260.073	1085.722
15Jun2018 1:00:00	2018	860.3102113	874.3251	1190.08	1236.718	1075.6
15Jun2018 2:00:00	2018	837.5608817	866.3668	1193.378	1223.433	1072.367
15Jun2018 3:00:00	2018	827.1229032	864.3907	1188.136	1215.901	1072.495
15Jun2018 4:00:00	2018	842.1181857	869.8902	1191.089	1207.793	1062.361
15Jun2018 5:00:00	2018	888.241376	873.1923	1185.299	1212.726	1058.492
15Jun2018 6:00:00	2018	1015.996754	898.5037	1211.827	1322.717	1057.783
15Jun2018 7:00:00	2018	1153.361803	952.0943	1274.388	1476.602	1061.339
15Jun2018 8:00:00	2018	1221.822864	966.5289	1336.359	1610.538	1052.41
15Jun2018 9:00:00	2018	1273.717054	970.0711	1340.908	1669.731	1056.874
15Jun2018 10:00:00	2018	1304.933535	966.1009	1333.127	1690.858	1066.067
15Jun2018 11:00:00	2018	1330.800407	965.5822	1335.56	1710.977	1066.28
15Jun2018 12:00:00	2018	1344.114653	964.0718	1336.901	1699.49	1046.018
15Jun2018 13:00:00	2018	1358.590936	973.8704	1335.77	1705.902	1053.355
15Jun2018 14:00:00	2018	1331.338449	975.0288	1347.76	1720.919	1077.222
15Jun2018 15:00:00	2018	1300.520526	960.2788	1380.428	1702.534	1094.672
15Jun2018 16:00:00	2018	1286.353368	912.9564	1378.377	1652.122	1101.353
15Jun2018 17:00:00	2018	1281.225828	902.4212	1358.657	1611.896	1099.111
15Jun2018 18:00:00	2018	1217.172446	894.6306	1327.884	1537.502	1094.365
15Jun2018 19:00:00	2018	1167.980337	883.9944	1314.344	1494.934	1118.212
15Jun2018 20:00:00	2018	1135.998399	879.2584	1290.043	1467.168	1109.294
15Jun2018 21:00:00	2018	1109.689302	868.9547	1283.047	1445.104	1106.41
15Jun2018 22:00:00	2018	1067.38853	868.0911	1280.51	1403.472	1102.31
15Jun2018 23:00:00	2018	983.4113978	836.2053	1258.351	1339.945	1083.236

16Jun2018 0:00:00	2018	907.0178496	810.7889	1214.369	1226.788	1073.824
16Jun2018 1:00:00	2018	855.9012649	793	1169.334	1186.884	1062.205
16Jun2018 2:00:00	2018	833.0086992	772.8224	1173.596	1157.129	1074.396
16Jun2018 3:00:00	2018	816.7951049	768.9537	1183.626	1157.628	1074.078
16Jun2018 4:00:00	2018	815.0058877	771.6875	1194.258	1167.904	1066.469
16Jun2018 5:00:00	2018	825.8573051	769.852	1184.769	1151.999	1055.568
16Jun2018 6:00:00	2018	855.0959094	775.2949	1189.579	1163.16	1052.237
16Jun2018 7:00:00	2018	926.1881923	801.694	1207.182	1260.278	1060.605
16Jun2018 8:00:00	2018	1021.402931	828.4114	1257.214	1384.446	1070.107
16Jun2018 9:00:00	2018	1096.369473	849.0114	1265.782	1473.029	1091.425
16Jun2018 10:00:00	2018	1140.47016	861.3127	1297.941	1537.359	1110.18
16Jun2018 11:00:00	2018	1168.126794	856.0204	1316.858	1571.866	1108.754
16Jun2018 12:00:00	2018	1179.607446	857.1875	1313.95	1568.188	1083.556
16Jun2018 13:00:00	2018	1166.54554	840.6269	1293.625	1549.602	1059.106
16Jun2018 14:00:00	2018	1160.018281	833.5715	1288.617	1546.334	1065.903
16Jun2018 15:00:00	2018	1150.70808	831.4849	1288.477	1535.593	1068.678
16Jun2018 16:00:00	2018	1150.508513	835.5204	1284.904	1551.904	1076.251
16Jun2018 17:00:00	2018	1147.71934	839.7892	1292.758	1568.05	1080.968
16Jun2018 18:00:00	2018	1121.175585	838.1933	1286.635	1529.366	1084.081
16Jun2018 19:00:00	2018	1096.580556	830.9298	1270.652	1491.578	1084.44
16Jun2018 20:00:00	2018	1076.271501	829.4943	1275.109	1517.149	1093.713
16Jun2018 21:00:00	2018	1050.700303	826.8518	1253.973	1468.055	1102.47
16Jun2018 22:00:00	2018	1028.742275	819.6914	1252.052	1435.785	1138.514
16Jun2018 23:00:00	2018	958.0515177	791.2797	1247.039	1408.221	1125.597
17Jun2018 0:00:00	2018	886.2730733	766.4557	1220.875	1312.413	1108.594
17Jun2018 1:00:00	2018	838.7668077	749.2199	1204.295	1224.805	1111.315
17Jun2018 2:00:00	2018	809.8508206	745.3753	1202.657	1194.077	1113.837
17Jun2018 3:00:00	2018	793.9291957	740.0547	1208.188	1158.873	1121.533
17Jun2018 4:00:00	2018	793.5244837	739.2082	1212.542	1136.447	1117.405
17Jun2018 5:00:00	2018	786.2313939	734.9868	1191.582	1113.579	1107.184
17Jun2018 6:00:00	2018	813.5338233	739.267	1192.302	1122.246	1111.896
17Jun2018 7:00:00	2018	875.7904332	755.8797	1200.436	1207.493	1109.821
17Jun2018 8:00:00	2018	960.4134054	774.4861	1228.3	1316.217	1109.298
17Jun2018 9:00:00	2018	1038.890642	786.322	1247.087	1393.448	1092.979
17Jun2018 10:00:00	2018	1099.399427	775.4752	1279.154	1514.523	1116.688
17Jun2018 11:00:00	2018	1137.205171	780.9296	1304.903	1553.794	1140.122
17Jun2018 12:00:00	2018	1154.64782	786.9043	1318.154	1583.583	1152.727
17Jun2018 13:00:00	2018	1157.277228	791.6327	1323.702	1592.32	1187.738
17Jun2018 14:00:00	2018	1162.98068	782.1248	1321.321	1618.202	1194.59
17Jun2018 15:00:00	2018	1175.115442	779.0087	1330.834	1645.812	1211.03
17Jun2018 16:00:00	2018	1198.805194	788.777	1337.267	1663.872	1205.148
17Jun2018 17:00:00	2018	1219.229954	813.7764	1367.271	1691.813	1214.03
17Jun2018 18:00:00	2018	1197.088716	810.7531	1362.78	1679.077	1207.141
17Jun2018 19:00:00	2018	1177.245253	831.1509	1350.283	1672.554	1191.155
17Jun2018 20:00:00	2018	1164.448376	823.2687	1353.027	1662.903	1175.662
17Jun2018 21:00:00	2018	1134.764635	817.8992	1334.286	1607.645	1152.089
17Jun2018 22:00:00	2018	1101.407346	804.1249	1329.795	1533.397	1160.831

17Jun2018 23:00:00	2018	997.742207	761.3911	1312.907	1456.619	1151.279
18Jun2018 0:00:00	2018	906.6337587	744.8636	1276.863	1349.684	1134.951
18Jun2018 1:00:00	2018	853.3387043	729.6865	1248.639	1250.918	1096.822
18Jun2018 2:00:00	2018	825.7648999	724.5974	1240.636	1224.393	1089.531
18Jun2018 3:00:00	2018	817.3614082	717.4775	1232.793	1232.006	1089.464
18Jun2018 4:00:00	2018	834.5789211	721.4892	1235.008	1226.912	1079.948
18Jun2018 5:00:00	2018	882.9144165	725.1383	1217.841	1223.987	1077.011
18Jun2018 6:00:00	2018	1022.9748	746.8572	1253.982	1354.604	1099.648
18Jun2018 7:00:00	2018	1172.16067	790.8535	1325.094	1554.21	1124.854
18Jun2018 8:00:00	2018	1262.89992	772.7166	1361.323	1698.108	1165.541
18Jun2018 9:00:00	2018	1336.262697	791.3289	1342.606	1792.38	1195.913
18Jun2018 10:00:00	2018	1392.702706	799.8948	1352.168	1824.674	1222.32
18Jun2018 11:00:00	2018	1436.445948	808.6216	1377.735	1857.665	1236.153
18Jun2018 12:00:00	2018	1446.190243	814.5036	1362.322	1867.532	1221.692
18Jun2018 13:00:00	2018	1445.080482	812.1989	1388.171	1898.449	1227.031
18Jun2018 14:00:00	2018	1434.856685	812.9336	1387.748	1901.451	1244.734
18Jun2018 15:00:00	2018	1442.172054	802.2188	1402.242	1929.6	1268.516
18Jun2018 16:00:00	2018	1450.846918	805.7608	1401.279	1950.683	1264.381
18Jun2018 17:00:00	2018	1443.694994	808.2923	1396.329	1954.805	1262.997
18Jun2018 18:00:00	2018	1358.390585	792.5474	1408.261	1923.914	1233.903
18Jun2018 19:00:00	2018	1301.104702	777.6477	1417.869	1904.314	1225.033
18Jun2018 20:00:00	2018	1260.226952	769.0594	1398.768	1843.523	1215.723
18Jun2018 21:00:00	2018	1202.586083	755.5592	1364.501	1781.441	1190.038
18Jun2018 22:00:00	2018	1137.895657	773.8254	1338.119	1688.711	1171.254
18Jun2018 23:00:00	2018	1026.962225	755.5868	1306.481	1585.519	1152.645
19Jun2018 0:00:00	2018	935.1454427	726.4576	1288.783	1455.82	1138.653
19Jun2018 1:00:00	2018	878.2902325	710.7676	1263.05	1384.381	1101.68
19Jun2018 2:00:00	2018	850.2644725	709.4808	1250.874	1338.185	1107.168
19Jun2018 3:00:00	2018	839.0545698	703.6403	1231.966	1310.249	1140.056
19Jun2018 4:00:00	2018	854.2341156	708.4515	1216.908	1290.31	1130.58
19Jun2018 5:00:00	2018	901.5070125	717.0023	1183.259	1293.965	1126.373
19Jun2018 6:00:00	2018	1040.670027	744.4896	1225.414	1438.342	1137.946
19Jun2018 7:00:00	2018	1186.417614	787.1538	1298.401	1629.993	1155.68
19Jun2018 8:00:00	2018	1278.425008	798.6732	1338.182	1741.476	1151.488
19Jun2018 9:00:00	2018	1349.720859	801.7475	1332.558	1851.871	1149.99
19Jun2018 10:00:00	2018	1395.682786	800.5089	1333.356	1899.54	1181.754
19Jun2018 11:00:00	2018	1438.8522	812.2865	1339.542	1923.75	1196.828
19Jun2018 12:00:00	2018	1468.778534	805.0142	1339.043	1931.477	1213.652
19Jun2018 13:00:00	2018	1491.535135	818.9819	1354.56	1956.667	1229.294
19Jun2018 14:00:00	2018	1498.903665	825.4172	1362.473	1946.095	1223.381
19Jun2018 15:00:00	2018	1511.569496	823.3248	1384.35	1964.194	1251.965
19Jun2018 16:00:00	2018	1527.407919	836.7662	1410.299	1976.148	1273.035
19Jun2018 17:00:00	2018	1522.516281	844.3351	1396.898	1959.258	1263.248
19Jun2018 18:00:00	2018	1447.755766	834.5509	1358.181	1909.159	1249.481
19Jun2018 19:00:00	2018	1397.648216	823.7752	1322.564	1868.752	1242.123
19Jun2018 20:00:00	2018	1351.82603	812.3283	1333.479	1834.794	1203.377
19Jun2018 21:00:00	2018	1275.438032	798.6608	1322.786	1752.5	1179.987

19Jun2018 22:00:00	2018	1200.381837	796.9494	1303.182	1669.225	1178.565
19Jun2018 23:00:00	2018	1082.378072	762.0199	1269.616	1555.214	1157.281
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20Jun2018 1:00:00	2018	914.9045805	724.3518	1215.603	1346.579	1115.192
20Jun2018 2:00:00	2018	880.6095788	704.7866	1196.769	1301.979	1124.003
20Jun2018 3:00:00	2018	862.7181811	704.2518	1225.549	1274.849	1115.411
20Jun2018 4:00:00	2018	872.923627	705.5617	1220.165	1261.595	1091.496
20Jun2018 5:00:00	2018	919.6755449	706.2905	1209.427	1264.962	1086.161
20Jun2018 6:00:00	2018	1065.57141	733.0991	1240.387	1397.873	1109.462
20Jun2018 7:00:00	2018	1222.958527	767.0991	1309.321	1588.269	1112.062
20Jun2018 8:00:00	2018	1315.651517	787.6141	1356.231	1721.242	1131.038
20Jun2018 9:00:00	2018	1377.998904	803.2231	1383.184	1813.529	1191.773
20Jun2018 10:00:00	2018	1425.50701	813.9332	1384.016	1885.575	1212.157
20Jun2018 11:00:00	2018	1474.525659	821.6218	1377.735	1933.074	1215.713
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20Jun2018 13:00:00	2018	1528.667133	833.9675	1393.052	1952.91	1246.707
20Jun2018 14:00:00	2018	1543.358608	837.8987	1362.354	1963.947	1232.814
20Jun2018 15:00:00	2018	1566.120945	851.4146	1403.461	1986.779	1258.165
20Jun2018 16:00:00	2018	1582.632082	868.65	1439.716	2006.861	1261.704
20Jun2018 17:00:00	2018	1584.074912	871.2313	1437.108	1990.706	1222.401
20Jun2018 18:00:00	2018	1499.683066	861.9994	1458.144	1937.425	1224.936
20Jun2018 19:00:00	2018	1439.131632	856.316	1452.823	1903.269	1333.428
20Jun2018 20:00:00	2018	1378.902646	839.1459	1439.096	1861.951	1245.114
20Jun2018 21:00:00	2018	1305.548241	822.895	1402.344	1786.791	1181.186
20Jun2018 22:00:00	2018	1233.452891	815.887	1366.317	1705.135	1188.132
20Jun2018 23:00:00	2018	1114.648486	792.8662	1294.551	1613.897	1169.583
21Jun2018 0:00:00	2018	1004.513261	761.5055	1265.644	1486.563	1161.598
21Jun2018 1:00:00	2018	940.460087	746.9895	1259.766	1426.501	1173.043
21Jun2018 2:00:00	2018	907.0226114	731.9659	1251.2	1359.669	1171.437
21Jun2018 3:00:00	2018	886.5411516	726.5804	1247.281	1328.746	1171.549
21Jun2018 4:00:00	2018	897.6302209	721.3218	1236.36	1334.531	1153.243
21Jun2018 5:00:00	2018	945.1515303	722.2332	1202.98	1332.685	1127.846
21Jun2018 6:00:00	2018	1084.05735	748.511	1241.9	1446.745	1131.524
21Jun2018 7:00:00	2018	1244.431136	795.7013	1320.805	1683.28	1149.809
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21Jun2018 9:00:00	2018	1428.938157	810.3711	1416.594	1920.99	1191.623
21Jun2018 10:00:00	2018	1491.826191	830.1903	1403.949	1984.156	1214.81
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21Jun2018 12:00:00	2018	1565.423909	857.8982	1402.279	2037.745	1234.039
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21Jun2018 14:00:00	2018	1608.72383	875.6124	1378.482	2073.227	1209.777
21Jun2018 15:00:00	2018	1612.89981	893.5703	1391.613	2086.837	1225.403
21Jun2018 16:00:00	2018	1612.690055	900.1761	1415.864	2088.404	1263.235
21Jun2018 17:00:00	2018	1576.426973	875.1316	1415.882	2087.727	1266.276
21Jun2018 18:00:00	2018	1444.094368	851.4178	1411.211	2034.952	1235.351
21Jun2018 19:00:00	2018	1366.277572	832.1103	1405.728	1986.953	1220.758
21Jun2018 20:00:00	2018	1300.049517	859.6628	1419.561	1936.864	1213.674

21Jun2018 21:00:00	2018	1234.52228	862.5853	1415.532	1887.684	1241.032
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21Jun2018 23:00:00	2018	1074.630769	797.7359	1353.22	1692.969	1218.682
22Jun2018 0:00:00	2018	978.1537883	769.1656	1334.319	1517.776	1193.977
22Jun2018 1:00:00	2018	918.2087365	752.3184	1323.498	1457.761	1227.572
22Jun2018 2:00:00	2018	884.9891605	740.54	1324.544	1398.804	1236.203
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22Jun2018 4:00:00	2018	882.6714997	740.5554	1321.637	1372.913	1205.509
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22Jun2018 11:00:00	2018	1488.527834	902.0335	1400.048	1952.593	1214.398
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22Jun2018 16:00:00	2018	1374.246753	917.5381	1333.329	1941.885	1164.326
22Jun2018 17:00:00	2018	1350.701241	952.9928	1306.084	1903.97	1168.536
22Jun2018 18:00:00	2018	1268.900666	936.3882	1344.953	1831.347	1141.463
22Jun2018 19:00:00	2018	1223.056364	911.1424	1308.702	1767.415	1058.121
22Jun2018 20:00:00	2018	1176.897436	885.0654	1329.57	1715.109	1059.269
22Jun2018 21:00:00	2018	1141.97677	873.6409	1370.102	1659.891	1083.207
22Jun2018 22:00:00	2018	1108.06506	866.3319	1375.248	1623.191	1097.918
22Jun2018 23:00:00	2018	1025.344558	834.8305	1343.645	1538.048	1103.25
23Jun2018 0:00:00	2018	943.5796372	800.7142	1299.461	1431.809	1138.2
23Jun2018 1:00:00	2018	887.9275895	770.3231	1243.912	1349.374	1174.369
23Jun2018 2:00:00	2018	851.6909624	757.3058	1235.382	1299.28	1172.924
23Jun2018 3:00:00	2018	837.0457253	745.7364	1215.606	1267.122	1134.036
23Jun2018 4:00:00	2018	835.7279125	749.9105	1275.953	1277.154	1119.844
23Jun2018 5:00:00	2018	852.7778702	749.9085	1275.145	1258.401	1108.351
23Jun2018 6:00:00	2018	888.3426933	757.4022	1273.176	1295.138	1115.026
23Jun2018 7:00:00	2018	954.405297	787.6706	1302.304	1380.42	1135.16
23Jun2018 8:00:00	2018	1047.05114	825.669	1349.61	1496.057	1155.637
23Jun2018 9:00:00	2018	1138.468268	857.0576	1332.695	1594.563	1149.727
23Jun2018 10:00:00	2018	1192.128575	851.6189	1342.396	1677.2	1155.441
23Jun2018 11:00:00	2018	1223.728435	863.1531	1358.941	1727.688	1168.712
23Jun2018 12:00:00	2018	1223.669891	879.7155	1371.195	1758.797	1176.093
23Jun2018 13:00:00	2018	1209.422586	855.8801	1400.273	1759.162	1198.478
23Jun2018 14:00:00	2018	1197.899748	857.6655	1409.979	1752.151	1192.659
23Jun2018 15:00:00	2018	1199.242702	859.4392	1412.208	1760.38	1173.972
23Jun2018 16:00:00	2018	1208.351104	857.573	1416.351	1787.512	1170.938
23Jun2018 17:00:00	2018	1213.605945	846.6637	1381.527	1763.916	1169.911
23Jun2018 18:00:00	2018	1186.7052	848.7341	1358.674	1714.51	1144.216
23Jun2018 19:00:00	2018	1144.335637	840.2997	1336.168	1678.235	1138.199

23Jun2018 20:00:00	2018	1108.815412	841.1237	1350.39	1663.246	1113.577
23Jun2018 21:00:00	2018	1087.736783	840.9043	1378.146	1634.44	1130.453
23Jun2018 22:00:00	2018	1074.642669	839.7201	1396.851	1621.504	1156.573
23Jun2018 23:00:00	2018	1005.58689	819.1301	1367.651	1554.466	1169.682
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24Jun2018 1:00:00	2018	875.6164194	775.2795	1282.549	1381.724	1160.976
24Jun2018 2:00:00	2018	841.880219	764.0568	1245.128	1326.215	1142.196
24Jun2018 3:00:00	2018	822.7607505	753.1488	1221.834	1294.404	1126.821
24Jun2018 4:00:00	2018	817.5293097	751.3624	1234.089	1274.28	1129.266
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24Jun2018 12:00:00	2018	1254.092723	889.1778	1450.619	1785.41	1187.834
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24Jun2018 15:00:00	2018	1302.759822	915.7958	1451.52	1821.359	1281.354
24Jun2018 16:00:00	2018	1329.610227	923.1639	1471.053	1832.933	1278.537
24Jun2018 17:00:00	2018	1354.871025	934.1371	1453.314	1880.241	1282.522
24Jun2018 18:00:00	2018	1342.727844	937.9757	1454.8	1857.671	1278.734
24Jun2018 19:00:00	2018	1320.251629	930.9035	1445.641	1849.148	1268.193
24Jun2018 20:00:00	2018	1292.780737	925.216	1435.252	1810.86	1266.881
24Jun2018 21:00:00	2018	1252.316718	897.9026	1410.055	1740.759	1243.142
24Jun2018 22:00:00	2018	1204.646966	875.6995	1395.713	1734.554	1220.873
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25Jun2018 5:00:00	2018	934.6785939	767.0755	1278.635	1405.719	1157.129
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25Jun2018 7:00:00	2018	1241.344074	861.4445	1385.566	1733.992	1189.658
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25Jun2018 9:00:00	2018	1420.79548	940.1297	1460.585	1940.401	1257.009
25Jun2018 10:00:00	2018	1486.564009	939.8326	1460.601	1962.765	1243.209
25Jun2018 11:00:00	2018	1488.947504	916.1223	1489	2025.838	1248.089
25Jun2018 12:00:00	2018	1511.798891	904.0599	1496.598	2057.234	1248.069
25Jun2018 13:00:00	2018	1549.788932	911.1566	1511.698	2101.966	1237.68
25Jun2018 14:00:00	2018	1556.494013	922.7433	1510.64	2090.938	1267.403
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25Jun2018 23:00:00	2018	1066.216358	870.0914	1344.949	1521.946	1163.542
26Jun2018 0:00:00	2018	961.9570642	831.948	1312.43	1432.681	1144.504
26Jun2018 1:00:00	2018	901.8168728	814.7552	1278.527	1329.938	1137.785
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27Jun2018 3:00:00	2018	832.1544124	795.2873	1264.2	1240.74	1045.804
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01Jul2018 16:00:00	2018	1113.310801	869.5576	1308.384	1493.058	1118.867
01Jul2018 17:00:00	2018	1102.106032	873.7251	1326.495	1529.129	1084.44
01Jul2018 18:00:00	2018	1074.881105	860.9248	1308.753	1473.901	1056.737
01Jul2018 19:00:00	2018	1053.123474	844.0015	1313.27	1460.353	1061.7
01Jul2018 20:00:00	2018	1024.43284	835.621	1296.769	1417.273	1117.787
01Jul2018 21:00:00	2018	994.346988	827.7355	1288.344	1380.401	1125.738
01Jul2018 22:00:00	2018	984.5820154	830.0943	1290.434	1385.818	1128.402
01Jul2018 23:00:00	2018	927.6881837	816.538	1274.358	1324.618	1083.461
02Jul2018 0:00:00	2018	876.06739	800.1618	1237.818	1262.007	1088.227
02Jul2018 1:00:00	2018	830.1605313	787.6907	1233.391	1218.804	1123.246
02Jul2018 2:00:00	2018	803.4484999	779.8645	1211.102	1189.69	1111.853
02Jul2018 3:00:00	2018	790.5361168	774.9852	1212.28	1174.092	1096.65
02Jul2018 4:00:00	2018	796.4998737	774.3207	1212.368	1169.193	1081.8
02Jul2018 5:00:00	2018	803.7309254	766.4363	1204.465	1138.352	1062.499
02Jul2018 6:00:00	2018	829.4587781	773.6918	1213.175	1154.759	1062.033
02Jul2018 7:00:00	2018	884.4897403	801.0871	1231.884	1220.861	1066.739
02Jul2018 8:00:00	2018	953.149139	835.6483	1284.966	1327.459	1067.501
02Jul2018 9:00:00	2018	1027.641374	865.2742	1311.289	1399.388	1075.861
02Jul2018 10:00:00	2018	1087.848126	886.31	1325.662	1465.726	1072.112
02Jul2018 11:00:00	2018	1125.569019	894.2152	1342.797	1515.74	1073.79
02Jul2018 12:00:00	2018	1146.125395	886.4955	1358.144	1526.553	1078.642
02Jul2018 13:00:00	2018	1145.723327	884.4159	1365.969	1534.247	1076.909
02Jul2018 14:00:00	2018	1146.930622	885.1024	1366.489	1517.029	1074.924
02Jul2018 15:00:00	2018	1147.066616	880.9632	1375.238	1533.522	1080.669
02Jul2018 16:00:00	2018	1177.74157	882.6767	1384.12	1597.299	1092.285
02Jul2018 17:00:00	2018	1205.356312	900.2762	1387.183	1638.737	1097.384
02Jul2018 18:00:00	2018	1156.33516	893.6331	1369.347	1602.284	1101.637
02Jul2018 19:00:00	2018	1118.546206	892.1236	1359.081	1558.311	1094.756
02Jul2018 20:00:00	2018	1095.50932	887.071	1346.485	1538.985	1095.899
02Jul2018 21:00:00	2018	1063.68354	879.7767	1339.378	1491.228	1066.895
02Jul2018 22:00:00	2018	1033.945427	869.8357	1329.58	1461.732	1060.965
02Jul2018 23:00:00	2018	943.2151592	833.4156	1285.555	1370.416	1048.252
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03Jul2018 1:00:00	2018	824.7175608	789.4662	1220.046	1227.818	1016.213
03Jul2018 2:00:00	2018	803.5576932	787.7453	1222.295	1168.271	1048.525
03Jul2018 3:00:00	2018	793.9834698	782.8885	1213.86	1169.235	1060.476
03Jul2018 4:00:00	2018	815.8009378	793.7531	1216.798	1167.428	1072.193
03Jul2018 5:00:00	2018	875.059117	801.0101	1227.053	1198.032	1094.063
03Jul2018 6:00:00	2018	987.5936712	824.9389	1254.483	1311.945	1105.645
03Jul2018 7:00:00	2018	1108.19658	867.6341	1313.413	1471.314	1124.947
03Jul2018 8:00:00	2018	1188.477749	901.7795	1358.698	1568.929	1140.441
03Jul2018 9:00:00	2018	1239.051221	914.9526	1398.999	1643.238	1134.032
03Jul2018 10:00:00	2018	1274.970283	929.0904	1426.248	1722.039	1089.796
03Jul2018 11:00:00	2018	1299.916919	934.9585	1440.249	1751.788	1094.293
03Jul2018 12:00:00	2018	1309.258167	938.9891	1434.808	1754.892	1105.907
03Jul2018 13:00:00	2018	1308.3318	946.6436	1439.14	1769.568	1104.969
03Jul2018 14:00:00	2018	1304.77977	949.2542	1442.251	1767.147	1092.411

03Jul2018 15:00:00	2018	1307.934846	940.2612	1431.733	1768.539	1119.447
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03Jul2018 17:00:00	2018	1300.210772	945.6132	1406.621	1731.164	1098.601
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03Jul2018 19:00:00	2018	1197.200579	921.4785	1349.509	1609.109	1059.762
03Jul2018 20:00:00	2018	1160.632805	917.2551	1346.427	1573.068	1092.725
03Jul2018 21:00:00	2018	1120.588053	910.733	1351.483	1550.677	1151.801
03Jul2018 22:00:00	2018	1085.863003	898.0871	1347.944	1483.055	1201.945
03Jul2018 23:00:00	2018	987.417168	861.9831	1302.868	1384.435	1207.72
04Jul2018 0:00:00	2018	908.1871284	825.7556	1270.17	1316.937	1210.959
04Jul2018 1:00:00	2018	857.5983292	808.6154	1241.806	1283.688	1198.631
04Jul2018 2:00:00	2018	832.4803905	791.7566	1208.677	1247.147	1203.857
04Jul2018 3:00:00	2018	822.4210203	786.2151	1217.343	1233.589	1198.244
04Jul2018 4:00:00	2018	840.0198818	790.5026	1216.081	1235.685	1188.918
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04Jul2018 8:00:00	2018	1208.359745	888.856	1321.552	1603.936	1096.129
04Jul2018 9:00:00	2018	1252.033482	907.1326	1346.832	1670.305	1092.68
04Jul2018 10:00:00	2018	1292.533233	912.7618	1375.123	1720.097	1101.758
04Jul2018 11:00:00	2018	1324.612071	920.6067	1395.822	1765.266	1114.425
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04Jul2018 13:00:00	2018	1364.882796	922.2804	1391.249	1777.585	1174.4
04Jul2018 14:00:00	2018	1368.485838	917.9635	1386.397	1783.616	1190.876
04Jul2018 15:00:00	2018	1371.159197	921.889	1382.482	1794.568	1217.516
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04Jul2018 17:00:00	2018	1352.004156	939.1765	1389.451	1792.623	1215.897
04Jul2018 18:00:00	2018	1281.541943	928.8815	1363.929	1735.907	1199.583
04Jul2018 19:00:00	2018	1237.199905	919.7661	1357.103	1711.878	1208.73
04Jul2018 20:00:00	2018	1205.850659	908.7647	1349.835	1683.173	1175.5
04Jul2018 21:00:00	2018	1154.250356	897.3593	1343.409	1629.975	1142.714
04Jul2018 22:00:00	2018	1108.300056	884.3622	1334.168	1578.721	1135.704
04Jul2018 23:00:00	2018	1012.197709	846.0601	1306.225	1501.538	1149.666
05Jul2018 0:00:00	2018	924.0769876	818.0549	1269.498	1392.378	1141.758
05Jul2018 1:00:00	2018	867.398795	802.7266	1270.781	1335.481	1160.149
05Jul2018 2:00:00	2018	837.3679827	790.4647	1253.424	1296.071	1153.408
05Jul2018 3:00:00	2018	824.8488403	779.6563	1228.856	1251.087	1138.673
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05Jul2018 9:00:00	2018	1307.908984	906.7208	1383.369	1731.79	1198.897
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05Jul2018 12:00:00	2018	1429.185967	948.1039	1432.19	1816.417	1229.944
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05Jul2018 18:00:00	2018	1435.565399	1000.58	1426.442	1883.449	1184.004
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05Jul2018 20:00:00	2018	1344.142134	989.1704	1419.221	1799.958	1149.328
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06Jul2018 1:00:00	2018	944.4320655	857.7145	1267.457	1380.309	1063.517
06Jul2018 2:00:00	2018	908.3459851	847.1592	1255.26	1336.159	1060.583
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10Jul2018 6:00:00	2018	1068.528699	923.04	1281.086	1465.05	1076.106
10Jul2018 7:00:00	2018	1201.743981	965.4737	1343.288	1643.808	1087.026
10Jul2018 8:00:00	2018	1291.841947	1004.305	1378.481	1799.912	1100.686
10Jul2018 9:00:00	2018	1354.013886	1019.346	1399.412	1884.207	1127.19
10Jul2018 10:00:00	2018	1408.850842	1025.544	1394.519	1924.837	1118.301
10Jul2018 11:00:00	2018	1429.197127	1058.728	1410.869	1944.989	1123.279
10Jul2018 12:00:00	2018	1416.569845	1059.472	1415.673	1915.498	1137.229
10Jul2018 13:00:00	2018	1407.065598	1060.679	1424.765	1926.129	1147.21
10Jul2018 14:00:00	2018	1389.789669	1052.852	1415.857	1927.802	1160.683
10Jul2018 15:00:00	2018	1402.935059	1019.004	1393.878	1927.668	1156.109
10Jul2018 16:00:00	2018	1416.909388	1004.372	1382.98	1912.572	1155.248
10Jul2018 17:00:00	2018	1414.159825	1001.888	1334.015	1864.578	1122.875
10Jul2018 18:00:00	2018	1347.756624	1025.741	1286.234	1779.645	1114.536
10Jul2018 19:00:00	2018	1295.652084	1019.786	1272.593	1708.431	1089.381
10Jul2018 20:00:00	2018	1252.119106	1010.165	1275.949	1679.06	1086.044
10Jul2018 21:00:00	2018	1190.302558	995.2052	1300.713	1654.217	1100.854
10Jul2018 22:00:00	2018	1133.76534	983.2165	1328.025	1587.511	1123.662
10Jul2018 23:00:00	2018	1036.704042	942.5106	1280.551	1479.552	1167.045
11Jul2018 0:00:00	2018	955.8853383	908.8747	1245.6	1404.714	1155.021
11Jul2018 1:00:00	2018	901.3495728	889.8632	1241.416	1349.582	1136.987
11Jul2018 2:00:00	2018	873.5069194	870.6577	1239.042	1316.823	1128.698
11Jul2018 3:00:00	2018	863.1640041	860.9239	1237.744	1295.655	1123.586
11Jul2018 4:00:00	2018	878.4434077	864.4239	1243.732	1308.481	1121.461
11Jul2018 5:00:00	2018	936.8298842	869.6504	1253.399	1350.327	1126.489
11Jul2018 6:00:00	2018	1051.249802	895.7016	1252.324	1420.917	1121.361
11Jul2018 7:00:00	2018	1176.421856	937.9617	1293.733	1545.07	1129.874
11Jul2018 8:00:00	2018	1258.803469	975.4726	1312.045	1614.081	1147.781
11Jul2018 9:00:00	2018	1319.647621	1007.438	1332.421	1689.491	1155.071
11Jul2018 10:00:00	2018	1383.780788	1020.807	1320.808	1773.296	1156.935

11Jul2018 11:00:00	2018	1432.162359	1036.238	1311.029	1804.501	1174.068
11Jul2018 12:00:00	2018	1458.501444	1045.385	1331.227	1837.362	1197.776
11Jul2018 13:00:00	2018	1476.981769	1057.736	1353.299	1870.242	1210.072
11Jul2018 14:00:00	2018	1495.118186	1047.874	1365.181	1897.79	1224.37
11Jul2018 15:00:00	2018	1505.079068	1056.973	1371.91	1900.479	1220.426
11Jul2018 16:00:00	2018	1516.883882	1074.653	1400.104	1917.356	1215.635
11Jul2018 17:00:00	2018	1513.355512	1087.034	1389.787	1928.882	1222.776
11Jul2018 18:00:00	2018	1442.140712	1068.201	1380.703	1892.554	1204.234
11Jul2018 19:00:00	2018	1393.098768	1060.431	1388.353	1832.557	1202.748
11Jul2018 20:00:00	2018	1347.774284	1063.304	1387.447	1801.176	1198.149
11Jul2018 21:00:00	2018	1279.415066	1046.702	1368.318	1727.262	1187.624
11Jul2018 22:00:00	2018	1218.153793	1033.092	1355.129	1652.186	1178.284
11Jul2018 23:00:00	2018	1110.621172	983.0311	1310.668	1546.594	1156.136
12Jul2018 0:00:00	2018	1012.801885	949.9666	1258.855	1444.545	1122.815
12Jul2018 1:00:00	2018	939.8958068	938.8675	1226.403	1381.685	1102.871
12Jul2018 2:00:00	2018	897.1655338	925.2096	1219.504	1323.871	1095.273
12Jul2018 3:00:00	2018	875.9041717	920.0485	1211.5	1291.928	1101.35
12Jul2018 4:00:00	2018	882.4130823	918.1326	1219.452	1292.034	1082.712
12Jul2018 5:00:00	2018	928.7095105	918.7496	1213.866	1305.991	1075.128
12Jul2018 6:00:00	2018	1040.586481	935.4492	1233.668	1406.906	1071.504
12Jul2018 7:00:00	2018	1182.997248	979.6398	1287.124	1561.671	1088.616
12Jul2018 8:00:00	2018	1284.921993	1000.526	1339.085	1727.515	1122.159
12Jul2018 9:00:00	2018	1361.935206	1020.516	1375.798	1819.078	1165.476
12Jul2018 10:00:00	2018	1427.470773	1012.225	1402.453	1886.148	1188.698
12Jul2018 11:00:00	2018	1477.356276	1030.554	1423.053	1932.344	1196.357
12Jul2018 12:00:00	2018	1513.263663	1045.011	1437.434	1963.557	1204.976
12Jul2018 13:00:00	2018	1540.28193	1061.097	1449.698	1968.559	1216.489
12Jul2018 14:00:00	2018	1559.492727	1071.81	1432.882	1958.786	1220.44
12Jul2018 15:00:00	2018	1574.389917	1089.27	1416.462	1951.123	1233.439
12Jul2018 16:00:00	2018	1584.539261	1099.708	1380.49	1971.399	1230.699
12Jul2018 17:00:00	2018	1588.529553	1100.83	1355.315	1979.955	1170.75
12Jul2018 18:00:00	2018	1522.825351	1096.237	1392.941	1905.532	1134.691
12Jul2018 19:00:00	2018	1478.104263	1107.703	1387.45	1863.578	1135.261
12Jul2018 20:00:00	2018	1421.824518	1118.563	1408.407	1847.572	1146.512
12Jul2018 21:00:00	2018	1348.752837	1101.329	1390.344	1761.07	1134.662
12Jul2018 22:00:00	2018	1284.858947	1083.067	1373.676	1703.291	1123.786
12Jul2018 23:00:00	2018	1168.927437	1023.56	1328.65	1586.998	1104.486
13Jul2018 0:00:00	2018	1063.160089	999.6858	1284.116	1477.4	1105.138
13Jul2018 1:00:00	2018	986.8130022	975.5515	1255.728	1406.409	1086.748
13Jul2018 2:00:00	2018	939.6643796	958.0376	1238.164	1349.324	1075.075
13Jul2018 3:00:00	2018	906.6614734	947.7301	1226.14	1306.223	1078.763
13Jul2018 4:00:00	2018	910.3991249	945.2074	1220.034	1290.485	1069.961
13Jul2018 5:00:00	2018	950.1580292	947.4885	1215.876	1301.792	1063.252
13Jul2018 6:00:00	2018	1060.826094	968.3153	1221.318	1383.198	1069.85
13Jul2018 7:00:00	2018	1201.73493	1006.02	1260.362	1500.481	1087.886
13Jul2018 8:00:00	2018	1318.664966	1045.907	1320.876	1628.75	1087.864
13Jul2018 9:00:00	2018	1410.388511	1082.577	1384.959	1713.198	1097.789

13Jul2018 10:00:00	2018	1481.57104	1110.42	1405.537	1770.119	1102.251
13Jul2018 11:00:00	2018	1536.440729	1119.196	1402.795	1828.388	1112.128
13Jul2018 12:00:00	2018	1568.395594	1128.394	1389.882	1857.072	1115.782
13Jul2018 13:00:00	2018	1598.009625	1085.73	1412.857	1896.335	1140.301
13Jul2018 14:00:00	2018	1620.232612	1069.074	1417.735	1912.454	1130.529
13Jul2018 15:00:00	2018	1644.384662	1080.424	1428.666	1881.49	1116.789
13Jul2018 16:00:00	2018	1654.398602	1089.757	1413.614	1805.026	1128.291
13Jul2018 17:00:00	2018	1644.366053	1093.455	1397.451	1738.704	1135.568
13Jul2018 18:00:00	2018	1559.588198	1090.463	1351.541	1638.82	1115.711
13Jul2018 19:00:00	2018	1504.839282	1102.336	1328.46	1566.322	1087.448
13Jul2018 20:00:00	2018	1372.106327	1095.445	1255.99	1533.832	1053.737
13Jul2018 21:00:00	2018	1246.520422	1094.86	1238.952	1486.138	1065.948
13Jul2018 22:00:00	2018	1186.283165	1053.624	1230.41	1441.653	1074.942
13Jul2018 23:00:00	2018	1086.164677	982.8997	1218.343	1368.413	1061.416
14Jul2018 0:00:00	2018	997.3900549	965.2337	1222.705	1309.218	1047.293
14Jul2018 1:00:00	2018	931.9778467	933.1332	1210.135	1251.076	1025.466
14Jul2018 2:00:00	2018	886.2587347	897.1727	1187.252	1213.977	1036.516
14Jul2018 3:00:00	2018	860.5933613	893.5889	1175.098	1193.199	1049.009
14Jul2018 4:00:00	2018	848.4954014	895.6972	1195.188	1188.725	1055.969
14Jul2018 5:00:00	2018	857.8264432	893.0755	1198.586	1196.221	1059.169
14Jul2018 6:00:00	2018	872.8618839	887.8629	1197.406	1197.983	1056.729
14Jul2018 7:00:00	2018	914.2169241	893.179	1171.079	1265.923	1066.736
14Jul2018 8:00:00	2018	998.6131341	923.9269	1191.553	1349.869	1078.569
14Jul2018 9:00:00	2018	1091.187271	950.1577	1199.463	1407.419	1095.476
14Jul2018 10:00:00	2018	1153.018106	961.0889	1224.352	1469.02	1084.852
14Jul2018 11:00:00	2018	1189.434335	967.8019	1244.827	1498.155	1099.497
14Jul2018 12:00:00	2018	1204.099849	982.2537	1250.376	1503.796	1092.405
14Jul2018 13:00:00	2018	1207.292181	985.16	1273.392	1501.127	1113.404
14Jul2018 14:00:00	2018	1208.449874	980.0369	1260.594	1473.354	1119.247
14Jul2018 15:00:00	2018	1215.465477	1011.945	1280.844	1472.166	1118.933
14Jul2018 16:00:00	2018	1228.48021	1039.956	1303.402	1483.01	1125.315
14Jul2018 17:00:00	2018	1239.383373	1041.809	1262.335	1490.635	1118.334
14Jul2018 18:00:00	2018	1218.843334	1041.919	1243.535	1470.289	1105.661
14Jul2018 19:00:00	2018	1186.84415	1037.867	1230.505	1449.89	1108.291
14Jul2018 20:00:00	2018	1141.767357	1035.795	1217.857	1419.816	1102.048
14Jul2018 21:00:00	2018	1099.093458	1022.561	1200.732	1362.162	1102.817
14Jul2018 22:00:00	2018	1082.893345	1010.54	1212.146	1367.022	1089.602
14Jul2018 23:00:00	2018	1014.322912	981.9265	1196.782	1340.152	1072.952
15Jul2018 0:00:00	2018	939.7268809	956.9519	1180.662	1265.198	1092.99
15Jul2018 1:00:00	2018	880.3286515	941.0383	1209.207	1212.44	1086.919
15Jul2018 2:00:00	2018	844.1346216	936.8873	1247.17	1182.538	1063.217
15Jul2018 3:00:00	2018	821.6189648	931.7161	1232.664	1163.676	1069.45
15Jul2018 4:00:00	2018	815.2979867	929.6419	1243.2	1171.923	1076.808
15Jul2018 5:00:00	2018	810.1374373	923.7534	1239.334	1134.953	1058.751
15Jul2018 6:00:00	2018	819.4030013	916.1474	1236.56	1140.8	1068.193
15Jul2018 7:00:00	2018	874.0640902	934.5106	1261.117	1205.25	1085.169
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15Jul2018 9:00:00	2018	1053.568935	987.0933	1296.253	1375.651	1120.654
15Jul2018 10:00:00	2018	1131.098407	1002.991	1319.902	1459.483	1106.058
15Jul2018 11:00:00	2018	1189.558044	1015.846	1354.955	1520.546	1110.518
15Jul2018 12:00:00	2018	1222.974744	1028.118	1361.544	1557.897	1116.197
15Jul2018 13:00:00	2018	1241.001847	1034.61	1376.099	1586.843	1134.601
15Jul2018 14:00:00	2018	1256.100398	1044.569	1367.582	1583.524	1132.705
15Jul2018 15:00:00	2018	1282.518847	1063.41	1375.873	1609.554	1144.02
15Jul2018 16:00:00	2018	1315.69345	1078.451	1394.184	1678.341	1143.742
15Jul2018 17:00:00	2018	1339.599078	1072.907	1410.889	1703.026	1164.553
15Jul2018 18:00:00	2018	1327.056643	1070.16	1406.719	1677.242	1169.366
15Jul2018 19:00:00	2018	1300.183757	1093.199	1403.468	1655.332	1182.504
15Jul2018 20:00:00	2018	1262.058319	1118.724	1401.114	1637.25	1167.809
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16Jul2018 10:00:00	2018	1454.585593	1130.895	1401.433	1857.14	1149.121
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16Jul2018 13:00:00	2018	1606.938951	1150.134	1374.071	2003.339	1130.508
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16Jul2018 18:00:00	2018	1598.888852	1219.564	1367.557	2024.561	1181.261
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18Jul2018 7:00:00	2018	1263.975433	1065.697	1227.782	1641.909	1085.832
18Jul2018 8:00:00	2018	1342.660666	1112.947	1278.815	1757.385	1090.81
18Jul2018 9:00:00	2018	1417.38046	1144.458	1306.785	1807.705	1140.388
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18Jul2018 11:00:00	2018	1534.284439	1193.174	1367.3	1889.381	1176.362
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18Jul2018 22:00:00	2018	1165.034914	1074.735	1341.03	1689.712	1174.885
18Jul2018 23:00:00	2018	1057.020422	1032.079	1279.204	1570.418	1169.724
19Jul2018 0:00:00	2018	970.3393834	998.8886	1240.032	1482.73	1161.017
19Jul2018 1:00:00	2018	915.9347132	986.472	1224.919	1433.862	1153.429
19Jul2018 2:00:00	2018	884.4816577	980.7432	1205.416	1390.855	1135.565
19Jul2018 3:00:00	2018	870.9154451	974.4064	1185.428	1356.66	1116
19Jul2018 4:00:00	2018	883.0136655	971.407	1189.355	1343.819	1117.514
19Jul2018 5:00:00	2018	942.3387383	968.1426	1166.391	1363.965	1115.278
19Jul2018 6:00:00	2018	1055.929756	984.8922	1140.213	1415.608	1086.614

19Jul2018 7:00:00	2018	1195.590588	1030.358	1177.464	1563.557	1063.441
19Jul2018 8:00:00	2018	1294.594595	1066.413	1267.858	1746.457	1086.892
19Jul2018 9:00:00	2018	1376.351572	1093.918	1355.972	1854.229	1145.461
19Jul2018 10:00:00	2018	1445.023853	1129.622	1354.401	1928.135	1155.473
19Jul2018 11:00:00	2018	1496.381243	1147.514	1397.939	1987.005	1176.302
19Jul2018 12:00:00	2018	1522.956112	1148.197	1434.604	2010.987	1188.909
19Jul2018 13:00:00	2018	1540.01162	1137.022	1446.513	2046.195	1180.151
19Jul2018 14:00:00	2018	1531.723943	1147.446	1434.888	2016.54	1189.236
19Jul2018 15:00:00	2018	1535.656732	1158.218	1448.775	2033.04	1186.242
19Jul2018 16:00:00	2018	1514.132129	1175.184	1427.143	2010.017	1192.287
19Jul2018 17:00:00	2018	1501.030737	1169.5	1419.103	1958.752	1198.724
19Jul2018 18:00:00	2018	1421.760986	1159.209	1399.866	1875.695	1196.667
19Jul2018 19:00:00	2018	1372.547848	1174.098	1369.655	1826.71	1194.145
19Jul2018 20:00:00	2018	1331.624817	1158.601	1365.77	1800.087	1171.996
19Jul2018 21:00:00	2018	1277.813756	1130.864	1337.155	1695.561	1158.202
19Jul2018 22:00:00	2018	1213.066288	1098.138	1318.763	1581.146	1153.374
19Jul2018 23:00:00	2018	1100.212262	1066.954	1283.208	1476.989	1137.902
20Jul2018 0:00:00	2018	1000.998712	1036.418	1256.567	1409.015	1116.103
20Jul2018 1:00:00	2018	938.3470797	1017.715	1246.625	1351.436	1106.614
20Jul2018 2:00:00	2018	904.6023758	1005.892	1233.525	1314.238	1105.028
20Jul2018 3:00:00	2018	883.3011301	999.0975	1214.796	1296.091	1098.069
20Jul2018 4:00:00	2018	896.5501189	995.485	1207.467	1278.18	1099.684
20Jul2018 5:00:00	2018	943.2732692	996.7823	1207.703	1316.034	1089.281
20Jul2018 6:00:00	2018	1045.939037	1012.922	1225.62	1392.494	1077.942
20Jul2018 7:00:00	2018	1174.807705	1056.383	1273.16	1547.685	1093.378
20Jul2018 8:00:00	2018	1270.091213	1097.679	1358.137	1678.827	1091.526
20Jul2018 9:00:00	2018	1353.087871	1110.58	1399.296	1727.804	1132.384
20Jul2018 10:00:00	2018	1420.432045	1129.84	1425.903	1822.948	1152.443
20Jul2018 11:00:00	2018	1478.057134	1141.249	1443.74	1888.807	1176.719
20Jul2018 12:00:00	2018	1518.227901	1152.62	1447.589	1922.881	1188.386
20Jul2018 13:00:00	2018	1540.335978	1172.114	1440.437	1907.796	1194.388
20Jul2018 14:00:00	2018	1553.020601	1181.592	1472.11	1903.93	1185.805
20Jul2018 15:00:00	2018	1567.591002	1187.16	1448.98	1932.514	1200.795
20Jul2018 16:00:00	2018	1567.896505	1200.097	1452.797	1834.824	1194.509
20Jul2018 17:00:00	2018	1542.908817	1207.434	1437.525	1691.446	1156.503
20Jul2018 18:00:00	2018	1448.492619	1207.117	1404.043	1572.655	1132.331
20Jul2018 19:00:00	2018	1379.186396	1191.062	1371.193	1529.164	1082.04
20Jul2018 20:00:00	2018	1298.872513	1160.819	1333.951	1480.754	1068.549
20Jul2018 21:00:00	2018	1220.678857	1127.6	1289.307	1458.525	1111.076
20Jul2018 22:00:00	2018	1163.756708	1102.549	1338.761	1469.621	1109.799
20Jul2018 23:00:00	2018	1058.04062	1057.864	1304.459	1392.991	1092.329
21Jul2018 0:00:00	2018	970.1005446	1021.639	1268.958	1309.158	1066.847
21Jul2018 1:00:00	2018	909.6923105	994.8456	1247.409	1258.965	1061.253
21Jul2018 2:00:00	2018	872.2787847	981.2507	1250.546	1219.872	1063.537
21Jul2018 3:00:00	2018	849.3101359	971.4606	1257.678	1194.847	1059.503
21Jul2018 4:00:00	2018	842.1831569	971.242	1258.335	1205.598	1055.244
21Jul2018 5:00:00	2018	848.4535851	967.1789	1232.931	1200.776	1041.841

21Jul2018 6:00:00	2018	864.7594173	965.1532	1206.399	1214.56	1015.718
21Jul2018 7:00:00	2018	931.3180293	987.4689	1256.444	1276.014	1033.682
21Jul2018 8:00:00	2018	1023.870289	1011.27	1321.115	1374.528	1061.911
21Jul2018 9:00:00	2018	1113.621553	1022.744	1379.62	1461.424	1085.489
21Jul2018 10:00:00	2018	1172.555714	1038.237	1400.31	1515.651	1107.354
21Jul2018 11:00:00	2018	1209.473349	1049.035	1400.275	1547.224	1121.38
21Jul2018 12:00:00	2018	1238.377756	1055.233	1413.797	1558.618	1137.602
21Jul2018 13:00:00	2018	1244.434468	1059.37	1406.639	1566.797	1101.338
21Jul2018 14:00:00	2018	1221.699807	1072.305	1391.982	1539.357	1150.292
21Jul2018 15:00:00	2018	1215.637687	1097.238	1395.388	1507.846	1111.603
21Jul2018 16:00:00	2018	1219.70998	1113.233	1408.01	1548.734	1075.601
21Jul2018 17:00:00	2018	1189.539104	1122.174	1381.546	1550.437	1043.222
21Jul2018 18:00:00	2018	1144.222534	1110.061	1315.084	1496.707	1017.206
21Jul2018 19:00:00	2018	1104.26405	1093.076	1308.094	1446.874	1041.156
21Jul2018 20:00:00	2018	1074.603884	1077.195	1317.79	1434.97	1055.522
21Jul2018 21:00:00	2018	1054.353082	1061.727	1312.185	1409.397	1083.023
21Jul2018 22:00:00	2018	1036.997599	1044.854	1329.12	1450.891	1109.052
21Jul2018 23:00:00	2018	962.7176302	1007.625	1304.508	1393.799	1125.263
22Jul2018 0:00:00	2018	893.5975484	981.8074	1281.308	1313.179	1112.373
22Jul2018 1:00:00	2018	844.9425314	967.1138	1244.703	1267.31	1102.262
22Jul2018 2:00:00	2018	813.8027755	955.1961	1239.263	1221.695	1106.894
22Jul2018 3:00:00	2018	798.6002851	946.0706	1245.335	1206.469	1075.233
22Jul2018 4:00:00	2018	798.5174307	942.5608	1246.096	1195.833	1075.705
22Jul2018 5:00:00	2018	810.4524019	940.2005	1248.799	1208.358	1019.518
22Jul2018 6:00:00	2018	824.7381603	941.7061	1248.88	1206.2	1019.052
22Jul2018 7:00:00	2018	872.8155128	960.8317	1256.98	1254.491	1033.728
22Jul2018 8:00:00	2018	951.3273944	983.8341	1285.93	1316.261	1054.642
22Jul2018 9:00:00	2018	1035.852937	1005.189	1312.434	1420.703	1055.954
22Jul2018 10:00:00	2018	1101.946628	1017.313	1309.567	1471.582	1045.586
22Jul2018 11:00:00	2018	1144.27084	1026.028	1307.08	1525.402	1005.489
22Jul2018 12:00:00	2018	1164.168382	1038.719	1308.944	1555.089	997.7605
22Jul2018 13:00:00	2018	1166.958572	1034.69	1314.294	1554.711	1065.058
22Jul2018 14:00:00	2018	1181.636315	1034.222	1312.751	1526.827	1070.453
22Jul2018 15:00:00	2018	1200.610983	1049.258	1312.694	1525.497	1086.279
22Jul2018 16:00:00	2018	1228.962193	1066.481	1333.131	1574.467	1100.604
22Jul2018 17:00:00	2018	1256.52197	1082.444	1352.136	1597.984	1125.161
22Jul2018 18:00:00	2018	1238.704789	1088.001	1351.412	1592.753	1135.911
22Jul2018 19:00:00	2018	1206.986389	1084.417	1339.283	1568.4	1127.416
22Jul2018 20:00:00	2018	1176.772234	1072.848	1340.331	1545.238	1112.809
22Jul2018 21:00:00	2018	1147.214061	1057.901	1329.699	1518.081	1120.994
22Jul2018 22:00:00	2018	1112.089976	1039.85	1327.259	1502.45	1131.328
22Jul2018 23:00:00	2018	1004.050524	990.9062	1284.182	1389.795	1111.577
23Jul2018 0:00:00	2018	917.3926412	956.8218	1250.949	1300.091	1090.981
23Jul2018 1:00:00	2018	863.9963726	944.694	1238.908	1243.919	1067.145
23Jul2018 2:00:00	2018	835.5240691	933.0791	1228.46	1202.676	1067.105
23Jul2018 3:00:00	2018	828.5807232	927.8948	1224.063	1197.429	1037.143
23Jul2018 4:00:00	2018	848.9035453	926.7931	1216.49	1199.727	1054.23

23Jul2018 5:00:00	2018	909.9343268	931.8132	1220.08	1234.809	1052.806
23Jul2018 6:00:00	2018	1012.01479	952.3695	1247.625	1304.419	1033.928
23Jul2018 7:00:00	2018	1143.371167	997.9304	1316.404	1435.109	1040.633
23Jul2018 8:00:00	2018	1243.074303	1035.775	1362.722	1551.207	1058.35
23Jul2018 9:00:00	2018	1309.02407	1042.69	1350.915	1627.681	1080.348
23Jul2018 10:00:00	2018	1366.105152	1060.397	1353.182	1694.166	1086.865
23Jul2018 11:00:00	2018	1407.787217	1066.608	1405.27	1761.627	1071.664
23Jul2018 12:00:00	2018	1434.66688	1075.795	1415.413	1782.26	1076.257
23Jul2018 13:00:00	2018	1456.426683	1089.938	1426.967	1805.346	1078.385
23Jul2018 14:00:00	2018	1469.917182	1095.558	1428.346	1802.745	1092.229
23Jul2018 15:00:00	2018	1482.250882	1095.553	1429.353	1776.442	1088.135
23Jul2018 16:00:00	2018	1470.70791	1112.873	1423.058	1783.988	1109.274
23Jul2018 17:00:00	2018	1396.487977	1120.01	1408.321	1735.43	1111.784
23Jul2018 18:00:00	2018	1303.032131	1120.126	1375.659	1658.082	1097.613
23Jul2018 19:00:00	2018	1246.996205	1124.024	1368.227	1610.025	1086.923
23Jul2018 20:00:00	2018	1207.522814	1075.919	1352.288	1568.935	1078.197
23Jul2018 21:00:00	2018	1174.089158	1054.998	1356.581	1544.482	1048.153
23Jul2018 22:00:00	2018	1102.052975	1027.516	1356.03	1523.777	1068.695
23Jul2018 23:00:00	2018	997.3126039	987.075	1314.891	1412.803	1060.536
24Jul2018 0:00:00	2018	918.2360069	940.466	1276.722	1333.585	1036.842
24Jul2018 1:00:00	2018	869.2529074	942.2331	1261.736	1300.51	1015.3
24Jul2018 2:00:00	2018	844.7054683	937.0179	1255.231	1266.206	1012.752
24Jul2018 3:00:00	2018	836.1841368	935.7401	1255.902	1246.804	1006.054
24Jul2018 4:00:00	2018	852.7832548	931.9347	1263.865	1260.377	998.499
24Jul2018 5:00:00	2018	918.0473353	931.7743	1259.863	1279.61	1002.099
24Jul2018 6:00:00	2018	1030.267302	950.0532	1281.693	1374.568	998.6281
24Jul2018 7:00:00	2018	1147.002091	983.4613	1325.899	1494.172	998.5877
24Jul2018 8:00:00	2018	1210.250419	1011.683	1348.099	1602.689	1018.385
24Jul2018 9:00:00	2018	1258.59242	1032.166	1368.754	1654.142	1012.059
24Jul2018 10:00:00	2018	1301.17671	1049.786	1391.313	1717.339	984.7211
24Jul2018 11:00:00	2018	1333.227554	1063.621	1407.697	1772.695	983.8386
24Jul2018 12:00:00	2018	1344.028707	1070.424	1416.716	1781.494	1027.886
24Jul2018 13:00:00	2018	1341.399275	1077.124	1428.139	1789.331	1036.778
24Jul2018 14:00:00	2018	1340.350354	1054.346	1424.149	1796.639	1058.198
24Jul2018 15:00:00	2018	1337.360531	1042.655	1414.623	1818.149	1058.901
24Jul2018 16:00:00	2018	1333.714317	1047.599	1428.57	1793.594	1070.617
24Jul2018 17:00:00	2018	1321.339065	1069.093	1409.933	1744.133	1079.337
24Jul2018 18:00:00	2018	1252.119308	1052.878	1387.596	1676.216	1070.252
24Jul2018 19:00:00	2018	1205.382153	1051.653	1338.067	1620.18	1070.957
24Jul2018 20:00:00	2018	1172.754393	1045.602	1287.18	1578.324	1073.179
24Jul2018 21:00:00	2018	1151.185468	1029.251	1329.845	1535.659	1086.06
24Jul2018 22:00:00	2018	1094.865398	1003.825	1330.89	1533.291	1080.787
24Jul2018 23:00:00	2018	995.1049957	970.0815	1294.333	1432.232	1070.053
25Jul2018 0:00:00	2018	915.1779004	943.4726	1251.531	1315.314	1067.417
25Jul2018 1:00:00	2018	865.2019456	930.8398	1240.649	1282.587	1060.608
25Jul2018 2:00:00	2018	844.7124548	919.5265	1256.042	1260.931	1057.652
25Jul2018 3:00:00	2018	835.0145101	915.5396	1268.266	1242.543	1053.474

25Jul2018 4:00:00	2018	850.3714932	915.8466	1259.33	1254.813	1030.497
25Jul2018 5:00:00	2018	910.6470221	923.6302	1258.239	1283.728	1011.463
25Jul2018 6:00:00	2018	1015.237722	941.8332	1258.396	1360.448	1005.79
25Jul2018 7:00:00	2018	1130.619841	980.9509	1314.987	1489.526	1025.513
25Jul2018 8:00:00	2018	1213.388614	1010.944	1363.586	1613.747	1035.921
25Jul2018 9:00:00	2018	1279.84042	1028.498	1387.249	1684.073	1029.949
25Jul2018 10:00:00	2018	1330.69669	1029.321	1396.021	1759.004	1013.343
25Jul2018 11:00:00	2018	1368.099969	1028.693	1401.113	1780.08	1041.461
25Jul2018 12:00:00	2018	1390.445199	1009.876	1358.013	1781.325	1042.618
25Jul2018 13:00:00	2018	1408.698007	1010.292	1383.316	1808.808	1022
25Jul2018 14:00:00	2018	1423.315057	1009.689	1403.042	1810.595	1025.7
25Jul2018 15:00:00	2018	1435.394966	1021.642	1395.188	1821.379	1026.478
25Jul2018 16:00:00	2018	1440.827964	1033.041	1388.576	1818.065	1029.223
25Jul2018 17:00:00	2018	1432.359082	1048.585	1400.983	1796.951	1037.874
25Jul2018 18:00:00	2018	1353.896492	1064.392	1392.943	1771.972	1030.975
25Jul2018 19:00:00	2018	1300.582462	1069.287	1376.326	1712.285	1026.82
25Jul2018 20:00:00	2018	1251.104474	1063.863	1355.379	1670.072	1027.79
25Jul2018 21:00:00	2018	1223.450004	1050.246	1359.755	1649.358	1023.358
25Jul2018 22:00:00	2018	1152.653665	1026.298	1356.118	1614.108	1020.253
25Jul2018 23:00:00	2018	1042.081458	983.1517	1308.511	1482.091	995.2516
26Jul2018 0:00:00	2018	954.8159936	950.0588	1275.817	1400.131	988.9363
26Jul2018 1:00:00	2018	891.5142395	942.466	1254.492	1312.058	980.8077
26Jul2018 2:00:00	2018	858.5308731	935.9583	1246.369	1303.566	982.6296
26Jul2018 3:00:00	2018	843.9334437	926.5512	1239.103	1282.356	974.9747
26Jul2018 4:00:00	2018	857.4587601	930.8333	1245.225	1256.322	964.1103
26Jul2018 5:00:00	2018	920.1354437	940.0163	1239.773	1298.195	950.5676
26Jul2018 6:00:00	2018	1023.995246	945.8875	1246.767	1357.277	944.0428
26Jul2018 7:00:00	2018	1135.385839	987.1752	1296.685	1511.707	955.8417
26Jul2018 8:00:00	2018	1220.865309	1021.283	1352.502	1629.526	976.7402
26Jul2018 9:00:00	2018	1292.935571	1031.483	1377.714	1718.125	1047.986
26Jul2018 10:00:00	2018	1361.47747	1020.229	1400.306	1801.773	1088.144
26Jul2018 11:00:00	2018	1424.507697	1022.837	1420.522	1857.148	1110.182
26Jul2018 12:00:00	2018	1460.462377	1031.48	1434.012	1884.926	1108.091
26Jul2018 13:00:00	2018	1482.783392	1032.678	1446.228	1924.656	1098.521
26Jul2018 14:00:00	2018	1492.652922	1041.027	1436.062	1909.559	1068.19
26Jul2018 15:00:00	2018	1495.38741	1047.433	1406.182	1899.186	1060.26
26Jul2018 16:00:00	2018	1494.638306	1053.253	1395.399	1891.98	1074.912
26Jul2018 17:00:00	2018	1444.26989	1047.296	1354.736	1871.443	1070.864
26Jul2018 18:00:00	2018	1326.373676	1047.96	1377.134	1808.346	1079.026
26Jul2018 19:00:00	2018	1266.048464	1046.362	1377.097	1765.432	1081.333
26Jul2018 20:00:00	2018	1213.749891	1042.887	1366.936	1685.818	1056.45
26Jul2018 21:00:00	2018	1178.951586	1036.076	1360.357	1655.385	1040.073
26Jul2018 22:00:00	2018	1118.937934	1015.667	1353.151	1597.829	1029.607
26Jul2018 23:00:00	2018	1011.474652	980.0097	1316.942	1526.177	1017.966
27Jul2018 0:00:00	2018	925.4773343	951.4431	1276.196	1408.031	1011.192
27Jul2018 1:00:00	2018	873.9278371	942.4662	1253.162	1347.217	1014.011
27Jul2018 2:00:00	2018	843.3098328	931.8972	1237.776	1276.016	1003.268

27Jul2018 3:00:00	2018	829.4198109	927.3215	1234.376	1276.67	993.44
27Jul2018 4:00:00	2018	842.2478313	927.9441	1237.198	1264.806	996.3919
27Jul2018 5:00:00	2018	902.0365783	929.3834	1236.733	1286.753	989.1696
27Jul2018 6:00:00	2018	1002.577257	935.9071	1245.784	1373.035	970.8258
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27Jul2018 9:00:00	2018	1289.162272	1023.838	1365.02	1708.8	1053.091
27Jul2018 10:00:00	2018	1344.678401	1006.549	1390.946	1778.825	1064.562
27Jul2018 11:00:00	2018	1382.972478	1012.296	1380.53	1842.841	1085.613
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27Jul2018 14:00:00	2018	1425.57083	1034.456	1408.816	1917.237	1114.014
27Jul2018 15:00:00	2018	1428.930307	1041.953	1414.52	1914.494	1115.024
27Jul2018 16:00:00	2018	1399.002264	1047.35	1408.292	1899.87	1122.462
27Jul2018 17:00:00	2018	1356.776178	1050.988	1418.063	1894.037	1139.256
27Jul2018 18:00:00	2018	1284.517807	1038.077	1412.131	1845.725	1128.42
27Jul2018 19:00:00	2018	1237.713331	1027.845	1391.838	1812.882	1113.794
27Jul2018 20:00:00	2018	1186.431372	1029.665	1365.249	1738.394	1090.781
27Jul2018 21:00:00	2018	1150.06102	1024.168	1347.497	1658.428	1069.899
27Jul2018 22:00:00	2018	1107.88213	1006.062	1340.542	1620.439	1074.479
27Jul2018 23:00:00	2018	1015.570678	976.7038	1295.457	1520.92	1059.407
28Jul2018 0:00:00	2018	934.7883206	975.9529	1259.81	1423.941	1041.865
28Jul2018 1:00:00	2018	879.8902263	954.1185	1227.562	1348.681	1030.185
28Jul2018 2:00:00	2018	846.6426242	941.6264	1213.938	1297.844	1014.116
28Jul2018 3:00:00	2018	823.2932035	936.333	1201.69	1269.76	1003.357
28Jul2018 4:00:00	2018	819.3505661	933.1853	1208.399	1259.482	997.6386
28Jul2018 5:00:00	2018	833.6520689	933.7213	1205.059	1249.268	981.4479
28Jul2018 6:00:00	2018	848.8858173	933.6498	1189.09	1244.426	968.0502
28Jul2018 7:00:00	2018	916.8807373	955.3126	1201.368	1284.592	981.5194
28Jul2018 8:00:00	2018	1014.153007	973.8079	1244.028	1397.302	1007.153
28Jul2018 9:00:00	2018	1115.5953	995.5151	1279.156	1517.625	1036.864
28Jul2018 10:00:00	2018	1186.414322	1001.139	1322.43	1593.562	1075.968
28Jul2018 11:00:00	2018	1227.039051	992.6017	1342.502	1682.415	1117.525
28Jul2018 12:00:00	2018	1247.871015	1005.987	1360.354	1730.264	1133.716
28Jul2018 13:00:00	2018	1256.750924	1017.861	1377.311	1761.142	1148.298
28Jul2018 14:00:00	2018	1253.24205	1027.725	1349.067	1766.365	1152.252
28Jul2018 15:00:00	2018	1267.924211	1027.497	1349.424	1785.257	1162.123
28Jul2018 16:00:00	2018	1285.763952	1037.477	1363.611	1793.252	1170.729
28Jul2018 17:00:00	2018	1288.705152	1043.559	1395.924	1798.209	1171.546
28Jul2018 18:00:00	2018	1269.187794	1042.898	1396.465	1768.151	1183.745
28Jul2018 19:00:00	2018	1230.640444	1035.602	1358.407	1733.238	1167.699
28Jul2018 20:00:00	2018	1188.035532	1028.634	1344.396	1715.597	1150.205
28Jul2018 21:00:00	2018	1156.669542	1030.461	1332.438	1670.066	1146.953
28Jul2018 22:00:00	2018	1121.961025	1010.111	1359.099	1645.225	1158.221
28Jul2018 23:00:00	2018	1029.450587	963.7406	1322.473	1571.313	1124.476
29Jul2018 0:00:00	2018	945.0450443	932.2943	1289.362	1467.119	1108.678
29Jul2018 1:00:00	2018	884.0233416	921.009	1261.644	1394.806	1090.2

29Jul2018 2:00:00	2018	844.5261516	910.4659	1249.074	1355.639	1077.578
29Jul2018 3:00:00	2018	822.5987877	913.2346	1239.097	1325.662	1065.036
29Jul2018 4:00:00	2018	816.0827118	910.4729	1232.651	1301.941	1064.256
29Jul2018 5:00:00	2018	824.7332711	905.5865	1226.155	1288.372	1042.887
29Jul2018 6:00:00	2018	827.7205264	906.5056	1214.346	1266.745	1040.26
29Jul2018 7:00:00	2018	883.534731	924.1669	1230	1326.802	1041.655
29Jul2018 8:00:00	2018	969.1929987	942.3519	1274.854	1399.28	1027.03
29Jul2018 9:00:00	2018	1064.247689	972.6562	1319.325	1526.616	1051.025
29Jul2018 10:00:00	2018	1152.183105	993.3431	1347.811	1623.045	1088.701
29Jul2018 11:00:00	2018	1218.62117	1006.773	1365.201	1706.262	1108.552
29Jul2018 12:00:00	2018	1259.879677	1013.632	1384.821	1743.905	1097.247
29Jul2018 13:00:00	2018	1284.775207	1021.328	1407.286	1810.007	1118.097
29Jul2018 14:00:00	2018	1305.564879	1014.37	1417.185	1840.7	1146.702
29Jul2018 15:00:00	2018	1330.697633	1028.563	1431.349	1853.382	1170.375
29Jul2018 16:00:00	2018	1362.881396	1043.673	1445.036	1923.78	1182.918
29Jul2018 17:00:00	2018	1381.300865	1059.107	1433.759	1962.239	1171.152
29Jul2018 18:00:00	2018	1363.831382	1059.027	1418.102	1906.716	1150.342
29Jul2018 19:00:00	2018	1332.793309	1049.807	1408.268	1887.397	1118.171
29Jul2018 20:00:00	2018	1292.010608	1042.446	1402.886	1815.492	1104.162
29Jul2018 21:00:00	2018	1261.496234	1018.44	1389.873	1771.159	1101.667
29Jul2018 22:00:00	2018	1205.783901	978.5254	1360.541	1736.097	1102.054
29Jul2018 23:00:00	2018	1089.758366	943.1589	1310.339	1609.322	1099.36
30Jul2018 0:00:00	2018	993.717203	910.7612	1276.096	1486.721	1086.99
30Jul2018 1:00:00	2018	931.0272071	912.3235	1251.994	1421.366	1063.125
30Jul2018 2:00:00	2018	896.9311588	908.9154	1228.211	1376.87	1067.951
30Jul2018 3:00:00	2018	880.372227	900.5544	1227.584	1361.52	1065.608
30Jul2018 4:00:00	2018	895.9619265	899.8859	1226.372	1370.733	1043.487
30Jul2018 5:00:00	2018	959.7463581	904.8782	1229.64	1402.346	1002.999
30Jul2018 6:00:00	2018	1064.160482	914.4602	1237.451	1480.896	981.3051
30Jul2018 7:00:00	2018	1190.936446	965.8623	1292.094	1625.936	982.8132
30Jul2018 8:00:00	2018	1295.408268	1013.518	1353.168	1767.199	995.5108
30Jul2018 9:00:00	2018	1386.915988	1036.248	1412.5	1900.559	1042.641
30Jul2018 10:00:00	2018	1474.77796	1043.3	1450.775	1942.234	1061.282
30Jul2018 11:00:00	2018	1556.648579	1067.399	1456.187	2019.279	1093.224
30Jul2018 12:00:00	2018	1615.026671	1088.589	1466.179	2059.13	1095.823
30Jul2018 13:00:00	2018	1661.093821	1111.986	1460.646	2092.708	1128.479
30Jul2018 14:00:00	2018	1683.733587	1134.428	1459.698	2087.775	1116.723
30Jul2018 15:00:00	2018	1693.35019	1148.88	1462.597	2091.537	1107.686
30Jul2018 16:00:00	2018	1653.996418	1162.728	1462.992	2092.978	1095.54
30Jul2018 17:00:00	2018	1593.476409	1161.992	1436.024	2055.201	1128.777
30Jul2018 18:00:00	2018	1532.905243	1156.424	1434.421	1983.939	1134.838
30Jul2018 19:00:00	2018	1446.363867	1146.381	1424.563	1928.15	1115.554
30Jul2018 20:00:00	2018	1346.645627	1130.561	1391.347	1862.575	1080.883
30Jul2018 21:00:00	2018	1290.109448	1108.479	1350.452	1822.751	1085.789
30Jul2018 22:00:00	2018	1189.635301	1065.435	1320.641	1747.298	1091.214
30Jul2018 23:00:00	2018	1073.833602	1016.75	1274.137	1625.916	1079.866
31Jul2018 0:00:00	2018	985.7485293	987.6144	1270.569	1515.604	1076.335

31Jul2018 1:00:00	2018	931.4916336	946.4924	1258.89	1436.389	1058.729
31Jul2018 2:00:00	2018	899.0881069	928.1096	1248.964	1397.892	1046.632
31Jul2018 3:00:00	2018	886.1102258	919.9977	1259.309	1384.685	1047.049
31Jul2018 4:00:00	2018	897.5908736	913.6682	1261.803	1363.592	1037.307
31Jul2018 5:00:00	2018	957.2030856	919.7214	1260.965	1414.532	1033.095
31Jul2018 6:00:00	2018	1063.280743	940.1826	1273.251	1471.815	1032.309
31Jul2018 7:00:00	2018	1185.992635	981.5261	1320.882	1602.796	1023.874
31Jul2018 8:00:00	2018	1283.707326	1026.594	1362.578	1704.001	1019.262
31Jul2018 9:00:00	2018	1366.539043	1049.076	1404.3	1797.225	1028.516
31Jul2018 10:00:00	2018	1434.719912	1063.004	1437.622	1844.536	1067.104
31Jul2018 11:00:00	2018	1493.89404	1071.922	1461.781	1919.304	1081.999
31Jul2018 12:00:00	2018	1528.718617	1075.653	1473.035	1970.496	1095.317
31Jul2018 13:00:00	2018	1550.115995	1092.563	1461.007	1987.569	1087.365
31Jul2018 14:00:00	2018	1564.851061	1107.005	1476.667	2023.143	1086.027
31Jul2018 15:00:00	2018	1566.527355	1120.616	1448.138	2042.103	1100.552
31Jul2018 16:00:00	2018	1562.412662	1126.446	1430.153	2054.431	1106.72
31Jul2018 17:00:00	2018	1556.442002	1133.599	1421.938	2045.162	1086.83
31Jul2018 18:00:00	2018	1470.649298	1121.963	1432.628	2003.7	1064.261
31Jul2018 19:00:00	2018	1417.918719	1098.007	1444.284	1971.336	1086.971
31Jul2018 20:00:00	2018	1362.879158	1102.627	1412.304	1877.787	1089.177
31Jul2018 21:00:00	2018	1329.305015	1096.47	1410.307	1810.093	1092.01
31Jul2018 22:00:00	2018	1243.3569	1066.131	1376.941	1751.593	1093.731
31Jul2018 23:00:00	2018	1114.996536	1022.731	1323.785	1588.175	1072.619
01Aug2018 0:00:00	2018	1014.708948	998.4065	1278.27	1493.148	1065.2
01Aug2018 1:00:00	2018	957.3484138	980.3971	1261.941	1416.353	1061.863
01Aug2018 2:00:00	2018	922.5195197	966.7657	1259.035	1389.344	1057.721
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01Aug2018 6:00:00	2018	1108.459889	975.6045	1267.088	1469.203	1065.49
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01Aug2018 13:00:00	2018	1602.155733	1126.467	1443.889	2036.236	1149.272
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01Aug2018 17:00:00	2018	1590.514131	1173.218	1397.198	2055.858	1241.087
01Aug2018 18:00:00	2018	1489.147225	1159.404	1399.531	1991.978	1235.297
01Aug2018 19:00:00	2018	1423.895756	1138.312	1410.443	1934.018	1194.917
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02Aug2018 18:00:00	2018	1353.433196	1159.278	1454.46	1732.511	1221.208
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02Aug2018 20:00:00	2018	1257.761047	1101.805	1380.3	1664.338	1233.054
02Aug2018 21:00:00	2018	1226.107106	1078.522	1382.35	1651.223	1196.75
02Aug2018 22:00:00	2018	1152.190308	1024.593	1354.733	1605.159	1240.283
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03Aug2018 8:00:00	2018	1216.508656	996.929	1339.061	1640.772	1230.326
03Aug2018 9:00:00	2018	1281.907559	1023.036	1388.227	1702.387	1241.69
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04Aug2018 8:00:00	2018	992.9312877	946.4028	1299.388	1399.704	1115.423
04Aug2018 9:00:00	2018	1068.369072	959.039	1335.782	1470.351	1103.998
04Aug2018 10:00:00	2018	1116.756567	970.5825	1343.887	1504.93	1105.328
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04Aug2018 12:00:00	2018	1144.869772	990.4629	1352.571	1525.109	1073.839
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04Aug2018 19:00:00	2018	1061.260084	968.2477	1330.796	1505.653	1156.932
04Aug2018 20:00:00	2018	1044.609956	946.2922	1328.495	1472.14	1158.76
04Aug2018 21:00:00	2018	1054.720696	949.2497	1335.328	1478.306	1146.728
04Aug2018 22:00:00	2018	1014.425883	936.1362	1302.497	1464.554	1142.717
04Aug2018 23:00:00	2018	944.9109618	908.319	1274.349	1389.15	1102.775
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05Aug2018 1:00:00	2018	843.5546082	885.6394	1249.89	1256.533	1072.833
05Aug2018 2:00:00	2018	816.5057313	881.1899	1247.455	1242.178	1069.804
05Aug2018 3:00:00	2018	800.8767537	875.9021	1244.48	1225.989	1079.283
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05Aug2018 5:00:00	2018	814.2383982	870.9758	1207.101	1194.432	1064.921
05Aug2018 6:00:00	2018	819.6294076	868.8257	1196.89	1168.925	1054.192
05Aug2018 7:00:00	2018	858.5723055	883.6351	1223.321	1235.904	1070.03
05Aug2018 8:00:00	2018	926.3788543	907.1884	1259.46	1305.94	1086.174
05Aug2018 9:00:00	2018	995.783388	914.3425	1316.015	1410.298	1085.253
05Aug2018 10:00:00	2018	1055.679471	919.8263	1347.104	1475.244	1089.385
05Aug2018 11:00:00	2018	1108.614455	927.7612	1370.288	1555.766	1113.08
05Aug2018 12:00:00	2018	1142.3428	934.2393	1381.912	1588.756	1122.014
05Aug2018 13:00:00	2018	1157.291968	946.1916	1392.841	1609.709	1136.816
05Aug2018 14:00:00	2018	1165.170405	948.7488	1390.412	1603.828	1149.811
05Aug2018 15:00:00	2018	1177.146358	933.1854	1393.96	1636.144	1153.194
05Aug2018 16:00:00	2018	1185.312209	931.9912	1414.501	1670.23	1170.474
05Aug2018 17:00:00	2018	1198.423039	940.0813	1443.451	1652.6	1163.362
05Aug2018 18:00:00	2018	1181.437708	938.3124	1428.074	1640.551	1177.012
05Aug2018 19:00:00	2018	1156.862835	930.7407	1393.241	1612.631	1182.499
05Aug2018 20:00:00	2018	1124.444295	917.8775	1378.671	1561.537	1189.426
05Aug2018 21:00:00	2018	1121.385032	911.4394	1377.307	1548.396	1201.047

05Aug2018 22:00:00	2018	1084.259798	892.2067	1362.112	1520.872	1211.808
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06Aug2018 0:00:00	2018	923.1524552	868.9742	1294.485	1363.304	1122.534
06Aug2018 1:00:00	2018	868.4647322	852.0932	1276.098	1308.071	1100.155
06Aug2018 2:00:00	2018	834.1686552	840.4397	1255.73	1279.292	1095.318
06Aug2018 3:00:00	2018	818.6925018	833.795	1249.163	1225.006	1093.14
06Aug2018 4:00:00	2018	819.488615	846.3584	1247.464	1213.815	1088.511
06Aug2018 5:00:00	2018	843.8003746	850.4736	1197.62	1192.734	1089.417
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06Aug2018 7:00:00	2018	918.0590411	873.708	1195.079	1247.822	1096.87
06Aug2018 8:00:00	2018	999.8467513	907.295	1302.471	1360.852	1107.895
06Aug2018 9:00:00	2018	1098.637699	926.4221	1352.937	1488.713	1115.845
06Aug2018 10:00:00	2018	1189.351517	940.7904	1399.04	1588.968	1141.425
06Aug2018 11:00:00	2018	1255.338688	965.5902	1426.044	1680.222	1151.715
06Aug2018 12:00:00	2018	1286.997343	973.2613	1434.288	1727.253	1172.553
06Aug2018 13:00:00	2018	1309.698573	965.6559	1376.972	1755.224	1178.788
06Aug2018 14:00:00	2018	1331.171756	981.4009	1359.268	1761.848	1177.036
06Aug2018 15:00:00	2018	1361.227739	994.9774	1396.843	1774.203	1214.604
06Aug2018 16:00:00	2018	1389.978926	1015.909	1429.824	1801.674	1217.279
06Aug2018 17:00:00	2018	1421.03595	1030.544	1453.59	1836.412	1208.243
06Aug2018 18:00:00	2018	1396.21259	1031.352	1453.009	1818.971	1192.052
06Aug2018 19:00:00	2018	1363.318543	1018.435	1423.538	1771.676	1182.899
06Aug2018 20:00:00	2018	1313.83864	995.6386	1421.039	1722.175	1175.65
06Aug2018 21:00:00	2018	1281.75978	986.9648	1422.83	1703.592	1148.457
06Aug2018 22:00:00	2018	1200.249757	948.8783	1398.512	1663.749	1131.732
06Aug2018 23:00:00	2018	1076.963231	896.8804	1346.749	1542.295	1109.637
07Aug2018 0:00:00	2018	983.0272215	893.2145	1295.817	1414.856	1093.864
07Aug2018 1:00:00	2018	920.8663001	891.1913	1280.288	1356.971	1121.16
07Aug2018 2:00:00	2018	888.7967967	883.1635	1273.53	1308.366	1151.869
07Aug2018 3:00:00	2018	882.0544722	871.2542	1268.226	1304.568	1149.703
07Aug2018 4:00:00	2018	898.7135132	868.865	1266.957	1290.969	1133.833
07Aug2018 5:00:00	2018	970.3901981	879.2178	1269.776	1372.231	1123.178
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07Aug2018 10:00:00	2018	1469.245204	1012.04	1426.46	1810.22	1186.741
07Aug2018 11:00:00	2018	1535.364992	1036.482	1399.02	1842.066	1185.298
07Aug2018 12:00:00	2018	1569.445729	1056.843	1427.38	1881.276	1181.842
07Aug2018 13:00:00	2018	1594.281802	1070.529	1444.509	1909.298	1186.717
07Aug2018 14:00:00	2018	1618.969796	1084.503	1471.369	1921.001	1199.921
07Aug2018 15:00:00	2018	1643.144014	1095.437	1465.495	1924.229	1204.147
07Aug2018 16:00:00	2018	1654.748145	1117.367	1451.297	1927.411	1189.121
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07Aug2018 18:00:00	2018	1569.654949	1117.499	1407.73	1840.286	1177.493
07Aug2018 19:00:00	2018	1502.549007	1107.672	1395.263	1800.778	1135.3
07Aug2018 20:00:00	2018	1436.519697	1081.033	1414.901	1756.036	1138.738

07Aug2018 21:00:00	2018	1386.330058	1055.041	1428.852	1728.162	1138.107
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07Aug2018 23:00:00	2018	1145.872667	997.9455	1351.162	1530.382	1158.891
08Aug2018 0:00:00	2018	1041.965492	964.9672	1332.683	1398.224	1153.146
08Aug2018 1:00:00	2018	976.1010871	945.547	1313.829	1329.881	1135.4
08Aug2018 2:00:00	2018	935.6247377	932.0177	1298.157	1284.697	1146.165
08Aug2018 3:00:00	2018	916.3918061	919.9897	1281.991	1249.328	1157.813
08Aug2018 4:00:00	2018	924.9029328	914.0329	1273.511	1255.749	1172.166
08Aug2018 5:00:00	2018	987.2074651	917.3218	1284.787	1306.319	1211.378
08Aug2018 6:00:00	2018	1091.88711	931.8286	1303.962	1366.601	1207.288
08Aug2018 7:00:00	2018	1194.626556	962.3722	1320.174	1527.668	1197.216
08Aug2018 8:00:00	2018	1282.490806	999.4332	1348.233	1638.815	1175.791
08Aug2018 9:00:00	2018	1359.47407	1009.779	1387.12	1735.379	1152.039
08Aug2018 10:00:00	2018	1446.19549	1036.133	1420.491	1832.146	1173.711
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08Aug2018 12:00:00	2018	1538.499611	1055.528	1461.441	1912.833	1165.363
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08Aug2018 14:00:00	2018	1596.971333	1081.777	1463.427	1962.855	1235.74
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08Aug2018 16:00:00	2018	1649.956879	1113.245	1466.981	1966.218	1264.17
08Aug2018 17:00:00	2018	1636.516141	1125.931	1436.775	1949.148	1252.026
08Aug2018 18:00:00	2018	1546.88766	1114.781	1407.87	1895.865	1242.412
08Aug2018 19:00:00	2018	1483.406733	1092.423	1373.189	1835.96	1246.564
08Aug2018 20:00:00	2018	1423.551053	1075.843	1384.086	1769.698	1234.063
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08Aug2018 22:00:00	2018	1283.7356	1026.344	1317.856	1707.781	1242.777
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09Aug2018 2:00:00	2018	949.5513444	914.8273	1233.142	1346.59	1174.037
09Aug2018 3:00:00	2018	931.5990175	911.3621	1183.318	1310.342	1172.963
09Aug2018 4:00:00	2018	942.7116587	901.3795	1179.431	1306.731	1162.936
09Aug2018 5:00:00	2018	1005.758155	907.367	1173.5	1335.217	1153.27
09Aug2018 6:00:00	2018	1115.097277	931.2412	1183.898	1427.051	1132.352
09Aug2018 7:00:00	2018	1223.025754	969.024	1229.807	1554.041	1128.432
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09Aug2018 13:00:00	2018	1663.612414	1112.377	1465.575	2042.212	1246.015
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09Aug2018 20:00:00	2018	1530.163625	1103.663	1442.793	1984.786	1216.96
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09Aug2018 22:00:00	2018	1380.276515	1043.902	1405.34	1831.866	1254.164
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10Aug2018 0:00:00	2018	1134.782319	980.0087	1327.758	1602.089	1190.248
10Aug2018 1:00:00	2018	1061.060821	955.844	1298.445	1524.024	1165.108
10Aug2018 2:00:00	2018	1009.907511	938.4844	1280.869	1462.995	1151.501
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10Aug2018 8:00:00	2018	1348.751019	1037.14	1388.74	1745.218	1181.545
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13Aug2018 23:00:00	2018	1019.048313	929.4724	1316.851	1395.899	1112.664
14Aug2018 0:00:00	2018	935.9924463	898.0564	1301.119	1333.421	1087.447
14Aug2018 1:00:00	2018	881.7280574	878.922	1286.139	1299.54	1074.079
14Aug2018 2:00:00	2018	856.3078076	863.4634	1276.142	1276.399	1090.563
14Aug2018 3:00:00	2018	845.2500371	857.9083	1271.226	1255.223	1090.445
14Aug2018 4:00:00	2018	857.8425028	852.6313	1268.229	1256.967	1107.289
14Aug2018 5:00:00	2018	924.378378	856.6031	1273.074	1314.016	1111.045
14Aug2018 6:00:00	2018	1037.544941	879.0428	1281.05	1380.588	1110.532
14Aug2018 7:00:00	2018	1139.288087	914.4529	1333.642	1496.365	1123.655
14Aug2018 8:00:00	2018	1229.282947	951.1082	1381.503	1612.649	1114.544
14Aug2018 9:00:00	2018	1311.516216	968.8808	1385.408	1673.082	1123.538
14Aug2018 10:00:00	2018	1384.858984	976.5622	1398.568	1720.145	1152.119
14Aug2018 11:00:00	2018	1441.65085	973.2864	1354.118	1795.597	1152.057
14Aug2018 12:00:00	2018	1479.88537	991.6192	1369.232	1815.327	1156.226
14Aug2018 13:00:00	2018	1519.317276	1015.443	1403.365	1842.977	1185.489
14Aug2018 14:00:00	2018	1549.834641	1028.925	1412.714	1847.212	1184.23
14Aug2018 15:00:00	2018	1576.838884	1044.622	1440.611	1879.668	1202.416
14Aug2018 16:00:00	2018	1599.130502	1073.538	1440.92	1893.608	1226.251
14Aug2018 17:00:00	2018	1601.386804	1090.155	1454.801	1878.23	1222.473
14Aug2018 18:00:00	2018	1518.286599	1072.926	1421.141	1839.881	1206.674
14Aug2018 19:00:00	2018	1452.602847	1052.97	1389.875	1814.121	1220.616
14Aug2018 20:00:00	2018	1403.576049	1034.221	1390.034	1760.189	1207.197
14Aug2018 21:00:00	2018	1366.191512	1031.281	1407.405	1741.01	1195.539
14Aug2018 22:00:00	2018	1247.62581	991.419	1361.865	1653.018	1176.088
14Aug2018 23:00:00	2018	1120.028606	947.2942	1341.713	1527.009	1149.471
15Aug2018 0:00:00	2018	1031.024432	918.1516	1363	1413.207	1160.948
15Aug2018 1:00:00	2018	963.0238343	900.3071	1341.238	1353.602	1125.594
15Aug2018 2:00:00	2018	929.4034574	886.9761	1336.898	1336.391	1125.484
15Aug2018 3:00:00	2018	914.1427668	880.5568	1286.907	1303.55	1111.264
15Aug2018 4:00:00	2018	923.3550901	898.3692	1258.063	1284.051	1110.259
15Aug2018 5:00:00	2018	995.1423773	909.0795	1236.395	1321.974	1114.681
15Aug2018 6:00:00	2018	1131.737067	918.4701	1260.52	1436.095	1121.249
15Aug2018 7:00:00	2018	1244.083188	949.8529	1304.389	1568.853	1135.129
15Aug2018 8:00:00	2018	1306.694132	974.8019	1324.801	1644.062	1127.58
15Aug2018 9:00:00	2018	1358.972846	993.0915	1349.691	1673.609	1110.592
15Aug2018 10:00:00	2018	1388.994364	1008.23	1358.991	1716.427	1115.104
15Aug2018 11:00:00	2018	1428.036779	1016.37	1379.518	1743.761	1146.088
15Aug2018 12:00:00	2018	1449.515987	1025.754	1389.791	1770.352	1154.666
15Aug2018 13:00:00	2018	1472.250201	1022.77	1404.323	1792.359	1158.858
15Aug2018 14:00:00	2018	1483.483081	1037.628	1410.16	1810.348	1166.192
15Aug2018 15:00:00	2018	1496.892271	1043.648	1406.534	1816.755	1154.203
15Aug2018 16:00:00	2018	1503.338008	1060.988	1416.046	1807.112	1165.397

15Aug2018 17:00:00	2018	1503.826027	1068.945	1405.229	1777.46	1166.588
15Aug2018 18:00:00	2018	1434.398601	1052.844	1382.786	1719.279	1182.64
15Aug2018 19:00:00	2018	1379.033817	1043.389	1371.785	1694.098	1161.083
15Aug2018 20:00:00	2018	1336.81611	1022.016	1377.035	1662.569	1139.09
15Aug2018 21:00:00	2018	1300.459707	1012.302	1384.078	1665.104	1154.756
15Aug2018 22:00:00	2018	1191.401877	968.9268	1376.91	1562.546	1176.862
15Aug2018 23:00:00	2018	1078.631091	931.5703	1332.542	1442.387	1140.169
16Aug2018 0:00:00	2018	983.5967276	914.3417	1294.374	1338.038	1116.961
16Aug2018 1:00:00	2018	925.9337334	896.2498	1272.704	1272.6	1110.899
16Aug2018 2:00:00	2018	890.8331311	882.3208	1255.369	1219.1	1111.863
16Aug2018 3:00:00	2018	875.8805966	887.1677	1244.332	1206.651	1112.296
16Aug2018 4:00:00	2018	889.736742	884.274	1269.745	1204.405	1135.956
16Aug2018 5:00:00	2018	954.940864	880.9179	1284.251	1259.659	1136.956
16Aug2018 6:00:00	2018	1074.626213	911.2892	1277.754	1367.236	1124.554
16Aug2018 7:00:00	2018	1170.995553	935.7024	1316.86	1474.528	1134.602
16Aug2018 8:00:00	2018	1239.175087	977.4802	1363.335	1609.784	1100.146
16Aug2018 9:00:00	2018	1305.978362	1010.001	1392.397	1681.277	1089.786
16Aug2018 10:00:00	2018	1367.30228	1039.299	1417.799	1739.54	1109.251
16Aug2018 11:00:00	2018	1427.854911	1051.994	1439.778	1790.396	1109.438
16Aug2018 12:00:00	2018	1465.841345	1054.097	1443.371	1842.191	1142.387
16Aug2018 13:00:00	2018	1500.315706	1064.572	1432.63	1867.073	1144.599
16Aug2018 14:00:00	2018	1530.475022	1042.577	1450.623	1908.002	1170.588
16Aug2018 15:00:00	2018	1562.401026	1054.323	1460.835	1920.058	1178.171
16Aug2018 16:00:00	2018	1574.994704	1068.908	1447.239	1959.02	1174.498
16Aug2018 17:00:00	2018	1565.825462	1076.662	1456.411	1947.359	1172.989
16Aug2018 18:00:00	2018	1482.956219	1078.85	1429.568	1914.076	1150.61
16Aug2018 19:00:00	2018	1418.326409	1071.234	1403.309	1854.304	1156.241
16Aug2018 20:00:00	2018	1368.468215	1050.385	1396.068	1796.291	1151.919
16Aug2018 21:00:00	2018	1338.700693	1048.073	1403.602	1786.712	1146.048
16Aug2018 22:00:00	2018	1226.882902	1012.413	1374.06	1690.351	1119.459
16Aug2018 23:00:00	2018	1108.852896	979.274	1333.367	1561.419	1095.184
17Aug2018 0:00:00	2018	1015.367105	942.6992	1297.762	1458.541	1082.667
17Aug2018 1:00:00	2018	948.7334674	925.1643	1271.129	1386.25	1078.15
17Aug2018 2:00:00	2018	907.8056341	911.199	1260.173	1340.41	1064.711
17Aug2018 3:00:00	2018	894.0845517	904.5048	1253.199	1323.157	1056.652
17Aug2018 4:00:00	2018	900.4594383	904.0926	1265.397	1318.801	1053.301
17Aug2018 5:00:00	2018	962.2540638	910.1485	1278.551	1360.846	1065.132
17Aug2018 6:00:00	2018	1081.175203	917.2212	1293.395	1446.099	1072.206
17Aug2018 7:00:00	2018	1177.614701	937.1831	1328.384	1547.162	1072.917
17Aug2018 8:00:00	2018	1263.760324	973.4138	1361.429	1671.517	1109.749
17Aug2018 9:00:00	2018	1322.054853	1012.338	1389.373	1744.715	1124.772
17Aug2018 10:00:00	2018	1367.753833	1024.336	1345.106	1776.297	1105.99
17Aug2018 11:00:00	2018	1401.122753	1032.64	1355.184	1813.92	1116.47
17Aug2018 12:00:00	2018	1446.930543	1062.996	1424.937	1884.385	1121.365
17Aug2018 13:00:00	2018	1492.570567	1081.523	1428.564	1896.046	1156.657
17Aug2018 14:00:00	2018	1518.134408	1078.014	1421.646	1906.871	1164.69
17Aug2018 15:00:00	2018	1532.897542	1087.862	1420.639	1932.727	1170.202

17Aug2018 16:00:00	2018	1536.440556	1088.158	1432.714	1911.413	1238.175
17Aug2018 17:00:00	2018	1527.247769	1080.045	1418.628	1893.721	1186.094
17Aug2018 18:00:00	2018	1438.310079	1069.223	1409.421	1848.896	1193.952
17Aug2018 19:00:00	2018	1375.045799	1057.645	1387.886	1776.136	1217.435
17Aug2018 20:00:00	2018	1323.651566	1039.896	1373.742	1729.666	1212.781
17Aug2018 21:00:00	2018	1291.27076	1050.543	1375.176	1702.513	1213.336
17Aug2018 22:00:00	2018	1194.505092	1007.331	1347.994	1652.405	1194.387
17Aug2018 23:00:00	2018	1084.923091	968.865	1301.821	1505.36	1177.402
18Aug2018 0:00:00	2018	993.9638906	943.3213	1273.844	1439.4	1195.469
18Aug2018 1:00:00	2018	931.1260151	917.9904	1252.114	1361.735	1201.958
18Aug2018 2:00:00	2018	892.2376559	902.0735	1233.726	1327.327	1188.357
18Aug2018 3:00:00	2018	870.6699264	891.1739	1229.126	1294.471	1183.915
18Aug2018 4:00:00	2018	865.1547374	889.1635	1228.32	1290.762	1168.911
18Aug2018 5:00:00	2018	885.3234016	894.2391	1229.18	1302.184	1160.981
18Aug2018 6:00:00	2018	911.966685	900.5163	1229.1	1297.956	1161.145
18Aug2018 7:00:00	2018	948.9038699	915.3462	1243.711	1355.997	1153.316
18Aug2018 8:00:00	2018	1025.217484	943.3292	1275.054	1455.657	1181.477
18Aug2018 9:00:00	2018	1106.826715	970.5887	1305.077	1529.2	1184.688
18Aug2018 10:00:00	2018	1176.651868	985.192	1323.492	1583.406	1198.993
18Aug2018 11:00:00	2018	1203.51985	996.5206	1330.499	1613.905	1199.718
18Aug2018 12:00:00	2018	1212.800207	1000.361	1323.29	1637.304	1158.343
18Aug2018 13:00:00	2018	1204.720488	1002.478	1306.417	1635.296	1171.117
18Aug2018 14:00:00	2018	1195.957313	1004.606	1294.233	1606.77	1159.609
18Aug2018 15:00:00	2018	1195.475486	1006.174	1300.955	1614.193	1154.669
18Aug2018 16:00:00	2018	1191.201016	1003.281	1312.198	1610.285	1146.647
18Aug2018 17:00:00	2018	1179.403404	1000.395	1319.125	1603.286	1123.124
18Aug2018 18:00:00	2018	1143.355357	986.1754	1310.459	1566.008	1122.964
18Aug2018 19:00:00	2018	1111.572386	968.5769	1292.375	1516.059	1110.549
18Aug2018 20:00:00	2018	1097.282221	982.7245	1295.142	1492.088	1105.918
18Aug2018 21:00:00	2018	1095.749218	967.463	1315.166	1509.854	1116.339
18Aug2018 22:00:00	2018	1031.180539	948.8276	1282.326	1458.43	1111.089
18Aug2018 23:00:00	2018	959.502656	925.7265	1263.592	1397.324	1096.594
19Aug2018 0:00:00	2018	889.6750714	900.5378	1243.368	1312.193	1092.2
19Aug2018 1:00:00	2018	840.2984985	886.9365	1221.577	1261.848	1092.073
19Aug2018 2:00:00	2018	810.5774293	875.1675	1215.498	1218.628	1079.586
19Aug2018 3:00:00	2018	795.8467504	869.1567	1207.809	1215.115	1062.5
19Aug2018 4:00:00	2018	795.597618	868.7273	1194.707	1194.375	1062.045
19Aug2018 5:00:00	2018	808.4313701	878.4752	1220.166	1211.336	1067.812
19Aug2018 6:00:00	2018	830.5470083	882.8879	1220.991	1213.432	1055.78
19Aug2018 7:00:00	2018	862.2965116	892.4501	1224.523	1242.935	1051.979
19Aug2018 8:00:00	2018	927.7963269	912.8679	1250.35	1315.607	1053.116
19Aug2018 9:00:00	2018	993.2716045	931.2342	1281.507	1382.982	1065.952
19Aug2018 10:00:00	2018	1052.228015	925.2238	1285.02	1445.17	1066.576
19Aug2018 11:00:00	2018	1094.876602	930.1275	1289.127	1484.587	1073.447
19Aug2018 12:00:00	2018	1124.019002	932.7201	1300.51	1521.978	1073.537
19Aug2018 13:00:00	2018	1138.092483	926.8558	1316.161	1558.576	1051.678
19Aug2018 14:00:00	2018	1146.68609	933.7709	1313.663	1564.883	1070.63

19Aug2018 15:00:00	2018	1156.845673	941.3174	1319.619	1598.405	1090.052
19Aug2018 16:00:00	2018	1181.825843	948.2041	1353.685	1654.66	1107.684
19Aug2018 17:00:00	2018	1201.930288	960.4988	1367.782	1684.009	1109.152
19Aug2018 18:00:00	2018	1179.482122	961.4533	1347.287	1651.562	1105.286
19Aug2018 19:00:00	2018	1149.456929	951.6701	1325.304	1605.171	1092.185
19Aug2018 20:00:00	2018	1145.967091	951.8319	1311.469	1572.746	1075.136
19Aug2018 21:00:00	2018	1142.185386	951.6524	1323.239	1568.711	1072.782
19Aug2018 22:00:00	2018	1059.12796	927.7461	1291.424	1477.332	1065.929
19Aug2018 23:00:00	2018	963.9378348	906.8209	1256.365	1359.252	1047.508
20Aug2018 0:00:00	2018	896.1379537	878.718	1233.018	1269.481	1036.902
20Aug2018 1:00:00	2018	854.7795042	866.9104	1218.439	1211.863	1022.321
20Aug2018 2:00:00	2018	828.864855	858.5948	1211.25	1190.441	994.193
20Aug2018 3:00:00	2018	821.8773274	847.3432	1208.916	1188.888	976.777
20Aug2018 4:00:00	2018	841.3383255	840.3322	1220.227	1207.378	986.731
20Aug2018 5:00:00	2018	908.9788792	846.3307	1231.71	1264.774	988.7646
20Aug2018 6:00:00	2018	1036.525761	877.5916	1258.429	1354.994	994.0282
20Aug2018 7:00:00	2018	1152.019386	910.3656	1289.792	1469.732	998.4416
20Aug2018 8:00:00	2018	1220.610716	945.8707	1326.493	1571.438	1017.454
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20Aug2018 10:00:00	2018	1301.444088	979.4393	1384.295	1719.758	1039.763
20Aug2018 11:00:00	2018	1329.865584	971.4811	1407.677	1775.28	1047.496
20Aug2018 12:00:00	2018	1355.835309	974.0305	1408.896	1802.955	1051.403
20Aug2018 13:00:00	2018	1380.934748	980.8846	1415.124	1817.74	1069.52
20Aug2018 14:00:00	2018	1390.127565	988.236	1432.497	1819.153	1098.901
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20Aug2018 16:00:00	2018	1396.460513	996.234	1438.749	1849.455	1106.366
20Aug2018 17:00:00	2018	1396.038324	1004.63	1414.701	1836.385	1094.7
20Aug2018 18:00:00	2018	1326.458285	995.9927	1396.58	1782.482	1083.732
20Aug2018 19:00:00	2018	1271.34506	982.7419	1378.281	1737.197	1077.42
20Aug2018 20:00:00	2018	1233.147382	978.8171	1353.078	1666.467	1079.367
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20Aug2018 22:00:00	2018	1102.22278	951.5969	1317.597	1577.535	1061.954
20Aug2018 23:00:00	2018	992.4422154	907.7276	1294.181	1470.539	1052.41
21Aug2018 0:00:00	2018	913.3072418	876.8365	1278.154	1377.541	1051.503
21Aug2018 1:00:00	2018	863.0867652	860.3681	1262.671	1294.596	1042.067
21Aug2018 2:00:00	2018	837.3771295	852.1144	1250.422	1261.634	1039.905
21Aug2018 3:00:00	2018	829.2821563	844.9591	1235.438	1248.714	1032.057
21Aug2018 4:00:00	2018	844.8742191	839.7844	1223.421	1213.596	1020.659
21Aug2018 5:00:00	2018	909.1374523	851.9916	1235.288	1272.822	1036.788
21Aug2018 6:00:00	2018	1028.72857	868.9917	1225.613	1346.474	1054.54
21Aug2018 7:00:00	2018	1126.811656	895.6584	1236.578	1480.219	1073.247
21Aug2018 8:00:00	2018	1203.382477	911.0068	1254.535	1563.703	1086.812
21Aug2018 9:00:00	2018	1268.433173	919.2622	1297.955	1666.158	1092.674
21Aug2018 10:00:00	2018	1336.873804	918.9726	1334.963	1729.417	1115.515
21Aug2018 11:00:00	2018	1393.2534	918.8732	1373.713	1830.2	1130.041
21Aug2018 12:00:00	2018	1430.191619	912.8819	1391.53	1852.758	1127.008
21Aug2018 13:00:00	2018	1457.118398	922.3306	1407.974	1894.849	1101.037

21Aug2018 14:00:00	2018	1472.079766	932.7005	1402.134	1863.455	1130.732
21Aug2018 15:00:00	2018	1494.960939	942.9479	1377.435	1877.124	1145.688
21Aug2018 16:00:00	2018	1507.319559	960.6886	1361.074	1897.287	1144.833
21Aug2018 17:00:00	2018	1507.908496	968.4289	1384.48	1901.554	1152.201
21Aug2018 18:00:00	2018	1438.135419	962.9598	1417.359	1847.242	1153.53
21Aug2018 19:00:00	2018	1374.447063	948.7306	1415.396	1768.403	1149.899
21Aug2018 20:00:00	2018	1321.10191	936.9445	1385.611	1699.722	1148.538
21Aug2018 21:00:00	2018	1292.212831	940.7847	1383.054	1697.896	1103.246
21Aug2018 22:00:00	2018	1174.796393	916.9585	1342.723	1603.392	1105.626
21Aug2018 23:00:00	2018	1054.082861	874.7617	1284.591	1484.312	1088.876
22Aug2018 0:00:00	2018	959.8561492	846.6817	1265.464	1380.297	1073.255
22Aug2018 1:00:00	2018	899.461568	828.0462	1248.246	1329.768	1060.745
22Aug2018 2:00:00	2018	864.5125435	817.0218	1236.386	1291.129	1060.355
22Aug2018 3:00:00	2018	851.5038071	811.5918	1232.532	1240.245	1062.662
22Aug2018 4:00:00	2018	864.2310325	812.6613	1228.887	1272.716	1032.978
22Aug2018 5:00:00	2018	929.6593576	817.4667	1239.537	1291.342	1035.786
22Aug2018 6:00:00	2018	1051.463266	842.9769	1251.722	1380.178	1041.049
22Aug2018 7:00:00	2018	1153.868125	874.8138	1283.432	1505.273	1051.462
22Aug2018 8:00:00	2018	1244.781464	902.5649	1320.345	1625.931	1112.123
22Aug2018 9:00:00	2018	1329.436396	912.8116	1348.596	1684.529	1170.7
22Aug2018 10:00:00	2018	1411.304688	923.0116	1372.191	1762.634	1205.348
22Aug2018 11:00:00	2018	1482.983364	947.8834	1397.306	1809.769	1211.977
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22Aug2018 13:00:00	2018	1575.725843	984.1054	1424.689	1888.998	1217.951
22Aug2018 14:00:00	2018	1598.889174	985.6425	1441.845	1887.052	1226.707
22Aug2018 15:00:00	2018	1626.335263	1007.324	1430.821	1879.222	1244.781
22Aug2018 16:00:00	2018	1646.842871	1029.189	1428.662	1884.941	1245.649
22Aug2018 17:00:00	2018	1646.390937	1040.758	1467.671	1829.219	1232.602
22Aug2018 18:00:00	2018	1571.198707	1044.293	1461.084	1785.965	1219.811
22Aug2018 19:00:00	2018	1504.526469	1042.482	1394.87	1701.75	1204.94
22Aug2018 20:00:00	2018	1441.794298	1020.336	1386.574	1686.558	1181.498
22Aug2018 21:00:00	2018	1399.467905	1002.847	1424.166	1671.814	1174.506
22Aug2018 22:00:00	2018	1264.51486	944.0801	1380.653	1546.7	1162.744
22Aug2018 23:00:00	2018	1123.309154	916.4971	1330.2	1427.603	1132.815
23Aug2018 0:00:00	2018	1021.768013	882.3309	1296.158	1342.899	1109.662
23Aug2018 1:00:00	2018	953.3864811	859.2028	1270.609	1281.898	1104.291
23Aug2018 2:00:00	2018	910.8396294	847.878	1252.548	1258.895	1090.281
23Aug2018 3:00:00	2018	891.1339186	842.4436	1272.694	1277.051	1073.353
23Aug2018 4:00:00	2018	897.9205567	841.7367	1268.018	1282.306	1082.906
23Aug2018 5:00:00	2018	958.3373526	854.0956	1280.146	1335.581	1070.367
23Aug2018 6:00:00	2018	1085.632206	877.374	1311.336	1428.864	1071.569
23Aug2018 7:00:00	2018	1184.488545	909.0459	1324.167	1487.469	1073.997
23Aug2018 8:00:00	2018	1260.508906	932.87	1358.719	1604.735	1084.78
23Aug2018 9:00:00	2018	1330.58556	939.1026	1388.679	1687.096	1086.375
23Aug2018 10:00:00	2018	1386.24629	961.5849	1406.143	1738.076	1078.205
23Aug2018 11:00:00	2018	1441.025382	989.3189	1426.708	1795.526	1081.422
23Aug2018 12:00:00	2018	1486.087042	1010.502	1436.404	1829.292	1065.706

23Aug2018 13:00:00	2018	1527.390977	1025.75	1454.644	1864.253	1062.438
23Aug2018 14:00:00	2018	1547.471739	1041.304	1451.382	1858.236	1069.467
23Aug2018 15:00:00	2018	1565.540602	1049.504	1453.225	1850.582	1103.953
23Aug2018 16:00:00	2018	1561.698451	1056.069	1458.215	1845.739	1147.595
23Aug2018 17:00:00	2018	1544.386524	1053.19	1447.977	1818.506	1141.446
23Aug2018 18:00:00	2018	1458.315747	1040.049	1418.142	1739.032	1083.98
23Aug2018 19:00:00	2018	1398.828948	1032.033	1408.307	1680.276	1068.665
23Aug2018 20:00:00	2018	1362.823579	1017.72	1438.41	1665.305	1060.544
23Aug2018 21:00:00	2018	1320.223688	996.5867	1448.182	1607.666	1066.207
23Aug2018 22:00:00	2018	1206.243403	954.7534	1400.699	1515.992	1052.218
23Aug2018 23:00:00	2018	1087.491768	915.2426	1342.152	1390.292	1061.048
24Aug2018 0:00:00	2018	995.3336067	886.6654	1305.285	1308.091	1066.69
24Aug2018 1:00:00	2018	932.1515821	871.3402	1285.595	1270.286	1060.649
24Aug2018 2:00:00	2018	890.8895528	855.5471	1297.421	1256.361	1044.643
24Aug2018 3:00:00	2018	871.1033672	846.2431	1294.294	1250.947	1034.88
24Aug2018 4:00:00	2018	881.3875264	851.2701	1285.204	1254.5	1007.422
24Aug2018 5:00:00	2018	944.8346601	863.8647	1303.07	1317.068	1000.439
24Aug2018 6:00:00	2018	1074.492569	888.4208	1336.001	1425.722	1007.646
24Aug2018 7:00:00	2018	1181.359238	915.1068	1366.629	1521.62	1031.948
24Aug2018 8:00:00	2018	1243.09933	948.3461	1407.232	1599.551	1066.659
24Aug2018 9:00:00	2018	1307.338638	954.1719	1443.123	1685.542	1082.241
24Aug2018 10:00:00	2018	1350.550199	966.3485	1479.379	1716.522	1090.387
24Aug2018 11:00:00	2018	1368.392634	958.663	1481.602	1739.551	1090.05
24Aug2018 12:00:00	2018	1352.097247	958.8905	1462.097	1704.976	1087.293
24Aug2018 13:00:00	2018	1344.844715	959.4525	1460.91	1708.206	1084.031
24Aug2018 14:00:00	2018	1330.851696	954.2418	1433.127	1688.291	1079.337
24Aug2018 15:00:00	2018	1304.67208	959.1753	1418.562	1665.877	1077.586
24Aug2018 16:00:00	2018	1278.455395	946.4856	1412.064	1654.939	1077.709
24Aug2018 17:00:00	2018	1262.150036	938.1344	1405.028	1618.246	1085.758
24Aug2018 18:00:00	2018	1198.377506	936.1232	1381.703	1569.19	1073.709
24Aug2018 19:00:00	2018	1162.855743	927.2016	1359.495	1543.823	1082.076
24Aug2018 20:00:00	2018	1149.699352	921.6657	1360.242	1548.066	1089.422
24Aug2018 21:00:00	2018	1130.099175	912.7385	1368.373	1528.828	1092.985
24Aug2018 22:00:00	2018	1048.099555	881.8598	1343.064	1431.796	1089.981
24Aug2018 23:00:00	2018	963.4184896	851.4035	1319.297	1396.165	1097.514
25Aug2018 0:00:00	2018	894.4307026	830.703	1298.083	1294.406	1090.692
25Aug2018 1:00:00	2018	845.6790668	818.0062	1287.428	1269.609	1091.595
25Aug2018 2:00:00	2018	816.7402938	809.969	1285.462	1226.709	1071.67
25Aug2018 3:00:00	2018	801.6312179	804.7267	1273.654	1224.925	1096.916
25Aug2018 4:00:00	2018	803.6465249	804.4683	1286.813	1227.377	1083.394
25Aug2018 5:00:00	2018	821.4541662	805.6463	1288.573	1235.355	1059.166
25Aug2018 6:00:00	2018	863.9483501	812.7909	1296.224	1257.809	1055.257
25Aug2018 7:00:00	2018	911.3797681	829.6004	1302.773	1277.261	1040.836
25Aug2018 8:00:00	2018	983.8944956	856.0335	1335.246	1389.186	1048.53
25Aug2018 9:00:00	2018	1056.207222	879.2898	1360.81	1445.615	1060.345
25Aug2018 10:00:00	2018	1107.653864	886.1477	1362.017	1491.532	1059.928
25Aug2018 11:00:00	2018	1134.72359	885.3747	1365.832	1529.822	1063.705

25Aug2018 12:00:00	2018	1155.402323	886.1474	1389.335	1520.493	1056.61
25Aug2018 13:00:00	2018	1162.78814	890.7076	1382.449	1530.26	1046.421
25Aug2018 14:00:00	2018	1159.365278	887.7459	1378.897	1528.161	1047.135
25Aug2018 15:00:00	2018	1154.755437	891.0912	1393.48	1527.879	1056.714
25Aug2018 16:00:00	2018	1157.788597	900.6193	1407.887	1516.701	1063.26
25Aug2018 17:00:00	2018	1157.220564	903.7058	1382.493	1525.51	1069.414
25Aug2018 18:00:00	2018	1128.167227	896.8479	1375.517	1493.539	1090.425
25Aug2018 19:00:00	2018	1103.851217	888.8207	1370.689	1472.64	1115.51
25Aug2018 20:00:00	2018	1112.178606	893.6509	1362.224	1464.934	1119.523
25Aug2018 21:00:00	2018	1095.764048	892.1856	1349.646	1487.282	1088.846
25Aug2018 22:00:00	2018	1030.478737	862.8105	1315.987	1421.443	1061.215
25Aug2018 23:00:00	2018	954.7589356	832.1278	1282.909	1339.318	1051.208
26Aug2018 0:00:00	2018	888.7219985	809.0136	1275.602	1290.875	1047.136
26Aug2018 1:00:00	2018	841.5133526	795.2852	1253.805	1242.94	1089.268
26Aug2018 2:00:00	2018	810.6212978	785.1511	1248.358	1233.535	1086.642
26Aug2018 3:00:00	2018	795.0362027	779.6417	1242.349	1219.37	1091.35
26Aug2018 4:00:00	2018	794.1092565	778.0168	1240.327	1185.432	1079.789
26Aug2018 5:00:00	2018	809.0780111	781.1692	1254.847	1206.687	1032.063
26Aug2018 6:00:00	2018	842.3307465	787.0364	1268.367	1221.952	1036.415
26Aug2018 7:00:00	2018	868.6413126	799.6667	1275.962	1263.644	1027.21
26Aug2018 8:00:00	2018	929.069652	821.4884	1297.647	1326.717	1021.862
26Aug2018 9:00:00	2018	1007.294307	836.2336	1325.838	1405.195	1024.171
26Aug2018 10:00:00	2018	1070.566282	846.877	1341.337	1478.403	1060.17
26Aug2018 11:00:00	2018	1109.132535	855.699	1344.555	1511.694	1060.523
26Aug2018 12:00:00	2018	1128.93912	861.1488	1363.319	1537.481	1077.764
26Aug2018 13:00:00	2018	1140.473213	861.2675	1357.91	1546.489	1084.432
26Aug2018 14:00:00	2018	1151.017199	862.9636	1356.516	1542.01	1087.862
26Aug2018 15:00:00	2018	1166.6594	871.1453	1366.183	1536.441	1090.783
26Aug2018 16:00:00	2018	1186.658272	885.1996	1360.502	1528.811	1106.137
26Aug2018 17:00:00	2018	1202.336596	894.4841	1360.93	1537.258	1107.231
26Aug2018 18:00:00	2018	1164.632277	889.2984	1346.131	1514.842	1114.897
26Aug2018 19:00:00	2018	1130.944609	878.7463	1338.965	1481.913	1108.144
26Aug2018 20:00:00	2018	1132.285281	879.8814	1341.156	1492.472	1111.109
26Aug2018 21:00:00	2018	1099.345262	870.7813	1331.185	1527.159	1105.359
26Aug2018 22:00:00	2018	1010.986532	837.2096	1295.359	1431.317	1099.947
26Aug2018 23:00:00	2018	916.1712605	803.6415	1236.147	1321.195	1088.979
27Aug2018 0:00:00	2018	854.1808102	788.6748	1211.562	1247.736	1082.131
27Aug2018 1:00:00	2018	818.3739886	781.5574	1192.134	1208.429	1071.405
27Aug2018 2:00:00	2018	798.5454083	783.4748	1189.054	1188.3	1051.873
27Aug2018 3:00:00	2018	793.7196756	777.2	1180.414	1176.983	1032.116
27Aug2018 4:00:00	2018	814.7530116	774.9286	1181.905	1188.708	1048.84
27Aug2018 5:00:00	2018	890.3911352	797.4027	1212.649	1251.23	1055.266
27Aug2018 6:00:00	2018	1028.662703	829.7054	1258.923	1405.253	1053.643
27Aug2018 7:00:00	2018	1142.892554	864.657	1307.254	1512.134	1050.232
27Aug2018 8:00:00	2018	1219.215459	898.5671	1352.81	1607.988	1063.33
27Aug2018 9:00:00	2018	1266.391278	918.2902	1380.496	1650.194	1051.038
27Aug2018 10:00:00	2018	1293.349974	921.8171	1373.701	1688.76	1039.155

27Aug2018 11:00:00	2018	1304.725048	919.5152	1362.724	1708.62	1042.685
27Aug2018 12:00:00	2018	1312.098058	913.7893	1356.62	1718.364	1044.84
27Aug2018 13:00:00	2018	1306.690488	914.7242	1371.695	1744.862	1076.58
27Aug2018 14:00:00	2018	1299.277885	916.0874	1370.89	1738.911	1083.211
27Aug2018 15:00:00	2018	1298.32531	906.0561	1366.562	1708.442	1077.276
27Aug2018 16:00:00	2018	1295.270833	892.5844	1345.959	1693.591	1071.476
27Aug2018 17:00:00	2018	1298.68556	881.4163	1329.559	1672.872	1085.883
27Aug2018 18:00:00	2018	1236.964612	869.5923	1313.21	1610.531	1093.432
27Aug2018 19:00:00	2018	1183.864621	865.7113	1326.527	1593.002	1088.536
27Aug2018 20:00:00	2018	1180.060506	878.2437	1362.99	1590.151	1103.412
27Aug2018 21:00:00	2018	1166.942646	877.2349	1341.508	1570.644	1122.57
27Aug2018 22:00:00	2018	1061.757077	843.2908	1290.026	1476.636	1117.002
27Aug2018 23:00:00	2018	958.1550345	817.5639	1242.207	1402.406	1109.306
28Aug2018 0:00:00	2018	884.4469449	794.7054	1201.35	1321.851	1104.077
28Aug2018 1:00:00	2018	842.2717692	781.5271	1210.765	1284.434	1097.55
28Aug2018 2:00:00	2018	818.9590789	776.064	1210.412	1254.73	1104.207
28Aug2018 3:00:00	2018	810.4269375	769.3709	1204.626	1229.182	1079.206
28Aug2018 4:00:00	2018	830.3024998	775.8863	1199.712	1236.716	1070.609
28Aug2018 5:00:00	2018	901.1072339	798.2048	1235.224	1303.425	1071.283
28Aug2018 6:00:00	2018	1034.625633	826.7178	1273.561	1409.393	1077.505
28Aug2018 7:00:00	2018	1131.068181	850.0654	1293.695	1531.282	1091.746
28Aug2018 8:00:00	2018	1199.318221	856.2382	1343.995	1624.788	1095.298
28Aug2018 9:00:00	2018	1249.086171	858.9293	1359.247	1652.427	1083.011
28Aug2018 10:00:00	2018	1294.679046	866.1063	1377.309	1700.083	1079.011
28Aug2018 11:00:00	2018	1319.817307	873.6468	1379.206	1747.731	1087.967
28Aug2018 12:00:00	2018	1329.391063	882.885	1389.257	1761.879	1099.731
28Aug2018 13:00:00	2018	1348.146412	895.5108	1397.014	1773.95	1103.932
28Aug2018 14:00:00	2018	1367.697983	890.8302	1411.959	1761.002	1089.134
28Aug2018 15:00:00	2018	1380.345713	885.1173	1409.698	1773.942	1079.006
28Aug2018 16:00:00	2018	1370.276233	912.9227	1400.378	1767.254	1085.835
28Aug2018 17:00:00	2018	1356.876727	923.0604	1392.831	1744.897	1106.946
28Aug2018 18:00:00	2018	1282.159353	910.5696	1367.099	1659.56	1099.543
28Aug2018 19:00:00	2018	1229.684483	906.0847	1349.847	1609.413	1091.815
28Aug2018 20:00:00	2018	1218.372507	908.459	1378.73	1623.616	1093.151
28Aug2018 21:00:00	2018	1193.639347	905.6504	1401.038	1630.445	1104.933
28Aug2018 22:00:00	2018	1081.143498	870.4844	1360.037	1542.544	1092.491
28Aug2018 23:00:00	2018	971.1784163	834.496	1309.743	1433.027	1083.206
29Aug2018 0:00:00	2018	894.3148474	804.1467	1270.05	1349.047	1078.036
29Aug2018 1:00:00	2018	846.8636765	782.872	1227.39	1306.137	1058.905
29Aug2018 2:00:00	2018	821.6949241	772.438	1223.947	1287.872	1059.626
29Aug2018 3:00:00	2018	814.5649477	773.1695	1208.675	1245.76	1057.857
29Aug2018 4:00:00	2018	831.1609211	778.1403	1083.737	1206.459	1032.524
29Aug2018 5:00:00	2018	905.025336	801.8516	1215.97	1302.525	1061.588
29Aug2018 6:00:00	2018	1049.701258	838.7582	1286.834	1433.839	1081.692
29Aug2018 7:00:00	2018	1151.664195	874.0405	1333.176	1556.101	1071.929
29Aug2018 8:00:00	2018	1218.98039	902.6801	1357.96	1651.396	1065.106
29Aug2018 9:00:00	2018	1275.46572	905.7858	1389.864	1704.7	1075.095

29Aug2018 10:00:00	2018	1316.452003	914.9325	1407.915	1749.466	1061.95
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29Aug2018 12:00:00	2018	1373.666633	922.7267	1418.691	1792.162	1065.403
29Aug2018 13:00:00	2018	1371.893517	922.3064	1413.418	1793.156	1070.493
29Aug2018 14:00:00	2018	1368.036762	932.5718	1408.782	1767.663	1067.84
29Aug2018 15:00:00	2018	1363.354497	933.1095	1403.104	1766.762	1071.127
29Aug2018 16:00:00	2018	1367.937199	938.2179	1416.596	1753.198	1078.062
29Aug2018 17:00:00	2018	1368.194438	943.8708	1403.4	1736.651	1079.399
29Aug2018 18:00:00	2018	1294.472953	933.1945	1388.911	1677.423	1074.101
29Aug2018 19:00:00	2018	1265.824273	919.2753	1355.21	1651.298	1076.662
29Aug2018 20:00:00	2018	1225.682464	924.5122	1363.838	1655.52	1066.108
29Aug2018 21:00:00	2018	1192.654835	917.1277	1354.296	1630.657	1078.174
29Aug2018 22:00:00	2018	1082.430756	879.4444	1318.689	1523.584	1069.369
29Aug2018 23:00:00	2018	974.4906594	842.2967	1283.866	1420.35	1058.714
30Aug2018 0:00:00	2018	899.6926064	821.1423	1263.962	1328.136	1054.759
30Aug2018 1:00:00	2018	851.0128857	814.162	1265.908	1296.202	1044.295
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30Aug2018 3:00:00	2018	818.137004	805.7525	1248.6	1254.798	1051.351
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30Aug2018 7:00:00	2018	1140.747774	878.1702	1309.814	1529.31	1061.996
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30Aug2018 9:00:00	2018	1267.804372	919.4551	1353.522	1686.395	1092.763
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30Aug2018 17:00:00	2018	1367.872162	971.6521	1392.741	1702.242	1121.205
30Aug2018 18:00:00	2018	1287.891764	953.977	1368.827	1632.724	1095.495
30Aug2018 19:00:00	2018	1236.089345	938.2545	1355.769	1627.656	1086.147
30Aug2018 20:00:00	2018	1236.751314	937.7159	1359.933	1626.147	1088.702
30Aug2018 21:00:00	2018	1201.398495	928.6847	1341.503	1574.013	1093.757
30Aug2018 22:00:00	2018	1086.292921	889.1692	1301.012	1455.16	1095.657
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31Aug2018 0:00:00	2018	891.0440453	827.754	1246.675	1326.891	1083.532
31Aug2018 1:00:00	2018	845.4684213	811.2273	1223.403	1272.186	1077.024
31Aug2018 2:00:00	2018	820.273538	803.6612	1198.181	1258.962	1092.307
31Aug2018 3:00:00	2018	810.5436618	805.2566	1181.702	1239.945	1103.016
31Aug2018 4:00:00	2018	829.0385613	814.2895	1203.481	1245.251	1093.504
31Aug2018 5:00:00	2018	893.9463925	830.0483	1214.334	1301.786	1071.544
31Aug2018 6:00:00	2018	1020.087445	858.5854	1247.139	1404.532	1074.184
31Aug2018 7:00:00	2018	1114.172789	889.058	1287.711	1502.587	1069.639
31Aug2018 8:00:00	2018	1190.230853	911.5029	1339.23	1588.666	1078.719

31Aug2018 9:00:00	2018	1249.020433	922.5491	1366.596	1685.265	1072.748
31Aug2018 10:00:00	2018	1295.101623	925.7839	1382.893	1719.923	1076.627
31Aug2018 11:00:00	2018	1336.858042	925.5478	1385.665	1750.412	1090.065
31Aug2018 12:00:00	2018	1356.002679	923.472	1373.282	1733.433	1098.331
31Aug2018 13:00:00	2018	1365.235372	925.7344	1369.218	1742.584	1104.36
31Aug2018 14:00:00	2018	1363.36452	924.582	1361.774	1729.629	1125.078
31Aug2018 15:00:00	2018	1350.886705	928.6603	1351.83	1684.489	1119.932
31Aug2018 16:00:00	2018	1329.661087	935.8964	1339.485	1667.991	1112.288
31Aug2018 17:00:00	2018	1308.717854	938.2326	1342.94	1659.455	1099.322
31Aug2018 18:00:00	2018	1238.166907	929.9946	1324.93	1623.341	1082.23
31Aug2018 19:00:00	2018	1179.943472	914.4637	1314.532	1588.437	1084.735
31Aug2018 20:00:00	2018	1174.681748	912.5717	1329.598	1621.314	1098.843
31Aug2018 21:00:00	2018	1141.310858	903.7698	1322.174	1580.906	1094.002
31Aug2018 22:00:00	2018	1049.784405	872.2857	1291.045	1488.212	1113.501
31Aug2018 23:00:00	2018	959.4213747	838.9583	1253.536	1400.544	1106.359
01Sep2018 0:00:00	2018	889.857102	817.4059	1230.565	1327.608	1104.655
01Sep2018 1:00:00	2018	840.7793474	804.5731	1216.944	1269.641	1107.295
01Sep2018 2:00:00	2018	812.3567416	795.6284	1212.528	1234.794	1110.533
01Sep2018 3:00:00	2018	798.8281323	790.3645	1210.806	1223.514	1109.05
01Sep2018 4:00:00	2018	800.100565	789.0173	1213.265	1209.939	1102.328
01Sep2018 5:00:00	2018	823.594565	791.1905	1210.778	1247.349	1084.665
01Sep2018 6:00:00	2018	865.3845609	804.3292	1216.098	1280.014	1087.611
01Sep2018 7:00:00	2018	909.2012013	816.1916	1230.378	1307.442	1074.799
01Sep2018 8:00:00	2018	982.9817382	842.7865	1242.938	1392.509	1075.378
01Sep2018 9:00:00	2018	1049.985653	861.4418	1258.964	1462.893	1110.7
01Sep2018 10:00:00	2018	1094.016849	863.8177	1255.854	1532.689	1122.284
01Sep2018 11:00:00	2018	1109.791492	866.534	1276.697	1539.151	1122.109
01Sep2018 12:00:00	2018	1122.37253	870.3651	1303.925	1531.052	1126.821
01Sep2018 13:00:00	2018	1126.217822	863.7895	1299.633	1500.496	1125.899
01Sep2018 14:00:00	2018	1123.88365	862.3297	1291.946	1493.537	1125.29
01Sep2018 15:00:00	2018	1118.792747	865.6336	1291.07	1482.1	1138.904
01Sep2018 16:00:00	2018	1119.010832	880.695	1298.185	1475.086	1136.295
01Sep2018 17:00:00	2018	1121.968972	895.5542	1326.723	1477.511	1136.881
01Sep2018 18:00:00	2018	1091.733543	891.206	1299.114	1442.632	1087.168
01Sep2018 19:00:00	2018	1065.247376	874.8425	1272.141	1411.149	1062.268
01Sep2018 20:00:00	2018	1077.391811	893.0576	1296.672	1424.971	1123.548
01Sep2018 21:00:00	2018	1062.621718	889.1298	1318.876	1424.848	1146.246
01Sep2018 22:00:00	2018	994.7733008	865.2841	1328.676	1386.816	1152.375
01Sep2018 23:00:00	2018	919.5815585	837.3927	1300.884	1326.848	1135.513
02Sep2018 0:00:00	2018	856.0695676	816.4763	1277.262	1271.33	1108.367
02Sep2018 1:00:00	2018	812.7643265	803.7466	1254.084	1205.051	1122.579
02Sep2018 2:00:00	2018	787.2937224	795.655	1236.702	1178.186	1116.087
02Sep2018 3:00:00	2018	776.2086678	791.9951	1244.519	1162.358	1100.678
02Sep2018 4:00:00	2018	777.8974592	792.7681	1239.238	1178.043	1088.02
02Sep2018 5:00:00	2018	794.4080721	799.5717	1240.368	1201.552	1109.335
02Sep2018 6:00:00	2018	828.4920452	811.4471	1245.712	1219.994	1119.093
02Sep2018 7:00:00	2018	856.2415528	820.7548	1246.979	1231.914	1094.527

02Sep2018 8:00:00	2018	913.7505983	840.1903	1261.38	1306.298	1094.75
02Sep2018 9:00:00	2018	977.2239255	846.1675	1276.921	1358.887	1078.884
02Sep2018 10:00:00	2018	1026.426384	851.0345	1279.138	1408.445	1058.032
02Sep2018 11:00:00	2018	1055.703499	857.9961	1298.372	1451.269	1052.62
02Sep2018 12:00:00	2018	1079.477373	862.0061	1301.051	1467.298	1042.344
02Sep2018 13:00:00	2018	1091.683887	854.8893	1303.078	1467.581	1037.244
02Sep2018 14:00:00	2018	1100.998915	856.9984	1296.694	1462.531	1047.149
02Sep2018 15:00:00	2018	1110.961199	862.0748	1296.533	1467.731	1058.424
02Sep2018 16:00:00	2018	1128.678442	872.2658	1310.748	1480.923	1074.273
02Sep2018 17:00:00	2018	1142.173616	882.2653	1394.21	1503.414	1087.978
02Sep2018 18:00:00	2018	1118.766802	883.1964	1408.078	1491.731	1079.686
02Sep2018 19:00:00	2018	1088.614773	877.8613	1393.84	1465.861	1071.227
02Sep2018 20:00:00	2018	1094.7673	881.1507	1361.984	1514.909	1062.454
02Sep2018 21:00:00	2018	1072.553309	875.6513	1318.639	1473.853	1042.591
02Sep2018 22:00:00	2018	1003.48788	843.9766	1297.508	1409.121	1033.561
02Sep2018 23:00:00	2018	924.1608822	813.2748	1261.551	1306.58	1036.075
03Sep2018 0:00:00	2018	860.5651354	791.699	1231.04	1244.676	1019.31
03Sep2018 1:00:00	2018	818.0637602	778.3237	1207.093	1201.463	1018.855
03Sep2018 2:00:00	2018	792.5700088	774.7243	1197.688	1188.246	1014.078
03Sep2018 3:00:00	2018	783.3076096	774.7154	1192.38	1203.472	1011.399
03Sep2018 4:00:00	2018	788.552368	777.917	1190.16	1177.072	1074.146
03Sep2018 5:00:00	2018	820.9042483	785.0482	1204.289	1194.855	1099.322
03Sep2018 6:00:00	2018	866.5332504	802.4142	1217.837	1232.242	1108.743
03Sep2018 7:00:00	2018	897.5599086	816.9113	1224.806	1267.462	1084.352
03Sep2018 8:00:00	2018	956.8005318	840.6059	1258.288	1321.569	1075.028
03Sep2018 9:00:00	2018	1042.502814	861.8162	1295.158	1398.576	1090.544
03Sep2018 10:00:00	2018	1124.059823	884.5229	1307.656	1480.147	1101.649
03Sep2018 11:00:00	2018	1167.430329	893.3178	1307.469	1532.705	1103.055
03Sep2018 12:00:00	2018	1167.44252	902.5484	1307.501	1544.201	1102.896
03Sep2018 13:00:00	2018	1154.594789	895.4457	1304.835	1555.155	1107.152
03Sep2018 14:00:00	2018	1153.26045	895.8043	1300.621	1534.048	1118.945
03Sep2018 15:00:00	2018	1159.783575	896.8058	1294.939	1539.899	1108.996
03Sep2018 16:00:00	2018	1194.224974	902.4092	1297.683	1549.536	1064.852
03Sep2018 17:00:00	2018	1212.449607	910.1979	1299.369	1563.065	1044.373
03Sep2018 18:00:00	2018	1173.224186	901.0342	1284.596	1535.361	1027.452
03Sep2018 19:00:00	2018	1159.440045	894.8743	1279.881	1511.709	1007.755
03Sep2018 20:00:00	2018	1171.091234	902.6809	1290.991	1531.729	1026.506
03Sep2018 21:00:00	2018	1113.155504	889.3467	1275.835	1508.815	1041.182
03Sep2018 22:00:00	2018	1008.345753	853.9944	1224.604	1415.511	1030.492
03Sep2018 23:00:00	2018	908.033392	819.7242	1186.623	1305.552	1015.471
04Sep2018 0:00:00	2018	845.5418023	804.0806	1161.558	1222.87	1002.329
04Sep2018 1:00:00	2018	807.6573765	789.6259	1159.327	1172.546	1003.287
04Sep2018 2:00:00	2018	787.7703149	785.1174	1142.808	1164.494	994.0727
04Sep2018 3:00:00	2018	784.1771595	785.7758	1128.772	1153.605	977.9225
04Sep2018 4:00:00	2018	808.0288058	792.862	1138.624	1173.505	983.5807
04Sep2018 5:00:00	2018	883.9133205	813.078	1167.716	1253.029	948.9879
04Sep2018 6:00:00	2018	1050.598926	858.2455	1231.898	1421.668	950.9539

04Sep2018 7:00:00	2018	1186.550482	906.5383	1289.203	1551.517	951.6908
04Sep2018 8:00:00	2018	1224.179934	927.852	1321.671	1595.671	972.2205
04Sep2018 9:00:00	2018	1262.391522	934.5666	1352.627	1621.733	973.6398
04Sep2018 10:00:00	2018	1289.190004	894.9154	1343.319	1646.303	998.7106
04Sep2018 11:00:00	2018	1302.257966	885.8044	1282.71	1610.28	998.77
04Sep2018 12:00:00	2018	1303.208209	888.1187	1307.793	1636.114	1000.361
04Sep2018 13:00:00	2018	1299.127085	882.4632	1362.625	1687.478	990.6917
04Sep2018 14:00:00	2018	1300.64351	883.474	1350.03	1700.982	991.378
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04Sep2018 16:00:00	2018	1315.948757	900.2603	1338.051	1671.383	998.2548
04Sep2018 17:00:00	2018	1320.695783	904.1991	1353.07	1667.864	1016.743
04Sep2018 18:00:00	2018	1253.602657	890.97	1349.104	1608.023	1005.349
04Sep2018 19:00:00	2018	1209.446336	919.3325	1339.143	1576.39	987.6558
04Sep2018 20:00:00	2018	1219.66808	932.9332	1350.247	1578.89	1001.887
04Sep2018 21:00:00	2018	1176.66748	923.4815	1332.662	1542.048	1017.564
04Sep2018 22:00:00	2018	1058.968136	884.8132	1295.504	1423.938	997.9852
04Sep2018 23:00:00	2018	948.7496065	849.8613	1263.924	1339.781	988.76
05Sep2018 0:00:00	2018	875.0755947	828.4859	1205.027	1245.186	988.4964
05Sep2018 1:00:00	2018	834.393324	816.7726	1165.714	1190.115	999.9746
05Sep2018 2:00:00	2018	815.4527678	808.8021	1158.328	1165.98	983.9593
05Sep2018 3:00:00	2018	809.9547701	808.5154	1159.741	1155.843	981.041
05Sep2018 4:00:00	2018	831.9837649	810.4085	1166.306	1167.926	978.0507
05Sep2018 5:00:00	2018	908.4687351	828.6618	1201.141	1246.109	985.2567
05Sep2018 6:00:00	2018	1069.938245	866.0106	1246.698	1386.229	986.943
05Sep2018 7:00:00	2018	1179.742293	900.322	1299.345	1517.154	992.9432
05Sep2018 8:00:00	2018	1211.691329	911.0925	1299.948	1573.802	1004.488
05Sep2018 9:00:00	2018	1241.914176	914.4842	1308.606	1622.322	1010.366
05Sep2018 10:00:00	2018	1271.850229	884.4411	1315.955	1675.254	1004.901
05Sep2018 11:00:00	2018	1307.326502	892.8736	1349.533	1711.467	982.7444
05Sep2018 12:00:00	2018	1338.618338	895.7852	1364.623	1736.026	977.9632
05Sep2018 13:00:00	2018	1360.13512	905.5619	1368.927	1758.881	982.1394
05Sep2018 14:00:00	2018	1368.382749	910.2874	1360.187	1738.497	989.7054
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06Sep2018 17:00:00	2018	1450.127831	939.4183	1312.432	1736.891	978.0664
06Sep2018 18:00:00	2018	1370.67196	942.8152	1355.149	1672.477	962.9212
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06Sep2018 22:00:00	2018	1114.760574	917.1369	1305.416	1487.416	978.5861
06Sep2018 23:00:00	2018	1000.756443	874.6534	1277.787	1419.739	960.8291
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07Sep2018 4:00:00	2018	836.0499012	823.6448	1217.38	1251.738	919.0773
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07Sep2018 22:00:00	2018	1123.137907	916.0993	1373.842	1545.395	989.3199
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08Sep2018 13:00:00	2018	1247.964946	942.2678	1348.86	1572.462	1107.901
08Sep2018 14:00:00	2018	1241.768087	946.1872	1358.381	1544.473	1125.059
08Sep2018 15:00:00	2018	1245.06032	954.6232	1367.767	1539.061	1115.681
08Sep2018 16:00:00	2018	1254.429265	961.4813	1373.905	1555.995	1119.591
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08Sep2018 18:00:00	2018	1214.833571	957.3075	1356.978	1514.086	1092.708
08Sep2018 19:00:00	2018	1169.693176	938.7264	1340.914	1478.286	1092.163
08Sep2018 20:00:00	2018	1168.968045	945.1887	1352.42	1537.18	1094.776
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08Sep2018 22:00:00	2018	1048.439251	898.2228	1315.993	1457.871	1042.183
08Sep2018 23:00:00	2018	963.0728002	866.4285	1293.016	1377.192	1056.426
09Sep2018 0:00:00	2018	891.6321562	839.6307	1279.55	1280.338	1041.346
09Sep2018 1:00:00	2018	842.7636309	822.2848	1233.935	1235.003	1023.394
09Sep2018 2:00:00	2018	813.2945392	812.4363	1224.545	1190.766	1023.659
09Sep2018 3:00:00	2018	798.6020641	808.9325	1230.371	1189.801	1042.89
09Sep2018 4:00:00	2018	796.2242377	811.0926	1225.525	1183.636	1046.531
09Sep2018 5:00:00	2018	811.6866009	817.7949	1240.081	1198.185	1067.348
09Sep2018 6:00:00	2018	850.3894128	826.9614	1254.387	1219.759	1071.245
09Sep2018 7:00:00	2018	881.3804553	834.7257	1251.802	1218.287	1058.245
09Sep2018 8:00:00	2018	951.7948957	854.2939	1264.57	1321.599	1075.328
09Sep2018 9:00:00	2018	1031.264905	870.8575	1419.619	1401.487	1085.569
09Sep2018 10:00:00	2018	1094.308714	882.5249	1463.09	1458.23	1093.232
09Sep2018 11:00:00	2018	1127.626059	886.021	1454.733	1496.381	1088.962
09Sep2018 12:00:00	2018	1143.75321	891.848	1460.292	1510.71	1083.355
09Sep2018 13:00:00	2018	1147.664495	893.862	1480.107	1489.948	1094.086
09Sep2018 14:00:00	2018	1154.317031	904.0078	1493.376	1468.57	1110.298
09Sep2018 15:00:00	2018	1169.577989	914.251	1517.874	1484.915	1115.945
09Sep2018 16:00:00	2018	1189.75255	928.8381	1539.511	1527.061	1104.972
09Sep2018 17:00:00	2018	1212.933794	943.8214	1543.627	1570.672	1101.737
09Sep2018 18:00:00	2018	1194.192441	939.7065	1529.648	1534.33	1074.066
09Sep2018 19:00:00	2018	1181.486903	931.1419	1545.106	1546.847	1062.37
09Sep2018 20:00:00	2018	1191.175345	932.8749	1566.685	1578.293	1013.716
09Sep2018 21:00:00	2018	1130.928721	909.5512	1549.348	1529.128	1004.75
09Sep2018 22:00:00	2018	1029.374515	871.0434	1503.908	1449.118	983.0284
09Sep2018 23:00:00	2018	929.8532935	835.4953	1467.471	1342.061	988.8653
10Sep2018 0:00:00	2018	861.8899653	814.3882	1444.337	1268.256	976.3513
10Sep2018 1:00:00	2018	825.4588934	805.2455	1439.53	1227.688	970.4211
10Sep2018 2:00:00	2018	804.8947191	805.008	1431.488	1194.194	968.4207
10Sep2018 3:00:00	2018	797.9294639	805.8307	1423.36	1210.396	973.167

10Sep2018 4:00:00	2018	819.8393456	809.3313	1417.716	1224.495	991.7671
10Sep2018 5:00:00	2018	897.6774927	821.8346	1417.618	1279.562	1001.489
10Sep2018 6:00:00	2018	1062.94082	861.361	1469.648	1433.653	984.5575
10Sep2018 7:00:00	2018	1186.601714	902.2645	1520.998	1594.629	981.2155
10Sep2018 8:00:00	2018	1222.655524	916.6325	1530.073	1655.581	990.7216
10Sep2018 9:00:00	2018	1255.934182	919.521	1520.691	1688.438	1013.207
10Sep2018 10:00:00	2018	1296.397926	914.1064	1533.205	1732.896	1027.09
10Sep2018 11:00:00	2018	1343.160677	906.9561	1540.261	1749.521	1032.715
10Sep2018 12:00:00	2018	1359.45151	884.4659	1559.534	1717.076	1010.766
10Sep2018 13:00:00	2018	1364.657661	907.1242	1561.715	1721.206	982.3825
10Sep2018 14:00:00	2018	1335.698875	912.3825	1562.934	1710.645	981.6303
10Sep2018 15:00:00	2018	1320.839726	909.927	1558.667	1707.349	977.5075
10Sep2018 16:00:00	2018	1333.004197	920.4565	1580.877	1717.388	973.5252
10Sep2018 17:00:00	2018	1339.694761	923.2242	1586.247	1742.468	986.8759
10Sep2018 18:00:00	2018	1260.229631	923.9545	1555.731	1676.723	969.9611
10Sep2018 19:00:00	2018	1238.48297	931.6198	1552.561	1633.403	958.1399
10Sep2018 20:00:00	2018	1249.078787	960.7627	1557.991	1657.324	961.0956
10Sep2018 21:00:00	2018	1183.856001	932.0052	1537.146	1607.455	960.3405
10Sep2018 22:00:00	2018	1065.45663	895.0497	1444.649	1462.289	952.1536
10Sep2018 23:00:00	2018	955.2338552	860.5296	1384.904	1334.064	954.6715
11Sep2018 0:00:00	2018	882.6214414	839.8381	1368.436	1279.181	937.2468
11Sep2018 1:00:00	2018	841.431797	826.3619	1346.052	1237.556	931.6785
11Sep2018 2:00:00	2018	819.0639039	818.2927	1386.286	1233.343	911.6156
11Sep2018 3:00:00	2018	814.4983423	818.5814	1397.939	1222.264	909.7961
11Sep2018 4:00:00	2018	835.9853343	823.4585	1403.018	1240.461	918.7071
11Sep2018 5:00:00	2018	913.84422	831.5148	1421.035	1303.731	929.5817
11Sep2018 6:00:00	2018	1079.290696	872.1087	1439.432	1437.215	946.4931
11Sep2018 7:00:00	2018	1197.876233	921.3273	1447.923	1524.633	951.0264
11Sep2018 8:00:00	2018	1227.366163	936.34	1472.145	1566.924	950.0091
11Sep2018 9:00:00	2018	1255.946796	934.206	1479.906	1589.466	966.0497
11Sep2018 10:00:00	2018	1287.950828	936.2967	1488.816	1623.618	974.2237
11Sep2018 11:00:00	2018	1318.660088	933.8046	1473.313	1648.585	975.813
11Sep2018 12:00:00	2018	1332.595539	932.6396	1462.347	1632.868	976.1136
11Sep2018 13:00:00	2018	1342.763852	936.6192	1467.336	1637.158	976.7702
11Sep2018 14:00:00	2018	1346.308887	941.4462	1461.661	1641.881	982.8407
11Sep2018 15:00:00	2018	1334.781392	941.2691	1504.653	1644.633	1009.472
11Sep2018 16:00:00	2018	1325.905016	942.161	1508.399	1661.89	1010.614
11Sep2018 17:00:00	2018	1336.007674	948.4598	1511.802	1652.59	1014.209
11Sep2018 18:00:00	2018	1274.144974	934.7083	1504.54	1607.925	1018.69
11Sep2018 19:00:00	2018	1233.495982	932.175	1497.303	1598.919	1029.941
11Sep2018 20:00:00	2018	1244.549439	946.4223	1506.776	1597.589	1035.046
11Sep2018 21:00:00	2018	1176.042998	929.2809	1481.471	1538.734	1029.68
11Sep2018 22:00:00	2018	1057.845044	883.2492	1431.197	1422.517	1017.576
11Sep2018 23:00:00	2018	951.5436365	844.9613	1385.438	1323.957	974.8859
12Sep2018 0:00:00	2018	878.581218	819.9825	1358.867	1269.22	1014.624
12Sep2018 1:00:00	2018	837.6567322	805.364	1352.845	1226.37	1008.817
12Sep2018 2:00:00	2018	818.7478906	800.2315	1355.725	1215.103	1029.379

12Sep2018 3:00:00	2018	814.3315651	797.7091	1337.022	1216.82	1009.109
12Sep2018 4:00:00	2018	834.1419087	801.8934	1337.329	1213.451	1010.384
12Sep2018 5:00:00	2018	911.794438	825.0373	1365.405	1282.56	1021.116
12Sep2018 6:00:00	2018	1081.896511	874.4356	1427.257	1433.569	1032.543
12Sep2018 7:00:00	2018	1213.89039	911.7657	1493.931	1581.759	1059.584
12Sep2018 8:00:00	2018	1246.783968	911.7244	1538.108	1627.583	1060.656
12Sep2018 9:00:00	2018	1278.560316	922.1555	1543.313	1679.246	1071.301
12Sep2018 10:00:00	2018	1310.696361	923.5766	1541.348	1702.812	1071.824
12Sep2018 11:00:00	2018	1325.448406	928.1122	1538.168	1727.646	1102.666
12Sep2018 12:00:00	2018	1313.411811	927.6923	1476.104	1721.462	1141.711
12Sep2018 13:00:00	2018	1302.723249	932.6252	1484.411	1724.684	1132.553
12Sep2018 14:00:00	2018	1291.901054	917.0415	1497.425	1715.179	1145.702
12Sep2018 15:00:00	2018	1292.564701	919.7121	1513.92	1723.821	1140.148
12Sep2018 16:00:00	2018	1307.857131	917.4061	1460.13	1743.062	1138.657
12Sep2018 17:00:00	2018	1326.153809	918.085	1442.091	1732.087	1134.872
12Sep2018 18:00:00	2018	1279.58258	915.9322	1434.29	1683.641	1116.612
12Sep2018 19:00:00	2018	1258.410287	945.7258	1459.875	1684.239	1124.545
12Sep2018 20:00:00	2018	1261.792488	959.2573	1514.651	1708.437	1138.121
12Sep2018 21:00:00	2018	1190.072778	936.8695	1447.93	1635.029	1134.986
12Sep2018 22:00:00	2018	1074.606492	898.0221	1410.144	1520.448	1132.95
12Sep2018 23:00:00	2018	971.2434668	870.5114	1421.298	1387.801	1133.007
13Sep2018 0:00:00	2018	899.3979724	846.8708	1399.76	1334.229	1117.57
13Sep2018 1:00:00	2018	858.5324383	831.8186	1370.446	1281.883	1083.824
13Sep2018 2:00:00	2018	838.5591778	821.2476	1338.768	1259.796	1086.672
13Sep2018 3:00:00	2018	835.4414759	824.1208	1350.502	1255.718	1097.082
13Sep2018 4:00:00	2018	858.5225185	826.3546	1360.665	1253.821	1105.188
13Sep2018 5:00:00	2018	939.0630531	843.8636	1405.902	1334.316	1120.332
13Sep2018 6:00:00	2018	1108.842399	890.4109	1449.584	1512.591	1139.515
13Sep2018 7:00:00	2018	1238.276399	921.5529	1496.206	1642.246	1145.938
13Sep2018 8:00:00	2018	1272.179776	927.4434	1547.088	1680.911	1139.605
13Sep2018 9:00:00	2018	1302.249956	937.1761	1526.952	1736.917	1131.591
13Sep2018 10:00:00	2018	1322.043302	939.6038	1527.046	1756.161	1143.292
13Sep2018 11:00:00	2018	1330.951596	940.3326	1522.169	1760.22	1126.618
13Sep2018 12:00:00	2018	1323.480304	929.6347	1519.214	1757.307	1108.019
13Sep2018 13:00:00	2018	1318.217474	930.0021	1514.601	1770.585	1098.812
13Sep2018 14:00:00	2018	1312.819302	927.6626	1523.077	1756.724	1094.278
13Sep2018 15:00:00	2018	1318.681585	925.8511	1541.546	1742.837	1066.248
13Sep2018 16:00:00	2018	1337.341887	940.498	1522.179	1749.576	1073.178
13Sep2018 17:00:00	2018	1349.505733	945.6048	1506.289	1743.978	1090.614
13Sep2018 18:00:00	2018	1311.653323	932.5793	1482.127	1669.525	1088.502
13Sep2018 19:00:00	2018	1282.441374	957.6283	1472.778	1644.152	1110.622
13Sep2018 20:00:00	2018	1279.614724	967.4189	1491.277	1676.766	1119.974
13Sep2018 21:00:00	2018	1208.846011	941.824	1494.037	1610.912	1121.252
13Sep2018 22:00:00	2018	1093.941756	903.706	1479.959	1500.172	1110.352
13Sep2018 23:00:00	2018	992.86322	875.5052	1434.45	1379.91	1129.701
14Sep2018 0:00:00	2018	921.6929339	863.4473	1413.113	1314.847	1130.791
14Sep2018 1:00:00	2018	878.4136435	854.1355	1416.361	1279.837	1120.531

14Sep2018 2:00:00	2018	858.3854569	847.9759	1409.682	1274.101	1118.379
14Sep2018 3:00:00	2018	852.4829712	841.463	1399.978	1257.886	1109.796
14Sep2018 4:00:00	2018	871.8056891	849.7603	1385.714	1271.215	1113.054
14Sep2018 5:00:00	2018	952.0545829	857.5488	1390.904	1335.007	1126.047
14Sep2018 6:00:00	2018	1115.109943	904.2575	1458.824	1450.788	1133.268
14Sep2018 7:00:00	2018	1252.044983	922.9481	1531.193	1596.403	1131.074
14Sep2018 8:00:00	2018	1294.496587	926.0148	1565.244	1652.802	1122.871
14Sep2018 9:00:00	2018	1326.460186	937.895	1550.468	1684.75	1111.4
14Sep2018 10:00:00	2018	1346.805152	937.7418	1551.249	1714.105	1107.858
14Sep2018 11:00:00	2018	1355.705567	934.0236	1556.91	1710.84	1113.613
14Sep2018 12:00:00	2018	1353.239184	929.0863	1567.594	1729.489	1116.412
14Sep2018 13:00:00	2018	1353.350265	927.3119	1569.797	1724.09	1127.385
14Sep2018 14:00:00	2018	1341.921466	912.76	1531.092	1711.76	1125.959
14Sep2018 15:00:00	2018	1331.143702	906.8741	1412.137	1701.094	1129.447
14Sep2018 16:00:00	2018	1323.609614	907.5008	1398.447	1692.283	1132.61
14Sep2018 17:00:00	2018	1313.310458	903.6887	1383.319	1669.929	1117.257
14Sep2018 18:00:00	2018	1263.038707	895.3457	1374.103	1619.675	1131.673
14Sep2018 19:00:00	2018	1242.798578	918.8756	1424.313	1613.558	1140.676
14Sep2018 20:00:00	2018	1230.405901	942.3084	1433.596	1656.164	1151.013
14Sep2018 21:00:00	2018	1171.28193	934.8278	1404.058	1594.405	1154.347
14Sep2018 22:00:00	2018	1079.124708	896.9849	1345.423	1515.973	1145.323
14Sep2018 23:00:00	2018	988.9445308	858.1932	1302.679	1413.347	1141.644
15Sep2018 0:00:00	2018	918.5873919	826.6434	1274.934	1353.319	1150.23
15Sep2018 1:00:00	2018	874.6133108	824.9574	1272.655	1287.552	1140.869
15Sep2018 2:00:00	2018	846.9808232	821.3583	1269.161	1290.812	1125.432
15Sep2018 3:00:00	2018	835.0367517	818.8244	1262.685	1240.989	1123.751
15Sep2018 4:00:00	2018	836.4987521	821.1985	1253.175	1241.027	1104.028
15Sep2018 5:00:00	2018	863.2407153	815.4319	1263.594	1304.271	1112.44
15Sep2018 6:00:00	2018	918.9914934	829.9846	1282.156	1337.773	1124.214
15Sep2018 7:00:00	2018	990.0965967	863.7025	1300.776	1401.806	1122.689
15Sep2018 8:00:00	2018	1072.513659	895.7553	1341.397	1465.834	1123.129
15Sep2018 9:00:00	2018	1145.800974	908.8839	1380.576	1542.46	1139.089
15Sep2018 10:00:00	2018	1188.394001	918.5833	1401.339	1603.388	1139.157
15Sep2018 11:00:00	2018	1211.869217	916.432	1408.849	1631.758	1136.277
15Sep2018 12:00:00	2018	1214.083823	904.1921	1397.849	1633.314	1134.485
15Sep2018 13:00:00	2018	1196.148275	896.3754	1389.637	1619.734	1115.701
15Sep2018 14:00:00	2018	1180.655389	906.6855	1398.245	1619.851	1105.311
15Sep2018 15:00:00	2018	1172.981102	906.7727	1397.591	1629.658	1115.369
15Sep2018 16:00:00	2018	1180.51143	911.7615	1402.872	1624.694	1130.305
15Sep2018 17:00:00	2018	1195.993698	913.808	1407.149	1618.685	1147.864
15Sep2018 18:00:00	2018	1183.101492	904.3499	1385.217	1583.557	1150.609
15Sep2018 19:00:00	2018	1173.332055	909.8616	1378.58	1577.992	1153.418
15Sep2018 20:00:00	2018	1166.518808	923.0972	1382.268	1579.978	1181.752
15Sep2018 21:00:00	2018	1118.107204	907.41	1348.08	1501.548	1181.194
15Sep2018 22:00:00	2018	1049.135984	881.5934	1315.661	1435.431	1165.166
15Sep2018 23:00:00	2018	969.7477162	851.1271	1289.145	1370.589	1156.246
16Sep2018 0:00:00	2018	906.2060469	823.3727	1259.08	1311.003	1152.853

16Sep2018 1:00:00	2018	859.6944131	808.6471	1242.661	1260.719	1141.164
16Sep2018 2:00:00	2018	831.5964655	805.6157	1236.278	1236.238	1131.764
16Sep2018 3:00:00	2018	820.5463992	799.8957	1229.306	1208.758	1121.833
16Sep2018 4:00:00	2018	821.0856876	800.2827	1234.189	1219.449	1113.976
16Sep2018 5:00:00	2018	841.1345071	812.5857	1238.199	1247.286	1108.145
16Sep2018 6:00:00	2018	884.8480741	829.4509	1261.963	1300.179	1107.609
16Sep2018 7:00:00	2018	935.8388946	847.8861	1279.309	1340.33	1106.579
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16Sep2018 9:00:00	2018	1076.413756	895.0608	1339.909	1502.419	1134.335
16Sep2018 10:00:00	2018	1134.205107	908.0563	1356.333	1555.334	1127.929
16Sep2018 11:00:00	2018	1167.948747	917.235	1372.706	1603.626	1123.356
16Sep2018 12:00:00	2018	1185.779956	916.8192	1378.161	1620.116	1111.43
16Sep2018 13:00:00	2018	1189.040584	908.2583	1369.798	1618.505	1107.084
16Sep2018 14:00:00	2018	1191.249151	907.9762	1355.687	1592.571	1102.754
16Sep2018 15:00:00	2018	1199.584931	905.1223	1354.204	1593.09	1101.24
16Sep2018 16:00:00	2018	1223.707358	913.2415	1360.491	1625.572	1100.049
16Sep2018 17:00:00	2018	1250.273502	915.4365	1370.448	1642.518	1123.25
16Sep2018 18:00:00	2018	1224.8617	903.7334	1364.957	1618.705	1126.905
16Sep2018 19:00:00	2018	1217.45277	910.2973	1364.697	1612.6	1128.279
16Sep2018 20:00:00	2018	1206.326913	910.3965	1381.025	1626.947	1140.326
16Sep2018 21:00:00	2018	1138.300537	896.1927	1354.793	1566.831	1138.775
16Sep2018 22:00:00	2018	1037.676985	870.2736	1311.846	1454.515	1118.307
16Sep2018 23:00:00	2018	940.5579887	842.5267	1278.522	1338.492	1121.297
17Sep2018 0:00:00	2018	875.9181695	824.3835	1260.445	1270.388	1115.684
17Sep2018 1:00:00	2018	837.9847894	815.1502	1233.284	1240.272	1108.156
17Sep2018 2:00:00	2018	821.7793376	809.7765	1233.642	1231.846	1108.221
17Sep2018 3:00:00	2018	822.950782	804.5054	1259.096	1263.163	1113.577
17Sep2018 4:00:00	2018	845.1845338	810.4541	1272.075	1276.224	1128.507
17Sep2018 5:00:00	2018	928.5228131	829.602	1296.277	1327.219	1157.721
17Sep2018 6:00:00	2018	1095.55581	879.7422	1347.895	1495.404	1181.796
17Sep2018 7:00:00	2018	1229.438661	909.8218	1382.223	1645.064	1191.149
17Sep2018 8:00:00	2018	1267.306448	905.1311	1401.831	1696.015	1181.116
17Sep2018 9:00:00	2018	1289.738654	905.3065	1413.328	1731.179	1167.758
17Sep2018 10:00:00	2018	1312.422607	902.3749	1417.008	1760.465	1153.382
17Sep2018 11:00:00	2018	1324.930409	893.0852	1409.729	1737.536	1140.803
17Sep2018 12:00:00	2018	1317.24787	892.6725	1349.315	1737.094	1119.443
17Sep2018 13:00:00	2018	1306.266757	891.5816	1362.862	1733.996	1109.439
17Sep2018 14:00:00	2018	1298.878584	886.2691	1383.35	1705.22	1112.822
17Sep2018 15:00:00	2018	1295.252849	882.0062	1384.088	1708.931	1098.156
17Sep2018 16:00:00	2018	1309.552091	895.4025	1361.705	1721.479	1103.827
17Sep2018 17:00:00	2018	1315.919756	899.6568	1361.18	1723.136	1124.078
17Sep2018 18:00:00	2018	1255.73706	913.8846	1366.517	1673.671	1122.659
17Sep2018 19:00:00	2018	1244.258129	921.5328	1369.499	1666.665	1146.536
17Sep2018 20:00:00	2018	1261.285629	938.1235	1375.889	1664.631	1176.212
17Sep2018 21:00:00	2018	1185.297681	912.0224	1346.527	1588.018	1174.242
17Sep2018 22:00:00	2018	1072.788959	882.6741	1321.16	1475.7	1156.409
17Sep2018 23:00:00	2018	967.3299042	859.6657	1278.408	1368.412	1144.097

18Sep2018 0:00:00	2018	898.9842334	828.1988	1257.338	1329.401	1119.206
18Sep2018 1:00:00	2018	855.3186117	816.7519	1236.559	1288.871	1100.216
18Sep2018 2:00:00	2018	834.4798909	811.3167	1232.143	1267.49	1109.539
18Sep2018 3:00:00	2018	832.0927161	807.041	1223.529	1256.306	1107.294
18Sep2018 4:00:00	2018	854.9854491	805.6151	1246.912	1267.08	1085.987
18Sep2018 5:00:00	2018	933.7426257	823.7165	1255.214	1333.191	1080.241
18Sep2018 6:00:00	2018	1103.483741	864.6539	1282.583	1489.806	1097.052
18Sep2018 7:00:00	2018	1248.613674	904.607	1286.096	1590.15	1120.628
18Sep2018 8:00:00	2018	1276.142001	919.4574	1299.001	1630.823	1092.65
18Sep2018 9:00:00	2018	1296.833961	922.9072	1297.492	1665.623	1047.195
18Sep2018 10:00:00	2018	1322.069433	923.6749	1300.301	1681.645	1060.905
18Sep2018 11:00:00	2018	1328.004186	924.4562	1292.163	1684.166	1060.444
18Sep2018 12:00:00	2018	1326.908033	917.7068	1273.513	1663.763	1049.046
18Sep2018 13:00:00	2018	1322.420439	915.3122	1282.159	1665.623	1051.07
18Sep2018 14:00:00	2018	1319.434733	919.7896	1277.735	1660.417	1048.271
18Sep2018 15:00:00	2018	1322.921609	913.6252	1270.659	1656.127	1043.421
18Sep2018 16:00:00	2018	1341.942918	922.963	1283.856	1663.458	1047.687
18Sep2018 17:00:00	2018	1359.164305	930.8746	1267.762	1651.912	1042.281
18Sep2018 18:00:00	2018	1322.794937	921.3109	1250.472	1601.984	1043.703
18Sep2018 19:00:00	2018	1309.156945	924.4688	1254.961	1591.535	1052.64
18Sep2018 20:00:00	2018	1286.19819	926.0341	1280.496	1640.981	1080.522
18Sep2018 21:00:00	2018	1203.011088	908.1411	1258.375	1571.022	1075.483
18Sep2018 22:00:00	2018	1085.95405	878.6112	1239.303	1458.53	1061.766
18Sep2018 23:00:00	2018	979.7168147	844.1127	1207.961	1354.063	1089.647
19Sep2018 0:00:00	2018	908.5687563	835.6484	1185.789	1300.257	1085.571
19Sep2018 1:00:00	2018	871.785269	820.8647	1201.108	1277.766	1081.311
19Sep2018 2:00:00	2018	852.243414	816.211	1191.271	1254.025	1081.426
19Sep2018 3:00:00	2018	845.6797302	816.2746	1210.248	1257.631	1086.064
19Sep2018 4:00:00	2018	868.4930989	821.6787	1203.197	1276.664	1057.16
19Sep2018 5:00:00	2018	944.7476742	842.4456	1208.216	1312.666	1018.669
19Sep2018 6:00:00	2018	1112.846526	880.8023	1265.248	1476.05	1038.497
19Sep2018 7:00:00	2018	1248.759802	921.942	1290.64	1601.261	1030.061
19Sep2018 8:00:00	2018	1280.869309	937.9018	1311.316	1613.808	1032.702
19Sep2018 9:00:00	2018	1298.78095	932.2581	1310.85	1633.094	1035.887
19Sep2018 10:00:00	2018	1315.549039	930.4076	1314.986	1653.502	1025.73
19Sep2018 11:00:00	2018	1324.639616	929.6914	1302.938	1686.439	1020.982
19Sep2018 12:00:00	2018	1318.749564	925.1302	1293.975	1680.352	1015.801
19Sep2018 13:00:00	2018	1317.616785	919.17	1288.847	1673.61	1026.704
19Sep2018 14:00:00	2018	1305.587711	914.0969	1291.834	1693.211	1041.762
19Sep2018 15:00:00	2018	1302.737224	914.2226	1278.541	1666.973	1072.627
19Sep2018 16:00:00	2018	1306.976388	920.0328	1278.913	1681.289	1074.074
19Sep2018 17:00:00	2018	1305.372711	926.0232	1320.935	1686.591	1082.37
19Sep2018 18:00:00	2018	1259.436655	919.1182	1327.892	1639.364	1073.378
19Sep2018 19:00:00	2018	1260.189523	929.9943	1345.676	1636.307	1075.917
19Sep2018 20:00:00	2018	1273.854732	937.7543	1350.329	1672.071	1101.158
19Sep2018 21:00:00	2018	1194.489928	925.2419	1317.922	1595.813	1046.844
19Sep2018 22:00:00	2018	1082.33471	902.7605	1253.325	1479.894	1025.742

19Sep2018 23:00:00	2018	978.4820567	868.5111	1207.349	1370.961	1021.963
20Sep2018 0:00:00	2018	902.3094916	844.543	1210.327	1310.423	1016.426
20Sep2018 1:00:00	2018	863.7966451	834.0547	1200.728	1279.19	1019.352
20Sep2018 2:00:00	2018	842.8786743	827.9585	1196.713	1243.723	1016.118
20Sep2018 3:00:00	2018	838.0293024	825.7058	1195.058	1246.119	1018.851
20Sep2018 4:00:00	2018	863.0252653	830.3699	1201.2	1249.656	1006.631
20Sep2018 5:00:00	2018	941.4530211	850.1404	1223.662	1307.214	1008.639
20Sep2018 6:00:00	2018	1109.933461	885.0116	1248.864	1468.917	1050.315
20Sep2018 7:00:00	2018	1237.291778	920.9651	1285.173	1559.21	1053.755
20Sep2018 8:00:00	2018	1263.386945	925.6179	1320.611	1632.643	1052.276
20Sep2018 9:00:00	2018	1291.252977	927.4728	1338.335	1645.521	1036.933
20Sep2018 10:00:00	2018	1311.121133	934.9961	1325.278	1683.684	1014.815
20Sep2018 11:00:00	2018	1325.149213	943.9741	1331.291	1703.983	1010.475
20Sep2018 12:00:00	2018	1319.147134	933.1881	1342.7	1744.368	998.4485
20Sep2018 13:00:00	2018	1326.480167	934.7759	1348.245	1747.158	977.823
20Sep2018 14:00:00	2018	1321.133107	935.32	1339.367	1739.927	978.7694
20Sep2018 15:00:00	2018	1316.319213	953.3181	1357.304	1742.589	983.3094
20Sep2018 16:00:00	2018	1321.082118	960.6172	1376.293	1739.772	995.695
20Sep2018 17:00:00	2018	1314.30359	943.9564	1351.052	1733.569	991.4072
20Sep2018 18:00:00	2018	1278.872888	936.5089	1333.383	1689.664	991.1074
20Sep2018 19:00:00	2018	1282.363835	944.6744	1351.505	1709.364	1014.684
20Sep2018 20:00:00	2018	1269.812457	941.7001	1364.491	1715.619	1051.255
20Sep2018 21:00:00	2018	1195.200633	963.6234	1338.139	1657.157	1041.185
20Sep2018 22:00:00	2018	1083.011485	927.8133	1292.58	1529.977	1029.304
20Sep2018 23:00:00	2018	982.3386144	894.2633	1254.147	1436.753	997.5552
21Sep2018 0:00:00	2018	910.0475147	870.2082	1232.082	1358.865	975.082
21Sep2018 1:00:00	2018	869.1853286	860.5768	1223.617	1326.373	976.9036
21Sep2018 2:00:00	2018	845.6660196	853.681	1269.956	1303.225	988.45
21Sep2018 3:00:00	2018	839.045028	850.9936	1261.306	1276.055	1005.103
21Sep2018 4:00:00	2018	861.7426678	855.0756	1268.627	1298.715	1025.749
21Sep2018 5:00:00	2018	937.4085539	870.0316	1273.136	1363.21	999.9767
21Sep2018 6:00:00	2018	1089.018286	910.7132	1304.029	1498.787	996.8826
21Sep2018 7:00:00	2018	1224.557072	952.8228	1362.03	1647.424	1011.746
21Sep2018 8:00:00	2018	1282.959708	947.2424	1406.532	1701.75	1014.584
21Sep2018 9:00:00	2018	1320.381638	902.0736	1394.801	1731.167	1057.141
21Sep2018 10:00:00	2018	1341.40845	905.4067	1392.627	1741.718	1079.053
21Sep2018 11:00:00	2018	1355.78644	901.9905	1398.823	1751.667	1072.891
21Sep2018 12:00:00	2018	1351.365419	896.0585	1390.907	1736.493	1066.166
21Sep2018 13:00:00	2018	1346.234466	898.0711	1377.286	1737.012	1039.017
21Sep2018 14:00:00	2018	1327.850476	903.0012	1372.975	1728.856	1031.045
21Sep2018 15:00:00	2018	1318.035067	906.8264	1366.178	1732.964	1037.848
21Sep2018 16:00:00	2018	1318.881353	909.2659	1376.901	1731.405	1050.854
21Sep2018 17:00:00	2018	1319.6612	909.5114	1351.782	1716.48	1057.996
21Sep2018 18:00:00	2018	1277.183966	904.3395	1352.585	1691.235	1045.868
21Sep2018 19:00:00	2018	1269.971893	931.656	1361.195	1668.807	1057.054
21Sep2018 20:00:00	2018	1246.397143	928.2884	1360.446	1654.118	1050.448
21Sep2018 21:00:00	2018	1182.068545	926.9973	1386.392	1575.44	1070.211

21Sep2018 22:00:00	2018	1091.817681	900.103	1348.692	1486	1071.047
21Sep2018 23:00:00	2018	1001.460892	873.7332	1307.63	1395.527	1073.198
22Sep2018 0:00:00	2018	931.7495613	853.1722	1265.113	1312.168	1071.94
22Sep2018 1:00:00	2018	885.65411	839.5687	1252.475	1272.488	1086.27
22Sep2018 2:00:00	2018	856.9482953	831.5727	1249.535	1247.493	1092.704
22Sep2018 3:00:00	2018	847.0799184	829.4432	1223.527	1228.841	1086.673
22Sep2018 4:00:00	2018	853.2625058	835.5055	1235.8	1251.931	1087.874
22Sep2018 5:00:00	2018	885.4832943	841.7916	1260.208	1291.456	1085.581
22Sep2018 6:00:00	2018	941.1005101	856.9432	1270.502	1368.293	1090.91
22Sep2018 7:00:00	2018	1008.858678	881.7706	1312.766	1432.767	1076.344
22Sep2018 8:00:00	2018	1083.419357	911.6731	1356.962	1496.129	1050.596
22Sep2018 9:00:00	2018	1153.254773	936.4462	1397.184	1576.248	1049.228
22Sep2018 10:00:00	2018	1198.15637	945.6799	1406.885	1643.583	1060.99
22Sep2018 11:00:00	2018	1218.134254	949.0582	1408.374	1659.339	1078.523
22Sep2018 12:00:00	2018	1221.551604	947.396	1420.185	1667.906	1079.388
22Sep2018 13:00:00	2018	1204.895898	939.777	1398.814	1624.264	1077.517
22Sep2018 14:00:00	2018	1195.758153	934.2943	1392.113	1628.502	1083.702
22Sep2018 15:00:00	2018	1190.955644	936.4539	1379.783	1577.931	1067.417
22Sep2018 16:00:00	2018	1195.06855	940.1433	1328.626	1592.289	1020.2
22Sep2018 17:00:00	2018	1217.396814	946.8128	1320.923	1589.529	1036.81
22Sep2018 18:00:00	2018	1198.680874	940.0366	1299.988	1567.213	1030.161
22Sep2018 19:00:00	2018	1195.897573	943.6724	1324.584	1592.856	1059.934
22Sep2018 20:00:00	2018	1180.195667	947.2428	1353.452	1607.558	1080.146
22Sep2018 21:00:00	2018	1131.431738	924.0828	1350.825	1545.974	1077.855
22Sep2018 22:00:00	2018	1060.790273	891.3449	1323.976	1467.925	1070.317
22Sep2018 23:00:00	2018	982.2881617	865.0245	1316.524	1400.994	1062.457
23Sep2018 0:00:00	2018	916.6250507	849.3988	1300.024	1345.51	1062.525
23Sep2018 1:00:00	2018	874.9382826	838.6215	1289.901	1322.54	1046.63
23Sep2018 2:00:00	2018	849.9395736	830.7806	1283.952	1281.74	1048.726
23Sep2018 3:00:00	2018	836.5352068	828.0445	1286.555	1281.482	1070.303
23Sep2018 4:00:00	2018	837.2489392	828.1296	1294.732	1272.998	1091.539
23Sep2018 5:00:00	2018	858.6441311	833.3826	1300.639	1285.105	1078.034
23Sep2018 6:00:00	2018	903.0111176	849.2378	1317.917	1318.426	1084.681
23Sep2018 7:00:00	2018	957.1167979	866.8155	1338.232	1370.823	1089.949
23Sep2018 8:00:00	2018	1018.139744	890.0762	1358.986	1433.979	1101.899
23Sep2018 9:00:00	2018	1079.495909	907.7362	1389.86	1490.231	1088.525
23Sep2018 10:00:00	2018	1132.560121	916.827	1411.606	1526.674	1099.272
23Sep2018 11:00:00	2018	1164.951424	920.7173	1414.067	1564.477	1095.244
23Sep2018 12:00:00	2018	1180.395452	919.0593	1400.085	1541.71	1097.268
23Sep2018 13:00:00	2018	1176.059421	905.154	1390.316	1527.242	1097.424
23Sep2018 14:00:00	2018	1172.697983	900.6182	1357.112	1518.542	1079.372
23Sep2018 15:00:00	2018	1168.872817	898.3326	1364.086	1524.459	1032.678
23Sep2018 16:00:00	2018	1190.261603	905.1764	1375.258	1574.893	1032.501
23Sep2018 17:00:00	2018	1225.116288	916.3261	1374.657	1581.243	1087.884
23Sep2018 18:00:00	2018	1223.919585	916.6686	1377.36	1574.368	1097.265
23Sep2018 19:00:00	2018	1230.215674	926.5816	1417.69	1618.554	1109.836
23Sep2018 20:00:00	2018	1216.459849	931.1843	1427.225	1627.331	1128.088

23Sep2018 21:00:00	2018	1148.145727	913.251	1397.187	1551.669	1127.668
23Sep2018 22:00:00	2018	1045.41701	881.1163	1356.208	1471.767	1118.497
23Sep2018 23:00:00	2018	950.7354723	849.3733	1316.581	1365.005	1113.434
24Sep2018 0:00:00	2018	888.5260148	830.7149	1306.97	1326.628	1105.81
24Sep2018 1:00:00	2018	851.5806199	823.2154	1284.699	1256.079	1101.391
24Sep2018 2:00:00	2018	834.0998992	818.307	1273.158	1227.244	1087.218
24Sep2018 3:00:00	2018	830.4593251	818.6603	1266.163	1220.509	1057.903
24Sep2018 4:00:00	2018	853.6069391	825.2508	1274.172	1239.902	1039.204
24Sep2018 5:00:00	2018	934.7065734	847.2079	1292.314	1314.054	1069.532
24Sep2018 6:00:00	2018	1103.969575	889.6896	1342.311	1486.729	1087.574
24Sep2018 7:00:00	2018	1244.105554	921.004	1391.775	1615.011	1094.193
24Sep2018 8:00:00	2018	1271.722874	938.8706	1414.303	1665.942	1084.265
24Sep2018 9:00:00	2018	1289.106191	932.6465	1434.152	1725.873	1063.772
24Sep2018 10:00:00	2018	1319.810691	930.2808	1440.318	1758.98	1049.08
24Sep2018 11:00:00	2018	1336.097525	927.7307	1405.797	1760.206	1046.657
24Sep2018 12:00:00	2018	1332.149426	930.8935	1410.139	1750.01	1043.629
24Sep2018 13:00:00	2018	1328.779337	937.3139	1375.314	1757.453	1043.038
24Sep2018 14:00:00	2018	1325.42816	921.0548	1364.307	1756.434	1033.995
24Sep2018 15:00:00	2018	1323.241622	912.3399	1369.701	1736.043	1027.806
24Sep2018 16:00:00	2018	1333.570749	902.4958	1383.919	1733.804	1032.582
24Sep2018 17:00:00	2018	1357.06137	902.0995	1368.639	1683.812	1042.401
24Sep2018 18:00:00	2018	1283.934167	898.6178	1345.119	1635.601	1043.559
24Sep2018 19:00:00	2018	1284.941362	931.6734	1402.697	1664.909	1052.111
24Sep2018 20:00:00	2018	1283.139721	937.086	1411.301	1677.953	1079.053
24Sep2018 21:00:00	2018	1202.740236	915.782	1382.352	1596.879	1104.926
24Sep2018 22:00:00	2018	1086.192663	890.5472	1334.364	1478.76	1110.587
24Sep2018 23:00:00	2018	977.367287	872.1746	1279.607	1373.501	1098.197
25Sep2018 0:00:00	2018	908.5745464	847.6611	1262.496	1306.321	1086.648
25Sep2018 1:00:00	2018	869.036657	838.8008	1253.617	1257.944	1060.066
25Sep2018 2:00:00	2018	849.0117336	833.0787	1260.156	1242.595	1058.292
25Sep2018 3:00:00	2018	844.7164921	827.1582	1271.361	1252.819	1061.216
25Sep2018 4:00:00	2018	870.0528732	833.6021	1282.953	1265.977	1057.72
25Sep2018 5:00:00	2018	949.656463	843.5067	1308.437	1325.558	1067.627
25Sep2018 6:00:00	2018	1120.286682	887.4199	1352.62	1470.767	1077.214
25Sep2018 7:00:00	2018	1251.436365	921.9636	1390.285	1611.412	1058.513
25Sep2018 8:00:00	2018	1276.088672	931.468	1405.533	1643.143	1053.975
25Sep2018 9:00:00	2018	1285.065813	926.1394	1402.846	1655.712	1055.974
25Sep2018 10:00:00	2018	1300.43067	900.7463	1416.549	1683.087	1039.465
25Sep2018 11:00:00	2018	1315.072307	891.1542	1420.144	1701.756	1033.484
25Sep2018 12:00:00	2018	1323.174412	875.4035	1408.461	1708.234	1032.618
25Sep2018 13:00:00	2018	1327.672949	871.2047	1366.805	1731.55	1043.867
25Sep2018 14:00:00	2018	1327.926077	870.3931	1376.506	1727.625	1044.587
25Sep2018 15:00:00	2018	1336.959883	880.1182	1306.786	1679.139	1036.762
25Sep2018 16:00:00	2018	1345.257403	892.8512	1328.928	1724.732	1036.38
25Sep2018 17:00:00	2018	1345.9863	883.4423	1350.751	1736.677	1041.566
25Sep2018 18:00:00	2018	1281.451024	886.4325	1332.916	1686.228	1031.124
25Sep2018 19:00:00	2018	1288.925713	911.4104	1374.652	1722.669	1041.635

25Sep2018 20:00:00	2018	1281.29078	934.6878	1382.345	1723.862	1062.801
25Sep2018 21:00:00	2018	1192.161701	911.2111	1361.733	1613.872	1055.207
25Sep2018 22:00:00	2018	1082.572347	884.9846	1298.236	1525.469	1043.151
25Sep2018 23:00:00	2018	973.8563758	848.8969	1263.854	1428.006	1013.634
26Sep2018 0:00:00	2018	900.627373	829.36	1238.69	1343.687	1001.396
26Sep2018 1:00:00	2018	859.6624578	821.9998	1240.377	1290.837	987.0605
26Sep2018 2:00:00	2018	841.0335136	822.9386	1243.529	1270.395	980.3376
26Sep2018 3:00:00	2018	836.680067	823.5238	1241.599	1254.361	994.7781
26Sep2018 4:00:00	2018	859.6441455	828.5692	1239.259	1266.204	992.8551
26Sep2018 5:00:00	2018	939.6802168	847.4792	1227.544	1340.246	1001.237
26Sep2018 6:00:00	2018	1109.136534	896.4277	1276.044	1497.329	1018.548
26Sep2018 7:00:00	2018	1252.659786	940.8012	1326.103	1638.03	1003.607
26Sep2018 8:00:00	2018	1285.423207	939.9492	1335.454	1681.941	1000.226
26Sep2018 9:00:00	2018	1302.930431	944.3905	1350.273	1708.675	992.9737
26Sep2018 10:00:00	2018	1319.09516	942.8442	1326.082	1730.374	980.1718
26Sep2018 11:00:00	2018	1326.583703	926.5888	1285.55	1716.674	977.5076
26Sep2018 12:00:00	2018	1335.871439	906.471	1288.786	1709.182	977.6864
26Sep2018 13:00:00	2018	1341.012928	904.38	1349.895	1733.876	992.1773
26Sep2018 14:00:00	2018	1338.060966	891.9691	1349.709	1731.351	999.6947
26Sep2018 15:00:00	2018	1336.184117	897.0903	1334.19	1696.886	1014.754
26Sep2018 16:00:00	2018	1349.561108	910.9315	1341.769	1726.199	1024.58
26Sep2018 17:00:00	2018	1355.536165	912.4089	1335.72	1711.463	1015.52
26Sep2018 18:00:00	2018	1299.331571	914.5551	1325.681	1685.2	1022.427
26Sep2018 19:00:00	2018	1300.013229	946.5237	1354.724	1712.556	1044.015
26Sep2018 20:00:00	2018	1272.026969	949.915	1366.235	1693.547	1082.522
26Sep2018 21:00:00	2018	1190.107644	944.1776	1350.9	1617.119	1082.508
26Sep2018 22:00:00	2018	1077.88648	905.8786	1306.799	1507.396	1076.824
26Sep2018 23:00:00	2018	974.2522531	866.3981	1263.115	1397.769	1061.066
27Sep2018 0:00:00	2018	905.7476158	857.2406	1243.331	1307.477	1042.718
27Sep2018 1:00:00	2018	862.4472841	844.7851	1240.765	1281.438	1034.426
27Sep2018 2:00:00	2018	840.1471486	836.3424	1241.823	1267.252	1045.748
27Sep2018 3:00:00	2018	834.4500364	834.742	1249.695	1268.908	1054.403
27Sep2018 4:00:00	2018	858.3288483	833.2182	1256.546	1294.33	1049.336
27Sep2018 5:00:00	2018	940.063155	845.9371	1270.247	1364.834	1058.783
27Sep2018 6:00:00	2018	1110.962061	882.7318	1316.841	1521.407	1072.469
27Sep2018 7:00:00	2018	1263.105622	923.7418	1374.038	1662.072	1077.016
27Sep2018 8:00:00	2018	1302.371056	915.6152	1404.491	1691.613	1033.383
27Sep2018 9:00:00	2018	1324.298974	922.7339	1423.27	1738.181	1031.211
27Sep2018 10:00:00	2018	1342.536563	928.3815	1416.625	1740.86	1019.457
27Sep2018 11:00:00	2018	1350.889455	928.1521	1410.142	1724.378	1007.269
27Sep2018 12:00:00	2018	1352.597072	916.1628	1403.202	1706.324	997.6276
27Sep2018 13:00:00	2018	1347.631641	906.3108	1393.647	1712.565	990.225
27Sep2018 14:00:00	2018	1332.115488	900.2978	1397.994	1689.251	1016.882
27Sep2018 15:00:00	2018	1328.606834	897.3066	1383.032	1677.871	1028.644
27Sep2018 16:00:00	2018	1340.495828	902.6475	1398.914	1707.341	1027.156
27Sep2018 17:00:00	2018	1347.949488	905.9689	1398.94	1688.865	1051.784
27Sep2018 18:00:00	2018	1294.908463	907.4454	1390.535	1672.817	1061.529

27Sep2018 19:00:00	2018	1293.986606	934.3976	1421.431	1734.396	1070.24
27Sep2018 20:00:00	2018	1283.420483	945.6733	1427.139	1729.988	1065.548
27Sep2018 21:00:00	2018	1208.119287	926.374	1395.016	1616.015	1056.827
27Sep2018 22:00:00	2018	1096.10618	902.892	1343.934	1529.189	1051.87
27Sep2018 23:00:00	2018	993.0747796	869.4088	1309.924	1419.746	1034.123
28Sep2018 0:00:00	2018	922.5654518	849.2355	1281.973	1345.567	1032.219
28Sep2018 1:00:00	2018	879.9112134	836.3527	1264.424	1314.201	1025.485
28Sep2018 2:00:00	2018	856.315688	829.1277	1259.435	1293.919	1025.727
28Sep2018 3:00:00	2018	851.9561964	828.1499	1251.61	1256.235	1027.122
28Sep2018 4:00:00	2018	873.4319739	834.2486	1258.943	1259.492	1011.177
28Sep2018 5:00:00	2018	947.9142002	853.7136	1278.774	1315.004	1010.597
28Sep2018 6:00:00	2018	1110.607681	890.6444	1322.578	1477.695	1018.211
28Sep2018 7:00:00	2018	1248.582244	928.6733	1357.964	1615.19	1027.215
28Sep2018 8:00:00	2018	1281.839435	930.1649	1379.025	1635.795	1013.699
28Sep2018 9:00:00	2018	1303.622017	928.6386	1406.035	1684.257	1034.586
28Sep2018 10:00:00	2018	1311.145894	925.1796	1421.157	1730.843	1019.743
28Sep2018 11:00:00	2018	1307.320549	916.8033	1422.144	1733.517	980.8474
28Sep2018 12:00:00	2018	1307.026941	909.5862	1428.409	1736.615	959.827
28Sep2018 13:00:00	2018	1306.655369	905.7761	1417.056	1726.917	959.5653
28Sep2018 14:00:00	2018	1299.325658	912.1211	1412.638	1721.176	960.5979
28Sep2018 15:00:00	2018	1293.96624	913.2297	1414.037	1700.331	961.2924
28Sep2018 16:00:00	2018	1293.810537	915.598	1415.938	1693.603	962.8391
28Sep2018 17:00:00	2018	1286.642078	929.575	1404.486	1689.171	1003.233
28Sep2018 18:00:00	2018	1233.047483	927.3737	1400.436	1659.596	1030.371
28Sep2018 19:00:00	2018	1246.531002	933.3922	1414.196	1665.456	1041.152
28Sep2018 20:00:00	2018	1229.340206	930.7385	1406.616	1676.452	1044.404
28Sep2018 21:00:00	2018	1169.917609	913.3472	1396.365	1611.634	1048.906
28Sep2018 22:00:00	2018	1080.926237	890.357	1347.592	1492.761	1038.879
28Sep2018 23:00:00	2018	996.2396658	876.4448	1309.256	1398.03	1048.495
29Sep2018 0:00:00	2018	926.4975214	847.1082	1292.59	1343.539	1042.74
29Sep2018 1:00:00	2018	880.993604	830.2096	1270.897	1310.753	1026.408
29Sep2018 2:00:00	2018	855.5009741	824.1627	1250.59	1283.357	1024.375
29Sep2018 3:00:00	2018	843.4389698	814.2789	1249.964	1250.38	1030.356
29Sep2018 4:00:00	2018	846.2392895	811.7846	1245.276	1251.694	1021.386
29Sep2018 5:00:00	2018	876.9698829	821.8573	1247.512	1267.58	1011.581
29Sep2018 6:00:00	2018	934.7694851	840.9833	1244.04	1301.265	1011.987
29Sep2018 7:00:00	2018	1015.84344	876.0267	1286.318	1415.856	1011.371
29Sep2018 8:00:00	2018	1087.266729	909.2226	1338.508	1485.634	1018.8
29Sep2018 9:00:00	2018	1144.617902	929.4358	1382.456	1533.679	1042.41
29Sep2018 10:00:00	2018	1182.619141	928.4474	1386.711	1598.814	1057.081
29Sep2018 11:00:00	2018	1204.597011	927.0721	1386.75	1623.212	1038.302
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29Sep2018 13:00:00	2018	1199.796211	918.1742	1376.445	1624.07	982.3725
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29Sep2018 16:00:00	2018	1193.118364	932.7666	1387.677	1627.849	1078.346
29Sep2018 17:00:00	2018	1212.72374	942.3341	1403.055	1609.676	1081.747

29Sep2018 18:00:00	2018	1206.344419	944.8491	1389.202	1606.129	1092.577
29Sep2018 19:00:00	2018	1205.190438	940.9477	1385.43	1602.948	1109.37
29Sep2018 20:00:00	2018	1188.447954	944.3964	1402.02	1576.711	1102.977
29Sep2018 21:00:00	2018	1135.768129	924.7537	1396.183	1531.356	1096.957
29Sep2018 22:00:00	2018	1065.943715	896.9279	1362.939	1453.073	1097.413
29Sep2018 23:00:00	2018	986.1597932	862.1922	1336.395	1403.584	1018.335
30Sep2018 0:00:00	2018	926.0079232	853.2277	1324.488	1346.837	1058.574
30Sep2018 1:00:00	2018	882.4969284	835.7058	1281.308	1302.737	1054.054
30Sep2018 2:00:00	2018	855.6828898	823.7204	1257.956	1279.628	1040.127
30Sep2018 3:00:00	2018	847.8740017	817.1325	1254.881	1249.036	1034.232
30Sep2018 4:00:00	2018	850.8999687	817.5977	1257.797	1258.214	1034.218
30Sep2018 5:00:00	2018	876.3658805	831.4146	1275.684	1281.009	1032.755
30Sep2018 6:00:00	2018	926.2436541	850.4403	1301.086	1343.436	1046.221
30Sep2018 7:00:00	2018	988.0573459	877.3323	1325.2	1394.954	1061.048
30Sep2018 8:00:00	2018	1045.599465	901.1354	1349.954	1456.953	1067.844
30Sep2018 9:00:00	2018	1115.267399	923.7652	1358.62	1512.469	1055.063
30Sep2018 10:00:00	2018	1171.654102	935.6052	1445.907	1548.092	1044.165
30Sep2018 11:00:00	2018	1202.210537	946.4989	1454.972	1560.272	1049.506
30Sep2018 12:00:00	2018	1217.857685	947.2814	1451.053	1583.591	1054.224
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30Sep2018 14:00:00	2018	1209.413318	941.1483	1450.568	1559.409	1051.306
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30Sep2018 17:00:00	2018	1295.813751	975.587	1393.927	1610.514	1066.464
30Sep2018 18:00:00	2018	1277.413431	968.2816	1401.804	1616.452	1049.731
30Sep2018 19:00:00	2018	1284.026621	976.191	1431.275	1681.675	1057.385
30Sep2018 20:00:00	2018	1257.289938	962.4552	1413.2	1685.15	1053.519
30Sep2018 21:00:00	2018	1184.006596	934.3946	1379.166	1607.091	1040.483
30Sep2018 22:00:00	2018	1077.629718	895.8031	1341.652	1499.679	1018.555
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01Oct2018 0:00:00	2018	913.6337817	846.6432	1265.233	1313.798	1012.104
01Oct2018 1:00:00	2018	876.2150747	838.9178	1275.263	1281.378	1006.202
01Oct2018 2:00:00	2018	856.3653097	834.5427	1272.441	1245.084	1002.483
01Oct2018 3:00:00	2018	853.088682	834.2765	1267.77	1251.19	1009.986
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01Oct2018 11:00:00	2018	1381.746557	920.4973	1432.471	1759.911	1040.954
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02Oct2018 0:00:00	2018	943.8084414	839.4458	1241.749	1352.937	1045.303
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02Oct2018 3:00:00	2018	879.828344	835.2437	1246.797	1256.462	1065.902
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02Oct2018 18:00:00	2018	1354.513345	926.8287	1403.654	1694.103	1109.195
02Oct2018 19:00:00	2018	1373.187787	941.3348	1385.51	1711.683	1136.792
02Oct2018 20:00:00	2018	1341.317498	933.2071	1376.852	1723.574	1153.694
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02Oct2018 22:00:00	2018	1130.510536	881.4665	1353.423	1541.412	1126.649
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03Oct2018 0:00:00	2018	953.7497453	857.1716	1264.769	1332.953	1095.458
03Oct2018 1:00:00	2018	915.5652539	848.7321	1237.082	1299.624	1098.111
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03Oct2018 3:00:00	2018	892.9325298	849.4924	1244.406	1253.298	1081.36
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03Oct2018 12:00:00	2018	1340.857889	908.6758	1377.098	1687.943	1099.973
03Oct2018 13:00:00	2018	1332.591467	899.5505	1379.966	1681.836	1108.504
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03Oct2018 23:00:00	2018	1019.862884	865.7716	1297.536	1385.049	1114.521
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04Oct2018 16:00:00	2018	1319.874116	897.9587	1378.468	1679.313	1030.753
04Oct2018 17:00:00	2018	1327.872002	904.5985	1367.946	1702.877	1022.771
04Oct2018 18:00:00	2018	1289.687841	907.186	1351.507	1682.417	1036.019
04Oct2018 19:00:00	2018	1328.424318	928.4063	1364.859	1698.198	1060.212
04Oct2018 20:00:00	2018	1320.826821	930.5512	1361.695	1680.249	1064.768
04Oct2018 21:00:00	2018	1245.141112	909.1563	1301.145	1620.774	1116.539
04Oct2018 22:00:00	2018	1129.391269	907.4084	1312.603	1544.24	1118.315
04Oct2018 23:00:00	2018	1025.993487	888.2421	1293.413	1447.232	1107.305
05Oct2018 0:00:00	2018	954.9403022	864.9268	1289.103	1373.962	1108.299
05Oct2018 1:00:00	2018	919.6339043	850.9801	1284.359	1327.124	1032.52
05Oct2018 2:00:00	2018	898.3267077	843.9378	1276.476	1308.937	1084.56
05Oct2018 3:00:00	2018	893.0693153	844.9682	1275.08	1293.946	1098.618
05Oct2018 4:00:00	2018	912.0258048	847.2287	1281.86	1295.312	1090.171
05Oct2018 5:00:00	2018	985.9421612	866.272	1302.118	1375.722	1094.612
05Oct2018 6:00:00	2018	1136.558782	902.9028	1348.206	1516.133	1075.019
05Oct2018 7:00:00	2018	1267.6427	937.6565	1391.877	1646.347	1073.687
05Oct2018 8:00:00	2018	1313.827598	945.1904	1393.019	1646.781	1079.637
05Oct2018 9:00:00	2018	1333.736225	936.0693	1406.399	1684.872	1076.696
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05Oct2018 11:00:00	2018	1340.409306	927.6771	1406.851	1669.935	1083.437
05Oct2018 12:00:00	2018	1336.195709	918.5233	1401.041	1648.357	1070.348
05Oct2018 13:00:00	2018	1328.582138	901.3574	1370.802	1644.338	1075.253
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05Oct2018 17:00:00	2018	1300.330723	916.2686	1343.609	1571.27	1085.552
05Oct2018 18:00:00	2018	1267.921883	919.3985	1337.424	1552.307	1106.038
05Oct2018 19:00:00	2018	1291.261902	938.9913	1396.301	1642.989	1119.932
05Oct2018 20:00:00	2018	1264.991193	931.5421	1402.901	1632.735	1128.1
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06Oct2018 6:00:00	2018	969.4320381	863.0613	1281.259	1299.987	1089.805
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06Oct2018 9:00:00	2018	1151.54077	909.8155	1290.662	1543.237	1124.925
06Oct2018 10:00:00	2018	1185.11873	917.7576	1307.004	1584.518	1133.349
06Oct2018 11:00:00	2018	1199.352824	919.3041	1308.686	1590.544	1109.467
06Oct2018 12:00:00	2018	1198.896864	923.0617	1336.821	1618.712	1094.755
06Oct2018 13:00:00	2018	1186.6464	910.2135	1319.519	1593.017	1103.938
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06Oct2018 15:00:00	2018	1161.258931	895.7909	1302.081	1567.187	1104.218
06Oct2018 16:00:00	2018	1163.642315	904.4396	1331.159	1561.391	1118.256
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06Oct2018 19:00:00	2018	1184.227747	930.1882	1355.502	1590.119	1141.39
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06Oct2018 21:00:00	2018	1130.096624	903.9575	1330.527	1513.599	1132.275
06Oct2018 22:00:00	2018	1064.430503	881.0706	1298.623	1420.337	1123.173
06Oct2018 23:00:00	2018	993.9053617	856.9083	1256.781	1363.733	1117.748
07Oct2018 0:00:00	2018	936.1067148	838.9881	1210.49	1288.151	1113.004
07Oct2018 1:00:00	2018	891.4551491	827.0117	1232.82	1235.425	1133.354
07Oct2018 2:00:00	2018	864.956166	819.9777	1260.52	1208.82	1139.026
07Oct2018 3:00:00	2018	855.1904463	820.3454	1260.83	1195.996	1149.183
07Oct2018 4:00:00	2018	859.4982161	825.4342	1260.95	1203.434	1164.905
07Oct2018 5:00:00	2018	879.4675655	835.311	1263.96	1224.239	1151.961
07Oct2018 6:00:00	2018	922.81032	860.856	1292.163	1288.681	1163.954
07Oct2018 7:00:00	2018	979.7228522	884.5354	1311.988	1352.24	1160.133
07Oct2018 8:00:00	2018	1030.250323	900.2801	1318.913	1397.961	1163.2
07Oct2018 9:00:00	2018	1086.593193	913.055	1364.367	1459.555	1166.953
07Oct2018 10:00:00	2018	1130.810275	911.1717	1388.239	1525.08	1183.03
07Oct2018 11:00:00	2018	1157.863021	909.4094	1386.234	1554.026	1193.57
07Oct2018 12:00:00	2018	1175.669047	907.5198	1396.683	1543.338	1202.067
07Oct2018 13:00:00	2018	1176.10623	903.5638	1376.423	1545.244	1198.48

07Oct2018 14:00:00	2018	1169.179588	898.022	1358.298	1540.383	1209.652
07Oct2018 15:00:00	2018	1164.626163	900.0427	1339.681	1523.833	1190.799
07Oct2018 16:00:00	2018	1161.556154	902.7451	1341.732	1557.336	1189.237
07Oct2018 17:00:00	2018	1143.772726	898.4337	1342.842	1528.127	1196.028
07Oct2018 18:00:00	2018	1105.363957	896.715	1336.524	1502.933	1207.958
07Oct2018 19:00:00	2018	1137.246762	922.3121	1369.026	1550.469	1221.869
07Oct2018 20:00:00	2018	1129.396197	927.411	1366.506	1532.191	1225.661
07Oct2018 21:00:00	2018	1099.008865	913.4862	1353.244	1485.846	1222.448
07Oct2018 22:00:00	2018	1040.879727	887.9298	1322.285	1422.436	1228.955
07Oct2018 23:00:00	2018	971.0035112	862.1884	1286.116	1345.871	1243.282
08Oct2018 0:00:00	2018	913.2854101	846.9079	1269.682	1292.339	1229.613
08Oct2018 1:00:00	2018	874.6986577	832.0502	1264.39	1249.687	1213.155
08Oct2018 2:00:00	2018	853.171352	831.093	1263.023	1227.804	1216.459
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08Oct2018 12:00:00	2018	1277.251409	972.7465	1420.718	1660.068	1170.945
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08Oct2018 16:00:00	2018	1280.377689	962.6468	1421.595	1644.645	1075.162
08Oct2018 17:00:00	2018	1302.841421	959.7679	1423.745	1674.483	1080.558
08Oct2018 18:00:00	2018	1283.533988	957.7444	1410.865	1637.993	1077.001
08Oct2018 19:00:00	2018	1294.271378	973.5813	1426.297	1661.706	1099.145
08Oct2018 20:00:00	2018	1260.476384	983.5839	1417.357	1635.277	1098.847
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08Oct2018 22:00:00	2018	1089.474005	925.6748	1347.787	1514.53	1116.934
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09Oct2018 1:00:00	2018	901.3450327	869.8338	1283.097	1313.474	1144.919
09Oct2018 2:00:00	2018	884.9775822	865.1758	1272.868	1293.653	1161.835
09Oct2018 3:00:00	2018	882.9517759	866.2833	1272.392	1294.365	1153.489
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09Oct2018 7:00:00	2018	1297.489706	935.7531	1394.469	1672.507	1185.965
09Oct2018 8:00:00	2018	1318.939866	946.6502	1390.759	1704.536	1172.342
09Oct2018 9:00:00	2018	1348.652143	955.9197	1401.215	1723.821	1251.347
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09Oct2018 11:00:00	2018	1382.583662	963.8073	1398.194	1747.395	1232.703
09Oct2018 12:00:00	2018	1379.547711	955.9415	1387.73	1749.475	1223.257

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10Oct2018 17:00:00	2018	1391.28372	928.0734	1378.93	1776.411	1165.989
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11Oct2018 22:00:00	2018	1108.57519	894.1102	1344.288	1557.268	1224.508
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13Oct2018 7:00:00	2018	1062.827692	888.3247	1332.109	1475.28	1184.536
13Oct2018 8:00:00	2018	1139.776408	926.0879	1364.383	1522.234	1201.818
13Oct2018 9:00:00	2018	1201.731613	950.2097	1372.869	1603.021	1241.249
13Oct2018 10:00:00	2018	1244.661422	944.9812	1396.137	1651.523	1242.571

13Oct2018 11:00:00	2018	1270.399548	936.2803	1351.986	1678.954	1236.906
13Oct2018 12:00:00	2018	1270.654804	949.7397	1395.314	1672.985	1230.867
13Oct2018 13:00:00	2018	1251.387913	944.5897	1396.197	1644.21	1241.441
13Oct2018 14:00:00	2018	1232.47123	934.1536	1379.051	1597.458	1249.982
13Oct2018 15:00:00	2018	1228.192876	931.7802	1374.708	1591.506	1250.381
13Oct2018 16:00:00	2018	1251.268522	959.9778	1374.176	1593.646	1244.374
13Oct2018 17:00:00	2018	1271.659837	976.7115	1393.2	1607.934	1250.038
13Oct2018 18:00:00	2018	1259.621882	969.3001	1408.98	1594.489	1248.105
13Oct2018 19:00:00	2018	1263.296955	966.9392	1366.578	1647.422	1268.069
13Oct2018 20:00:00	2018	1226.051673	954.5579	1351.29	1617.371	1251.671
13Oct2018 21:00:00	2018	1178.432181	932.3615	1340.893	1561.613	1219.657
13Oct2018 22:00:00	2018	1107.274104	909.1318	1305.297	1476.53	1226.035
13Oct2018 23:00:00	2018	1025.2511	881.4431	1292.004	1426.371	1221.819
14Oct2018 0:00:00	2018	959.3429046	858.3228	1320.817	1379.373	1218.931
14Oct2018 1:00:00	2018	914.0556163	844.7333	1313.545	1348.588	1214.757
14Oct2018 2:00:00	2018	886.039059	837.6362	1304.944	1311.561	1222.328
14Oct2018 3:00:00	2018	873.7471368	838.2456	1306.217	1301.541	1216.776
14Oct2018 4:00:00	2018	878.7057042	843.748	1302.61	1277.374	1215.803
14Oct2018 5:00:00	2018	902.9549842	854.0951	1308.485	1284.526	1216.991
14Oct2018 6:00:00	2018	950.6067461	868.7509	1328.678	1337.612	1227.005
14Oct2018 7:00:00	2018	1016.174028	874.7711	1344.433	1409.981	1222.85
14Oct2018 8:00:00	2018	1063.883	881.6461	1378.325	1456.829	1241.349
14Oct2018 9:00:00	2018	1119.521938	888.9044	1400.704	1531.513	1239.427
14Oct2018 10:00:00	2018	1157.79718	882.7718	1414.811	1568.592	1254.103
14Oct2018 11:00:00	2018	1178.446155	874.2639	1401.821	1588.413	1265.957
14Oct2018 12:00:00	2018	1188.614907	874.6011	1414.649	1614.636	1257.539
14Oct2018 13:00:00	2018	1184.203973	864.0334	1407.411	1603.663	1277.699
14Oct2018 14:00:00	2018	1177.066998	863.7841	1394.957	1572.189	1298.622
14Oct2018 15:00:00	2018	1179.925725	870.0603	1388.137	1548.047	1294.283
14Oct2018 16:00:00	2018	1205.172109	881.323	1397.523	1580.846	1299.206
14Oct2018 17:00:00	2018	1229.067617	896.9151	1395.649	1627.612	1285.652
14Oct2018 18:00:00	2018	1234.250936	901.2307	1402.85	1635.394	1304.868
14Oct2018 19:00:00	2018	1282.00354	922.6133	1414.101	1677.177	1337.305
14Oct2018 20:00:00	2018	1248.475491	916.4818	1409.765	1669.728	1331.159
14Oct2018 21:00:00	2018	1179.763066	893.4324	1371.765	1586.79	1323.124
14Oct2018 22:00:00	2018	1072.24753	864.879	1319.214	1476.464	1321.941
14Oct2018 23:00:00	2018	974.5054142	838.1526	1269.599	1368.155	1315.609
15Oct2018 0:00:00	2018	907.3148286	820.9074	1249.589	1273.592	1306.475
15Oct2018 1:00:00	2018	871.6302395	811.4291	1239.031	1220.082	1295.856
15Oct2018 2:00:00	2018	853.3221318	806.7667	1227.853	1183.302	1285.065
15Oct2018 3:00:00	2018	850.2590362	806.5845	1228.541	1174.8	1279.196
15Oct2018 4:00:00	2018	874.4489196	811.8833	1231.918	1200.616	1274.672
15Oct2018 5:00:00	2018	960.7632332	833.2336	1265.286	1296.56	1320.748
15Oct2018 6:00:00	2018	1131.745228	875.2745	1327.624	1450.594	1341.197
15Oct2018 7:00:00	2018	1289.003062	886.0821	1398.535	1628.015	1360.775
15Oct2018 8:00:00	2018	1303.370674	890.2932	1390.143	1658.853	1369.451
15Oct2018 9:00:00	2018	1320.282185	888.6099	1364.468	1676.492	1373.937

15Oct2018 10:00:00	2018	1348.095301	886.2063	1358.186	1703.321	1347.883
15Oct2018 11:00:00	2018	1353.511476	880.173	1337.985	1713.606	1334.147
15Oct2018 12:00:00	2018	1360.296139	871.4205	1336.142	1720.255	1318.336
15Oct2018 13:00:00	2018	1370.836211	878.1991	1369.602	1716.038	1337.625
15Oct2018 14:00:00	2018	1367.887755	876.4751	1372.023	1724.947	1435.648
15Oct2018 15:00:00	2018	1368.520352	871.338	1371.611	1737.925	1468.848
15Oct2018 16:00:00	2018	1364.951422	883.5683	1361.109	1723.875	1418.24
15Oct2018 17:00:00	2018	1363.721476	889.4218	1346.636	1721.86	1392.526
15Oct2018 18:00:00	2018	1327.622449	898.9796	1348.321	1699.149	1407.402
15Oct2018 19:00:00	2018	1341.750277	917.1578	1366.884	1710.85	1405.454
15Oct2018 20:00:00	2018	1289.425211	907.4258	1370.247	1652.111	1402.534
15Oct2018 21:00:00	2018	1200.109404	892.4203	1354.015	1565.92	1407.807
15Oct2018 22:00:00	2018	1082.755593	869.3307	1289.907	1456.303	1390.491
15Oct2018 23:00:00	2018	978.3945522	846.589	1257.594	1366.834	1371.229
16Oct2018 0:00:00	2018	908.4471711	817.6306	1253.736	1304.955	1365.833
16Oct2018 1:00:00	2018	870.1079449	809.6839	1248.364	1273.811	1356.334
16Oct2018 2:00:00	2018	851.393699	802.4187	1243.276	1253.991	1367.212
16Oct2018 3:00:00	2018	846.1383306	805.2988	1235.097	1220.411	1357.791
16Oct2018 4:00:00	2018	871.4156003	806.0281	1235.956	1234.659	1380.963
16Oct2018 5:00:00	2018	953.6466092	815.241	1222.356	1304.572	1386.443
16Oct2018 6:00:00	2018	1129.53213	860.0177	1268.422	1465.674	1380.447
16Oct2018 7:00:00	2018	1280.104846	888.7096	1353.255	1667.619	1322.588
16Oct2018 8:00:00	2018	1298.564203	896.1356	1333.364	1686.896	1305.747
16Oct2018 9:00:00	2018	1302.138257	893.2987	1355.776	1698.408	1281.113
16Oct2018 10:00:00	2018	1313.336457	883.3151	1334.749	1714.388	1282.201
16Oct2018 11:00:00	2018	1327.039967	880.1948	1336.162	1718.519	1259.705
16Oct2018 12:00:00	2018	1336.618051	874.8104	1333.178	1710.151	1247.298
16Oct2018 13:00:00	2018	1348.728527	863.9021	1333.678	1712.048	1260.871
16Oct2018 14:00:00	2018	1352.857471	866.3184	1329.401	1710.697	1260.519
16Oct2018 15:00:00	2018	1358.03953	868.4265	1327.039	1713.453	1276.944
16Oct2018 16:00:00	2018	1365.94054	877.3374	1335.777	1721.534	1268.399
16Oct2018 17:00:00	2018	1365.724625	883.9315	1301.286	1710.097	1350.154
16Oct2018 18:00:00	2018	1322.475195	879.7321	1288.687	1689.826	1385.799
16Oct2018 19:00:00	2018	1340.968676	897.2853	1357.547	1726.576	1394.94
16Oct2018 20:00:00	2018	1291.164441	889.7168	1353.938	1677.283	1405.755
16Oct2018 21:00:00	2018	1203.570971	867.408	1338.187	1593.586	1377.779
16Oct2018 22:00:00	2018	1084.157519	871.3363	1291.815	1457.099	1371.503
16Oct2018 23:00:00	2018	978.4583706	859.3725	1254.292	1353.215	1369.372
17Oct2018 0:00:00	2018	905.6026435	838.9025	1225.016	1281.165	1373.72
17Oct2018 1:00:00	2018	862.5418243	828.5801	1218.837	1235.012	1372.776
17Oct2018 2:00:00	2018	846.3306833	820.6019	1213.605	1211.444	1380.948
17Oct2018 3:00:00	2018	842.1332017	824.2951	1209.497	1206.029	1383.303
17Oct2018 4:00:00	2018	865.2220672	829.6786	1212	1215.988	1373.129
17Oct2018 5:00:00	2018	947.8354029	852.6008	1234.446	1287.872	1367.823
17Oct2018 6:00:00	2018	1121.686522	883.6556	1283.795	1449.985	1357.823
17Oct2018 7:00:00	2018	1271.009817	891.4675	1318.284	1640.414	1358.54
17Oct2018 8:00:00	2018	1288.549739	883.8819	1357.488	1674.278	1351.374

17Oct2018 9:00:00	2018	1297.700129	877.7421	1326.035	1680.648	1356.918
17Oct2018 10:00:00	2018	1318.20385	877.6261	1299.21	1695.617	1408.274
17Oct2018 11:00:00	2018	1339.357285	873.206	1297.324	1689.102	1409.698
17Oct2018 12:00:00	2018	1348.644785	867.4322	1282.96	1694.91	1341.452
17Oct2018 13:00:00	2018	1372.225475	870.9368	1292.39	1709.718	1341.203
17Oct2018 14:00:00	2018	1378.154384	868.1617	1278.79	1717.684	1325.074
17Oct2018 15:00:00	2018	1389.338746	866.0186	1272.766	1726.184	1329.461
17Oct2018 16:00:00	2018	1395.974173	874.3822	1293.069	1733.56	1341.775
17Oct2018 17:00:00	2018	1390.537748	873.7087	1290.229	1730.811	1255.7
17Oct2018 18:00:00	2018	1335.364934	886.8382	1341.212	1708.307	1245.668
17Oct2018 19:00:00	2018	1344.687552	919.9314	1382.837	1742.367	1279.397
17Oct2018 20:00:00	2018	1293.147086	922.0168	1380.663	1694.045	1295.88
17Oct2018 21:00:00	2018	1203.110796	916.9869	1353.971	1606.493	1302.356
17Oct2018 22:00:00	2018	1086.607843	884.7799	1310.364	1485.484	1255.576
17Oct2018 23:00:00	2018	981.3505967	854.6077	1270.279	1374.241	1244.118
18Oct2018 0:00:00	2018	910.56797	832.7681	1245.031	1312.005	1236.494
18Oct2018 1:00:00	2018	867.3253826	822.0594	1223.813	1257.169	1227.579
18Oct2018 2:00:00	2018	846.7802737	816.593	1216.31	1225.01	1223.92
18Oct2018 3:00:00	2018	842.8802669	811.3375	1212.151	1218.526	1205.335
18Oct2018 4:00:00	2018	863.1732299	821.0931	1212.89	1220.876	1183.105
18Oct2018 5:00:00	2018	941.5016522	841.0174	1232.904	1279.982	1165.444
18Oct2018 6:00:00	2018	1110.534543	884.7524	1265.226	1432.754	1161.228
18Oct2018 7:00:00	2018	1263.696839	935.8382	1308.072	1605.394	1201.124
18Oct2018 8:00:00	2018	1285.511213	930.5422	1319.178	1645.761	1228.169
18Oct2018 9:00:00	2018	1303.9246	926.235	1354.123	1670.273	1208.602
18Oct2018 10:00:00	2018	1325.69131	918.1801	1358.619	1690.065	1216.755
18Oct2018 11:00:00	2018	1350.368774	918.7351	1350.754	1717.622	1222.593
18Oct2018 12:00:00	2018	1347.617225	909.081	1346.788	1734.738	1217.806
18Oct2018 13:00:00	2018	1345.998696	912.0967	1351.218	1741.441	1200.596
18Oct2018 14:00:00	2018	1342.419721	904.2135	1346.756	1757.612	1198.934
18Oct2018 15:00:00	2018	1342.021045	900.4845	1339.798	1744.437	1201.177
18Oct2018 16:00:00	2018	1343.658017	910.9243	1339.452	1727.666	1203.298
18Oct2018 17:00:00	2018	1344.528976	912.1074	1349.525	1713.722	1206.353
18Oct2018 18:00:00	2018	1317.895261	917.5042	1351.621	1702.402	1227.299
18Oct2018 19:00:00	2018	1330.62871	927.2605	1367.413	1734.179	1232.353
18Oct2018 20:00:00	2018	1284.602854	909.9371	1340.459	1688.697	1229.596
18Oct2018 21:00:00	2018	1193.486634	882.9242	1330.841	1606.892	1230.726
18Oct2018 22:00:00	2018	1076.560413	869.4691	1304.367	1516.922	1219.015
18Oct2018 23:00:00	2018	974.158471	865.3087	1253.128	1378.255	1210.197
19Oct2018 0:00:00	2018	906.1290944	847.3057	1219.828	1317.413	1213.202
19Oct2018 1:00:00	2018	867.4924282	840.0815	1208.372	1269.517	1215.203
19Oct2018 2:00:00	2018	847.8601392	833.6705	1177.948	1243.801	1221.017
19Oct2018 3:00:00	2018	844.6610803	838.4656	1181.806	1245.974	1214.687
19Oct2018 4:00:00	2018	865.6630402	841.2323	1211.387	1271.722	1196.41
19Oct2018 5:00:00	2018	944.7925751	854.4867	1236.688	1322.059	1207.703
19Oct2018 6:00:00	2018	1110.794785	896.0411	1283.736	1525.895	1216.075
19Oct2018 7:00:00	2018	1263.049802	932.638	1353.576	1690.112	1240.324

19Oct2018 8:00:00	2018	1286.737296	940.5704	1367.663	1699.946	1236.912
19Oct2018 9:00:00	2018	1298.076548	928.3215	1353.837	1745.499	1270.777
19Oct2018 10:00:00	2018	1305.744938	911.6512	1358.278	1739.406	1253.435
19Oct2018 11:00:00	2018	1313.137099	894.6197	1353.411	1763.899	1256.409
19Oct2018 12:00:00	2018	1314.0303	876.2735	1337.855	1732.977	1287.027
19Oct2018 13:00:00	2018	1315.148811	884.1999	1345.451	1715.343	1289.098
19Oct2018 14:00:00	2018	1308.676535	888.2852	1367.374	1724.243	1293.208
19Oct2018 15:00:00	2018	1303.194109	892.6302	1373.588	1675.963	1210.636
19Oct2018 16:00:00	2018	1296.249446	898.9518	1376.169	1671.632	1234.339
19Oct2018 17:00:00	2018	1289.816722	895.1003	1368.445	1666.109	1247.622
19Oct2018 18:00:00	2018	1251.796601	894.98	1382.537	1651.795	1285.456
19Oct2018 19:00:00	2018	1268.60195	912.6969	1416.776	1679.322	1384.357
19Oct2018 20:00:00	2018	1223.738908	906.1133	1413.879	1688.476	1393.853
19Oct2018 21:00:00	2018	1155.314416	916.1332	1395.804	1608.452	1389.138
19Oct2018 22:00:00	2018	1070.023389	890.6571	1366.688	1517.685	1376.62
19Oct2018 23:00:00	2018	984.3376497	868.0962	1328.054	1434.286	1373.735
20Oct2018 0:00:00	2018	917.7935371	850.728	1300.15	1344.973	1339.046
20Oct2018 1:00:00	2018	873.5637395	831.7402	1296.033	1302.576	1363.6
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20Oct2018 4:00:00	2018	836.8958158	828.9036	1280.722	1257.352	1335.297
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20Oct2018 6:00:00	2018	929.1018764	855.5786	1307.084	1352.039	1354.695
20Oct2018 7:00:00	2018	1012.007524	869.0208	1343.823	1434.357	1354.173
20Oct2018 8:00:00	2018	1082.565653	888.7686	1359.008	1498.429	1356.112
20Oct2018 9:00:00	2018	1146.893458	899.8231	1384.207	1544.821	1339.106
20Oct2018 10:00:00	2018	1179.285854	895.7513	1392.966	1589.331	1324.911
20Oct2018 11:00:00	2018	1207.172185	882.5437	1380.246	1602.977	1328.003
20Oct2018 12:00:00	2018	1216.679563	872.7892	1366.232	1571.407	1281.697
20Oct2018 13:00:00	2018	1207.061069	867.0364	1368.701	1558.643	1262.794
20Oct2018 14:00:00	2018	1186.889427	863.0066	1366.726	1550.493	1260.026
20Oct2018 15:00:00	2018	1177.436997	861.8388	1349.996	1535.948	1313.68
20Oct2018 16:00:00	2018	1178.934826	870.2984	1367.141	1543.225	1322.798
20Oct2018 17:00:00	2018	1185.439792	878.7994	1378.92	1564.235	1340.876
20Oct2018 18:00:00	2018	1185.918358	888.378	1392.886	1580.387	1366.817
20Oct2018 19:00:00	2018	1198.848882	906.3382	1413.479	1603.648	1399.676
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20Oct2018 21:00:00	2018	1105.710769	877.5966	1362.918	1517.914	1407.032
20Oct2018 22:00:00	2018	1036.872719	848.6245	1344.982	1461.098	1366.773
20Oct2018 23:00:00	2018	959.0537218	840.1505	1330.817	1391.833	1367.769
21Oct2018 0:00:00	2018	897.5989133	827.2987	1313.692	1325.128	1342.409
21Oct2018 1:00:00	2018	850.3592345	822.6609	1300.244	1273.17	1331.475
21Oct2018 2:00:00	2018	827.6282404	822.5861	1299.285	1249.879	1341.595
21Oct2018 3:00:00	2018	819.3520211	824.2026	1282.497	1239.246	1341.828
21Oct2018 4:00:00	2018	822.8213452	825.5041	1293.504	1238.178	1348.805
21Oct2018 5:00:00	2018	847.5246691	825.6547	1306.357	1257.4	1352.316
21Oct2018 6:00:00	2018	899.9451947	838.9872	1314.071	1302.166	1347.472

21Oct2018 7:00:00	2018	967.6161515	863.5978	1345.472	1374.191	1350.608
21Oct2018 8:00:00	2018	1024.142652	879.6517	1367.954	1420.203	1355.804
21Oct2018 9:00:00	2018	1077.272641	881.6074	1379.048	1472.901	1351.45
21Oct2018 10:00:00	2018	1116.476759	882.5474	1379.775	1522.16	1336.045
21Oct2018 11:00:00	2018	1140.247916	878.0333	1395.29	1556.904	1308.371
21Oct2018 12:00:00	2018	1154.647802	874.1954	1407.212	1583.279	1314.382
21Oct2018 13:00:00	2018	1153.938454	863.8719	1405.481	1578.235	1327.337
21Oct2018 14:00:00	2018	1149.39657	858.0986	1393.214	1575.674	1308.76
21Oct2018 15:00:00	2018	1155.58728	865.6734	1388.387	1581.902	1307.546
21Oct2018 16:00:00	2018	1180.663807	884.3294	1398.549	1598.44	1333.554
21Oct2018 17:00:00	2018	1214.786612	901.1047	1412.548	1640.241	1341.805
21Oct2018 18:00:00	2018	1232.870031	916.1879	1436.246	1674.097	1336.475
21Oct2018 19:00:00	2018	1257.122638	934.0119	1468.843	1717.877	1351.485
21Oct2018 20:00:00	2018	1216.391564	924.3689	1416.766	1648.621	1350.318
21Oct2018 21:00:00	2018	1144.520747	905.4603	1386.523	1565.554	1342.65
21Oct2018 22:00:00	2018	1044.659779	872.8482	1346.902	1459.852	1316.764
21Oct2018 23:00:00	2018	947.6373874	848.0468	1332.324	1375.802	1286.334
22Oct2018 0:00:00	2018	884.1176657	839.982	1313.74	1295.126	1265.426
22Oct2018 1:00:00	2018	853.066785	846.2549	1306.092	1261.656	1263.45
22Oct2018 2:00:00	2018	839.1661799	844.4918	1309.692	1256.298	1260.81
22Oct2018 3:00:00	2018	836.612367	846.432	1312.649	1250.453	1267.124
22Oct2018 4:00:00	2018	864.1883153	856.1488	1315.358	1261.735	1266.67
22Oct2018 5:00:00	2018	953.6240338	871.0031	1337.584	1328.499	1275.449
22Oct2018 6:00:00	2018	1125.666697	913.8762	1391.492	1498.319	1297.201
22Oct2018 7:00:00	2018	1283.106742	949.4428	1456.847	1681.387	1296.324
22Oct2018 8:00:00	2018	1310.51495	943.6916	1461.076	1713.014	1287.852
22Oct2018 9:00:00	2018	1311.999972	940.4847	1480.554	1701.305	1305.491
22Oct2018 10:00:00	2018	1322.281304	920.6994	1453.299	1757.801	1296.194
22Oct2018 11:00:00	2018	1333.753908	910.8573	1436.433	1750.588	1273.387
22Oct2018 12:00:00	2018	1330.460564	909.7283	1424.482	1768.654	1255.364
22Oct2018 13:00:00	2018	1326.843793	908.548	1432.26	1779.78	1245.134
22Oct2018 14:00:00	2018	1325.447102	905.7577	1423.486	1780.041	1247.083
22Oct2018 15:00:00	2018	1329.739795	905.7605	1432.056	1770.229	1240.676
22Oct2018 16:00:00	2018	1337.188797	920.286	1438.88	1761.766	1241.394
22Oct2018 17:00:00	2018	1345.694757	914.8162	1404.544	1740.624	1245.239
22Oct2018 18:00:00	2018	1326.769294	913.5988	1420.382	1715.853	1272.222
22Oct2018 19:00:00	2018	1336.60421	927.4632	1429.763	1734.28	1296.528
22Oct2018 20:00:00	2018	1279.586439	939.7034	1406.915	1683.058	1280.808
22Oct2018 21:00:00	2018	1193.901167	919.0342	1396.799	1613.879	1274.548
22Oct2018 22:00:00	2018	1076.742993	879.1745	1360.305	1518.351	1269.933
22Oct2018 23:00:00	2018	976.0742592	848.4312	1324.282	1417.728	1270.657
23Oct2018 0:00:00	2018	909.6608574	839.9683	1306.835	1363.536	1256.703
23Oct2018 1:00:00	2018	871.3377315	836.2219	1301.352	1326.805	1249.883
23Oct2018 2:00:00	2018	852.5560301	829.0543	1297.149	1299.766	1245.672
23Oct2018 3:00:00	2018	848.1594446	831.4994	1287.983	1294.304	1243.38
23Oct2018 4:00:00	2018	877.8688787	828.9379	1293.158	1304.219	1259.142
23Oct2018 5:00:00	2018	965.4678459	846.8949	1307.568	1385.91	1256.364

23Oct2018 6:00:00	2018	1135.949806	888.5982	1355.681	1549.424	1270.987
23Oct2018 7:00:00	2018	1292.294606	921.0399	1414.785	1693.473	1272.6
23Oct2018 8:00:00	2018	1309.915787	928.3032	1427.167	1716.841	1263.212
23Oct2018 9:00:00	2018	1307.72922	926.951	1416.427	1719.728	1251.714
23Oct2018 10:00:00	2018	1317.333253	918.6786	1406.357	1720.377	1255.761
23Oct2018 11:00:00	2018	1324.757557	914.5002	1398.061	1725.032	1277.373
23Oct2018 12:00:00	2018	1332.212774	905.2157	1384.81	1708.911	1281.363
23Oct2018 13:00:00	2018	1346.186229	895.5654	1373.006	1707.69	1282.234
23Oct2018 14:00:00	2018	1347.455668	897.366	1383.209	1712.056	1255.905
23Oct2018 15:00:00	2018	1355.104386	901.0097	1377.736	1715.974	1249.793
23Oct2018 16:00:00	2018	1363.194303	914.9245	1376.913	1722.187	1241.137
23Oct2018 17:00:00	2018	1363.349128	922.3132	1376.457	1695.799	1237.225
23Oct2018 18:00:00	2018	1330.350852	949.0158	1401.734	1739.366	1261.459
23Oct2018 19:00:00	2018	1331.231713	968.9464	1421.603	1754.7	1278.742
23Oct2018 20:00:00	2018	1276.398598	957.1641	1409.119	1727.855	1290.222
23Oct2018 21:00:00	2018	1192.360383	927.8475	1374.621	1653.429	1298.189
23Oct2018 22:00:00	2018	1072.908297	899.0925	1343.229	1542.39	1288.811
23Oct2018 23:00:00	2018	973.6363714	881.7529	1308.84	1435.001	1283.411
24Oct2018 0:00:00	2018	902.0265344	869.5411	1286.279	1361.957	1260.743
24Oct2018 1:00:00	2018	861.5948354	846.048	1270.812	1321.393	1262.776
24Oct2018 2:00:00	2018	842.6458245	835.3521	1281.748	1303.027	1263.013
24Oct2018 3:00:00	2018	836.6782692	832.5954	1276.291	1291.008	1266.282
24Oct2018 4:00:00	2018	859.3458194	838.0078	1288.653	1309.75	1248.241
24Oct2018 5:00:00	2018	945.1214205	851.752	1303.232	1384.751	1257.075
24Oct2018 6:00:00	2018	1121.457318	891.1774	1355.212	1547.77	1259.017
24Oct2018 7:00:00	2018	1276.880427	944.1013	1414.218	1730.968	1257.517
24Oct2018 8:00:00	2018	1301.061419	922.3757	1410.36	1753.442	1248.211
24Oct2018 9:00:00	2018	1303.617805	915.7299	1391.789	1756.751	1234.046
24Oct2018 10:00:00	2018	1318.402347	907.9561	1394.068	1751.408	1217.238
24Oct2018 11:00:00	2018	1340.528268	912.9896	1391.188	1720.153	1210.588
24Oct2018 12:00:00	2018	1351.875888	917.5806	1390.277	1703.357	1218.639
24Oct2018 13:00:00	2018	1357.744193	913.2688	1384.824	1699.169	1220.072
24Oct2018 14:00:00	2018	1352.853157	911.434	1380.916	1706.405	1218.859
24Oct2018 15:00:00	2018	1354.322453	908.4221	1388.667	1707.322	1219.259
24Oct2018 16:00:00	2018	1372.469405	909.6903	1394.95	1734.571	1220.595
24Oct2018 17:00:00	2018	1387.061569	906.7842	1406.264	1735.051	1217.742
24Oct2018 18:00:00	2018	1346.533544	911.4829	1431.107	1771.091	1242.539
24Oct2018 19:00:00	2018	1335.649105	923.9698	1442.825	1781.465	1256.468
24Oct2018 20:00:00	2018	1284.031525	914.0165	1425.014	1737.939	1252.537
24Oct2018 21:00:00	2018	1195.095365	918.2552	1390.796	1653.394	1236.765
24Oct2018 22:00:00	2018	1085.482479	899.539	1327.622	1517.036	1231.994
24Oct2018 23:00:00	2018	979.4254292	877.5378	1282.567	1411.942	1218.001
25Oct2018 0:00:00	2018	910.5996461	858.9507	1289.965	1354.184	1206.485
25Oct2018 1:00:00	2018	872.0965356	846.9068	1280.059	1295.792	1211.399
25Oct2018 2:00:00	2018	854.3575581	846.5168	1270.498	1267.412	1221.102
25Oct2018 3:00:00	2018	851.1466406	845.3302	1256.538	1252.606	1225.822
25Oct2018 4:00:00	2018	878.025966	850.8167	1261.817	1266.64	1240.91

25Oct2018 5:00:00	2018	965.0082657	870.3707	1273.967	1343.978	1251.262
25Oct2018 6:00:00	2018	1129.521303	902.1203	1326.673	1506.396	1266.209
25Oct2018 7:00:00	2018	1282.672422	954.0218	1401.636	1676.154	1274.974
25Oct2018 8:00:00	2018	1307.772267	950.7195	1424.148	1742.368	1240.173
25Oct2018 9:00:00	2018	1308.295258	946.3471	1435.873	1756.806	1219.056
25Oct2018 10:00:00	2018	1320.215717	941.5771	1414.388	1735.959	1226.279
25Oct2018 11:00:00	2018	1339.462439	935.0552	1418.71	1753.008	1235.956
25Oct2018 12:00:00	2018	1349.568407	926.6213	1419.706	1749.593	1207.226
25Oct2018 13:00:00	2018	1348.390012	927.1186	1417.24	1760.594	1215.134
25Oct2018 14:00:00	2018	1335.689129	917.8961	1418.218	1743.476	1210.98
25Oct2018 15:00:00	2018	1333.434936	925.5621	1415.824	1749.332	1214.432
25Oct2018 16:00:00	2018	1342.241396	914.3251	1415.085	1755.887	1212.912
25Oct2018 17:00:00	2018	1351.352869	922.2153	1414.324	1759.116	1208.102
25Oct2018 18:00:00	2018	1344.904849	912.2459	1440.779	1772.102	1206.69
25Oct2018 19:00:00	2018	1326.665494	911.8322	1460.861	1791.829	1231.013
25Oct2018 20:00:00	2018	1278.181314	897.4382	1444.409	1727.362	1241.645
25Oct2018 21:00:00	2018	1199.610978	883.6603	1408.654	1606.434	1239.29
25Oct2018 22:00:00	2018	1090.986503	873.7298	1365.521	1508.153	1237.433
25Oct2018 23:00:00	2018	985.118985	844.2033	1328.603	1395.987	1224.968
26Oct2018 0:00:00	2018	914.6756682	825.0361	1304.058	1327.195	1206.551
26Oct2018 1:00:00	2018	869.0366324	813.5833	1290.086	1286.552	1201.032
26Oct2018 2:00:00	2018	846.1696781	806.6669	1283.748	1253.989	1204.421
26Oct2018 3:00:00	2018	838.9585292	807.3193	1279.898	1261.048	1199.814
26Oct2018 4:00:00	2018	863.3067692	814.5847	1283.408	1265.216	1214.679
26Oct2018 5:00:00	2018	947.1981177	832.272	1283.858	1333.969	1218.525
26Oct2018 6:00:00	2018	1100.526665	873.0662	1320.967	1492.225	1224.89
26Oct2018 7:00:00	2018	1257.002002	919.4601	1395.133	1662.315	1255.753
26Oct2018 8:00:00	2018	1303.764095	930.1432	1412.628	1699.358	1249.639
26Oct2018 9:00:00	2018	1326.521516	932.2597	1409.464	1699.271	1232.839
26Oct2018 10:00:00	2018	1345.74041	907.747	1416.665	1679.99	1240.101
26Oct2018 11:00:00	2018	1353.435926	899.4067	1416.272	1678.54	1207.136
26Oct2018 12:00:00	2018	1348.246249	878.6761	1406.482	1666.413	1172.376
26Oct2018 13:00:00	2018	1330.072358	865.9478	1411.191	1667.317	1173.448
26Oct2018 14:00:00	2018	1323.122222	852.5589	1393.709	1658.931	1169.859
26Oct2018 15:00:00	2018	1328.229137	858.2009	1387.296	1649.965	1184.001
26Oct2018 16:00:00	2018	1324.385601	871.549	1393.805	1681.897	1200.695
26Oct2018 17:00:00	2018	1319.584516	855.0502	1375.982	1668.567	1209.967
26Oct2018 18:00:00	2018	1303.841952	857.6246	1376.492	1692.355	1232.982
26Oct2018 19:00:00	2018	1284.805791	885.4874	1365.029	1665.88	1244.402
26Oct2018 20:00:00	2018	1237.502089	877.0123	1372.445	1635.113	1233.012
26Oct2018 21:00:00	2018	1168.926262	872.722	1373.024	1590.821	1227.018
26Oct2018 22:00:00	2018	1076.075739	853.0745	1327.814	1527.108	1205.468
26Oct2018 23:00:00	2018	991.0672435	830.1671	1286.892	1439.656	1189.694
27Oct2018 0:00:00	2018	923.6425683	812.9403	1269.534	1361.853	1168.143
27Oct2018 1:00:00	2018	874.9638458	798.7834	1268.406	1315.651	1156.465
27Oct2018 2:00:00	2018	849.7018115	796.3983	1247.06	1273.29	1144.721
27Oct2018 3:00:00	2018	839.5794184	776.4989	1248.654	1250.305	1140.64

27Oct2018 4:00:00	2018	839.0201331	784.2298	1255.341	1245.529	1143.336
27Oct2018 5:00:00	2018	872.550475	786.6098	1263.919	1277.329	1151.808
27Oct2018 6:00:00	2018	934.1108577	798.9101	1290.102	1336.682	1159.148
27Oct2018 7:00:00	2018	1018.333106	823.8889	1324.554	1458.833	1163.252
27Oct2018 8:00:00	2018	1091.131178	846.7412	1339.139	1526.711	1165.902
27Oct2018 9:00:00	2018	1144.502877	850.8257	1341.65	1571.53	1169.86
27Oct2018 10:00:00	2018	1177.833189	847.09	1303.484	1585.302	1169.402
27Oct2018 11:00:00	2018	1195.492236	837.377	1280.131	1607.124	1169.718
27Oct2018 12:00:00	2018	1200.297591	837.2265	1314.975	1607.769	1165.366
27Oct2018 13:00:00	2018	1188.646986	833.6054	1328.89	1591.739	1174.137
27Oct2018 14:00:00	2018	1173.764875	834.5797	1322.424	1575.382	1176.277
27Oct2018 15:00:00	2018	1163.22095	831.3515	1322.159	1561.467	1170.7
27Oct2018 16:00:00	2018	1166.526818	846.4893	1341.122	1575.598	1180.873
27Oct2018 17:00:00	2018	1188.968837	858.3848	1350.013	1599.304	1185.382
27Oct2018 18:00:00	2018	1221.529101	875.7073	1370.129	1625.667	1206.881
27Oct2018 19:00:00	2018	1214.821473	880.0801	1376.569	1627.021	1215.407
27Oct2018 20:00:00	2018	1169.294412	870.4435	1351.851	1583.78	1200.996
27Oct2018 21:00:00	2018	1121.983657	854.3451	1331.023	1514.761	1195.404
27Oct2018 22:00:00	2018	1054.546614	838.9071	1310.433	1437.764	1181.99
27Oct2018 23:00:00	2018	973.5820594	829.4477	1288.021	1352.577	1172.332
28Oct2018 0:00:00	2018	913.7629019	827.8643	1269.559	1295.946	1172.582
28Oct2018 1:00:00	2018	871.1309708	813.2464	1234.887	1272.784	1166.364
28Oct2018 2:00:00	2018	846.0119671	804.743	1206.596	1253.693	1163.564
28Oct2018 3:00:00	2018	833.8468111	822.7872	1242.467	1270.462	1160.996
28Oct2018 4:00:00	2018	831.6413772	818.1337	1270.574	1249.339	1160.073
28Oct2018 5:00:00	2018	859.1966003	824.1482	1284.481	1290.196	1162.053
28Oct2018 6:00:00	2018	905.1004143	826.666	1311.011	1334.465	1167.092
28Oct2018 7:00:00	2018	969.4909918	848.28	1326.821	1410.709	1178.311
28Oct2018 8:00:00	2018	1044.13142	869.1835	1343.189	1463.335	1202.626
28Oct2018 9:00:00	2018	1104.9579	882.9429	1340.186	1497.361	1200.471
28Oct2018 10:00:00	2018	1158.384531	893.253	1294.128	1534.023	1209.994
28Oct2018 11:00:00	2018	1188.333535	891.5053	1364.461	1581.364	1207.084
28Oct2018 12:00:00	2018	1191.830731	887.0048	1379.898	1614.645	1192.794
28Oct2018 13:00:00	2018	1184.147613	873.8321	1372.297	1600.715	1190.413
28Oct2018 14:00:00	2018	1168.830943	862.3537	1366.071	1616.833	1179.388
28Oct2018 15:00:00	2018	1168.784757	856.0196	1354.057	1604.04	1181.467
28Oct2018 16:00:00	2018	1196.401182	872.3685	1363.855	1658.236	1181.778
28Oct2018 17:00:00	2018	1233.845262	888.6264	1382.344	1706.236	1197.948
28Oct2018 18:00:00	2018	1264.56563	908.8704	1407.537	1719.317	1207.885
28Oct2018 19:00:00	2018	1267.454216	914.2518	1406.541	1688.123	1215.035
28Oct2018 20:00:00	2018	1222.579552	899.1704	1389.669	1646.777	1203.318
28Oct2018 21:00:00	2018	1150.166159	876.1524	1368.461	1604.071	1180.347
28Oct2018 22:00:00	2018	1050.180011	846.7471	1336.268	1506.78	1183.002
28Oct2018 23:00:00	2018	951.8372523	839.4185	1310.733	1406.901	1170.064
29Oct2018 0:00:00	2018	887.2293744	822.2098	1285.018	1339.515	1162.974
29Oct2018 1:00:00	2018	853.3607484	816.5355	1274.586	1284.397	1152.596
29Oct2018 2:00:00	2018	836.9283434	813.7728	1270.704	1288.786	1152.769

29Oct2018 3:00:00	2018	833.0032489	815.1363	1273.192	1289.422	1150.747
29Oct2018 4:00:00	2018	855.500936	825.6826	1279.388	1310.821	1147.912
29Oct2018 5:00:00	2018	941.0200588	849.0658	1302.528	1377.924	1157.559
29Oct2018 6:00:00	2018	1116.015477	894.092	1353.194	1528.486	1170.198
29Oct2018 7:00:00	2018	1277.476086	948.9982	1424.321	1697.266	1186.299
29Oct2018 8:00:00	2018	1309.019825	946.7492	1422.654	1740.459	1199.001
29Oct2018 9:00:00	2018	1311.135705	945.5954	1428.928	1722.991	1196.889
29Oct2018 10:00:00	2018	1320.563546	940.7946	1431.912	1748.933	1197.667
29Oct2018 11:00:00	2018	1331.408791	910.1869	1411.16	1758.932	1173.53
29Oct2018 12:00:00	2018	1325.958206	898.827	1405.166	1721.592	1162.821
29Oct2018 13:00:00	2018	1328.540493	892.7109	1423.545	1736.048	1191.442
29Oct2018 14:00:00	2018	1321.209713	894.1753	1417.76	1724.831	1210.619
29Oct2018 15:00:00	2018	1323.553432	886.7353	1416.745	1712.612	1224.117
29Oct2018 16:00:00	2018	1333.827944	901.5749	1420.694	1725.981	1225.856
29Oct2018 17:00:00	2018	1343.693952	889.709	1418.662	1740.379	1250.426
29Oct2018 18:00:00	2018	1355.253728	899.779	1434.364	1779.43	1267.304
29Oct2018 19:00:00	2018	1342.588686	904.1964	1425.725	1757.978	1269.241
29Oct2018 20:00:00	2018	1293.479916	909.8633	1404.654	1706.929	1267.305
29Oct2018 21:00:00	2018	1208.067562	917.9326	1364.185	1628.002	1262.354
29Oct2018 22:00:00	2018	1091.18242	883.6908	1322.712	1532.421	1254.339
29Oct2018 23:00:00	2018	986.5835668	851.7656	1272.892	1440.34	1243.249
30Oct2018 0:00:00	2018	913.9143737	831.6973	1266.92	1366.267	1234.992
30Oct2018 1:00:00	2018	875.8112187	820.6037	1275.71	1299.495	1229.949
30Oct2018 2:00:00	2018	856.1758994	815.3676	1270.456	1294.426	1222.281
30Oct2018 3:00:00	2018	853.3283361	814.5311	1268.005	1286.323	1220.25
30Oct2018 4:00:00	2018	877.9851815	817.0839	1261.33	1293.501	1228.021
30Oct2018 5:00:00	2018	966.5032302	836.4978	1278.684	1357.331	1243.411
30Oct2018 6:00:00	2018	1132.694407	878.8184	1332.574	1521.755	1253.305
30Oct2018 7:00:00	2018	1286.422759	931.5562	1396.569	1701.948	1259.532
30Oct2018 8:00:00	2018	1321.769859	928.6097	1429.19	1766.45	1265.329
30Oct2018 9:00:00	2018	1313.765417	912.2299	1421.98	1757.095	1268.215
30Oct2018 10:00:00	2018	1318.284804	904.1728	1423.405	1757.699	1283.967
30Oct2018 11:00:00	2018	1328.797127	897.3393	1365.348	1709.917	1274.331
30Oct2018 12:00:00	2018	1328.536368	883.4208	1394.947	1739.96	1261.86
30Oct2018 13:00:00	2018	1326.297427	872.1951	1415.234	1760.935	1259.369
30Oct2018 14:00:00	2018	1317.802694	877.2733	1404.332	1738.497	1256.51
30Oct2018 15:00:00	2018	1318.051337	871.3093	1359.221	1731.425	1261.967
30Oct2018 16:00:00	2018	1326.500573	885.6571	1371.797	1749.674	1266.144
30Oct2018 17:00:00	2018	1339.721612	877.7052	1376.648	1750.924	1271.529
30Oct2018 18:00:00	2018	1347.545615	891.8382	1393.155	1779.848	1277.666
30Oct2018 19:00:00	2018	1336.10999	896.4822	1419.52	1800.553	1274.412
30Oct2018 20:00:00	2018	1286.037892	917.5506	1428.944	1734.339	1239.829
30Oct2018 21:00:00	2018	1213.88368	905.9653	1397.107	1651.708	1243.879
30Oct2018 22:00:00	2018	1101.746328	881.2223	1363.519	1532.366	1238.893
30Oct2018 23:00:00	2018	994.6293643	852.65	1333.814	1429.664	1247.222
31Oct2018 0:00:00	2018	920.7127204	833.3606	1309.919	1354.773	1254.196
31Oct2018 1:00:00	2018	885.7175044	821.5363	1292.285	1312.591	1254.427

31Oct2018 2:00:00	2018	866.0492208	820.9389	1274.315	1281.168	1256.098
31Oct2018 3:00:00	2018	857.8158988	820.6706	1271.111	1278.524	1263.229
31Oct2018 4:00:00	2018	880.9832228	827.3039	1281.386	1277.56	1263.909
31Oct2018 5:00:00	2018	962.6878898	848.7016	1300.265	1337.846	1274.621
31Oct2018 6:00:00	2018	1134.772788	887.7173	1361.688	1506.519	1286.332
31Oct2018 7:00:00	2018	1288.913523	922.9145	1408.767	1678.626	1289.454
31Oct2018 8:00:00	2018	1327.464527	937.6033	1413.898	1723.87	1295.957
31Oct2018 9:00:00	2018	1332.809895	929.1734	1358.177	1699.353	1283.093
31Oct2018 10:00:00	2018	1342.707774	923.5025	1366.961	1714.713	1278.467
31Oct2018 11:00:00	2018	1341.957816	916.4617	1355.275	1695.011	1280.649
31Oct2018 12:00:00	2018	1329.900675	909.5871	1363.032	1689.558	1272.624
31Oct2018 13:00:00	2018	1328.974062	915.9585	1364.017	1697.78	1256.92
31Oct2018 14:00:00	2018	1327.919867	910.748	1358.684	1686.841	1265.865
31Oct2018 15:00:00	2018	1313.325409	908.4037	1356.717	1686.629	1264.607
31Oct2018 16:00:00	2018	1322.442795	905.6468	1397.392	1739.056	1291.235
31Oct2018 17:00:00	2018	1321.148197	892.7402	1399.85	1710.084	1294.653
31Oct2018 18:00:00	2018	1313.342297	905.3884	1409.192	1732.411	1300.215
31Oct2018 19:00:00	2018	1284.835831	910.2865	1411.282	1709.71	1294.822
31Oct2018 20:00:00	2018	1253.62728	913.9599	1410.466	1661.445	1287.67
31Oct2018 21:00:00	2018	1187.931901	899.89	1374.278	1569.343	1285.711
31Oct2018 22:00:00	2018	1078.726933	881.9428	1335.302	1467.044	1288.027
31Oct2018 23:00:00	2018	986.7190142	851.5095	1304.775	1369.25	1282.908
01Nov2018 0:00:00	2018	923.1412235	832.1231	1286.358	1288.164	1266.429
01Nov2018 1:00:00	2018	885.4620204	825.8644	1268.435	1256.913	1265.436
01Nov2018 2:00:00	2018	863.2997956	813.7778	1259.551	1224.248	1259.597
01Nov2018 3:00:00	2018	858.6284183	814.4806	1264.611	1235.94	1251.427
01Nov2018 4:00:00	2018	884.0279057	814.7794	1277.815	1275.871	1242.537
01Nov2018 5:00:00	2018	961.0535306	827.9849	1301.7	1341.084	1239.953
01Nov2018 6:00:00	2018	1130.83348	868.9941	1348.791	1484.002	1247.886
01Nov2018 7:00:00	2018	1276.178565	923.8055	1409.152	1654.349	1238.192
01Nov2018 8:00:00	2018	1325.012929	947.042	1422.4	1705.127	1247.09
01Nov2018 9:00:00	2018	1328.948226	946.8642	1420.98	1699.038	1265.852
01Nov2018 10:00:00	2018	1336.487581	939.9928	1419.698	1709.565	1246.198
01Nov2018 11:00:00	2018	1336.690874	938.5339	1426.536	1711.206	1228.096
01Nov2018 12:00:00	2018	1326.185279	926.6175	1412.917	1712.621	1227.056
01Nov2018 13:00:00	2018	1328.811917	923.4177	1417.74	1710.669	1217.061
01Nov2018 14:00:00	2018	1325.35396	923.0299	1359.383	1703.319	1219.435
01Nov2018 15:00:00	2018	1319.439821	921.4022	1329.135	1713.073	1220.256
01Nov2018 16:00:00	2018	1341.839684	925.9799	1343.716	1737.168	1227.832
01Nov2018 17:00:00	2018	1373.682005	932.2639	1368.133	1766.425	1250.184
01Nov2018 18:00:00	2018	1383.865775	945.4822	1387.434	1770.395	1265.697
01Nov2018 19:00:00	2018	1351.338984	944.6035	1378.227	1732.478	1260.564
01Nov2018 20:00:00	2018	1300.027941	931.9588	1391.358	1686.18	1271.934
01Nov2018 21:00:00	2018	1215.063836	910.4173	1379.835	1598.097	1288.687
01Nov2018 22:00:00	2018	1106.720582	890.4841	1340.766	1486.942	1278.698
01Nov2018 23:00:00	2018	1005.561353	852.4755	1313.466	1387.171	1270.524
02Nov2018 0:00:00	2018	931.5176788	829.1086	1286.103	1318.471	1283.989

02Nov2018 1:00:00	2018	889.9402959	816.5775	1278.623	1295.824	1266.128
02Nov2018 2:00:00	2018	866.0412116	810.9144	1270.575	1274.358	1272.003
02Nov2018 3:00:00	2018	860.0312691	809.2888	1273.014	1266.161	1276.929
02Nov2018 4:00:00	2018	881.2949464	812.3388	1268.849	1278.604	1268.4
02Nov2018 5:00:00	2018	956.6032154	829.402	1277.532	1342.11	1270.965
02Nov2018 6:00:00	2018	1113.546533	871.7152	1321.975	1496.075	1274.538
02Nov2018 7:00:00	2018	1263.066524	923.6752	1381.294	1671.3	1286.546
02Nov2018 8:00:00	2018	1327.992776	927.4753	1426.62	1754.606	1302.344
02Nov2018 9:00:00	2018	1350.480894	931.1461	1442.903	1765.772	1311.264
02Nov2018 10:00:00	2018	1365.404894	927.3244	1449.208	1786.103	1313.858
02Nov2018 11:00:00	2018	1370.16026	923.6787	1449.658	1787.576	1315.546
02Nov2018 12:00:00	2018	1375.947155	920.86	1425.96	1748.004	1318.792
02Nov2018 13:00:00	2018	1380.949031	925.5965	1418.138	1764.138	1312.907
02Nov2018 14:00:00	2018	1367.213182	928.5911	1419.949	1745.511	1315.519
02Nov2018 15:00:00	2018	1347.865531	926.8761	1401.162	1742.896	1322.153
02Nov2018 16:00:00	2018	1354.355115	931.635	1379.724	1727.434	1328.866
02Nov2018 17:00:00	2018	1376.336164	929.5627	1375.781	1729.185	1333.486
02Nov2018 18:00:00	2018	1365.645138	925.2096	1357.691	1757.769	1331.466
02Nov2018 19:00:00	2018	1322.828425	919.2077	1375.911	1744.718	1322.266
02Nov2018 20:00:00	2018	1267.918075	910.9311	1385.402	1715.432	1312.27
02Nov2018 21:00:00	2018	1195.835686	894.0217	1340.91	1659.957	1313.16
02Nov2018 22:00:00	2018	1108.990131	872.4861	1327.696	1550.42	1316.337
02Nov2018 23:00:00	2018	1019.654465	863.264	1313.98	1468.543	1331.574
03Nov2018 0:00:00	2018	950.7610469	823.4409	1295.107	1375.779	1324.131
03Nov2018 1:00:00	2018	904.2706893	827.8479	1279.757	1336.248	1318.226
03Nov2018 2:00:00	2018	878.052039	818.0566	1267.993	1293.576	1348.87
03Nov2018 3:00:00	2018	867.8496768	813.7488	1259.089	1279.202	1347.267
03Nov2018 4:00:00	2018	873.7081274	817.6545	1249.393	1280.656	1340.243
03Nov2018 5:00:00	2018	900.5848244	823.536	1260.785	1290.475	1340.45
03Nov2018 6:00:00	2018	956.1624473	841.74	1277.42	1363.139	1323.971
03Nov2018 7:00:00	2018	1040.908348	869.0343	1305.158	1457.662	1298.09
03Nov2018 8:00:00	2018	1123.962881	893.615	1341.077	1543.966	1300.739
03Nov2018 9:00:00	2018	1170.796364	897.8372	1362.831	1576.264	1282.123
03Nov2018 10:00:00	2018	1194.67902	883.0746	1381.016	1611.26	1289.959
03Nov2018 11:00:00	2018	1208.799711	881.9248	1337.929	1628.239	1286.782
03Nov2018 12:00:00	2018	1217.558077	881.5789	1365.332	1618.53	1278.168
03Nov2018 13:00:00	2018	1200.063993	874.4075	1348.527	1585.044	1279.301
03Nov2018 14:00:00	2018	1176.832119	870.9854	1337.179	1545.863	1287.972
03Nov2018 15:00:00	2018	1168.972545	870.575	1332.074	1546.438	1299.702
03Nov2018 16:00:00	2018	1175.457628	883.7468	1360.335	1573.947	1333.827
03Nov2018 17:00:00	2018	1208.295076	896.117	1376.074	1622.806	1316.632
03Nov2018 18:00:00	2018	1257.665631	922.1106	1395.957	1672.322	1345.208
03Nov2018 19:00:00	2018	1232.292772	918.5192	1394.121	1650.75	1350.667
03Nov2018 20:00:00	2018	1188.767383	907.5111	1393.069	1625.668	1338.832
03Nov2018 21:00:00	2018	1137.118817	889.6433	1374.107	1566.656	1337.905
03Nov2018 22:00:00	2018	1067.293516	866.5638	1337.642	1484.075	1320.4
03Nov2018 23:00:00	2018	989.6060063	840.2282	1312.065	1435.213	1306.394

04Nov2018 0:00:00	2018	922.2885912	819.3562	1288.309	1360.287	1304.686
04Nov2018 1:00:00	2018	1714.8511	1602.301	2571.022	2597.531	2623.414
04Nov2018 2:00:00	2018	830.3308749	793.2909	1275.048	1257.198	1326.074
04Nov2018 3:00:00	2018	824.6613515	794.4078	1267.402	1257.399	1303.307
04Nov2018 4:00:00	2018	827.992422	799.1431	1277.541	1271.811	1311.528
04Nov2018 5:00:00	2018	859.1735632	792.9355	1288.151	1292.488	1317.56
04Nov2018 6:00:00	2018	924.5345506	809.9517	1314.1	1356.979	1327.369
04Nov2018 7:00:00	2018	997.4227572	832.3002	1338.62	1427.626	1328.609
04Nov2018 8:00:00	2018	1057.686282	845.7221	1359.553	1500.617	1332.932
04Nov2018 9:00:00	2018	1123.655701	861.4883	1381.589	1562.83	1334.597
04Nov2018 10:00:00	2018	1168.821087	864.2174	1390.455	1589.024	1323.091
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04Nov2018 13:00:00	2018	1192.178544	863.4666	1408.291	1627.237	1327.886
04Nov2018 14:00:00	2018	1204.337575	866.5783	1392.502	1612.017	1340.399
04Nov2018 15:00:00	2018	1230.482624	879.1717	1416.977	1652.931	1348.488
04Nov2018 16:00:00	2018	1290.772171	901.1122	1442.392	1736.47	1346.743
04Nov2018 17:00:00	2018	1364.925678	933.2434	1482.428	1805.701	1355.707
04Nov2018 18:00:00	2018	1331.865673	924.8435	1469.387	1793.32	1367.412
04Nov2018 19:00:00	2018	1280.617761	918.9052	1449.509	1740.117	1361.29
04Nov2018 20:00:00	2018	1225.292523	905.4858	1441.596	1699.688	1355.112
04Nov2018 21:00:00	2018	1149.844074	879.179	1413.726	1626.058	1360.026
04Nov2018 22:00:00	2018	1050.300938	867.0685	1372.55	1518.639	1347.896
04Nov2018 23:00:00	2018	961.8452262	843.462	1354.431	1413.688	1317.31
05Nov2018 0:00:00	2018	912.7835093	829.7909	1333.434	1364.755	1305.046
05Nov2018 1:00:00	2018	881.9142566	824.6243	1321.288	1315.586	1322.823
05Nov2018 2:00:00	2018	870.573314	825.454	1314.929	1289.219	1304.572
05Nov2018 3:00:00	2018	876.4093678	830.7047	1307.355	1289.524	1284.603
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05Nov2018 5:00:00	2018	1002.491747	852.4948	1340.103	1392.853	1302.04
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05Nov2018 7:00:00	2018	1310.074545	955.8969	1462.727	1722.443	1323.014
05Nov2018 8:00:00	2018	1336.51775	957.2541	1468.109	1723.953	1323.791
05Nov2018 9:00:00	2018	1356.601543	961.1531	1473.152	1750.537	1323.637
05Nov2018 10:00:00	2018	1370.406103	948.5521	1428.738	1796.863	1301.692
05Nov2018 11:00:00	2018	1380.233508	947.7716	1373.61	1798.258	1294.014
05Nov2018 12:00:00	2018	1381.230625	937.3693	1361.271	1802.171	1268.455
05Nov2018 13:00:00	2018	1385.252097	927.7042	1373.914	1806.021	1280.119
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05Nov2018 15:00:00	2018	1398.724608	949.5385	1384.607	1818.267	1292.981
05Nov2018 16:00:00	2018	1442.990004	975.8209	1418.082	1852.723	1346.227
05Nov2018 17:00:00	2018	1512.129943	1008.127	1457.174	1939.497	1362.902
05Nov2018 18:00:00	2018	1471.018925	994.9617	1435.181	1898.793	1353.976
05Nov2018 19:00:00	2018	1414.807418	984.0915	1440.769	1848.073	1349.853
05Nov2018 20:00:00	2018	1347.494128	969.3635	1425.026	1781.616	1320.123
05Nov2018 21:00:00	2018	1256.639365	931.5241	1402.698	1672.112	1307.397
05Nov2018 22:00:00	2018	1135.062295	896.7545	1366.661	1588.74	1304.849

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06Nov2018 1:00:00	2018	935.0104779	876.7968	1304.258	1405.402	1218.538
06Nov2018 2:00:00	2018	919.4482978	873.253	1301.1	1368.27	1231.602
06Nov2018 3:00:00	2018	919.5572188	879.532	1301.485	1360.121	1228.238
06Nov2018 4:00:00	2018	945.4341873	884.1485	1308.869	1389	1229.643
06Nov2018 5:00:00	2018	1033.962139	902.1545	1330.232	1448.622	1260.211
06Nov2018 6:00:00	2018	1203.211561	940.4906	1365.019	1626.477	1267.062
06Nov2018 7:00:00	2018	1341.957928	954.4657	1431.485	1779.885	1267.619
06Nov2018 8:00:00	2018	1359.641149	969.0365	1452.55	1787.969	1243.989
06Nov2018 9:00:00	2018	1379.053243	980.0492	1452.879	1827.128	1239.593
06Nov2018 10:00:00	2018	1396.857719	977.5528	1455.011	1806.266	1241.016
06Nov2018 11:00:00	2018	1411.519132	972.8186	1470.564	1816.086	1239.284
06Nov2018 12:00:00	2018	1404.036132	964.7115	1500.713	1799.128	1226.975
06Nov2018 13:00:00	2018	1403.68274	964.0038	1503.836	1791.02	1233.297
06Nov2018 14:00:00	2018	1393.573339	961.5272	1519.47	1790.405	1221.529
06Nov2018 15:00:00	2018	1402.547464	965.7131	1526.949	1826.623	1191.463
06Nov2018 16:00:00	2018	1446.616256	991.6598	1512.694	1871.746	1217.772
06Nov2018 17:00:00	2018	1522.993704	1024.186	1487.713	1939.065	1249.916
06Nov2018 18:00:00	2018	1480.221317	1007.273	1459.179	1888.257	1232.676
06Nov2018 19:00:00	2018	1419.880024	990.1075	1526.165	1847.913	1226.426
06Nov2018 20:00:00	2018	1359.977857	975.6428	1485.736	1822.123	1210.596
06Nov2018 21:00:00	2018	1266.75463	943.9498	1434.994	1738.884	1207.406
06Nov2018 22:00:00	2018	1149.440398	901.2861	1384.918	1618.072	1198.018
06Nov2018 23:00:00	2018	1053.888355	900.0333	1359.031	1547.339	1188.689
07Nov2018 0:00:00	2018	988.4714637	867.826	1335.937	1467.807	1172.473
07Nov2018 1:00:00	2018	947.9225779	856.8244	1311.177	1428.57	1151.893
07Nov2018 2:00:00	2018	929.1363358	850.8014	1290.542	1413.467	1138.126
07Nov2018 3:00:00	2018	926.7615669	853.0635	1292.227	1403.308	1132.967
07Nov2018 4:00:00	2018	951.2090401	862.8021	1299.941	1426.025	1133.979
07Nov2018 5:00:00	2018	1040.145994	883.955	1314.535	1474.889	1135.693
07Nov2018 6:00:00	2018	1207.666743	927.8213	1367.042	1650.098	1150.444
07Nov2018 7:00:00	2018	1347.108791	960.0548	1424.478	1811.007	1169.641
07Nov2018 8:00:00	2018	1359.766552	971.1012	1435.131	1809.379	1175.927
07Nov2018 9:00:00	2018	1365.064447	970.2437	1443.814	1842.381	1177.802
07Nov2018 10:00:00	2018	1375.275584	969.5109	1445.441	1846.151	1182.244
07Nov2018 11:00:00	2018	1380.276764	967.8261	1448.895	1848.883	1173.504
07Nov2018 12:00:00	2018	1371.166215	952.4218	1426.187	1797.523	1192.585
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07Nov2018 14:00:00	2018	1359.186694	946.4124	1431.805	1782.087	1202.824
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07Nov2018 17:00:00	2018	1506.465709	1017.375	1484.622	1950.231	1250.768
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07Nov2018 20:00:00	2018	1363.149562	982.3648	1473.412	1827.09	1223.464
07Nov2018 21:00:00	2018	1277.574138	955.1854	1418.923	1730.044	1216.337

07Nov2018 22:00:00	2018	1168.328131	920.0911	1389.684	1615.522	1203.677
07Nov2018 23:00:00	2018	1064.228987	905.0522	1360.214	1518.133	1188.288
08Nov2018 0:00:00	2018	997.8672508	878.0217	1341.349	1441.967	1173.522
08Nov2018 1:00:00	2018	961.2518153	866.6057	1327.33	1406.828	1163.051
08Nov2018 2:00:00	2018	948.8051498	859.7784	1330.119	1413.07	1159.272
08Nov2018 3:00:00	2018	950.2580735	859.2043	1335.673	1410.059	1162.893
08Nov2018 4:00:00	2018	973.9196896	865.0082	1339.513	1432.725	1175.136
08Nov2018 5:00:00	2018	1059.031082	883.6851	1358.657	1494.636	1178.853
08Nov2018 6:00:00	2018	1221.090786	924.4614	1380.851	1642.735	1189.133
08Nov2018 7:00:00	2018	1357.120072	958.0232	1446.71	1783.213	1194.064
08Nov2018 8:00:00	2018	1375.004882	970.4315	1460.24	1795.042	1197.976
08Nov2018 9:00:00	2018	1378.068568	972.1628	1446.34	1811.029	1192.205
08Nov2018 10:00:00	2018	1383.618302	963.0074	1423.972	1829.871	1178.488
08Nov2018 11:00:00	2018	1389.623086	953.735	1401.583	1837.957	1168.915
08Nov2018 12:00:00	2018	1377.45201	943.4795	1390.543	1804.024	1163.832
08Nov2018 13:00:00	2018	1367.59825	927.8013	1421.981	1806.777	1179.004
08Nov2018 14:00:00	2018	1358.364241	931.7138	1435.372	1794.217	1198.449
08Nov2018 15:00:00	2018	1367.748386	944.2778	1439.74	1803.719	1219.136
08Nov2018 16:00:00	2018	1406.190519	968.4216	1438.378	1865.469	1233.352
08Nov2018 17:00:00	2018	1495.203124	995.0049	1467.727	1968.693	1255.365
08Nov2018 18:00:00	2018	1461.853034	987.6175	1472.651	1948.848	1248.089
08Nov2018 19:00:00	2018	1416.033138	980.8007	1473.195	1892.251	1259.677
08Nov2018 20:00:00	2018	1364.362945	965.19	1464.877	1819.84	1260.421
08Nov2018 21:00:00	2018	1278.434031	936.1464	1438.571	1756.45	1252.208
08Nov2018 22:00:00	2018	1162.880666	903.1302	1401.77	1645.351	1236.875
08Nov2018 23:00:00	2018	1064.094563	876.2584	1366.608	1542.695	1222.002
09Nov2018 0:00:00	2018	998.5155246	859.1907	1343.232	1486.525	1207.723
09Nov2018 1:00:00	2018	962.3199289	865.7777	1334.908	1431.862	1201.697
09Nov2018 2:00:00	2018	943.8479213	874.7847	1346.898	1406.609	1187.647
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09Nov2018 5:00:00	2018	1038.787985	889.3376	1369.838	1487.04	1152.481
09Nov2018 6:00:00	2018	1192.994344	909.3404	1412.05	1625.688	1151.643
09Nov2018 7:00:00	2018	1334.087549	929.5714	1458.103	1770.604	1163.153
09Nov2018 8:00:00	2018	1365.911551	932.7089	1433.225	1782.861	1170.53
09Nov2018 9:00:00	2018	1386.758079	936.2612	1421.173	1806.992	1175.016
09Nov2018 10:00:00	2018	1390.338631	933.3659	1406.266	1819.712	1181.899
09Nov2018 11:00:00	2018	1383.927863	929.3838	1398.684	1802.445	1142.736
09Nov2018 12:00:00	2018	1379.989041	915.7488	1440.013	1778.161	1174.943
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09Nov2018 14:00:00	2018	1357.505653	900.6053	1460.936	1812.224	1164.673
09Nov2018 15:00:00	2018	1345.596577	909.8922	1460.034	1807.48	1159.198
09Nov2018 16:00:00	2018	1369.632443	927.1302	1482.328	1840.576	1160.169
09Nov2018 17:00:00	2018	1437.373612	952.5852	1508.08	1897.04	1180.953
09Nov2018 18:00:00	2018	1386.304322	945.6838	1492.897	1865.316	1174.008
09Nov2018 19:00:00	2018	1330.463627	942.4665	1473.584	1805.53	1168.713
09Nov2018 20:00:00	2018	1282.472987	932.8823	1467.166	1749.255	1160.543

09Nov2018 21:00:00	2018	1216.543247	915.9761	1439.115	1675.741	1154.281
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10Nov2018 0:00:00	2018	972.3481103	851.4597	1342.661	1405.647	1112.938
10Nov2018 1:00:00	2018	928.9769478	835.9261	1326.41	1361.024	1105.899
10Nov2018 2:00:00	2018	900.7364565	833.1813	1318.063	1332.279	1110.967
10Nov2018 3:00:00	2018	892.5212534	831.0817	1317.891	1316.217	1109.239
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10Nov2018 5:00:00	2018	932.6142799	846.6756	1322.996	1324.97	1113.622
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10Nov2018 8:00:00	2018	1133.279621	935.3985	1398.494	1544.555	1127.556
10Nov2018 9:00:00	2018	1184.899639	948.7839	1407.087	1604.99	1142.758
10Nov2018 10:00:00	2018	1224.946372	944.0586	1413.498	1646.931	1146.42
10Nov2018 11:00:00	2018	1231.076412	939.2448	1406.558	1647.458	1143.592
10Nov2018 12:00:00	2018	1222.82439	929.4903	1336.534	1628.774	1138.026
10Nov2018 13:00:00	2018	1207.636369	925.7423	1344.936	1624.945	1136.828
10Nov2018 14:00:00	2018	1194.982416	920.585	1392.891	1632.463	1132.188
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10Nov2018 16:00:00	2018	1232.446525	948.2867	1396.184	1721.98	1144.228
10Nov2018 17:00:00	2018	1327.936527	988.6187	1461.846	1805.444	1158.657
10Nov2018 18:00:00	2018	1303.896508	980.6563	1460.342	1758.398	1154.569
10Nov2018 19:00:00	2018	1249.852323	964.9543	1403.393	1697.24	1151.904
10Nov2018 20:00:00	2018	1204.854561	950.3883	1416.053	1639.817	1148.269
10Nov2018 21:00:00	2018	1151.32649	931.3719	1398.626	1609.599	1136.183
10Nov2018 22:00:00	2018	1081.798258	902.1367	1370.871	1548.908	1131.139
10Nov2018 23:00:00	2018	1006.151855	860.0465	1343.675	1473.252	1123.735
11Nov2018 0:00:00	2018	947.8398644	820.7664	1325.777	1438.088	1114.767
11Nov2018 1:00:00	2018	906.2266643	805.1054	1331.03	1381.922	1114.181
11Nov2018 2:00:00	2018	879.8579789	798.827	1335.353	1340.226	1115.003
11Nov2018 3:00:00	2018	871.9189603	796.79	1334.76	1336.059	1110.469
11Nov2018 4:00:00	2018	876.2600746	802.5129	1337.204	1339.775	1109.438
11Nov2018 5:00:00	2018	902.3282098	810.5065	1343.339	1373.459	1104.808
11Nov2018 6:00:00	2018	945.3174576	828.8795	1343.787	1416.708	1106.198
11Nov2018 7:00:00	2018	1003.181131	871.2741	1362.793	1459.61	1119.57
11Nov2018 8:00:00	2018	1060.5184	899.9699	1373.989	1518.776	1121.19
11Nov2018 9:00:00	2018	1115.829811	919.3865	1388.729	1570.968	1119.706
11Nov2018 10:00:00	2018	1165.415479	921.5129	1413.96	1579.647	1131.469
11Nov2018 11:00:00	2018	1202.213891	914.8263	1415.488	1578.668	1137.541
11Nov2018 12:00:00	2018	1213.846506	915.1346	1418.533	1570.847	1134.82
11Nov2018 13:00:00	2018	1204.491827	915.0454	1428.259	1574.706	1159.783
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11Nov2018 15:00:00	2018	1213.439605	924.343	1419.708	1590.35	1167.297
11Nov2018 16:00:00	2018	1259.243547	947.6177	1462.634	1654.601	1132.49
11Nov2018 17:00:00	2018	1360.769089	989.8372	1481.246	1789.366	1154.815
11Nov2018 18:00:00	2018	1335.848756	983.4611	1457.091	1771.592	1168.186
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11Nov2018 20:00:00	2018	1238.344026	954.5254	1441.605	1676.423	1190.537
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11Nov2018 22:00:00	2018	1091.697153	896.7299	1416.613	1568.257	1148.396
11Nov2018 23:00:00	2018	1006.691906	846.1041	1375.568	1480.508	1115.86
12Nov2018 0:00:00	2018	948.2174474	833.3326	1342.616	1420.21	1123.103
12Nov2018 1:00:00	2018	912.5357676	842.8826	1317.306	1375.11	1117.832
12Nov2018 2:00:00	2018	897.0468862	850.4482	1315.178	1342.265	1101.574
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12Nov2018 9:00:00	2018	1258.418857	934.1167	1414.619	1605.888	1146.087
12Nov2018 10:00:00	2018	1284.601012	925.0955	1448.899	1631.104	1153.532
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12Nov2018 13:00:00	2018	1282.428885	912.5933	1435.471	1617.753	1155.364
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12Nov2018 16:00:00	2018	1347.583736	927.9341	1464.822	1741.22	1182.963
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12Nov2018 23:00:00	2018	997.4842904	864.4828	1369.451	1401.588	1163.415
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13Nov2018 1:00:00	2018	896.4563495	837.215	1355.681	1332.841	1148.496
13Nov2018 2:00:00	2018	881.4359396	835.1102	1350.897	1317.772	1146.681
13Nov2018 3:00:00	2018	880.198743	839.6029	1349.13	1293.752	1145.229
13Nov2018 4:00:00	2018	905.1618413	847.5295	1345.072	1309.24	1156.879
13Nov2018 5:00:00	2018	990.7002213	874.2925	1347.689	1367.716	1160.702
13Nov2018 6:00:00	2018	1157.458341	906.9296	1384.094	1489.476	1189.636
13Nov2018 7:00:00	2018	1298.328278	958.2435	1443.649	1633.539	1195.538
13Nov2018 8:00:00	2018	1307.839962	952.4963	1456.831	1679.494	1161.618
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13Nov2018 10:00:00	2018	1347.997898	943.209	1450.203	1743.805	1155.56
13Nov2018 11:00:00	2018	1349.475066	942.0238	1445.89	1748.207	1154.347
13Nov2018 12:00:00	2018	1336.1023	939.4395	1439.875	1744.993	1163.327
13Nov2018 13:00:00	2018	1340.578019	935.779	1440.889	1727.603	1159.102
13Nov2018 14:00:00	2018	1335.963603	932.2727	1453.647	1762.139	1146.174
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14Nov2018 6:00:00	2018	1146.50547	881.2776	1326.905	1473.143	1142.912
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14Nov2018 17:00:00	2018	1477.613234	964.9669	1513.009	1885.167	1195.5
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14Nov2018 21:00:00	2018	1224.360705	919.8294	1436.818	1591.519	1212.242
14Nov2018 22:00:00	2018	1108.266309	887.6208	1393.587	1480.867	1203.871
14Nov2018 23:00:00	2018	1009.540611	858.4053	1354.388	1380.866	1197.859
15Nov2018 0:00:00	2018	945.6490688	838.1946	1349.8	1336.373	1168.842
15Nov2018 1:00:00	2018	907.700259	824.6213	1337.477	1309.998	1161.828
15Nov2018 2:00:00	2018	886.6458614	817.0674	1327.301	1283.653	1161.666
15Nov2018 3:00:00	2018	882.9749927	812.3749	1289.899	1264.564	1146.439
15Nov2018 4:00:00	2018	907.5496008	821.1063	1246.348	1264.835	1137.096
15Nov2018 5:00:00	2018	995.3284987	838.231	1276.261	1336.854	1147.053
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15Nov2018 7:00:00	2018	1301.931565	916.5342	1457.091	1660.351	1168.014
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15Nov2018 21:00:00	2018	1216.840948	919.0212	1458.968	1628.491	1240.601
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16Nov2018 18:00:00	2018	1451.8784	983.8259	1591.199	1871.737	1300.751
16Nov2018 19:00:00	2018	1398.717159	974.8813	1629.725	1845.279	1288.651
16Nov2018 20:00:00	2018	1345.904757	965.5639	1573.826	1800.113	1270.97
16Nov2018 21:00:00	2018	1270.319357	947.1058	1560.173	1737.699	1254.67
16Nov2018 22:00:00	2018	1176.529467	919.628	1538.799	1667.667	1235.585
16Nov2018 23:00:00	2018	1089.020087	902.0694	1467.663	1579.685	1220.957
17Nov2018 0:00:00	2018	1024.655699	892.3765	1454.084	1500.819	1215.984
17Nov2018 1:00:00	2018	982.2435168	875.6512	1478.312	1449.803	1219.753
17Nov2018 2:00:00	2018	962.020341	874.4627	1480.279	1425.132	1214.938
17Nov2018 3:00:00	2018	951.9114319	880.909	1471.87	1402.126	1224.806
17Nov2018 4:00:00	2018	957.3772251	889.866	1473.558	1398.232	1218.416
17Nov2018 5:00:00	2018	988.8756118	901.0559	1474.715	1418.794	1217.434
17Nov2018 6:00:00	2018	1046.856543	922.5426	1498.171	1450.284	1219.545
17Nov2018 7:00:00	2018	1122.585144	948.4551	1527.827	1537.425	1208.382
17Nov2018 8:00:00	2018	1177.484805	946.5637	1543.595	1580.633	1190.274
17Nov2018 9:00:00	2018	1224.8734	948.7814	1551.675	1619.432	1176.707
17Nov2018 10:00:00	2018	1245.537886	938.6491	1553.415	1668.49	1182.592
17Nov2018 11:00:00	2018	1253.882197	926.5333	1543.289	1676.998	1178.923
17Nov2018 12:00:00	2018	1244.442982	930.8789	1539.655	1671.588	1179.458
17Nov2018 13:00:00	2018	1225.297752	909.6985	1525.427	1662.892	1179.318
17Nov2018 14:00:00	2018	1207.64397	906.6261	1530.384	1674.913	1164.882
17Nov2018 15:00:00	2018	1206.903654	912.1026	1541.199	1691.477	1178.824
17Nov2018 16:00:00	2018	1257.010652	934.2443	1581.018	1738.051	1195.34

17Nov2018 17:00:00	2018	1357.10014	973.784	1633.945	1839.961	1210.86
17Nov2018 18:00:00	2018	1329.327146	967.5976	1625.298	1801.806	1205.173
17Nov2018 19:00:00	2018	1289.699406	954.7658	1596.539	1763.775	1199.273
17Nov2018 20:00:00	2018	1249.730882	956.7273	1535.085	1682.489	1185.462
17Nov2018 21:00:00	2018	1196.455233	928.2015	1453.245	1633.273	1183.585
17Nov2018 22:00:00	2018	1123.891053	910.9941	1419.133	1552.481	1191.698
17Nov2018 23:00:00	2018	1042.810028	886.055	1394.052	1481.343	1186.515
18Nov2018 0:00:00	2018	972.9965869	864.2849	1366.653	1403.403	1178.945
18Nov2018 1:00:00	2018	923.6582555	849.954	1355.523	1363.252	1174.424
18Nov2018 2:00:00	2018	894.7199745	840.7392	1344.318	1335.026	1166.652
18Nov2018 3:00:00	2018	880.7463603	833.2045	1341.231	1334.341	1161.664
18Nov2018 4:00:00	2018	881.7123886	834.7211	1338.851	1328.485	1160.334
18Nov2018 5:00:00	2018	902.6582658	842.2626	1345.218	1350.999	1182.798
18Nov2018 6:00:00	2018	946.9292324	854.4724	1345.33	1349.378	1179.207
18Nov2018 7:00:00	2018	1008.588523	874.7346	1377.329	1426.897	1187.167
18Nov2018 8:00:00	2018	1064.691636	888.2778	1404.366	1461.706	1191.509
18Nov2018 9:00:00	2018	1119.16603	888.8305	1427.426	1517.654	1194.127
18Nov2018 10:00:00	2018	1167.860944	886.4622	1439.026	1566.619	1198.409
18Nov2018 11:00:00	2018	1204.047302	891.4515	1444.111	1589.043	1194.397
18Nov2018 12:00:00	2018	1220.530949	894.7149	1448.837	1624.741	1185.028
18Nov2018 13:00:00	2018	1223.14052	887.8146	1430.854	1631.942	1187.876
18Nov2018 14:00:00	2018	1227.438322	897.2029	1442.439	1637.2	1207.316
18Nov2018 15:00:00	2018	1253.722076	914.6182	1447.702	1679.873	1216.637
18Nov2018 16:00:00	2018	1329.392476	936.1368	1471.569	1811.4	1244.964
18Nov2018 17:00:00	2018	1388.964146	954.8812	1496.265	1856.938	1264.305
18Nov2018 18:00:00	2018	1354.104422	941.0309	1505.002	1800.075	1256.465
18Nov2018 19:00:00	2018	1302.995231	931.3674	1485.342	1766.165	1263.593
18Nov2018 20:00:00	2018	1250.700521	910.5138	1453.874	1723.886	1248.02
18Nov2018 21:00:00	2018	1175.582309	873.3839	1418.747	1625.022	1242.109
18Nov2018 22:00:00	2018	1072.850713	833.1587	1399.459	1529.771	1236.602
18Nov2018 23:00:00	2018	975.7154021	817.9914	1353.785	1457.601	1222.868
19Nov2018 0:00:00	2018	912.0104978	797.5167	1330.69	1369.471	1212.78
19Nov2018 1:00:00	2018	877.765044	790.958	1324.227	1349.29	1207.188
19Nov2018 2:00:00	2018	864.7281649	790.2598	1318.548	1317.869	1202.902
19Nov2018 3:00:00	2018	867.267749	797.9252	1314.114	1302.013	1198.807
19Nov2018 4:00:00	2018	894.6085603	809.098	1326.888	1322.971	1197.181
19Nov2018 5:00:00	2018	982.9491079	835.2015	1335.014	1391.507	1189.196
19Nov2018 6:00:00	2018	1150.051255	886.631	1382.057	1544.061	1199.59
19Nov2018 7:00:00	2018	1296.778652	930.2901	1462.479	1717.29	1220.842
19Nov2018 8:00:00	2018	1315.157428	925.6159	1482.93	1732.213	1166.018
19Nov2018 9:00:00	2018	1322.686661	918.8748	1489.759	1750.886	1158.565
19Nov2018 10:00:00	2018	1337.638678	907.5524	1511.376	1775.251	1216.704
19Nov2018 11:00:00	2018	1345.42046	902.1065	1508.707	1790.836	1207.375
19Nov2018 12:00:00	2018	1343.962668	879.6851	1480.504	1781.347	1203.457
19Nov2018 13:00:00	2018	1341.615175	874.3304	1462.384	1790.955	1202.395
19Nov2018 14:00:00	2018	1338.830131	875.7832	1461.148	1783.468	1204.132
19Nov2018 15:00:00	2018	1350.27828	888.8816	1473.118	1785.77	1195.137

19Nov2018 16:00:00	2018	1398.66066	918.794	1508.595	1853.745	1215.708
19Nov2018 17:00:00	2018	1489.171529	942.5688	1518.073	1942.419	1226.374
19Nov2018 18:00:00	2018	1433.997994	926.9979	1496.723	1903.719	1219.699
19Nov2018 19:00:00	2018	1379.817148	940.7433	1496.89	1855.397	1225.273
19Nov2018 20:00:00	2018	1321.784122	936.5654	1456.872	1760.826	1209.269
19Nov2018 21:00:00	2018	1235.914392	937.5767	1405.176	1658.014	1123.178
19Nov2018 22:00:00	2018	1118.583239	902.3634	1380.198	1551.232	1109.635
19Nov2018 23:00:00	2018	1014.378352	863.3438	1339.685	1440.276	1087.61
20Nov2018 0:00:00	2018	944.6663378	847.1671	1320.363	1370.301	1072.917
20Nov2018 1:00:00	2018	901.1102853	833.2614	1305.647	1333.353	1066.928
20Nov2018 2:00:00	2018	885.1806699	830.7786	1301.294	1314.808	1049.922
20Nov2018 3:00:00	2018	881.0755314	828.1742	1287.94	1287.214	1058.284
20Nov2018 4:00:00	2018	909.4849598	832.4618	1289.039	1321.333	1044.794
20Nov2018 5:00:00	2018	998.5264307	846.8298	1291.374	1382.271	1065.324
20Nov2018 6:00:00	2018	1159.547961	885.2961	1349.676	1549.01	1072.098
20Nov2018 7:00:00	2018	1302.576214	923.9087	1444.989	1743.489	1103.464
20Nov2018 8:00:00	2018	1311.438579	904.7305	1465.699	1766.48	1129.931
20Nov2018 9:00:00	2018	1316.13622	883.4638	1466.557	1781.678	1145.42
20Nov2018 10:00:00	2018	1332.891243	878.5442	1442.122	1770.399	1148.136
20Nov2018 11:00:00	2018	1336.426237	873.5208	1430.69	1774.22	1133.181
20Nov2018 12:00:00	2018	1334.25912	865.6824	1421.949	1787.963	1132.975
20Nov2018 13:00:00	2018	1334.679281	862.9564	1427.112	1745.577	1153.376
20Nov2018 14:00:00	2018	1331.639681	861.1004	1436.27	1755.953	1152.617
20Nov2018 15:00:00	2018	1337.316997	864.1806	1446.97	1772.801	1165.766
20Nov2018 16:00:00	2018	1380.372954	878.1441	1478.088	1843.807	1193.003
20Nov2018 17:00:00	2018	1471.271598	910.1656	1482.329	1900.593	1198.932
20Nov2018 18:00:00	2018	1418.346844	896.5814	1471.149	1854.657	1205.605
20Nov2018 19:00:00	2018	1371.180383	894.907	1468.877	1814.617	1206.161
20Nov2018 20:00:00	2018	1312.335312	915.5612	1449.151	1745.088	1203.645
20Nov2018 21:00:00	2018	1223.122588	904.6956	1420.615	1640.007	1205.264
20Nov2018 22:00:00	2018	1108.430411	884.3845	1389.675	1528.732	1188.715
20Nov2018 23:00:00	2018	1009.464153	857.3033	1342.758	1426.994	1173.099
21Nov2018 0:00:00	2018	941.05426	817.5983	1332.329	1362.126	1156.27
21Nov2018 1:00:00	2018	904.8116309	810.1842	1313.289	1342.725	1152.136
21Nov2018 2:00:00	2018	886.6947547	773.3918	1295.065	1279.657	1157.275
21Nov2018 3:00:00	2018	886.2140081	771.0759	1287.704	1271.436	1159.531
21Nov2018 4:00:00	2018	909.7179729	784.5299	1297.941	1267.6	1160.717
21Nov2018 5:00:00	2018	997.2827463	805.8873	1312.452	1367.377	1165.241
21Nov2018 6:00:00	2018	1161.01308	841.8398	1362.276	1513.342	1173.741
21Nov2018 7:00:00	2018	1308.000758	881.4951	1434.148	1685.873	1198.26
21Nov2018 8:00:00	2018	1331.106388	889.7849	1431.125	1718.293	1176.17
21Nov2018 9:00:00	2018	1345.295769	891.5327	1433.954	1725.57	1167.09
21Nov2018 10:00:00	2018	1363.614603	898.2645	1432.283	1767.16	1149.921
21Nov2018 11:00:00	2018	1373.775418	900.0679	1424.783	1773.947	1156.019
21Nov2018 12:00:00	2018	1373.314161	883.5483	1399.512	1749.8	1234.599
21Nov2018 13:00:00	2018	1366.628445	877.2257	1400.171	1720.811	1265.004
21Nov2018 14:00:00	2018	1357.706183	874.1407	1403.852	1729.751	1250.91

21Nov2018 15:00:00	2018	1355.217677	883.7325	1432.856	1770.263	1257.542
21Nov2018 16:00:00	2018	1413.48596	907.2055	1472.403	1854.492	1296.521
21Nov2018 17:00:00	2018	1483.432999	909.5552	1486.338	1920.4	1290.989
21Nov2018 18:00:00	2018	1426.640534	883.6393	1471.972	1860.515	1291.134
21Nov2018 19:00:00	2018	1373.753669	878.6457	1477.056	1800.01	1264.765
21Nov2018 20:00:00	2018	1317.806313	877.8713	1466.71	1735.088	1216.556
21Nov2018 21:00:00	2018	1230.553837	872.7943	1437.424	1682.439	1182.232
21Nov2018 22:00:00	2018	1119.186508	846.2054	1391.844	1585.38	1135.11
21Nov2018 23:00:00	2018	1017.034645	814.7003	1329.9	1461.134	1142.619
22Nov2018 0:00:00	2018	942.8943587	794.985	1306.115	1389.55	1131.773
22Nov2018 1:00:00	2018	901.3635839	779.4455	1293.509	1321.337	1125.328
22Nov2018 2:00:00	2018	884.7165394	771.5905	1302.086	1337.181	1119.415
22Nov2018 3:00:00	2018	883.8269663	769.582	1312.478	1308.193	1136.857
22Nov2018 4:00:00	2018	909.0500066	773.2094	1318.55	1349.811	1135.745
22Nov2018 5:00:00	2018	995.4325047	787.8061	1339.156	1415.128	1130.344
22Nov2018 6:00:00	2018	1158.069709	824.7555	1384.956	1564.186	1160.093
22Nov2018 7:00:00	2018	1302.473366	865.6928	1432.508	1720.446	1156.443
22Nov2018 8:00:00	2018	1332.388794	870.6381	1464.992	1753.076	1187.211
22Nov2018 9:00:00	2018	1339.794341	893.1767	1468.111	1764.751	1180.642
22Nov2018 10:00:00	2018	1352.504783	878.1835	1458.267	1762.427	1165.445
22Nov2018 11:00:00	2018	1359.27226	874.0261	1445.608	1738.668	1151.295
22Nov2018 12:00:00	2018	1349.353326	885.1027	1438.912	1739.678	1154.428
22Nov2018 13:00:00	2018	1347.320798	911.1545	1437.217	1741.204	1183.581
22Nov2018 14:00:00	2018	1342.231399	916.8436	1450.51	1741.645	1220.16
22Nov2018 15:00:00	2018	1348.504618	918.652	1439.481	1745.183	1187.825
22Nov2018 16:00:00	2018	1389.234751	946.8404	1483.466	1827.051	1166.44
22Nov2018 17:00:00	2018	1462.697937	988.936	1528.342	1871.604	1183.741
22Nov2018 18:00:00	2018	1412.908332	974.284	1502.163	1815.251	1169.534
22Nov2018 19:00:00	2018	1364.508424	963.8681	1485.034	1764.442	1153.105
22Nov2018 20:00:00	2018	1317.881829	948.3946	1465.922	1703.652	1148.434
22Nov2018 21:00:00	2018	1238.417647	933.0638	1445.892	1620.029	1159.163
22Nov2018 22:00:00	2018	1127.580641	903.1516	1400.697	1524.999	1141.18
22Nov2018 23:00:00	2018	1026.281391	877.4133	1355.936	1426.373	1129.012
23Nov2018 0:00:00	2018	954.1421333	850.1884	1324.652	1357.011	1147.837
23Nov2018 1:00:00	2018	913.3487559	844.4125	1317.449	1311.876	1135.535
23Nov2018 2:00:00	2018	894.0380824	841.9662	1321.841	1297.304	1131.386
23Nov2018 3:00:00	2018	891.9667477	842.2669	1319.771	1287.865	1128.087
23Nov2018 4:00:00	2018	918.0285811	845.2842	1345.443	1292.325	1132.351
23Nov2018 5:00:00	2018	1003.870256	858.6265	1362.677	1393.499	1162.448
23Nov2018 6:00:00	2018	1155.151395	882.6966	1415.666	1549.416	1175.441
23Nov2018 7:00:00	2018	1298.560192	912.3915	1467.959	1729.358	1179.713
23Nov2018 8:00:00	2018	1343.433882	913.5461	1454.443	1746.35	1182.94
23Nov2018 9:00:00	2018	1356.072538	916.0817	1465.64	1747.573	1178.074
23Nov2018 10:00:00	2018	1370.948266	913.1919	1471.988	1770.366	1185.312
23Nov2018 11:00:00	2018	1378.135008	913.2442	1481.367	1799.306	1181.986
23Nov2018 12:00:00	2018	1381.357572	909.6284	1489.645	1792.342	1158.595
23Nov2018 13:00:00	2018	1387.462251	910.8389	1461.395	1786.639	1166.959

23Nov2018 14:00:00	2018	1382.877743	919.583	1464.727	1786.104	1166.888
23Nov2018 15:00:00	2018	1378.083133	915.3192	1457.723	1829.804	1165.123
23Nov2018 16:00:00	2018	1411.031615	930.7839	1506.775	1914.641	1164.168
23Nov2018 17:00:00	2018	1459.352542	948.8873	1520.951	1916.113	1179.16
23Nov2018 18:00:00	2018	1403.748849	935.3853	1495.522	1867.013	1174.405
23Nov2018 19:00:00	2018	1348.491535	923.6664	1483.871	1812.549	1178.872
23Nov2018 20:00:00	2018	1298.834557	916.6784	1459.797	1763.796	1173.537
23Nov2018 21:00:00	2018	1237.26616	898.2726	1441.705	1698.08	1155.712
23Nov2018 22:00:00	2018	1145.607057	866.4918	1388.438	1588.6	1146.247
23Nov2018 23:00:00	2018	1053.913533	834.7627	1366.03	1491.952	1164.95
24Nov2018 0:00:00	2018	984.1349527	834.8588	1337.738	1370.829	1144.217
24Nov2018 1:00:00	2018	936.7414007	836.2644	1331.965	1307.75	1142.237
24Nov2018 2:00:00	2018	911.1397607	831.6132	1331.757	1294.242	1149.661
24Nov2018 3:00:00	2018	902.6150055	828.7492	1326.262	1290.346	1141.779
24Nov2018 4:00:00	2018	906.7998333	830.6073	1326.804	1291.085	1122.381
24Nov2018 5:00:00	2018	941.9673905	840.9365	1345.198	1324.071	1106.645
24Nov2018 6:00:00	2018	997.1353246	862.6978	1365.009	1390.047	1101.767
24Nov2018 7:00:00	2018	1074.157082	892.9037	1381.601	1484.044	1097.229
24Nov2018 8:00:00	2018	1141.129198	912.2893	1387.44	1555.996	1108.097
24Nov2018 9:00:00	2018	1194.440195	928.6282	1379.986	1603.267	1119.223
24Nov2018 10:00:00	2018	1226.754866	934.5151	1392.659	1643.397	1126.488
24Nov2018 11:00:00	2018	1235.959677	928.2779	1405.305	1660.7	1121.681
24Nov2018 12:00:00	2018	1231.235958	915.5704	1402.227	1661.272	1118.716
24Nov2018 13:00:00	2018	1214.281241	906.7582	1410.998	1658.668	1108.005
24Nov2018 14:00:00	2018	1201.843482	902.0762	1435.825	1685.185	1120.98
24Nov2018 15:00:00	2018	1204.128506	903.1462	1458.598	1683.488	1150.921
24Nov2018 16:00:00	2018	1263.854127	922.3024	1503.387	1787.637	1169.563
24Nov2018 17:00:00	2018	1363.672643	966.2406	1536.78	1819.082	1164.462
24Nov2018 18:00:00	2018	1334.506716	971.7951	1512.687	1753.573	1162.479
24Nov2018 19:00:00	2018	1287.997728	959.8573	1473.488	1690.709	1155.846
24Nov2018 20:00:00	2018	1248.282401	946.3778	1448.603	1646.381	1141.799
24Nov2018 21:00:00	2018	1201.01896	932.0286	1402.537	1589.509	1134.658
24Nov2018 22:00:00	2018	1130.992815	886.7551	1338.437	1514.711	1122.474
24Nov2018 23:00:00	2018	1047.075423	857.6599	1300.314	1450.405	1105.23
25Nov2018 0:00:00	2018	979.9104854	849.8475	1298.377	1358.24	1105.138
25Nov2018 1:00:00	2018	931.8186388	854.5598	1288.841	1304.305	1101.947
25Nov2018 2:00:00	2018	905.9611301	850.5566	1283.849	1284.647	1087.793
25Nov2018 3:00:00	2018	896.773298	848.0405	1280.76	1276.303	1094.401
25Nov2018 4:00:00	2018	901.3162429	851.5319	1297.949	1277.123	1104.45
25Nov2018 5:00:00	2018	928.3285646	860.5905	1310.342	1296.169	1117.79
25Nov2018 6:00:00	2018	974.2245871	874.1012	1321.69	1338.819	1120.377
25Nov2018 7:00:00	2018	1040.257221	893.0808	1353.036	1434.365	1120.999
25Nov2018 8:00:00	2018	1088.556907	894.8058	1379.017	1504.773	1110.729
25Nov2018 9:00:00	2018	1137.044629	887.0485	1376.157	1567.244	1108.381
25Nov2018 10:00:00	2018	1176.1166	876.2481	1380.783	1613.318	1119.337
25Nov2018 11:00:00	2018	1199.808592	878.6488	1386.258	1611.246	1120.157
25Nov2018 12:00:00	2018	1207.391551	871.0184	1394.956	1639.474	1137.442

25Nov2018 13:00:00	2018	1203.270763	863.901	1401.857	1633.285	1144.079
25Nov2018 14:00:00	2018	1201.295869	867.1308	1401.441	1635.841	1139.412
25Nov2018 15:00:00	2018	1216.710977	878.1589	1410.126	1657.719	1146.259
25Nov2018 16:00:00	2018	1294.254701	919.1096	1463.213	1754.782	1163.252
25Nov2018 17:00:00	2018	1392.108287	964.8744	1531.909	1870.454	1186.619
25Nov2018 18:00:00	2018	1368.291097	949.8621	1518.857	1829.529	1181.435
25Nov2018 19:00:00	2018	1320.344462	935.8973	1483.619	1782.306	1184.785
25Nov2018 20:00:00	2018	1287.122754	923.2794	1457.856	1738.141	1188.784
25Nov2018 21:00:00	2018	1218.931723	902.6335	1431.579	1645.027	1171.901
25Nov2018 22:00:00	2018	1116.568151	883.2627	1394.896	1546.044	1167.235
25Nov2018 23:00:00	2018	1015.797611	850.6465	1356.421	1444.611	1156.019
26Nov2018 0:00:00	2018	951.7389834	830.3565	1328.214	1365.321	1167.533
26Nov2018 1:00:00	2018	918.3958171	831.6143	1312.875	1325.831	1180.731
26Nov2018 2:00:00	2018	900.9511704	822.6306	1285.699	1332.817	1166.766
26Nov2018 3:00:00	2018	895.4771164	819.0291	1287.752	1343.539	1145.15
26Nov2018 4:00:00	2018	918.5519497	823.9679	1312.073	1353.154	1141.736
26Nov2018 5:00:00	2018	999.3329848	843.6476	1314.175	1430.049	1139.829
26Nov2018 6:00:00	2018	1160.12864	885.7605	1358.253	1589.28	1150.323
26Nov2018 7:00:00	2018	1310.337502	938.6369	1444.673	1753.996	1159.201
26Nov2018 8:00:00	2018	1330.455239	940.4618	1482.662	1809.261	1163.263
26Nov2018 9:00:00	2018	1344.072769	942.4043	1486.773	1806.726	1146.693
26Nov2018 10:00:00	2018	1356.605217	941.1382	1487.12	1830.067	1146.961
26Nov2018 11:00:00	2018	1360.34242	936.4622	1494.702	1864.361	1149.031
26Nov2018 12:00:00	2018	1365.775487	926.5805	1492.318	1839.952	1140.943
26Nov2018 13:00:00	2018	1375.501359	927.9999	1475.959	1841.242	1135.931
26Nov2018 14:00:00	2018	1378.099568	933.3961	1477.39	1828.939	1143.432
26Nov2018 15:00:00	2018	1387.815459	929.6478	1492.449	1847.358	1139.246
26Nov2018 16:00:00	2018	1451.236711	946.9474	1537.473	1945.082	1162.388
26Nov2018 17:00:00	2018	1516.908086	972.5714	1543.902	1968.028	1176.379
26Nov2018 18:00:00	2018	1457.384687	971.8444	1484.581	1888.226	1163.023
26Nov2018 19:00:00	2018	1401.426316	963.1089	1466.039	1814.313	1167.046
26Nov2018 20:00:00	2018	1342.991452	952.0487	1440.023	1758.729	1161.735
26Nov2018 21:00:00	2018	1253.329274	946.3146	1405.298	1691.423	1140.721
26Nov2018 22:00:00	2018	1125.503177	906.5739	1362.272	1599.969	1136.666
26Nov2018 23:00:00	2018	1017.327413	865.6549	1285.908	1474.572	1137.045
27Nov2018 0:00:00	2018	949.1405123	850.7381	1277.885	1359.853	1113.949
27Nov2018 1:00:00	2018	906.5009959	836.4151	1272.253	1309.938	1115.94
27Nov2018 2:00:00	2018	887.3000574	826.718	1264.376	1294.278	1110.888
27Nov2018 3:00:00	2018	879.5967767	829.8654	1262.102	1314.334	1098.943
27Nov2018 4:00:00	2018	902.7596876	825.8192	1242.292	1324.753	1098.852
27Nov2018 5:00:00	2018	989.4873348	844.2134	1275.367	1409.071	1108.188
27Nov2018 6:00:00	2018	1155.546138	884.9483	1322.855	1565.94	1136.86
27Nov2018 7:00:00	2018	1300.246806	928.3018	1392.786	1734.631	1158.262
27Nov2018 8:00:00	2018	1328.092071	918.3665	1382.383	1775.011	1157.256
27Nov2018 9:00:00	2018	1329.421725	911.5534	1399.675	1768.773	1137.223
27Nov2018 10:00:00	2018	1334.1976	908.1682	1406.163	1786.073	1133.121
27Nov2018 11:00:00	2018	1340.039727	901.3448	1414.732	1781.28	1132.994

27Nov2018 12:00:00	2018	1338.615143	894.0192	1407.583	1813.947	1111.793
27Nov2018 13:00:00	2018	1342.856894	889.2976	1412.217	1823.516	1131.658
27Nov2018 14:00:00	2018	1341.148629	885.3184	1413.989	1811.501	1146.302
27Nov2018 15:00:00	2018	1340.487885	885.9665	1416.907	1817.635	1154.581
27Nov2018 16:00:00	2018	1395.234495	911.4871	1459.438	1875.197	1172.49
27Nov2018 17:00:00	2018	1485.17421	942.5686	1458.137	1948.153	1173.342
27Nov2018 18:00:00	2018	1429.149055	934.5677	1466.665	1889.226	1158.301
27Nov2018 19:00:00	2018	1373.865089	929.5787	1449.234	1854.478	1164.935
27Nov2018 20:00:00	2018	1321.576941	915.6168	1443.873	1830.313	1161.459
27Nov2018 21:00:00	2018	1239.121094	905.6233	1398.317	1738.981	1160.09
27Nov2018 22:00:00	2018	1118.021061	870.5029	1367.704	1638.135	1141.428
27Nov2018 23:00:00	2018	1013.444063	835.9333	1321.763	1492.94	1130.29
28Nov2018 0:00:00	2018	941.0512471	809.9247	1294.085	1393.979	1117.173
28Nov2018 1:00:00	2018	901.3577422	803.4302	1286.649	1350.343	1112.446
28Nov2018 2:00:00	2018	879.8043497	798.4183	1280.472	1321.007	1121.793
28Nov2018 3:00:00	2018	879.7906046	800.2859	1254.846	1309.701	1111.859
28Nov2018 4:00:00	2018	908.7112362	810.1492	1269.655	1350.738	1116.297
28Nov2018 5:00:00	2018	998.1626931	828.575	1299.715	1416.732	1129.42
28Nov2018 6:00:00	2018	1160.377814	872.157	1350.687	1568.123	1147.234
28Nov2018 7:00:00	2018	1315.47501	926.5442	1393.124	1737.962	1160.37
28Nov2018 8:00:00	2018	1331.144809	917.9038	1417.612	1772.522	1167.706
28Nov2018 9:00:00	2018	1340.435074	913.9901	1397.394	1743.359	1173.214
28Nov2018 10:00:00	2018	1343.192074	883.971	1384.147	1747.535	1163.016
28Nov2018 11:00:00	2018	1342.542509	859.6673	1388.97	1750.897	1153.286
28Nov2018 12:00:00	2018	1338.148626	854.1587	1386.563	1730.66	1154.382
28Nov2018 13:00:00	2018	1335.630522	858.403	1377.374	1727.533	1165.302
28Nov2018 14:00:00	2018	1329.160239	861.0932	1409.396	1729.923	1194.956
28Nov2018 15:00:00	2018	1339.50388	884.8882	1413.912	1750.781	1200.63
28Nov2018 16:00:00	2018	1400.516329	910.1833	1438.919	1843.648	1211.327
28Nov2018 17:00:00	2018	1482.746793	945.0468	1493.567	1969.644	1217.173
28Nov2018 18:00:00	2018	1428.113137	934.5858	1481.238	1909.953	1217.377
28Nov2018 19:00:00	2018	1377.86439	932.2478	1459.213	1862.952	1204.704
28Nov2018 20:00:00	2018	1321.974549	929.7563	1465.798	1804.266	1201.639
28Nov2018 21:00:00	2018	1240.670982	934.5572	1442.389	1724.033	1182.809
28Nov2018 22:00:00	2018	1122.606623	893.9593	1400.578	1607.014	1162.137
28Nov2018 23:00:00	2018	1020.230305	863.3364	1340.703	1511.096	1143.736
29Nov2018 0:00:00	2018	952.4357345	851.2211	1324.132	1419.454	1142.125
29Nov2018 1:00:00	2018	915.4887233	837.8567	1303.551	1378.457	1132.312
29Nov2018 2:00:00	2018	892.4784398	837.0541	1273.594	1335.594	1128.158
29Nov2018 3:00:00	2018	890.9251407	833.8912	1275.321	1311.728	1131.569
29Nov2018 4:00:00	2018	914.91233	843.6941	1308.024	1289.741	1131.987
29Nov2018 5:00:00	2018	1007.653651	862.7345	1320.129	1347.986	1133.634
29Nov2018 6:00:00	2018	1165.486411	891.8879	1361.697	1500.533	1142.343
29Nov2018 7:00:00	2018	1322.001446	928.2866	1427.112	1667.713	1160.391
29Nov2018 8:00:00	2018	1343.311876	928.9917	1412.254	1702.187	1166.146
29Nov2018 9:00:00	2018	1339.227394	921.0101	1406.97	1718.196	1167.105
29Nov2018 10:00:00	2018	1344.078917	906.1052	1396.16	1724.288	1170.607

29Nov2018 11:00:00	2018	1344.514022	893.2718	1380.438	1735.469	1176.675
29Nov2018 12:00:00	2018	1336.622106	882.5795	1365.14	1730.445	1153.449
29Nov2018 13:00:00	2018	1331.959767	879.6588	1364.234	1737.426	1133.752
29Nov2018 14:00:00	2018	1331.982798	881.125	1362.69	1737.763	1151.627
29Nov2018 15:00:00	2018	1343.407395	886.0394	1381.303	1769.487	1153.671
29Nov2018 16:00:00	2018	1410.732978	918.1435	1439.873	1824.193	1167.253
29Nov2018 17:00:00	2018	1483.247604	948.0952	1466.755	1913.582	1174.511
29Nov2018 18:00:00	2018	1432.205182	935.011	1461.096	1850.614	1188.307
29Nov2018 19:00:00	2018	1386.493668	936.957	1433.645	1822.213	1194.446
29Nov2018 20:00:00	2018	1334.897372	925.8399	1416.311	1779.185	1210.894
29Nov2018 21:00:00	2018	1260.586287	902.7164	1386.531	1686.933	1206.294
29Nov2018 22:00:00	2018	1146.224867	875.8599	1349.678	1591.748	1193.766
29Nov2018 23:00:00	2018	1040.553038	858.453	1317.192	1499.028	1190.698
30Nov2018 0:00:00	2018	973.9534587	843.0941	1302.859	1412.467	1187.098
30Nov2018 1:00:00	2018	933.0595382	835.9632	1291.398	1385.245	1179.385
30Nov2018 2:00:00	2018	908.8931887	831.9495	1286.048	1365.659	1166.012
30Nov2018 3:00:00	2018	909.9333985	832.9421	1283.145	1347.921	1152.894
30Nov2018 4:00:00	2018	934.2471945	839.8019	1292.681	1358.736	1157.379
30Nov2018 5:00:00	2018	1017.564884	860.8055	1317.595	1433.211	1165.42
30Nov2018 6:00:00	2018	1174.750451	901.6658	1340.976	1547.045	1170.241
30Nov2018 7:00:00	2018	1320.98245	933.9577	1415.082	1715.439	1183.126
30Nov2018 8:00:00	2018	1358.683472	933.1179	1430.066	1761.927	1189.382
30Nov2018 9:00:00	2018	1358.785655	930.5781	1417.32	1767.327	1174.455
30Nov2018 10:00:00	2018	1367.57403	922.3	1416.186	1774.262	1175.987
30Nov2018 11:00:00	2018	1371.826656	917.4243	1413.555	1763.396	1175.946
30Nov2018 12:00:00	2018	1363.705146	908.6441	1399.101	1752.406	1182.073
30Nov2018 13:00:00	2018	1358.377841	906.3708	1391.56	1765.705	1193.5
30Nov2018 14:00:00	2018	1347.388917	895.0432	1384.834	1770.796	1201.583
30Nov2018 15:00:00	2018	1350.964861	901.5992	1400.698	1793.512	1195.78
30Nov2018 16:00:00	2018	1404.932252	925.7749	1464.107	1885.152	1205.73
30Nov2018 17:00:00	2018	1462.387583	951.3527	1472.669	1929.83	1200.145
30Nov2018 18:00:00	2018	1407.918955	931.8186	1402.064	1864.002	1172.774
30Nov2018 19:00:00	2018	1354.734836	927.8508	1371.012	1815.037	1174.657
30Nov2018 20:00:00	2018	1308.521554	915.3113	1355.356	1769.153	1168.279
30Nov2018 21:00:00	2018	1239.165684	888.9202	1332.224	1690.123	1170.243
30Nov2018 22:00:00	2018	1148.683269	867.1012	1288.9	1608.346	1178.739
30Nov2018 23:00:00	2018	1054.655436	859.2594	1251.413	1519.707	1151.802
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01Dec2018 6:00:00	2018	991.0646054	826.5016	1293.585	1394.214	1092.889
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01Dec2018 8:00:00	2018	1161.177876	873.4849	1342.615	1580.323	1130.753
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01Dec2018 18:00:00	2018	1355.165726	930.4337	1418.812	1803.304	1163.397
01Dec2018 19:00:00	2018	1305.776721	919.1212	1432.842	1738.646	1132.478
01Dec2018 20:00:00	2018	1265.725293	928.5425	1389.025	1682.862	1147.651
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02Dec2018 0:00:00	2018	983.3205176	823.1384	1232.621	1388.085	1163.621
02Dec2018 1:00:00	2018	936.8262731	820.1044	1252.554	1342.166	1156.152
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02Dec2018 19:00:00	2018	1363.781561	938.0705	1473.239	1829.982	1156.893
02Dec2018 20:00:00	2018	1312.459744	925.2407	1443.171	1774.817	1163.36
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02Dec2018 22:00:00	2018	1123.219256	871.7109	1366.086	1572.91	1159.334
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03Dec2018 22:00:00	2018	1180.84857	947.503	1347.352	1599.44	1233.943
03Dec2018 23:00:00	2018	1067.044653	912.4814	1314.8	1485.422	1211.291
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12Dec2018 19:00:00	2018	1434.82945	1009.816	1536.383	1888.321	1208.843
12Dec2018 20:00:00	2018	1387.682562	1000.293	1528.537	1833.719	1197.432
12Dec2018 21:00:00	2018	1307.97568	978.3917	1470.054	1743.597	1201.882
12Dec2018 22:00:00	2018	1180.220386	948.284	1429.582	1618.396	1203.149
12Dec2018 23:00:00	2018	1062.131218	917.871	1398.281	1524.065	1189.454
13Dec2018 0:00:00	2018	985.3667927	890.2077	1379.617	1456.917	1198.049
13Dec2018 1:00:00	2018	933.2498371	875.943	1365.986	1417.092	1175.4
13Dec2018 2:00:00	2018	911.3755298	865.3457	1333.329	1375.782	1153.142
13Dec2018 3:00:00	2018	914.3897979	867.6966	1332.182	1371.391	1146.957

13Dec2018 4:00:00	2018	934.8605598	875.0942	1351.295	1383.065	1152.217
13Dec2018 5:00:00	2018	1014.41684	899.3103	1360.758	1483.204	1141.344
13Dec2018 6:00:00	2018	1182.640388	933.9179	1383.408	1626.999	1161.609
13Dec2018 7:00:00	2018	1339.087207	987.295	1446.534	1777.222	1175.291
13Dec2018 8:00:00	2018	1376.57951	1010.104	1468.621	1832.952	1176.028
13Dec2018 9:00:00	2018	1372.800128	1000.366	1436.643	1814.129	1198.107
13Dec2018 10:00:00	2018	1382.564674	985.1396	1426.312	1829.456	1189.465
13Dec2018 11:00:00	2018	1382.476679	974.1129	1431.736	1798.941	1177.442
13Dec2018 12:00:00	2018	1373.161103	965.0176	1432.666	1790.036	1187.502
13Dec2018 13:00:00	2018	1374.494806	966.85	1449.007	1781.479	1189.708
13Dec2018 14:00:00	2018	1368.098114	948.0545	1450.222	1773.901	1198.724
13Dec2018 15:00:00	2018	1367.222879	947.6966	1449.567	1803.163	1198.791
13Dec2018 16:00:00	2018	1439.956026	974.0828	1487.987	1895.052	1216.417
13Dec2018 17:00:00	2018	1511.337181	994.6707	1487.499	1966.319	1213.166
13Dec2018 18:00:00	2018	1451.943594	990.1907	1474.38	1920.523	1220.724
13Dec2018 19:00:00	2018	1404.808618	991.6509	1485.611	1882.025	1216.448
13Dec2018 20:00:00	2018	1360.904637	978.9725	1471.568	1828.869	1200.455
13Dec2018 21:00:00	2018	1278.960496	954.8226	1471.62	1762.733	1205.599
13Dec2018 22:00:00	2018	1167.434264	924.6829	1439.211	1625.473	1213.157
13Dec2018 23:00:00	2018	1049.859035	899.5102	1388.549	1506.812	1193.375
14Dec2018 0:00:00	2018	971.5260073	873.0511	1357.07	1427.166	1199.685
14Dec2018 1:00:00	2018	929.5765109	860.1051	1343.103	1385.271	1199.941
14Dec2018 2:00:00	2018	906.2002001	853.8713	1334.568	1363.166	1203.701
14Dec2018 3:00:00	2018	903.5762872	850.8518	1311.781	1351.986	1173.358
14Dec2018 4:00:00	2018	926.338087	854.1774	1327.847	1376.627	1169.203
14Dec2018 5:00:00	2018	1003.090126	870.3337	1348.087	1450.033	1159.034
14Dec2018 6:00:00	2018	1158.038303	908.3601	1381.421	1587.896	1178.794
14Dec2018 7:00:00	2018	1310.03239	958.3617	1439.414	1738.056	1200.489
14Dec2018 8:00:00	2018	1357.162909	959.624	1454.768	1781.415	1206.699
14Dec2018 9:00:00	2018	1358.226754	962.6966	1431.022	1780.484	1200.131
14Dec2018 10:00:00	2018	1364.034197	968.1923	1453.295	1806.775	1189.077
14Dec2018 11:00:00	2018	1373.585875	963.5539	1471.78	1814.233	1173.136
14Dec2018 12:00:00	2018	1365.894197	956.2768	1458.487	1801.527	1144.999
14Dec2018 13:00:00	2018	1365.256886	951.3599	1468.653	1791.926	1146.682
14Dec2018 14:00:00	2018	1358.038722	950.0289	1459.79	1788.606	1155.662
14Dec2018 15:00:00	2018	1350.011615	949.6236	1480.324	1810.354	1174.545
14Dec2018 16:00:00	2018	1403.605611	970.8964	1525.884	1893.836	1229.698
14Dec2018 17:00:00	2018	1469.659025	997.7938	1538.219	1923.104	1172.924
14Dec2018 18:00:00	2018	1404.838729	985.2486	1523.36	1836.915	1126.254
14Dec2018 19:00:00	2018	1355.458295	972.0442	1505.534	1788.879	1126.22
14Dec2018 20:00:00	2018	1306.677199	975.3488	1492.764	1745.29	1125.62
14Dec2018 21:00:00	2018	1241.140403	941.9959	1448.559	1664.707	1085.427
14Dec2018 22:00:00	2018	1142.022608	918.9272	1397.67	1564.116	1074.1
14Dec2018 23:00:00	2018	1042.793598	884.5284	1359.177	1452.109	1051.969
15Dec2018 0:00:00	2018	969.7877286	858.3069	1340.584	1407.6	1041.069
15Dec2018 1:00:00	2018	916.2527659	839.1385	1332.089	1354.091	1032.669
15Dec2018 2:00:00	2018	889.3581484	829.5406	1325.35	1338.367	1066.626

15Dec2018 3:00:00	2018	876.0655517	832.002	1335.949	1332.137	1110.171
15Dec2018 4:00:00	2018	877.710661	837.0094	1343.254	1339.075	1101
15Dec2018 5:00:00	2018	914.8028682	845.1378	1345.88	1358.744	1107.875
15Dec2018 6:00:00	2018	969.6733781	866.6401	1351.934	1408.807	1115.022
15Dec2018 7:00:00	2018	1058.076114	896.9065	1382.526	1519.581	1129.025
15Dec2018 8:00:00	2018	1136.67201	927.0229	1409.196	1603.305	1127.15
15Dec2018 9:00:00	2018	1187.000729	942.6504	1419.404	1629.415	1120.789
15Dec2018 10:00:00	2018	1221.355343	941.5755	1417.558	1653.302	1109.128
15Dec2018 11:00:00	2018	1240.323829	936.1908	1413.768	1682.709	1090.384
15Dec2018 12:00:00	2018	1256.340001	935.7157	1411.435	1661.701	1101.558
15Dec2018 13:00:00	2018	1259.719387	935.333	1408.8	1665.141	1125.434
15Dec2018 14:00:00	2018	1244.134824	935.6548	1404.829	1656.154	1137.216
15Dec2018 15:00:00	2018	1240.837943	940.7034	1409.46	1659.984	1143.841
15Dec2018 16:00:00	2018	1298.43151	962.6301	1468.865	1778.653	1168.389
15Dec2018 17:00:00	2018	1386.656558	994.5722	1503.617	1848.553	1191.978
15Dec2018 18:00:00	2018	1353.222848	985.4394	1480.31	1784.774	1197.468
15Dec2018 19:00:00	2018	1311.051775	977.1597	1457.178	1751.718	1183.536
15Dec2018 20:00:00	2018	1272.968699	963.658	1442.58	1701.329	1192.932
15Dec2018 21:00:00	2018	1226.146713	941.5972	1429.788	1674.069	1189.233
15Dec2018 22:00:00	2018	1150.334	913.3537	1408.989	1602.253	1177.914
15Dec2018 23:00:00	2018	1061.924319	886.3095	1355.394	1534.097	1142.391
16Dec2018 0:00:00	2018	997.1360269	862.1093	1333.794	1450.293	1134.39
16Dec2018 1:00:00	2018	942.040901	850.6612	1324.336	1358.334	1137.05
16Dec2018 2:00:00	2018	913.093572	844.7185	1293.075	1317.705	1138.167
16Dec2018 3:00:00	2018	904.6765118	847.1885	1288.671	1289.197	1130.091
16Dec2018 4:00:00	2018	904.9878284	851.6603	1308.105	1307.602	1118.39
16Dec2018 5:00:00	2018	931.1839351	858.0768	1354.405	1337.613	1124.925
16Dec2018 6:00:00	2018	981.3352464	878.9857	1398.041	1428.227	1129.022
16Dec2018 7:00:00	2018	1044.781858	905.7668	1416.333	1489.234	1154.685
16Dec2018 8:00:00	2018	1120.328632	929.4063	1443.934	1565.636	1176.372
16Dec2018 9:00:00	2018	1170.811246	938.0265	1450.245	1599.283	1171.386
16Dec2018 10:00:00	2018	1203.491857	937.6766	1472.759	1643.312	1174.025
16Dec2018 11:00:00	2018	1215.934587	932.3432	1476.604	1670.75	1173.273
16Dec2018 12:00:00	2018	1222.288891	921.1342	1467.768	1676.593	1156.454
16Dec2018 13:00:00	2018	1215.799941	914.0739	1478.286	1679.208	1163.542
16Dec2018 14:00:00	2018	1220.565201	920.8533	1470.179	1682.179	1162.696
16Dec2018 15:00:00	2018	1233.184606	932.1978	1485.251	1733.766	1174.767
16Dec2018 16:00:00	2018	1321.854559	965.8123	1544	1845.374	1195.505
16Dec2018 17:00:00	2018	1423.556384	1003.197	1582.883	1913.1	1204.208
16Dec2018 18:00:00	2018	1394.823631	987.8567	1571.15	1873.942	1199.512
16Dec2018 19:00:00	2018	1354.562407	971.1182	1543.351	1806.65	1189.975
16Dec2018 20:00:00	2018	1311.207561	955.3415	1522.508	1782.717	1164.53
16Dec2018 21:00:00	2018	1240.691318	928.8861	1498.308	1690.463	1159.689
16Dec2018 22:00:00	2018	1131.133596	889.595	1456.511	1602.11	1149.38
16Dec2018 23:00:00	2018	1026.485105	854.4681	1389.272	1460.807	1141.3
17Dec2018 0:00:00	2018	951.3090166	831.8568	1361.219	1395.628	1117.512
17Dec2018 1:00:00	2018	910.2857764	820.5532	1346.857	1349.92	1105.878

17Dec2018 2:00:00	2018	888.9166189	817.3008	1339.418	1314.114	1122.221
17Dec2018 3:00:00	2018	886.7932878	813.9988	1332.43	1331.409	1120.685
17Dec2018 4:00:00	2018	918.4600719	822.9644	1331.648	1323.865	1115.932
17Dec2018 5:00:00	2018	1001.069937	844.6431	1351.464	1400.259	1118.889
17Dec2018 6:00:00	2018	1163.393711	886.7655	1387.079	1542.459	1132.477
17Dec2018 7:00:00	2018	1319.877274	948.1082	1476.007	1721.287	1167.043
17Dec2018 8:00:00	2018	1370.722319	952.3512	1512.481	1797.252	1170.694
17Dec2018 9:00:00	2018	1368.49344	951.9578	1508.229	1808.839	1171.778
17Dec2018 10:00:00	2018	1368.869763	950.1116	1513.011	1843.589	1166.617
17Dec2018 11:00:00	2018	1374.91385	949.8441	1512.611	1854.356	1155.931
17Dec2018 12:00:00	2018	1371.576158	939.5954	1489.227	1824.93	1160.149
17Dec2018 13:00:00	2018	1366.944797	938.4078	1485.331	1814.347	1158.598
17Dec2018 14:00:00	2018	1359.68333	930.7961	1492.191	1797.912	1162.526
17Dec2018 15:00:00	2018	1370.224931	938.6616	1494.003	1807.64	1154.789
17Dec2018 16:00:00	2018	1435.651708	954.2464	1542.57	1910.985	1166.204
17Dec2018 17:00:00	2018	1521.547955	990.2735	1513.015	1971.545	1168.292
17Dec2018 18:00:00	2018	1471.543027	977.7187	1478.031	1914.58	1167.023
17Dec2018 19:00:00	2018	1422.622609	988.3559	1523.073	1884.754	1169.481
17Dec2018 20:00:00	2018	1370.064585	978.8687	1507.839	1840.252	1161.535
17Dec2018 21:00:00	2018	1287.174329	958.1185	1490.07	1743.025	1153.491
17Dec2018 22:00:00	2018	1158.152295	923.3459	1433.133	1624.832	1150.108
17Dec2018 23:00:00	2018	1043.288076	887.8105	1393.93	1503.023	1131.1
18Dec2018 0:00:00	2018	963.9807489	856.8568	1357.404	1420.207	1125.612
18Dec2018 1:00:00	2018	920.7788873	841.8755	1354.576	1384.832	1134.853
18Dec2018 2:00:00	2018	898.9654052	837.7686	1350.579	1343.363	1134.11
18Dec2018 3:00:00	2018	894.3160684	841.4386	1348.039	1345.864	1125.775
18Dec2018 4:00:00	2018	922.6498215	846.028	1354.075	1353.161	1118.743
18Dec2018 5:00:00	2018	1010.948696	867.3218	1375.468	1434.37	1115.78
18Dec2018 6:00:00	2018	1171.270551	908.4997	1417.331	1550.567	1127.731
18Dec2018 7:00:00	2018	1322.680033	963.1874	1473.602	1720.388	1142.553
18Dec2018 8:00:00	2018	1364.371251	961.9421	1505.28	1791.705	1153.625
18Dec2018 9:00:00	2018	1358.081554	963.7227	1507.827	1773.642	1154.155
18Dec2018 10:00:00	2018	1364.865006	967.2991	1496.63	1783.847	1153.871
18Dec2018 11:00:00	2018	1369.302479	966.8788	1481.067	1794.674	1149.089
18Dec2018 12:00:00	2018	1356.692316	964.5452	1469.064	1755.561	1148.28
18Dec2018 13:00:00	2018	1350.190343	954.6553	1474.961	1776.077	1147.839
18Dec2018 14:00:00	2018	1337.554721	946.9022	1478.984	1772.572	1147.385
18Dec2018 15:00:00	2018	1352.711614	958.2591	1489.873	1781.861	1166.036
18Dec2018 16:00:00	2018	1429.521673	979.9881	1543.795	1897.002	1181.728
18Dec2018 17:00:00	2018	1501.704234	990.9313	1504.45	1949.006	1195.512
18Dec2018 18:00:00	2018	1448.038075	980.7584	1494.401	1887.987	1193.144
18Dec2018 19:00:00	2018	1404.817673	974.7037	1496.18	1856.665	1197.105
18Dec2018 20:00:00	2018	1356.175971	983.779	1508.088	1822.418	1207.648
18Dec2018 21:00:00	2018	1271.949654	977.3496	1478.706	1752.779	1201.93
18Dec2018 22:00:00	2018	1148.468492	937.6183	1431.579	1616.749	1194.471
18Dec2018 23:00:00	2018	1037.627056	898.5828	1391.253	1518.116	1175.736
19Dec2018 0:00:00	2018	960.7149085	874.9744	1367.232	1438.063	1163.707

19Dec2018 1:00:00	2018	913.4883968	862.7574	1356.581	1390.819	1158.982
19Dec2018 2:00:00	2018	893.7474641	855.0105	1349.24	1363.434	1155.605
19Dec2018 3:00:00	2018	891.4352599	856.0116	1341.557	1332.283	1151.659
19Dec2018 4:00:00	2018	918.3008982	863.3668	1342.548	1341.308	1170.239
19Dec2018 5:00:00	2018	1002.717201	881.4803	1353.206	1380.511	1180.757
19Dec2018 6:00:00	2018	1164.573471	925.6047	1397.81	1524.952	1179.803
19Dec2018 7:00:00	2018	1318.731322	979.7433	1477.511	1684.885	1202.654
19Dec2018 8:00:00	2018	1363.338123	986.4366	1501.762	1753.818	1182.587
19Dec2018 9:00:00	2018	1355.759663	983.2856	1483.445	1732.501	1163.043
19Dec2018 10:00:00	2018	1365.138953	972.6227	1481.735	1740.297	1179.597
19Dec2018 11:00:00	2018	1361.987433	963.4704	1459.43	1752.807	1181.749
19Dec2018 12:00:00	2018	1352.287712	951.5595	1437.824	1725.053	1170.984
19Dec2018 13:00:00	2018	1349.979507	936.5472	1402.422	1708.819	1158.444
19Dec2018 14:00:00	2018	1346.086931	941.5545	1420.5	1727.733	1156.442
19Dec2018 15:00:00	2018	1353.800795	963.3358	1438.078	1749.149	1153.751
19Dec2018 16:00:00	2018	1420.405568	985.5595	1504.748	1847.384	1171.035
19Dec2018 17:00:00	2018	1503.353995	1015.452	1514.573	1914.202	1188.193
19Dec2018 18:00:00	2018	1450.153105	1001.465	1524.209	1862.957	1163.631
19Dec2018 19:00:00	2018	1405.874634	997.0543	1532.608	1807.702	1159.973
19Dec2018 20:00:00	2018	1360.705114	1001.961	1521.541	1769.045	1160.633
19Dec2018 21:00:00	2018	1281.760818	996.4489	1493.969	1691.893	1165.614
19Dec2018 22:00:00	2018	1161.566428	956.1407	1449.062	1574.866	1146.162
19Dec2018 23:00:00	2018	1049.674152	919.587	1398.897	1459.612	1156.346
20Dec2018 0:00:00	2018	971.6777118	890.1728	1371.429	1380.256	1151.77
20Dec2018 1:00:00	2018	924.0872611	868.6256	1351.384	1331.364	1156.632
20Dec2018 2:00:00	2018	898.6433386	862.9998	1326.07	1308.86	1138.485
20Dec2018 3:00:00	2018	894.1509981	869.3758	1332.247	1298.022	1126.443
20Dec2018 4:00:00	2018	916.8784529	877.4315	1352.345	1314.794	1117.688
20Dec2018 5:00:00	2018	1001.243933	890.2253	1371.996	1386.596	1128.234
20Dec2018 6:00:00	2018	1161.309448	935.5488	1428.862	1559.494	1141.817
20Dec2018 7:00:00	2018	1313.079123	976.7791	1494.809	1729.441	1140.943
20Dec2018 8:00:00	2018	1368.025212	1002.88	1528.834	1809.561	1145.004
20Dec2018 9:00:00	2018	1366.470975	1003.753	1515.239	1801.625	1146.148
20Dec2018 10:00:00	2018	1366.30088	1004.469	1507.726	1827.179	1168.669
20Dec2018 11:00:00	2018	1370.533781	1005.813	1505.522	1823.54	1183.22
20Dec2018 12:00:00	2018	1365.36621	993.2849	1496.791	1810.622	1197.653
20Dec2018 13:00:00	2018	1365.697175	987.4114	1494.912	1808.56	1193.446
20Dec2018 14:00:00	2018	1357.30773	980.78	1490.368	1796.089	1208.721
20Dec2018 15:00:00	2018	1366.911127	978.7044	1501.292	1846.067	1210.077
20Dec2018 16:00:00	2018	1432.221948	985.9852	1551.017	1938.227	1241.098
20Dec2018 17:00:00	2018	1495.710035	999.327	1518.47	1959.581	1252.82
20Dec2018 18:00:00	2018	1442.874053	986.4696	1494.222	1886.774	1241.758
20Dec2018 19:00:00	2018	1398.472926	990.3872	1500.88	1832.858	1221.458
20Dec2018 20:00:00	2018	1352.505439	981.9667	1494.623	1784.673	1207.26
20Dec2018 21:00:00	2018	1282.183761	967.6424	1473.776	1708.817	1203.673
20Dec2018 22:00:00	2018	1166.77518	937.4982	1432.635	1607.976	1197.22
20Dec2018 23:00:00	2018	1058.023599	911.204	1380.76	1482.464	1182.531

21Dec2018 0:00:00	2018	980.1050882	889.4246	1350.245	1402.119	1156.992
21Dec2018 1:00:00	2018	927.7840169	876.9092	1334.524	1338.266	1168.792
21Dec2018 2:00:00	2018	898.2543024	868.3343	1304.79	1299.982	1176.328
21Dec2018 3:00:00	2018	894.5832313	867.1161	1303.557	1291.313	1162.853
21Dec2018 4:00:00	2018	917.3648824	878.1444	1317.843	1303.293	1157.28
21Dec2018 5:00:00	2018	991.4932624	891.5535	1323.543	1380.644	1166.786
21Dec2018 6:00:00	2018	1141.813394	922.9359	1366.515	1532.56	1168.012
21Dec2018 7:00:00	2018	1297.10505	969.9893	1439.615	1701.02	1173.073
21Dec2018 8:00:00	2018	1357.755592	984.1851	1485.927	1775.355	1190.284
21Dec2018 9:00:00	2018	1365.91724	988.836	1484.08	1776.271	1180.556
21Dec2018 10:00:00	2018	1368.799985	990.0665	1498.757	1773.729	1156.62
21Dec2018 11:00:00	2018	1358.719261	985.0265	1503.351	1800.66	1174.215
21Dec2018 12:00:00	2018	1350.500962	969.8596	1491.221	1791.52	1198.383
21Dec2018 13:00:00	2018	1343.945722	969.3591	1507.148	1801.826	1192.759
21Dec2018 14:00:00	2018	1331.774361	970.198	1503.809	1810.859	1193.57
21Dec2018 15:00:00	2018	1334.035756	964.5255	1531.511	1841.098	1179.056
21Dec2018 16:00:00	2018	1393.464647	978.6133	1576.62	1914.049	1183.315
21Dec2018 17:00:00	2018	1466.633261	984.4517	1550.489	1976.112	1196.457
21Dec2018 18:00:00	2018	1416.817419	975.623	1528.033	1908.146	1200.913
21Dec2018 19:00:00	2018	1367.167584	968.3718	1539.778	1865.928	1197.308
21Dec2018 20:00:00	2018	1321.198439	979.2143	1524.855	1797.574	1231.654
21Dec2018 21:00:00	2018	1258.814544	979.9107	1498.512	1740.529	1235.598
21Dec2018 22:00:00	2018	1166.848202	936.5588	1455.278	1645.211	1239.683
21Dec2018 23:00:00	2018	1070.089979	919.0408	1421.489	1542.1	1236.402
22Dec2018 0:00:00	2018	992.430209	895.0183	1393.851	1452.769	1220.278
22Dec2018 1:00:00	2018	946.7443912	884.7751	1365.875	1372.152	1190.548
22Dec2018 2:00:00	2018	919.7429867	883.0267	1352.365	1352.581	1185.179
22Dec2018 3:00:00	2018	909.8786	885.7389	1347.132	1314.93	1190.131
22Dec2018 4:00:00	2018	918.0927859	888.571	1349.1	1321.704	1171.977
22Dec2018 5:00:00	2018	948.2217304	895.8934	1363.63	1337.759	1166.857
22Dec2018 6:00:00	2018	1004.89783	909.2104	1372.939	1383.989	1154.879
22Dec2018 7:00:00	2018	1085.087435	933.8939	1399.196	1485.822	1166.195
22Dec2018 8:00:00	2018	1168.186876	948.3155	1450.442	1600.856	1194.794
22Dec2018 9:00:00	2018	1213.115848	953.3089	1450.485	1629.242	1210.138
22Dec2018 10:00:00	2018	1235.684331	952.3789	1459.382	1679.193	1207.979
22Dec2018 11:00:00	2018	1248.035633	947.2923	1457.946	1698.406	1201.46
22Dec2018 12:00:00	2018	1244.211978	942.6663	1450.035	1685.255	1190.126
22Dec2018 13:00:00	2018	1233.121115	939.754	1459.062	1683.466	1180.439
22Dec2018 14:00:00	2018	1221.405473	941.2484	1463.851	1668.878	1177.415
22Dec2018 15:00:00	2018	1234.740937	949.6817	1464.43	1650.901	1185.585
22Dec2018 16:00:00	2018	1299.270035	982.6362	1520.06	1764.407	1213.246
22Dec2018 17:00:00	2018	1386.254897	1018.238	1544.233	1837.479	1227.321
22Dec2018 18:00:00	2018	1357.186503	1009.293	1543.655	1791.462	1222.397
22Dec2018 19:00:00	2018	1316.267268	996.5484	1527.539	1734.337	1223.615
22Dec2018 20:00:00	2018	1277.955272	986.369	1517.971	1701.68	1222.796
22Dec2018 21:00:00	2018	1226.902465	975.3234	1502.975	1678.038	1222.416
22Dec2018 22:00:00	2018	1151.401786	956.6211	1477.244	1614.98	1213.391

22Dec2018 23:00:00	2018	1063.639078	915.7336	1446.748	1533.016	1193.939
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23Dec2018 1:00:00	2018	937.6305333	878.8341	1413.768	1391.723	1226.209
23Dec2018 2:00:00	2018	907.2436329	874.0518	1408.4	1365.354	1232.603
23Dec2018 3:00:00	2018	894.254997	870.7913	1395.587	1333.191	1237.737
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23Dec2018 5:00:00	2018	925.5138548	880.6131	1393.913	1338.987	1233.292
23Dec2018 6:00:00	2018	972.2449593	898.6466	1402.513	1357.855	1234.915
23Dec2018 7:00:00	2018	1033.114144	916.5095	1423.16	1455.549	1234.801
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23Dec2018 9:00:00	2018	1156.20434	944.6024	1468.22	1561.311	1169.448
23Dec2018 10:00:00	2018	1193.283057	943.5926	1484.953	1632.734	1157.631
23Dec2018 11:00:00	2018	1210.010982	945.0122	1495.757	1661.524	1160.854
23Dec2018 12:00:00	2018	1212.990049	944.7252	1482.85	1682.976	1158.812
23Dec2018 13:00:00	2018	1204.29052	933.4291	1482.362	1674.705	1161.127
23Dec2018 14:00:00	2018	1205.890124	934.1955	1478.848	1658.944	1173.427
23Dec2018 15:00:00	2018	1220.287365	936.5793	1481.625	1663.818	1185.402
23Dec2018 16:00:00	2018	1283.354158	964.9817	1534.423	1787.424	1269.491
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23Dec2018 18:00:00	2018	1338.424147	992.6252	1522.34	1786.504	1312.862
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23Dec2018 20:00:00	2018	1269.152849	974.131	1531.137	1717.512	1304.379
23Dec2018 21:00:00	2018	1220.838621	965.9088	1497.559	1669.309	1317.191
23Dec2018 22:00:00	2018	1142.262047	948.7916	1456.436	1556.402	1318.278
23Dec2018 23:00:00	2018	1056.575508	918.3459	1416.796	1461.278	1286.216
24Dec2018 0:00:00	2018	985.8957408	896.3378	1391.473	1403.766	1285.207
24Dec2018 1:00:00	2018	939.6712217	884.9263	1383.499	1357.838	1265.595
24Dec2018 2:00:00	2018	917.6790486	880.8805	1373.692	1314.791	1270.559
24Dec2018 3:00:00	2018	913.0060598	882.7431	1381.5	1351.578	1256.782
24Dec2018 4:00:00	2018	929.4116056	888.6179	1385.906	1360.51	1254.862
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24Dec2018 6:00:00	2018	1066.686881	926.3451	1421.096	1483.747	1282.621
24Dec2018 7:00:00	2018	1153.896275	954.1505	1459.41	1586.422	1279.758
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24Dec2018 9:00:00	2018	1273.724964	1000.669	1507.805	1710.809	1262.191
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24Dec2018 12:00:00	2018	1296.945545	982.2892	1487.771	1749.069	1230.084
24Dec2018 13:00:00	2018	1286.275636	974.8461	1495.002	1737.891	1221.815
24Dec2018 14:00:00	2018	1272.556891	969.2579	1485.924	1721.199	1232.025
24Dec2018 15:00:00	2018	1281.472583	963.1441	1586.716	1723.448	1252.7
24Dec2018 16:00:00	2018	1336.110739	990.0021	1636.901	1793.305	1265.437
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24Dec2018 20:00:00	2018	1195.43645	983.86	1563.887	1637.196	1230.154
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24Dec2018 23:00:00	2018	1040.47354	941.3544	1491.139	1480.68	1211.009
25Dec2018 0:00:00	2018	975.9753045	912.0044	1454.916	1378.82	1197.288
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25Dec2018 2:00:00	2018	899.3534674	891.3673	1421.112	1292.656	1196.163
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25Dec2018 4:00:00	2018	896.2631064	890.9495	1415.125	1292.586	1185.044
25Dec2018 5:00:00	2018	923.5321421	898.6153	1424.559	1316.996	1203.413
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25Dec2018 7:00:00	2018	1022.572076	942.6986	1463.069	1418.153	1185.539
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25Dec2018 9:00:00	2018	1124.729032	968.8617	1504.347	1511.455	1197.727
25Dec2018 10:00:00	2018	1151.772981	973.5754	1507.659	1552.793	1202.36
25Dec2018 11:00:00	2018	1169.363469	975.3019	1507.197	1575.543	1207.995
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25Dec2018 19:00:00	2018	1156.845801	961.9021	1520.097	1597.072	1230.536
25Dec2018 20:00:00	2018	1138.606137	954.6539	1514.15	1582.665	1229.469
25Dec2018 21:00:00	2018	1113.169216	960.4738	1502.853	1560.318	1229.946
25Dec2018 22:00:00	2018	1066.582221	936.7731	1475.517	1492.012	1227.521
25Dec2018 23:00:00	2018	998.0045551	905.555	1442.869	1417.461	1213.357
26Dec2018 0:00:00	2018	938.2332238	889.7641	1421.936	1350.18	1193.417
26Dec2018 1:00:00	2018	895.8056182	877.0995	1415.902	1299.267	1195.185
26Dec2018 2:00:00	2018	873.1815996	872.7616	1405.84	1278.38	1191.331
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26Dec2018 8:00:00	2018	1084.830768	932.2162	1489.905	1492.345	1208.154
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26Dec2018 11:00:00	2018	1199.534229	961.3515	1543.861	1621.122	1221.888
26Dec2018 12:00:00	2018	1209.552563	952.5221	1540.758	1631.078	1220.274
26Dec2018 13:00:00	2018	1206.999202	943.6606	1530.781	1606.088	1218.363
26Dec2018 14:00:00	2018	1202.119136	947.6142	1527.359	1597.231	1220.978
26Dec2018 15:00:00	2018	1222.390279	951.6405	1521.593	1614.688	1216.132
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26Dec2018 17:00:00	2018	1347.893867	981.6632	1594.715	1782.718	1239.715
26Dec2018 18:00:00	2018	1320.690457	974.858	1576.608	1752.43	1232.133
26Dec2018 19:00:00	2018	1290.802364	972.8076	1573.931	1725.762	1230.583
26Dec2018 20:00:00	2018	1254.492614	983.0253	1532.147	1688.817	1218.104

26Dec2018 21:00:00	2018	1202.013493	966.3996	1501.332	1639.435	1220.723
26Dec2018 22:00:00	2018	1122.33431	936.2746	1469.933	1558.819	1216.164
26Dec2018 23:00:00	2018	1040.062727	904.2638	1447.845	1470.871	1230.455
27Dec2018 0:00:00	2018	973.4471636	884.1226	1448.736	1429.516	1213.951
27Dec2018 1:00:00	2018	932.7926569	875.8038	1436.848	1389.051	1215.319
27Dec2018 2:00:00	2018	912.1079124	872.9956	1440.309	1369.319	1209.58
27Dec2018 3:00:00	2018	905.7104495	881.6032	1440.866	1361.024	1202.516
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27Dec2018 9:00:00	2018	1282.598621	979.3087	1537.599	1731.242	1234.461
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27Dec2018 13:00:00	2018	1332.993542	995.6691	1593.931	1761.794	1241.371
27Dec2018 14:00:00	2018	1319.811872	994.7419	1595.403	1768.036	1193.974
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27Dec2018 17:00:00	2018	1456.850488	1041.232	1608.002	1879.458	1284.985
27Dec2018 18:00:00	2018	1408.855971	1027.975	1591.538	1839.377	1281.784
27Dec2018 19:00:00	2018	1360.162205	1010.076	1586.695	1811.961	1294.171
27Dec2018 20:00:00	2018	1313.517425	1007.111	1561.048	1753.107	1279.345
27Dec2018 21:00:00	2018	1244.580916	993.1254	1491.971	1699.926	1271.494
27Dec2018 22:00:00	2018	1150.693002	956.9198	1463.884	1613.894	1249.752
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28Dec2018 2:00:00	2018	928.1706122	897.6877	1392.662	1359.63	1222.018
28Dec2018 3:00:00	2018	923.8138154	897.8829	1392.186	1347.64	1202.148
28Dec2018 4:00:00	2018	942.586863	900.7753	1386.639	1362.629	1231.84
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28Dec2018 13:00:00	2018	1312.038171	977.2796	1484.908	1764.144	1230.797
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28Dec2018 16:00:00	2018	1376.710158	988.5922	1519.261	1824.373	1251.509
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28Dec2018 18:00:00	2018	1380.439498	1003.123	1517.832	1833.562	1241.095
28Dec2018 19:00:00	2018	1327.712114	1008.636	1505.689	1788.31	1236.29

28Dec2018 20:00:00	2018	1282.482688	994.0142	1468.6	1754.332	1224.537
28Dec2018 21:00:00	2018	1222.231307	976.9554	1427.412	1708.613	1209.757
28Dec2018 22:00:00	2018	1135.999625	949.3213	1401.299	1617.569	1232.708
28Dec2018 23:00:00	2018	1049.534026	922.0448	1383.514	1532.559	1237.85
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29Dec2018 1:00:00	2018	931.028006	882.0477	1354.369	1390.205	1238.427
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29Dec2018 4:00:00	2018	894.5747665	870.477	1339.141	1341.027	1195.069
29Dec2018 5:00:00	2018	919.8354378	874.0641	1332.648	1350.781	1199.661
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29Dec2018 7:00:00	2018	1022.436958	910.038	1389.857	1486.564	1205.204
29Dec2018 8:00:00	2018	1093.525449	929.6324	1423.408	1563.881	1209.242
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29Dec2018 14:00:00	2018	1167.102456	953.4037	1440.469	1639.4	1209.629
29Dec2018 15:00:00	2018	1168.125425	949.6819	1445.196	1645.072	1219.79
29Dec2018 16:00:00	2018	1230.147898	976.7704	1491.513	1715.592	1242.413
29Dec2018 17:00:00	2018	1321.318388	1007.053	1526.97	1780.275	1242.243
29Dec2018 18:00:00	2018	1292.362829	988.669	1502.434	1758.534	1240.854
29Dec2018 19:00:00	2018	1249.910786	977.8228	1480.068	1709.087	1230.185
29Dec2018 20:00:00	2018	1212.387221	977.6414	1459.17	1661.686	1244.003
29Dec2018 21:00:00	2018	1166.335902	958.7826	1459.03	1624.53	1245.616
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16Jan2019 10:00:00	2019	1412.262362	1036.193	1491.586	1834.067	1204.204
16Jan2019 11:00:00	2019	1427.534631	1015.099	1490.144	1848.789	1205.976
16Jan2019 12:00:00	2019	1426.89656	1000.544	1489.347	1841.205	1178.455
16Jan2019 13:00:00	2019	1429.908513	1002.819	1490.778	1839.461	1177.999
16Jan2019 14:00:00	2019	1426.429305	1003.087	1493.9	1835.603	1190.146
16Jan2019 15:00:00	2019	1441.118069	998.978	1509.242	1846.973	1189.975
16Jan2019 16:00:00	2019	1482.964625	1016.309	1498.588	1907.247	1207.852
16Jan2019 17:00:00	2019	1539.426168	1035.229	1515.998	1987.873	1225.235
16Jan2019 18:00:00	2019	1490.231674	1021.658	1509.695	1959.939	1211.696
16Jan2019 19:00:00	2019	1434.858757	1011.501	1525.645	1918.278	1205.14
16Jan2019 20:00:00	2019	1384.604634	994.4536	1510.026	1863.861	1197.592
16Jan2019 21:00:00	2019	1302.861779	977.766	1469.897	1770.361	1200.932
16Jan2019 22:00:00	2019	1183.79746	968.6671	1427.281	1659.336	1192.989
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17Jan2019 1:00:00	2019	977.2856143	905.9549	1353.101	1434.749	1156.45
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17Jan2019 4:00:00	2019	984.3764145	907.1601	1348.969	1426.324	1154.28
17Jan2019 5:00:00	2019	1065.729704	923.5535	1376.587	1498.153	1166.353
17Jan2019 6:00:00	2019	1226.020576	939.7596	1387.458	1646.68	1177.075
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25Jan2019 2:00:00	2019	943.975361	861.4723	1404.799	1364.611	1178.188
25Jan2019 3:00:00	2019	942.6532016	857.6989	1399.593	1356.002	1155.341
25Jan2019 4:00:00	2019	959.2596978	862.1698	1392.05	1372.623	1151.652
25Jan2019 5:00:00	2019	1035.166561	879.0109	1388.146	1441.452	1149.892

25Jan2019 6:00:00	2019	1188.412287	915.6315	1425.213	1570.494	1159.537
25Jan2019 7:00:00	2019	1324.723139	967.6563	1485.442	1745.75	1174.734
25Jan2019 8:00:00	2019	1363.976235	974.3778	1504.933	1801.228	1174.724
25Jan2019 9:00:00	2019	1370.757511	978.6109	1494.219	1778.489	1173.413
25Jan2019 10:00:00	2019	1383.741041	956.3113	1461.663	1764.77	1175.177
25Jan2019 11:00:00	2019	1383.904109	945.8225	1480.918	1760.366	1171.741
25Jan2019 12:00:00	2019	1371.400333	932.3016	1471.907	1749.532	1168.839
25Jan2019 13:00:00	2019	1364.451265	919.9448	1469.635	1743.296	1169.793
25Jan2019 14:00:00	2019	1351.316847	908.4179	1456.348	1742.838	1179.278
25Jan2019 15:00:00	2019	1344.7887	889.7363	1441.123	1725.421	1173.789
25Jan2019 16:00:00	2019	1352.238524	894.3011	1455.743	1717.521	1177.974
25Jan2019 17:00:00	2019	1422.218257	924.9358	1503.681	1808.567	1191.078
25Jan2019 18:00:00	2019	1408.749527	937.4975	1496.369	1799.294	1182.636
25Jan2019 19:00:00	2019	1355.994017	954.6189	1487.693	1757.161	1190.339
25Jan2019 20:00:00	2019	1303.883672	941.973	1474.568	1718.56	1180.306
25Jan2019 21:00:00	2019	1232.313075	939.5938	1452.405	1663.934	1182.177
25Jan2019 22:00:00	2019	1143.600457	910.0024	1427.229	1553.523	1173.028
25Jan2019 23:00:00	2019	1051.220229	875.4799	1387.906	1457.35	1163.666
26Jan2019 0:00:00	2019	982.2759959	853.7875	1348.636	1356.335	1160.064
26Jan2019 1:00:00	2019	933.0617909	842.0706	1342.9	1307.568	1166.471
26Jan2019 2:00:00	2019	905.3932962	837.3253	1335.921	1291.761	1162.175
26Jan2019 3:00:00	2019	895.2292796	833.8129	1327.275	1283.57	1151.333
26Jan2019 4:00:00	2019	902.392263	838.4787	1328.443	1290.065	1135.178
26Jan2019 5:00:00	2019	936.014511	848.3828	1323.768	1293.738	1122.701
26Jan2019 6:00:00	2019	997.0990327	865.619	1339.427	1361.431	1110.461
26Jan2019 7:00:00	2019	1073.791906	896.2667	1369.995	1443.411	1144.23
26Jan2019 8:00:00	2019	1138.875117	917.0856	1398.714	1511.332	1154.74
26Jan2019 9:00:00	2019	1184.772216	927.9202	1408.382	1546.433	1149.202
26Jan2019 10:00:00	2019	1219.650255	933.0884	1430.564	1621.521	1155.347
26Jan2019 11:00:00	2019	1226.876702	928.0757	1431.263	1645.156	1155.796
26Jan2019 12:00:00	2019	1226.074067	919.9636	1425.125	1657.888	1141.469
26Jan2019 13:00:00	2019	1210.61423	912.961	1416.284	1648.631	1124.452
26Jan2019 14:00:00	2019	1198.325139	909.1655	1405.667	1616.668	1125.414
26Jan2019 15:00:00	2019	1195.789274	909.9078	1405.451	1586.01	1137.095
26Jan2019 16:00:00	2019	1222.903359	926.1547	1426.999	1616.61	1160.115
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26Jan2019 18:00:00	2019	1298.79469	963.1003	1461.998	1717.195	1169.055
26Jan2019 19:00:00	2019	1256.838914	949.2396	1435.633	1671.141	1163.107
26Jan2019 20:00:00	2019	1216.187544	933.9215	1433.421	1635.159	1154.995
26Jan2019 21:00:00	2019	1158.069083	914.1299	1464.3	1557.67	1145.598
26Jan2019 22:00:00	2019	1085.832873	890.1245	1441.169	1481.047	1133.622
26Jan2019 23:00:00	2019	1005.046555	860.599	1422.703	1419.049	1127.366
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27Jan2019 1:00:00	2019	890.6757483	825.5768	1384.136	1294.571	1116.99
27Jan2019 2:00:00	2019	863.0486465	816.9243	1355.32	1275.437	1112.163
27Jan2019 3:00:00	2019	851.2789115	816.1649	1295.406	1235.804	1106.428
27Jan2019 4:00:00	2019	851.2516382	817.4192	1296.157	1227.646	1107.836

27Jan2019 5:00:00	2019	874.2875413	823.9882	1294.398	1255.706	1109.163
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27Jan2019 7:00:00	2019	1012.873168	882.0569	1312.258	1389.098	1118.766
27Jan2019 8:00:00	2019	1084.336241	909.0586	1348.306	1463.723	1124.488
27Jan2019 9:00:00	2019	1130.811176	922.0324	1357.212	1504.749	1130.129
27Jan2019 10:00:00	2019	1173.914941	932.4991	1386.826	1562.263	1119.687
27Jan2019 11:00:00	2019	1200.709829	932.855	1411.172	1581.073	1111.923
27Jan2019 12:00:00	2019	1236.2047	940.0457	1419.299	1615.694	1114.669
27Jan2019 13:00:00	2019	1238.430433	935.5256	1417.881	1609.173	1118.669
27Jan2019 14:00:00	2019	1247.024364	937.2463	1421.623	1623.676	1126.323
27Jan2019 15:00:00	2019	1278.96188	959.0385	1437.9	1624.131	1124.847
27Jan2019 16:00:00	2019	1334.461788	983.2162	1464.998	1718.032	1126.57
27Jan2019 17:00:00	2019	1404.817006	1009.513	1528.363	1846.196	1164.519
27Jan2019 18:00:00	2019	1402.378882	1010.138	1532.123	1833.038	1167.569
27Jan2019 19:00:00	2019	1365.380337	1000.594	1525.293	1784.665	1170.507
27Jan2019 20:00:00	2019	1316.252322	991.0151	1504.923	1742.306	1168.425
27Jan2019 21:00:00	2019	1237.73779	968.6391	1475.532	1680.654	1158.287
27Jan2019 22:00:00	2019	1126.050626	938.7491	1432.301	1571.119	1148.557
27Jan2019 23:00:00	2019	1032.67719	909.4904	1393.48	1460.555	1132.382
28Jan2019 0:00:00	2019	973.5116734	888.8582	1373.577	1399.245	1117.566
28Jan2019 1:00:00	2019	941.6463194	883.3544	1368.593	1368.262	1114.535
28Jan2019 2:00:00	2019	915.7285531	879.3994	1362.126	1353.323	1111.009
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28Jan2019 4:00:00	2019	944.3144513	887.7519	1381.611	1376.725	1104.636
28Jan2019 5:00:00	2019	1033.499702	904.5004	1383.357	1447.485	1116.475
28Jan2019 6:00:00	2019	1199.999724	939.897	1420.672	1591.477	1123.544
28Jan2019 7:00:00	2019	1350.977889	984.8857	1502.042	1765.774	1154.396
28Jan2019 8:00:00	2019	1390.902199	995.1914	1525.282	1827.417	1166.568
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28Jan2019 10:00:00	2019	1392.15422	988.339	1507.426	1814.994	1172.523
28Jan2019 11:00:00	2019	1393.402553	979.6665	1486.54	1833.102	1171.357
28Jan2019 12:00:00	2019	1392.489355	973.9574	1505.216	1823.282	1185.286
28Jan2019 13:00:00	2019	1384.581139	972.0153	1502.968	1802.171	1186.784
28Jan2019 14:00:00	2019	1374.386947	968.218	1501.049	1816.299	1194.279
28Jan2019 15:00:00	2019	1378.825369	965.8341	1507.679	1826.251	1189.893
28Jan2019 16:00:00	2019	1402.250772	957.6075	1519.392	1877.467	1184.956
28Jan2019 17:00:00	2019	1484.053693	980.6166	1542.278	1953.073	1243.237
28Jan2019 18:00:00	2019	1486.449955	999.1416	1495.325	1910.79	1245.797
28Jan2019 19:00:00	2019	1440.277347	991.3694	1462.245	1852.383	1241.25
28Jan2019 20:00:00	2019	1383.908913	967.7075	1463.866	1802.985	1236.876
28Jan2019 21:00:00	2019	1297.569215	937.6914	1459.503	1727.581	1219.817
28Jan2019 22:00:00	2019	1176.605633	928.8273	1422.994	1634.948	1202.299
28Jan2019 23:00:00	2019	1079.000631	914.2407	1410.945	1531.625	1192.274
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29Jan2019 1:00:00	2019	976.5609734	894.0533	1410.594	1435.36	1181.401
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29Jan2019 4:00:00	2019	989.6470175	889.7868	1431.722	1423.568	1147.24
29Jan2019 5:00:00	2019	1072.282892	905.1963	1452.213	1503.873	1154.456
29Jan2019 6:00:00	2019	1243.471781	933.8213	1462.071	1664.024	1156.572
29Jan2019 7:00:00	2019	1383.587169	977.3805	1506.528	1818.419	1165.514
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29Jan2019 10:00:00	2019	1408.927232	993.8016	1521.985	1887.829	1193.302
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29Jan2019 13:00:00	2019	1390.185807	961.0149	1525.207	1867.779	1119.154
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29Jan2019 16:00:00	2019	1403.787104	932.9432	1513.468	1859.256	1205.695
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29Jan2019 22:00:00	2019	1171.465561	931.8453	1459.278	1633.376	1206.492
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30Jan2019 12:00:00	2019	1380.525549	959.1097	1519.658	1829.683	1161.269
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30Jan2019 20:00:00	2019	1344.553952	956.3696	1464.484	1785.986	1177.172
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31Jan2019 2:00:00	2019	913.6372919	837.5599	1346.619	1353.911	1131.778

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31Jan2019 5:00:00	2019	1026.302109	867.6511	1348.557	1409.229	1140.379
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31Jan2019 8:00:00	2019	1366.403908	976.419	1495.759	1764.906	1165.524
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02Feb2019 18:00:00	2019	1495.028423	1040.893	1527.692	1972.317	1225.804
02Feb2019 19:00:00	2019	1448.20895	1026.78	1503.845	1938.826	1220.02
02Feb2019 20:00:00	2019	1400.658843	1017.537	1508.267	1894.164	1230.326
02Feb2019 21:00:00	2019	1344.996475	997.8383	1488.889	1842.402	1252.856
02Feb2019 22:00:00	2019	1261.11018	985.1353	1480.537	1776.167	1253.461
02Feb2019 23:00:00	2019	1182.074096	969.9486	1457.931	1689.306	1238.352
03Feb2019 0:00:00	2019	1125.764461	952.0539	1442.637	1632.344	1227.019
03Feb2019 1:00:00	2019	1085.823292	933.1493	1426.993	1600.44	1222.272
03Feb2019 2:00:00	2019	1059.913211	933.6621	1403.293	1559.671	1211.239
03Feb2019 3:00:00	2019	1051.382209	933.8563	1401.923	1519.768	1203.039
03Feb2019 4:00:00	2019	1058.549128	939.2248	1402.259	1533.889	1206.502
03Feb2019 5:00:00	2019	1082.604506	946.17	1405.401	1547.699	1209.461
03Feb2019 6:00:00	2019	1126.035828	954.3264	1406.369	1580.089	1197.528
03Feb2019 7:00:00	2019	1188.763269	978.0881	1420.383	1639.16	1196.238
03Feb2019 8:00:00	2019	1252.147832	983.2	1440.718	1702.747	1213.74
03Feb2019 9:00:00	2019	1318.893389	997.6013	1464.149	1749.759	1219.224
03Feb2019 10:00:00	2019	1378.527687	1006.625	1479.065	1783.264	1224.606
03Feb2019 11:00:00	2019	1416.79531	1009.34	1490.141	1830.667	1232.282
03Feb2019 12:00:00	2019	1442.12331	1015.213	1494.017	1843.687	1260.982
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03Feb2019 14:00:00	2019	1447.46974	1014.134	1500.933	1845.602	1244.096
03Feb2019 15:00:00	2019	1456.131806	1020.418	1527.907	1890.153	1254.593
03Feb2019 16:00:00	2019	1498.551623	1041.591	1534.576	1924.809	1248.783
03Feb2019 17:00:00	2019	1556.898183	1056.97	1583.502	2016.412	1270.336
03Feb2019 18:00:00	2019	1564.550425	1044.648	1587.33	2012.781	1256.197
03Feb2019 19:00:00	2019	1521.027707	1025.899	1562.451	1979.75	1237.642
03Feb2019 20:00:00	2019	1478.906751	1016.875	1549.805	1947.148	1231.333
03Feb2019 21:00:00	2019	1410.800666	993.2186	1515.926	1871.955	1234.726
03Feb2019 22:00:00	2019	1305.770506	955.8406	1472.484	1786.097	1230.088
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04Feb2019 5:00:00	2019	1186.011921	940.1273	1450.332	1677.296	1190.019
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04Feb2019 7:00:00	2019	1485.739673	1006.104	1550.24	1915.103	1216.134
04Feb2019 8:00:00	2019	1515.716768	1010.616	1552.287	1948.187	1213.53
04Feb2019 9:00:00	2019	1536.484309	1019.852	1573.215	1983.246	1217.602
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04Feb2019 14:00:00	2019	1551.833912	1006.509	1491.161	1949.098	1253.333
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05Feb2019 1:00:00	2019	1156.004454	933.9912	1444.972	1655.445	1219.715
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11Feb2019 9:00:00	2019	1510.718569	1049.505	1562.681	1999.577	1142.82
11Feb2019 10:00:00	2019	1519.166178	1047.956	1567.426	1999.818	1163.475
11Feb2019 11:00:00	2019	1529.956566	1041.609	1556.994	1993.914	1146.097
11Feb2019 12:00:00	2019	1525.126899	1032.405	1549.08	1983.754	1129.577
11Feb2019 13:00:00	2019	1510.784581	1029.604	1561.906	1980.831	1137.269
11Feb2019 14:00:00	2019	1492.904429	1023.863	1565.703	1953.328	1089.397
11Feb2019 15:00:00	2019	1492.026716	1024.852	1564.565	1943.306	1119.923
11Feb2019 16:00:00	2019	1513.674995	1038.772	1538.278	1971.559	1166.183
11Feb2019 17:00:00	2019	1567.174715	1067.967	1553.007	2028.67	1220.629
11Feb2019 18:00:00	2019	1617.27211	1092.968	1571.744	2073.656	1234.112
11Feb2019 19:00:00	2019	1586.678628	1088.247	1559.25	2028.44	1196.549
11Feb2019 20:00:00	2019	1536.792754	1072.503	1540.999	1954.099	1206.651

11Feb2019 21:00:00	2019	1445.692181	1054.487	1518.274	1873.028	1204.012
11Feb2019 22:00:00	2019	1321.343589	1021.484	1488.527	1767.863	1192.519
11Feb2019 23:00:00	2019	1227.671244	995.658	1471.606	1694.316	1175.937
12Feb2019 0:00:00	2019	1168.614814	983.1137	1436.827	1644.129	1157.128
12Feb2019 1:00:00	2019	1135.648724	974.8333	1457.693	1591.029	1175.539
12Feb2019 2:00:00	2019	1118.436773	973.6212	1470.644	1568.482	1172.056
12Feb2019 3:00:00	2019	1114.373414	977.1747	1474.203	1575.438	1164.216
12Feb2019 4:00:00	2019	1131.829246	980.9	1468.13	1578.288	1177.174
12Feb2019 5:00:00	2019	1196.986873	992.3237	1462.349	1644.765	1182.008
12Feb2019 6:00:00	2019	1346.172826	1023.412	1467.285	1785.055	1179.668
12Feb2019 7:00:00	2019	1473.805995	1068.15	1527.41	1943.056	1181.499
12Feb2019 8:00:00	2019	1481.350646	1059.32	1556.682	1945.978	1167.824
12Feb2019 9:00:00	2019	1493.618453	1043.925	1538.386	1963.181	1155.208
12Feb2019 10:00:00	2019	1508.921627	1043.245	1535.947	2000.954	1148.427
12Feb2019 11:00:00	2019	1505.769354	1035.832	1526.79	2005.934	1129.735
12Feb2019 12:00:00	2019	1497.023971	1022.807	1521.485	1968.046	1111.319
12Feb2019 13:00:00	2019	1489.042762	1018.234	1515.472	1928.568	1111.658
12Feb2019 14:00:00	2019	1483.586514	1037.188	1520.075	1915.479	1108.465
12Feb2019 15:00:00	2019	1485.207207	1027.244	1526.238	1920.393	1116.298
12Feb2019 16:00:00	2019	1507.893994	1042.529	1537.806	1947.683	1134.021
12Feb2019 17:00:00	2019	1569.587608	1061.051	1539.412	1992.194	1163.065
12Feb2019 18:00:00	2019	1599.657562	1069.05	1572.692	2063.102	1202.364
12Feb2019 19:00:00	2019	1561.48854	1057.065	1568.282	2038.884	1218.162
12Feb2019 20:00:00	2019	1506.860798	1045.671	1580.121	1992.196	1219.42
12Feb2019 21:00:00	2019	1422.857488	1017.228	1547.969	1918.726	1214.26
12Feb2019 22:00:00	2019	1310.923831	981.5932	1511.985	1807.803	1202.508
12Feb2019 23:00:00	2019	1206.417138	975.8943	1464.15	1684.823	1191.725
13Feb2019 0:00:00	2019	1141.732349	954.8988	1462.144	1611.581	1156.868
13Feb2019 1:00:00	2019	1107.07823	948.1968	1456.4	1576.041	1130.401
13Feb2019 2:00:00	2019	1093.195617	943.379	1455.407	1554.155	1127.99
13Feb2019 3:00:00	2019	1090.262872	947.94	1452.888	1530.037	1122.908
13Feb2019 4:00:00	2019	1112.113575	952.5039	1461.829	1590.063	1168.307
13Feb2019 5:00:00	2019	1189.27959	970.1343	1490.826	1665.063	1210.961
13Feb2019 6:00:00	2019	1337.911558	1008.334	1527.269	1804.005	1216.435
13Feb2019 7:00:00	2019	1464.129061	1025.786	1551.893	1953.325	1242.4
13Feb2019 8:00:00	2019	1466.283526	1024.08	1540.14	1941.583	1230.769
13Feb2019 9:00:00	2019	1490.298634	1023.402	1544.329	1936.796	1215.7
13Feb2019 10:00:00	2019	1500.592361	1017.624	1537.653	1927.363	1216.215
13Feb2019 11:00:00	2019	1507.279765	1025.025	1543.078	1911.562	1213.188
13Feb2019 12:00:00	2019	1500.396696	1017.767	1528.556	1920.055	1203.059
13Feb2019 13:00:00	2019	1475.811545	995.9751	1516.396	1928.447	1214.783
13Feb2019 14:00:00	2019	1461.690858	989.8767	1496.875	1909.904	1201.76
13Feb2019 15:00:00	2019	1458.418467	987.0838	1494.198	1906.338	1196.937
13Feb2019 16:00:00	2019	1478.363577	1001.421	1494.314	1912.125	1202.199
13Feb2019 17:00:00	2019	1526.624729	1022.91	1522.799	1949.499	1232.554
13Feb2019 18:00:00	2019	1575.379945	1046.016	1563.158	2007.971	1252.242
13Feb2019 19:00:00	2019	1546.980133	1037.039	1574.626	1991.294	1255.871

13Feb2019 20:00:00	2019	1501.473477	1026.698	1574.929	1969.837	1265.459
13Feb2019 21:00:00	2019	1423.997554	1007.333	1547.457	1882.09	1294.053
13Feb2019 22:00:00	2019	1318.160004	991.4579	1509.254	1779.452	1292.569
13Feb2019 23:00:00	2019	1219.635469	971.3528	1469.269	1638.141	1279.952
14Feb2019 0:00:00	2019	1151.558688	958.1388	1449.793	1574.993	1271.319
14Feb2019 1:00:00	2019	1112.709893	954.6464	1449.681	1558.089	1259.599
14Feb2019 2:00:00	2019	1093.18204	946.2577	1450.71	1530.929	1260.433
14Feb2019 3:00:00	2019	1089.520607	940.755	1449.383	1541.384	1258.58
14Feb2019 4:00:00	2019	1109.457032	941.5791	1457.461	1562.514	1252.567
14Feb2019 5:00:00	2019	1181.660517	959.9186	1473.558	1656.959	1262.812
14Feb2019 6:00:00	2019	1318.330942	985.2674	1503.188	1806.611	1281.015
14Feb2019 7:00:00	2019	1431.155401	1013.727	1549.378	1950.774	1281.205
14Feb2019 8:00:00	2019	1449.667965	1012.902	1561.102	1944.905	1263.606
14Feb2019 9:00:00	2019	1464.735708	1010.336	1561.178	1973.848	1254.716
14Feb2019 10:00:00	2019	1467.045957	1010.16	1561.522	1986.758	1219.24
14Feb2019 11:00:00	2019	1472.016726	1009.409	1558.439	1972.019	1223.899
14Feb2019 12:00:00	2019	1463.450284	996.3884	1548.802	1938.89	1206.383
14Feb2019 13:00:00	2019	1454.850272	986.228	1533.397	1922.419	1210.914
14Feb2019 14:00:00	2019	1442.091496	984.7558	1523.026	1918.521	1209.996
14Feb2019 15:00:00	2019	1438.627303	988.4924	1527.315	1917.964	1212.516
14Feb2019 16:00:00	2019	1452.060237	1002.149	1550.674	1933.025	1221.182
14Feb2019 17:00:00	2019	1506.275916	1026.91	1603.541	1995.645	1256.408
14Feb2019 18:00:00	2019	1554.090832	1048.174	1634.075	2044.427	1273.175
14Feb2019 19:00:00	2019	1520.86818	1038.117	1623.216	2018.259	1280.327
14Feb2019 20:00:00	2019	1475.267706	1029.064	1583.713	1956.59	1271.834
14Feb2019 21:00:00	2019	1404.341023	1006.763	1539.692	1866.649	1267.656
14Feb2019 22:00:00	2019	1303.04984	971.3515	1499.979	1752.334	1259.236
14Feb2019 23:00:00	2019	1210.285293	962.6229	1493.425	1700.648	1249.515
15Feb2019 0:00:00	2019	1147.386716	940.3222	1486.804	1650.594	1242.845
15Feb2019 1:00:00	2019	1105.807985	935.9722	1457.976	1591.642	1229.267
15Feb2019 2:00:00	2019	1085.970538	944.8615	1438.142	1566.429	1220.33
15Feb2019 3:00:00	2019	1080.973267	941.5587	1439.147	1567.954	1218.731
15Feb2019 4:00:00	2019	1101.509595	941.6862	1452.16	1579.62	1225.547
15Feb2019 5:00:00	2019	1166.231739	959.6991	1462.08	1630.213	1232.29
15Feb2019 6:00:00	2019	1289.848432	997.5336	1513.278	1777.886	1229.682
15Feb2019 7:00:00	2019	1402.10046	1035.798	1571.822	1910.654	1207.29
15Feb2019 8:00:00	2019	1446.258279	1036.732	1558.853	1938.415	1201.782
15Feb2019 9:00:00	2019	1477.636765	1043.263	1563.429	1957.219	1194.363
15Feb2019 10:00:00	2019	1496.262532	1040.126	1568.061	1982.208	1212.826
15Feb2019 11:00:00	2019	1499.990993	1029.519	1562.214	1995.238	1207.174
15Feb2019 12:00:00	2019	1493.157653	1020.633	1549.172	1983.845	1197.71
15Feb2019 13:00:00	2019	1480.259138	1018.435	1550.84	1966.969	1193.987
15Feb2019 14:00:00	2019	1470.328299	1014.55	1541.581	1944.419	1197.022
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15Feb2019 17:00:00	2019	1510.298656	1032.166	1560.369	1991.863	1221.248
15Feb2019 18:00:00	2019	1527.199166	1046.796	1586.003	2026.183	1232.86

15Feb2019 19:00:00	2019	1486.646371	1034.66	1560.018	1968.805	1230.442
15Feb2019 20:00:00	2019	1436.246258	1018.013	1546.57	1899.158	1229.117
15Feb2019 21:00:00	2019	1365.87794	1008.26	1554.627	1845.076	1231.077
15Feb2019 22:00:00	2019	1275.216445	1009.473	1513.016	1739.007	1203.692
15Feb2019 23:00:00	2019	1192.475441	985.4273	1497.634	1669.054	1182.031
16Feb2019 0:00:00	2019	1130.132939	967.9551	1480.877	1584.75	1179.694
16Feb2019 1:00:00	2019	1086.413989	955.0574	1472.801	1554.669	1178.182
16Feb2019 2:00:00	2019	1064.815986	949.1987	1482.294	1548.371	1162.959
16Feb2019 3:00:00	2019	1055.069412	948.5761	1490.668	1542.993	1148.197
16Feb2019 4:00:00	2019	1056.59843	953.2732	1498.693	1534.906	1149.278
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16Feb2019 8:00:00	2019	1254.71176	1030.596	1533.635	1717.908	1174.857
16Feb2019 9:00:00	2019	1324.046296	1038.874	1544.608	1779.844	1189.406
16Feb2019 10:00:00	2019	1365.816441	1041.563	1559.005	1799.151	1187.956
16Feb2019 11:00:00	2019	1389.691665	1038.821	1551.219	1799.106	1181.565
16Feb2019 12:00:00	2019	1393.93389	1052.205	1541.699	1762.585	1172.406
16Feb2019 13:00:00	2019	1381.246673	1048.167	1534.892	1741.231	1169.881
16Feb2019 14:00:00	2019	1363.065117	1046.16	1529.973	1742.09	1162.025
16Feb2019 15:00:00	2019	1361.444176	1045.184	1531.133	1745.802	1160.21
16Feb2019 16:00:00	2019	1376.357088	1039.402	1549.108	1768.138	1167.034
16Feb2019 17:00:00	2019	1422.22733	1049.289	1573.519	1833.181	1181.495
16Feb2019 18:00:00	2019	1456.544765	1059.716	1586.942	1873.127	1176.436
16Feb2019 19:00:00	2019	1417.974917	1041.426	1564.601	1817.044	1171.742
16Feb2019 20:00:00	2019	1373.790644	1023.909	1548.822	1787.756	1175.986
16Feb2019 21:00:00	2019	1320.69897	1001.88	1531.078	1759.937	1166.54
16Feb2019 22:00:00	2019	1249.827591	984.8365	1510.753	1658.852	1167.915
16Feb2019 23:00:00	2019	1174.327356	971.8684	1451.847	1571.421	1169.087
17Feb2019 0:00:00	2019	1115.213816	952.6585	1438.069	1540.115	1162.508
17Feb2019 1:00:00	2019	1077.672684	941.8382	1433.713	1525.209	1157.622
17Feb2019 2:00:00	2019	1055.303418	932.9396	1419.428	1474.292	1151.412
17Feb2019 3:00:00	2019	1047.305588	929.5435	1442.29	1499.446	1152.855
17Feb2019 4:00:00	2019	1052.068624	934.6326	1456.601	1508.625	1140.375
17Feb2019 5:00:00	2019	1074.583403	947.2365	1458.058	1505.047	1156.258
17Feb2019 6:00:00	2019	1116.151556	961.5975	1467.057	1554.27	1153.745
17Feb2019 7:00:00	2019	1166.46482	970.226	1456.421	1609.126	1144.211
17Feb2019 8:00:00	2019	1209.075832	989.9766	1473.72	1646.7	1140.852
17Feb2019 9:00:00	2019	1263.998251	1007.706	1505.328	1715.279	1142.042
17Feb2019 10:00:00	2019	1305.741484	996.7444	1510.815	1749.169	1136.16
17Feb2019 11:00:00	2019	1326.37248	984.4457	1517.108	1761.517	1157.599
17Feb2019 12:00:00	2019	1330.734092	978.9861	1501.117	1736.809	1154.986
17Feb2019 13:00:00	2019	1327.605165	972.9936	1496.879	1700.311	1157.225
17Feb2019 14:00:00	2019	1324.935323	969.3255	1509.289	1704.819	1151.017
17Feb2019 15:00:00	2019	1331.216141	971.2991	1521.617	1710.367	1149.495
17Feb2019 16:00:00	2019	1359.114454	983.0884	1523.724	1754.103	1154.231
17Feb2019 17:00:00	2019	1402.096541	1006.337	1535.414	1811.079	1178.629

17Feb2019 18:00:00	2019	1439.485295	1029.311	1579.818	1869.549	1197.175
17Feb2019 19:00:00	2019	1401.189506	1023.313	1541.522	1834.273	1190.426
17Feb2019 20:00:00	2019	1360.293102	1011.819	1536.715	1834.445	1179.436
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17Feb2019 22:00:00	2019	1237.472855	971.9254	1508.427	1691.371	1189.938
17Feb2019 23:00:00	2019	1161.866736	946.4505	1483.951	1611.119	1184.366
18Feb2019 0:00:00	2019	1105.329713	937.9925	1480.871	1564.957	1178.81
18Feb2019 1:00:00	2019	1066.708538	936.742	1476.133	1544.05	1176.08
18Feb2019 2:00:00	2019	1048.318384	935.842	1471.78	1510.855	1182.293
18Feb2019 3:00:00	2019	1043.647543	936.1923	1473.464	1516.295	1175.24
18Feb2019 4:00:00	2019	1053.284885	944.4875	1458.771	1533.555	1173.126
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18Feb2019 6:00:00	2019	1147.732746	965.6436	1467.107	1611.443	1178.472
18Feb2019 7:00:00	2019	1196.384851	992.4641	1498.148	1654.243	1187.64
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18Feb2019 9:00:00	2019	1273.740105	1008.075	1544.246	1732.788	1180.06
18Feb2019 10:00:00	2019	1317.5536	991.9845	1517.109	1767.236	1170.19
18Feb2019 11:00:00	2019	1342.902943	985.2364	1514.633	1800.514	1175.518
18Feb2019 12:00:00	2019	1344.611005	977.0036	1514.313	1786.46	1179.102
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18Feb2019 14:00:00	2019	1321.815222	1013.848	1514.089	1740.219	1158.278
18Feb2019 15:00:00	2019	1323.21089	1014.123	1511.853	1742.63	1148.72
18Feb2019 16:00:00	2019	1356.038497	1025.088	1529.826	1764.095	1163.175
18Feb2019 17:00:00	2019	1419.213969	1045.001	1568.483	1844.381	1188.448
18Feb2019 18:00:00	2019	1479.371971	1063.899	1605.809	1930.762	1209.546
18Feb2019 19:00:00	2019	1459.892615	1064.58	1601.714	1905.868	1192.589
18Feb2019 20:00:00	2019	1418.70014	1047.213	1583.94	1851.403	1172.389
18Feb2019 21:00:00	2019	1347.430943	1022.406	1544.654	1780.507	1167.824
18Feb2019 22:00:00	2019	1243.135443	987.8704	1513.714	1706.891	1175.79
18Feb2019 23:00:00	2019	1150.891719	957.1552	1480.415	1626.406	1166.483
19Feb2019 0:00:00	2019	1086.707948	939.3433	1463.837	1563.298	1157.105
19Feb2019 1:00:00	2019	1046.356652	927.9359	1452.076	1525.081	1144.805
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19Feb2019 5:00:00	2019	1116.654332	945.3609	1461.12	1573.953	1113.338
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19Feb2019 14:00:00	2019	1368.917406	977.7688	1468.386	1857.787	1110.136
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19Feb2019 21:00:00	2019	1306.774474	955.0356	1527.495	1737.326	1211.59
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20Feb2019 4:00:00	2019	995.9916259	887.4315	1417.285	1423.966	1284.068
20Feb2019 5:00:00	2019	1075.559103	899.2438	1441.481	1498.146	1291.615
20Feb2019 6:00:00	2019	1221.789072	931.2659	1465.535	1625.127	1296.706
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20Feb2019 9:00:00	2019	1388.126118	976.2211	1516.947	1792.726	1299.876
20Feb2019 10:00:00	2019	1402.610785	986.1687	1521.327	1843.037	1295.034
20Feb2019 11:00:00	2019	1409.452383	1018.636	1514.827	1863.752	1295.985
20Feb2019 12:00:00	2019	1401.615285	1013.66	1511.481	1861.844	1299.245
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20Feb2019 14:00:00	2019	1387.281443	1009.269	1506.574	1863.221	1313.235
20Feb2019 15:00:00	2019	1385.487243	1008.85	1537.29	1870.858	1310.991
20Feb2019 16:00:00	2019	1409.309525	987.3902	1541.504	1895.798	1318.724
20Feb2019 17:00:00	2019	1463.574457	998.3145	1583.727	1942.551	1339.931
20Feb2019 18:00:00	2019	1488.579583	1014.925	1587.734	1986.117	1361.812
20Feb2019 19:00:00	2019	1464.770526	1007.152	1558.451	1928.548	1378.782
20Feb2019 20:00:00	2019	1422.459611	1001.676	1551.72	1853.618	1365.268
20Feb2019 21:00:00	2019	1345.725288	1004.535	1530.589	1778.908	1362.6
20Feb2019 22:00:00	2019	1239.755776	1001.514	1518.784	1665.183	1338.294
20Feb2019 23:00:00	2019	1138.82855	973.023	1500.754	1586.887	1287.571
21Feb2019 0:00:00	2019	1073.260865	953.4348	1482.725	1521.472	1205.82
21Feb2019 1:00:00	2019	1035.010349	944.1306	1468.93	1492.19	1189.897
21Feb2019 2:00:00	2019	1019.078109	938.9818	1465.328	1468.506	1137.888
21Feb2019 3:00:00	2019	1016.386019	939.1892	1464.274	1443.281	1127.421
21Feb2019 4:00:00	2019	1041.161338	945.949	1465.228	1473.653	1134.227
21Feb2019 5:00:00	2019	1118.195152	957.3446	1481.528	1575.322	1136.393
21Feb2019 6:00:00	2019	1271.929736	982.9205	1514.767	1697.213	1135.929
21Feb2019 7:00:00	2019	1393.924745	1010.453	1517.51	1824.786	1141.506
21Feb2019 8:00:00	2019	1405.269415	1022.299	1512.047	1856.044	1130.051
21Feb2019 9:00:00	2019	1413.559906	1020.543	1553.071	1903.388	1147.644
21Feb2019 10:00:00	2019	1422.526986	1005.08	1502.514	1893.278	1148.229
21Feb2019 11:00:00	2019	1428.181129	1006.755	1506.452	1903.323	1149.013
21Feb2019 12:00:00	2019	1421.508459	997.5272	1513.782	1875.39	1170.656
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21Feb2019 14:00:00	2019	1399.860421	1001.832	1547.264	1875.351	1160.597
21Feb2019 15:00:00	2019	1395.810217	997.2682	1545.675	1863.084	1162.903

21Feb2019 16:00:00	2019	1412.279498	996.5295	1541.904	1897.199	1159.487
21Feb2019 17:00:00	2019	1449.326689	991.7464	1523.451	1884.017	1203.716
21Feb2019 18:00:00	2019	1492.6652	1029.116	1561.417	1945.24	1177.573
21Feb2019 19:00:00	2019	1474.008207	1037.612	1588.028	1930.779	1174.405
21Feb2019 20:00:00	2019	1427.332694	1027.145	1588.656	1903.578	1170.984
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21Feb2019 22:00:00	2019	1241.176765	977.1168	1526.231	1687.524	1180.845
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22Feb2019 1:00:00	2019	1039.217355	914.9064	1451.022	1463.211	1111.033
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22Feb2019 11:00:00	2019	1392.461396	988.2184	1515.4	1821.516	1092.09
22Feb2019 12:00:00	2019	1387.409188	983.086	1510.587	1789.936	1089.547
22Feb2019 13:00:00	2019	1380.660154	977.0937	1460.318	1777.55	1056.47
22Feb2019 14:00:00	2019	1367.895501	971.4128	1427.76	1742.608	1045.933
22Feb2019 15:00:00	2019	1361.10084	969.256	1448.858	1751.861	1042.333
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22Feb2019 17:00:00	2019	1374.537168	992.966	1550.783	1829.67	1071.504
22Feb2019 18:00:00	2019	1408.41599	1013.68	1565.288	1874.195	1108.451
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22Feb2019 21:00:00	2019	1277.416565	979.3342	1529.777	1738.339	1118.347
22Feb2019 22:00:00	2019	1188.887366	955.7626	1497.669	1646.404	1107.98
22Feb2019 23:00:00	2019	1100.277977	928.1402	1462.086	1569.05	1098.647
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23Feb2019 6:00:00	2019	1088.840443	934.3757	1476.894	1549.321	1090.76
23Feb2019 7:00:00	2019	1159.702508	970.7038	1494.435	1616.216	1087.991
23Feb2019 8:00:00	2019	1221.997925	994.42	1521.365	1670.734	1078.144
23Feb2019 9:00:00	2019	1288.085156	1015.688	1547.223	1724.538	1074.115
23Feb2019 10:00:00	2019	1321.948501	1025.562	1539.78	1780.69	1058.313
23Feb2019 11:00:00	2019	1336.629343	1028.569	1547.808	1786.967	1064.683
23Feb2019 12:00:00	2019	1329.717573	1029.523	1560.932	1810.789	1074.633
23Feb2019 13:00:00	2019	1312.661813	1023.881	1539.962	1787.177	1078.291
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23Feb2019 17:00:00	2019	1365.753715	1053.189	1532.501	1808.382	1106.515
23Feb2019 18:00:00	2019	1410.982482	1071.093	1562.108	1855.672	1124.735
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23Feb2019 20:00:00	2019	1352.954764	1054.115	1550.432	1810.376	1121.207
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24Feb2019 1:00:00	2019	1049.037136	946.0251	1436.149	1531.628	1134.705
24Feb2019 2:00:00	2019	1026.51784	938.6017	1428.936	1469.694	1123.914
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24Feb2019 6:00:00	2019	1091.062295	959.4754	1465.242	1538.731	1083.726
24Feb2019 7:00:00	2019	1139.601201	985.2707	1472.818	1578.195	1087.269
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24Feb2019 12:00:00	2019	1316.052718	1004.513	1513.999	1784.485	1085.272
24Feb2019 13:00:00	2019	1315.050171	992.199	1510.615	1751.831	1092.156
24Feb2019 14:00:00	2019	1310.467323	997.4758	1509.842	1772.29	1120.757
24Feb2019 15:00:00	2019	1320.141405	1003.573	1525.018	1781.61	1136.098
24Feb2019 16:00:00	2019	1364.029495	1019.92	1548.932	1818.771	1136.71
24Feb2019 17:00:00	2019	1426.46964	1044.126	1572.876	1852.111	1148.356
24Feb2019 18:00:00	2019	1480.8694	1074.346	1595.082	1917.148	1153.1
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24Feb2019 20:00:00	2019	1424.306953	1068.072	1597.851	1872.06	1161.689
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24Feb2019 22:00:00	2019	1257.478489	1010.886	1529.429	1690.957	1155.282
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26Feb2019 16:00:00	2019	1433.875988	988.843	1561.616	1915.826	1189.187
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28Feb2019 14:00:00	2019	1366.6226	980.1244	1409.905	1746.829	1112.051
28Feb2019 15:00:00	2019	1368.065445	977.48	1409.63	1757.031	1104.316
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28Feb2019 18:00:00	2019	1445.757591	1029.903	1465.018	1863.637	1154.795
28Feb2019 19:00:00	2019	1436.314266	1031.993	1467.141	1880.778	1176.343
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28Feb2019 21:00:00	2019	1307.98276	999.4822	1463.191	1794.943	1173.508
28Feb2019 22:00:00	2019	1203.08109	964.7675	1451.603	1713.751	1163.913
28Feb2019 23:00:00	2019	1109.87465	925.3131	1419.375	1609.097	1155.842
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01Mar2019 3:00:00	2019	1006.586481	878.8061	1384.935	1453.384	1153.156
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01Mar2019 11:00:00	2019	1481.439584	992.4	1546.31	1901.549	1145.037

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01Mar2019 14:00:00	2019	1461.844759	984.9353	1517.078	1873.138	1146.311
01Mar2019 15:00:00	2019	1454.202734	984.0995	1522.299	1861.565	1150.472
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01Mar2019 18:00:00	2019	1507.643406	1033.376	1543.581	1879.83	1179.322
01Mar2019 19:00:00	2019	1504.345159	1038.988	1560.979	1870.134	1182.95
01Mar2019 20:00:00	2019	1457.004795	1031.548	1554.4	1824.622	1187.735
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09Mar2019 13:00:00	2019	1222.742587	981.9443	1440.325	1617.649	1133.008
09Mar2019 14:00:00	2019	1210.11594	971.329	1430.97	1572.331	1123.923
09Mar2019 15:00:00	2019	1205.446867	968.7524	1436.242	1560.717	1094.996
09Mar2019 16:00:00	2019	1214.695849	983.0465	1448.644	1593.039	1090.242
09Mar2019 17:00:00	2019	1243.070519	995.9397	1463.446	1626.958	1099.143
09Mar2019 18:00:00	2019	1278.05635	1028.88	1497.422	1667.531	1120.824
09Mar2019 19:00:00	2019	1290.878864	1043.816	1527.905	1707.952	1145.816
09Mar2019 20:00:00	2019	1255.088542	1033.289	1520.128	1662.988	1156.65
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10Mar2019 1:00:00	2019	963.8792957	923.7372	1419.025	1384.662	1157.086
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10Mar2019 16:00:00	2019	1206.41389	937.1845	1448.648	1584.578	1113.889
10Mar2019 17:00:00	2019	1237.041409	956.2551	1460.615	1619.2	1119.273
10Mar2019 18:00:00	2019	1240.058991	965.4431	1468.863	1614.817	1112.062
10Mar2019 19:00:00	2019	1271.849765	991.9561	1515.589	1692.17	1144.508
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10Mar2019 21:00:00	2019	1248.868842	1002.214	1533.093	1666.7	1143.081
10Mar2019 22:00:00	2019	1149.567894	973.153	1505.236	1576.558	1137.68
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11Mar2019 10:00:00	2019	1368.184103	1002.77	1457.149	1704.407	1125.858
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11Mar2019 18:00:00	2019	1290.606194	1010.621	1487.089	1625.392	1143.218
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12Mar2019 16:00:00	2019	1358.616348	979.2312	1470.354	1703.366	1093.015
12Mar2019 17:00:00	2019	1370.180651	984.6724	1470.338	1692.032	1077.023
12Mar2019 18:00:00	2019	1330.719901	989.4296	1470.132	1648.647	1068.351
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13Mar2019 5:00:00	2019	1018.283848	914.7449	1380.735	1345.625	1091.608
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18Mar2019 4:00:00	2019	892.771592	863.7529	1279.594	1273.973	1243.358
18Mar2019 5:00:00	2019	976.2008634	892.2043	1292.208	1319.524	1250.456
18Mar2019 6:00:00	2019	1139.790642	934.3231	1341.87	1468.753	1249.167
18Mar2019 7:00:00	2019	1279.016044	982.1313	1383.32	1605.492	1248.882
18Mar2019 8:00:00	2019	1296.458106	981.3108	1385.161	1637.578	1243.139
18Mar2019 9:00:00	2019	1309.638079	968	1399.443	1636.183	1223.194
18Mar2019 10:00:00	2019	1321.994507	958.6129	1395.926	1652.777	1212.97
18Mar2019 11:00:00	2019	1334.814372	938.4777	1384.054	1661.031	1195.145
18Mar2019 12:00:00	2019	1332.946564	923.9389	1377.022	1639.436	1193.734
18Mar2019 13:00:00	2019	1328.899732	922.8849	1382.471	1640.997	1173.312
18Mar2019 14:00:00	2019	1317.762635	934.9613	1409.247	1624.317	1192.159
18Mar2019 15:00:00	2019	1306.306091	935.5824	1418.798	1615.37	1198.163
18Mar2019 16:00:00	2019	1313.209754	934.488	1415.981	1632.655	1197.503
18Mar2019 17:00:00	2019	1318.690796	938.7194	1414.237	1653.429	1175.736
18Mar2019 18:00:00	2019	1264.020709	933.1638	1407.035	1600.689	1166.748
18Mar2019 19:00:00	2019	1253.464833	942.7996	1403.174	1587.666	1161.197
18Mar2019 20:00:00	2019	1280.107711	970.5169	1490.39	1639.96	1180.105
18Mar2019 21:00:00	2019	1206.815505	949.8112	1493.994	1570.515	1171.977
18Mar2019 22:00:00	2019	1098.66089	908.2357	1451.662	1456.487	1171.551
18Mar2019 23:00:00	2019	996.2489716	877.1591	1413.572	1351.93	1134.492
19Mar2019 0:00:00	2019	933.95958	867.1719	1396.494	1278.37	1114.556
19Mar2019 1:00:00	2019	896.3279298	856.3493	1409.012	1261.536	1103.068
19Mar2019 2:00:00	2019	878.6352089	850.6217	1413.213	1242.93	1109.525
19Mar2019 3:00:00	2019	878.6462912	845.1895	1409.143	1233.526	1114.43

19Mar2019 4:00:00	2019	900.5636379	847.5895	1401.948	1251.017	1106.581
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19Mar2019 6:00:00	2019	1141.929063	901.299	1421.019	1444.043	1121.984
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19Mar2019 8:00:00	2019	1286.413339	939.9017	1467.269	1618.208	1131.905
19Mar2019 9:00:00	2019	1294.261637	931.4053	1463.762	1639.679	1136.949
19Mar2019 10:00:00	2019	1304.527363	922.2919	1456.73	1654.707	1121.007
19Mar2019 11:00:00	2019	1315.460224	916.3502	1440.237	1659.642	1118.358
19Mar2019 12:00:00	2019	1321.502244	906.2807	1420.932	1625.611	1129.765
19Mar2019 13:00:00	2019	1328.732171	899.8368	1416.451	1620.345	1115.391
19Mar2019 14:00:00	2019	1326.439482	887.0629	1415.424	1613.616	1119.939
19Mar2019 15:00:00	2019	1325.872041	886.5349	1409	1611.802	1113.613
19Mar2019 16:00:00	2019	1324.995095	890.1583	1407.527	1615.794	1107.337
19Mar2019 17:00:00	2019	1323.807395	888.2182	1411.053	1609.157	1128.417
19Mar2019 18:00:00	2019	1265.314037	878.3422	1406.811	1569.971	1123.751
19Mar2019 19:00:00	2019	1245.08904	885.2865	1417.062	1566.577	1141.5
19Mar2019 20:00:00	2019	1265.903624	907.52	1431.552	1616.666	1194.396
19Mar2019 21:00:00	2019	1198.95407	900.0772	1406.598	1562.155	1192.836
19Mar2019 22:00:00	2019	1089.770352	881.9729	1408.107	1455.367	1166.355
19Mar2019 23:00:00	2019	979.9095996	863.589	1383.42	1368.594	1129.976
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20Mar2019 1:00:00	2019	878.9390676	840.9887	1369.038	1265.73	1123.575
20Mar2019 2:00:00	2019	864.5861373	835.7204	1376.036	1241.805	1128.625
20Mar2019 3:00:00	2019	859.8025956	838.7539	1376.924	1238.198	1115.146
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20Mar2019 9:00:00	2019	1298.118858	910.9598	1402.159	1658.919	1160.157
20Mar2019 10:00:00	2019	1307.732034	890.3826	1430.866	1668.82	1140.003
20Mar2019 11:00:00	2019	1317.693431	880.4083	1443.364	1643.91	1136.795
20Mar2019 12:00:00	2019	1322.899035	876.2377	1436.443	1631.243	1169.295
20Mar2019 13:00:00	2019	1331.392739	877.9386	1405.713	1639.773	1170.015
20Mar2019 14:00:00	2019	1330.793302	872.4337	1422.713	1653.615	1161.501
20Mar2019 15:00:00	2019	1326.780077	866.3428	1399.786	1676.319	1169.2
20Mar2019 16:00:00	2019	1328.465716	871.5248	1410.106	1679.857	1188.571
20Mar2019 17:00:00	2019	1328.946482	879.0002	1380.641	1659.068	1194.901
20Mar2019 18:00:00	2019	1271.746298	875.5492	1372.922	1600.617	1193.433
20Mar2019 19:00:00	2019	1244.291264	881.1488	1404.528	1600.578	1192.864
20Mar2019 20:00:00	2019	1266.612444	898.5635	1412.622	1641.312	1210.473
20Mar2019 21:00:00	2019	1204.062835	881.3185	1385.747	1585.63	1207.188
20Mar2019 22:00:00	2019	1092.415728	855.202	1392.994	1509.238	1198.79
20Mar2019 23:00:00	2019	984.874182	841.0349	1384.708	1384.453	1145.017
21Mar2019 0:00:00	2019	919.3142936	821.1905	1365.395	1294.118	1093.897
21Mar2019 1:00:00	2019	881.8745045	809.5445	1354.191	1265.203	1073.573
21Mar2019 2:00:00	2019	865.0853069	808.9208	1367.345	1233.934	1108.398

21Mar2019 3:00:00	2019	864.2274015	814.5712	1366.886	1236.553	1117.534
21Mar2019 4:00:00	2019	885.9756358	818.3941	1350.671	1252.607	1060.641
21Mar2019 5:00:00	2019	968.4260553	833.2897	1366.219	1329.459	1085.022
21Mar2019 6:00:00	2019	1128.218795	845.8702	1420.461	1485.429	1110.152
21Mar2019 7:00:00	2019	1258.763393	879.6793	1465.829	1629.425	1116.891
21Mar2019 8:00:00	2019	1278.691401	881.9269	1479.027	1661.037	1158.059
21Mar2019 9:00:00	2019	1293.301658	875.758	1461.156	1669.039	1150.685
21Mar2019 10:00:00	2019	1310.972335	870.2627	1459.223	1652.738	1098.878
21Mar2019 11:00:00	2019	1324.839219	867.8245	1467.42	1673.813	1066.118
21Mar2019 12:00:00	2019	1327.7329	856.2046	1480.584	1660.642	1039.74
21Mar2019 13:00:00	2019	1333.298311	880.2074	1476.903	1702.918	1060.151
21Mar2019 14:00:00	2019	1329.664103	880.6909	1479.874	1730.086	1078.53
21Mar2019 15:00:00	2019	1324.567846	866.1729	1472.74	1709.683	1097.8
21Mar2019 16:00:00	2019	1320.583742	849.7152	1469.007	1680.325	1100.842
21Mar2019 17:00:00	2019	1312.396583	857.1897	1465.615	1675.388	1096.427
21Mar2019 18:00:00	2019	1254.297545	850.1611	1465.268	1630.684	1096.47
21Mar2019 19:00:00	2019	1233.95879	880.857	1469.156	1594.878	1105.507
21Mar2019 20:00:00	2019	1257.169322	903.7512	1512.101	1648.542	1126.124
21Mar2019 21:00:00	2019	1195.03026	896.1711	1483.247	1593.884	1125.142
21Mar2019 22:00:00	2019	1089.544993	877.7423	1456.55	1488.152	1138.866
21Mar2019 23:00:00	2019	989.3541421	847.088	1445.065	1388.607	1127.934
22Mar2019 0:00:00	2019	925.9305379	820.5532	1418.314	1321.9	1120.809
22Mar2019 1:00:00	2019	886.905886	811.8681	1418.603	1284.155	1106.257
22Mar2019 2:00:00	2019	864.774575	809.2435	1432.457	1270.581	1125.232
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22Mar2019 4:00:00	2019	881.4722414	820.3855	1420.016	1278.202	1104.151
22Mar2019 5:00:00	2019	957.3737611	841.1585	1437.698	1336.714	1107.877
22Mar2019 6:00:00	2019	1112.506186	884.7213	1472.188	1459.98	1102.289
22Mar2019 7:00:00	2019	1242.593924	927.2933	1516.73	1599.336	1097.712
22Mar2019 8:00:00	2019	1273.775007	937.3068	1531.954	1663.329	1093.958
22Mar2019 9:00:00	2019	1298.92282	929.9302	1532.429	1678.862	1104.609
22Mar2019 10:00:00	2019	1318.293888	916.1471	1486.716	1688.572	1105.091
22Mar2019 11:00:00	2019	1323.876549	909.7276	1488.907	1675.139	1111.115
22Mar2019 12:00:00	2019	1323.496305	890.5343	1476.675	1669.594	1106.403
22Mar2019 13:00:00	2019	1324.795093	888.2139	1482.437	1650.947	1093.623
22Mar2019 14:00:00	2019	1318.623757	878.4273	1480.368	1620.231	1090.278
22Mar2019 15:00:00	2019	1305.302268	866.1041	1469.777	1601.542	1103.727
22Mar2019 16:00:00	2019	1291.940754	863.1237	1460.966	1569.097	1104.688
22Mar2019 17:00:00	2019	1282.614385	868.6185	1456.598	1547.536	1084.511
22Mar2019 18:00:00	2019	1220.169407	864.9392	1443.715	1487.083	1072.69
22Mar2019 19:00:00	2019	1188.805738	869.4183	1455.227	1522.521	1072.5
22Mar2019 20:00:00	2019	1208.198147	887.3868	1498.644	1605.513	1102.495
22Mar2019 21:00:00	2019	1157.125201	874.7121	1479.471	1549.965	1111.622
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22Mar2019 23:00:00	2019	979.3967093	819.4549	1409.737	1388.476	1099.051
23Mar2019 0:00:00	2019	917.4182969	800.4216	1408.792	1332.349	1095.297
23Mar2019 1:00:00	2019	875.5277738	804.8714	1408.494	1285.721	1092.895

23Mar2019 2:00:00	2019	852.2391021	803.3513	1414.042	1258.389	1095.439
23Mar2019 3:00:00	2019	843.277213	795.3942	1409.549	1246.542	1096.257
23Mar2019 4:00:00	2019	853.7168835	795.114	1403.998	1245.274	1083.044
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23Mar2019 6:00:00	2019	938.8781707	820.3345	1428.295	1332.007	1100.329
23Mar2019 7:00:00	2019	1003.541732	848.4905	1441.004	1401.877	1110.598
23Mar2019 8:00:00	2019	1067.363158	863.2137	1459.814	1466.267	1123.447
23Mar2019 9:00:00	2019	1125.294295	867.1629	1468.605	1533.666	1129.144
23Mar2019 10:00:00	2019	1159.751315	873.5935	1457.089	1572.652	1128.648
23Mar2019 11:00:00	2019	1176.111409	874.823	1468.048	1597.568	1144.736
23Mar2019 12:00:00	2019	1169.946597	858.9308	1455.659	1556.879	1131.145
23Mar2019 13:00:00	2019	1159.588932	853.6946	1451.517	1519.095	1135.897
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23Mar2019 16:00:00	2019	1144.518932	868.8518	1451.333	1498.118	1125.135
23Mar2019 17:00:00	2019	1149.212409	872.3611	1443.318	1513.635	1119.485
23Mar2019 18:00:00	2019	1129.146012	880.1025	1436.839	1470.582	1097.535
23Mar2019 19:00:00	2019	1135.494265	901.5917	1445.743	1470.376	1051.625
23Mar2019 20:00:00	2019	1158.490899	926.2179	1477.694	1534.426	1064.932
23Mar2019 21:00:00	2019	1120.142485	914.0719	1458.298	1496.581	1063.24
23Mar2019 22:00:00	2019	1057.680452	890.2825	1412.429	1415.382	1060.679
23Mar2019 23:00:00	2019	979.4130612	862.2178	1392.839	1336.686	1054.299
24Mar2019 0:00:00	2019	919.6378984	842.8085	1380.3	1273.665	1035.637
24Mar2019 1:00:00	2019	874.3228835	824.0144	1398.692	1248.756	1040.223
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24Mar2019 3:00:00	2019	844.6234636	818.8294	1383.377	1218.012	1037.903
24Mar2019 4:00:00	2019	846.0887433	821.7927	1406.188	1241.933	1040.975
24Mar2019 5:00:00	2019	865.2160638	830.0145	1409.736	1257.645	1045.32
24Mar2019 6:00:00	2019	905.5094175	837.6803	1430.471	1296.9	1053.085
24Mar2019 7:00:00	2019	958.8012998	868.0358	1454.255	1336.837	1048.758
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24Mar2019 10:00:00	2019	1153.359919	929.1829	1494.658	1473.603	1051.316
24Mar2019 11:00:00	2019	1184.422948	946.2568	1488.267	1521.955	1058.558
24Mar2019 12:00:00	2019	1200.116418	944.7342	1481.469	1532.933	1061.958
24Mar2019 13:00:00	2019	1192.942453	940.1535	1474.916	1519.974	1059.889
24Mar2019 14:00:00	2019	1187.473447	939.3141	1471.511	1514.543	1048.028
24Mar2019 15:00:00	2019	1199.697088	945.2291	1489.132	1531.644	1042.337
24Mar2019 16:00:00	2019	1225.743391	950.3481	1493.816	1564.324	1041.731
24Mar2019 17:00:00	2019	1247.442663	944.0802	1485.573	1581.276	1053.217
24Mar2019 18:00:00	2019	1226.197392	935.294	1486.81	1545.319	1049.641
24Mar2019 19:00:00	2019	1216.29042	938.9598	1491.874	1539.897	1057.244
24Mar2019 20:00:00	2019	1216.799103	956.5275	1521.792	1605.08	1074.671
24Mar2019 21:00:00	2019	1156.254515	926.6212	1504.335	1586.014	1083.311
24Mar2019 22:00:00	2019	1066.821562	898.7722	1465.05	1499.851	1073.709
24Mar2019 23:00:00	2019	973.625011	868.6333	1440.293	1407.281	1067.477
25Mar2019 0:00:00	2019	907.4909756	857.6	1427.522	1335.856	1052.588

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25Mar2019 3:00:00	2019	851.4798696	831.0878	1384.728	1257.017	1046.705
25Mar2019 4:00:00	2019	874.5456824	849.7521	1370.511	1274.954	1030.888
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25Mar2019 21:00:00	2019	1192.835396	930.4768	1451.901	1559.613	1064.492
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25Mar2019 23:00:00	2019	990.5192277	869.1494	1395.316	1334.081	1048.976
26Mar2019 0:00:00	2019	925.0143286	845.7471	1377.344	1265.074	1047.448
26Mar2019 1:00:00	2019	882.6927895	832.1432	1366.229	1218.09	1043.522
26Mar2019 2:00:00	2019	860.306488	827.9331	1367.285	1199.352	1046.407
26Mar2019 3:00:00	2019	853.7722463	825.5671	1380.14	1214.735	1045.48
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26Mar2019 5:00:00	2019	956.7068174	855.4506	1399.311	1317.842	1075.195
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26Mar2019 10:00:00	2019	1295.99453	918.0449	1506.823	1729.135	1036.748
26Mar2019 11:00:00	2019	1311.669934	903.6742	1511.89	1749.732	1035.012
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26Mar2019 16:00:00	2019	1297.294274	912.2679	1495.856	1694.551	1058.974
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26Mar2019 18:00:00	2019	1251.065032	924.3391	1473.25	1665.106	1008.91
26Mar2019 19:00:00	2019	1240.028636	927.6246	1460.971	1633.531	1014.48
26Mar2019 20:00:00	2019	1257.559246	943.8629	1444.217	1660.054	1032.335
26Mar2019 21:00:00	2019	1195.275161	929.0059	1386.667	1606.915	1031.485
26Mar2019 22:00:00	2019	1092.604946	885.7722	1391.221	1503.1	1019.545
26Mar2019 23:00:00	2019	1000.194293	856.4344	1381.57	1411.716	1003.175

27Mar2019 0:00:00	2019	933.7412903	835.4727	1354.864	1321.338	999.1092
27Mar2019 1:00:00	2019	891.3602639	829.2731	1344.922	1266.583	996.8205
27Mar2019 2:00:00	2019	870.5787576	826.0912	1351.133	1229.926	991.2997
27Mar2019 3:00:00	2019	865.007537	828.8	1338.439	1224.793	994.4806
27Mar2019 4:00:00	2019	884.6289801	834.4356	1330.696	1206.332	996.468
27Mar2019 5:00:00	2019	961.7045514	854.9869	1341.88	1282.458	999.2045
27Mar2019 6:00:00	2019	1110.370204	902.6135	1386.879	1394.275	1006.317
27Mar2019 7:00:00	2019	1222.003345	949.8863	1442.033	1508.231	1007.48
27Mar2019 8:00:00	2019	1268.329676	962.8852	1470.438	1603.457	1004.375
27Mar2019 9:00:00	2019	1295.993706	963.9863	1470.495	1656.671	1012.504
27Mar2019 10:00:00	2019	1319.981847	963.59	1473.731	1678.153	1011.726
27Mar2019 11:00:00	2019	1329.130205	965.5391	1461.399	1695.485	1007.3
27Mar2019 12:00:00	2019	1316.355509	953.312	1413.456	1685.536	1004.067
27Mar2019 13:00:00	2019	1317.021706	946.0025	1372.724	1656.936	1012.24
27Mar2019 14:00:00	2019	1305.321668	952.6029	1365.472	1638.57	1017.532
27Mar2019 15:00:00	2019	1298.410588	951.2839	1364.571	1630.217	1014.065
27Mar2019 16:00:00	2019	1305.944609	966.9938	1362.155	1616.313	1007.5
27Mar2019 17:00:00	2019	1319.206753	967.2357	1352.345	1609.447	1005.318
27Mar2019 18:00:00	2019	1263.039906	957.5239	1365.678	1558.016	1003.678
27Mar2019 19:00:00	2019	1239.82702	952.1457	1384.965	1569.91	1002.18
27Mar2019 20:00:00	2019	1261.600831	962.4121	1385.118	1607.606	1018.357
27Mar2019 21:00:00	2019	1211.13868	948.4761	1363.471	1589.523	1014.29
27Mar2019 22:00:00	2019	1113.785753	922.0141	1331.201	1499.569	1001.446
27Mar2019 23:00:00	2019	1014.88711	882.6653	1297.838	1387.07	994.9705
28Mar2019 0:00:00	2019	945.3090432	858.601	1272.026	1313.466	988.4884
28Mar2019 1:00:00	2019	904.4697256	848.3767	1272.403	1257.992	983.3535
28Mar2019 2:00:00	2019	883.207017	846.0727	1273.978	1244.939	984.7027
28Mar2019 3:00:00	2019	878.3529915	852.0008	1270.349	1235.353	999.6803
28Mar2019 4:00:00	2019	900.3354347	847.2608	1275.862	1256.263	1003.642
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28Mar2019 6:00:00	2019	1120.150377	896.5261	1321.779	1455.865	1020.993
28Mar2019 7:00:00	2019	1222.438409	943.2218	1356.571	1576.221	1019.628
28Mar2019 8:00:00	2019	1263.209277	956.5932	1375.896	1613.645	1008.323
28Mar2019 9:00:00	2019	1287.101047	953.4464	1401.726	1644.418	1008.58
28Mar2019 10:00:00	2019	1297.240697	947.9523	1411.446	1675.228	1015.173
28Mar2019 11:00:00	2019	1311.431849	949.2734	1408.645	1663.283	1003.816
28Mar2019 12:00:00	2019	1307.648517	937.0453	1397.591	1643.168	999.9489
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28Mar2019 14:00:00	2019	1292.65814	922.5294	1372.222	1603.764	1005.99
28Mar2019 15:00:00	2019	1283.645057	912.7648	1356.435	1588.108	1009.223
28Mar2019 16:00:00	2019	1272.850486	912.2849	1333.033	1572.29	1003.393
28Mar2019 17:00:00	2019	1274.974324	919.8544	1334.408	1587.34	997.9672
28Mar2019 18:00:00	2019	1229.30573	916.8288	1333.381	1540.59	990.5841
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28Mar2019 20:00:00	2019	1240.305709	962.6906	1361.494	1604.535	1005.641
28Mar2019 21:00:00	2019	1197.486343	949.6158	1368.042	1585.482	1014.648
28Mar2019 22:00:00	2019	1102.062035	920.2169	1333.291	1491.786	1005.736

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29Mar2019 1:00:00	2019	899.0924028	862.5106	1269.925	1255.248	994.3879
29Mar2019 2:00:00	2019	878.5019215	859.2824	1262.731	1232.247	987.1844
29Mar2019 3:00:00	2019	875.5341609	862.494	1273.764	1226.035	991.7854
29Mar2019 4:00:00	2019	893.0363342	869.6915	1279.023	1233.487	994.5067
29Mar2019 5:00:00	2019	961.604709	886.9202	1296.413	1294.109	997.695
29Mar2019 6:00:00	2019	1103.179065	921.9423	1344.536	1416.919	1007.521
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29Mar2019 10:00:00	2019	1301.931358	966.6647	1411.223	1701.658	1015.562
29Mar2019 11:00:00	2019	1305.458163	944.0226	1394.123	1703.984	1008.804
29Mar2019 12:00:00	2019	1306.278372	929.5429	1401.646	1677.7	1004.211
29Mar2019 13:00:00	2019	1301.902553	921.5525	1406.277	1670.567	994.3942
29Mar2019 14:00:00	2019	1291.338174	913.6283	1393.846	1644.42	1000.386
29Mar2019 15:00:00	2019	1278.840119	914.9137	1384.154	1615.171	996.9243
29Mar2019 16:00:00	2019	1265.897095	920.9075	1373.054	1584.512	997.2359
29Mar2019 17:00:00	2019	1253.516143	928.3624	1366.464	1553.192	996.6202
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29Mar2019 19:00:00	2019	1181.60401	920.2823	1360.958	1489.07	995.9432
29Mar2019 20:00:00	2019	1209.142117	932.0663	1399.725	1534.45	1019.522
29Mar2019 21:00:00	2019	1176.935265	940.8277	1397.507	1526.017	1018.15
29Mar2019 22:00:00	2019	1096.985148	912.9168	1343.956	1434.562	1012.836
29Mar2019 23:00:00	2019	1010.669093	885.2295	1310.701	1354.363	1004.648
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30Mar2019 1:00:00	2019	907.1467306	852.8263	1292.414	1240.674	1006.523
30Mar2019 2:00:00	2019	882.7869152	846.3609	1276.792	1206.711	1002.178
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30Mar2019 10:00:00	2019	1164.881825	896.1765	1365.144	1517.727	985.7207
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30Mar2019 13:00:00	2019	1165.108293	866.7118	1346.705	1501.208	985.3958
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30Mar2019 16:00:00	2019	1142.520743	866.4945	1348.062	1489.676	981.2509
30Mar2019 17:00:00	2019	1150.045959	875.6879	1345.848	1454.611	982.4688
30Mar2019 18:00:00	2019	1128.869166	874.0594	1338.66	1449.838	980.3797
30Mar2019 19:00:00	2019	1111.158996	874.6883	1340.348	1426.503	980.1295
30Mar2019 20:00:00	2019	1140.276836	886.8409	1356.017	1462.025	1006.985
30Mar2019 21:00:00	2019	1116.547419	898.1109	1347.061	1444.683	1012.166

30Mar2019 22:00:00	2019	1055.466495	881.2811	1332.264	1365.876	1009.302
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31Mar2019 1:00:00	2019	876.948839	814.4853	1251.619	1217.644	983.9488
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31Mar2019 3:00:00	2019	841.3447842	802.6871	1250.239	1182.562	971.6002
31Mar2019 4:00:00	2019	844.6820553	811.7283	1278.776	1210.82	979.2439
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31Mar2019 12:00:00	2019	1161.240371	881.0227	1391.567	1497.647	915.1633
31Mar2019 13:00:00	2019	1156.835457	866.5115	1386.283	1489.09	922.6481
31Mar2019 14:00:00	2019	1147.680059	862.6594	1378.246	1499.964	923.306
31Mar2019 15:00:00	2019	1147.814917	860.2995	1361.57	1494.001	925.396
31Mar2019 16:00:00	2019	1168.827564	858.8248	1384.707	1508.318	934.0588
31Mar2019 17:00:00	2019	1197.670134	869.1241	1392.566	1518.081	941.8037
31Mar2019 18:00:00	2019	1185.804053	875.0775	1393.653	1476.227	939.4742
31Mar2019 19:00:00	2019	1172.84004	884.2876	1382.922	1471.32	968.0902
31Mar2019 20:00:00	2019	1198.185878	896.28	1413.889	1520.221	998.4238
31Mar2019 21:00:00	2019	1162.691874	892.7868	1390.116	1482.221	982.8759
31Mar2019 22:00:00	2019	1068.29619	862.2868	1348.77	1398.609	1015.603
31Mar2019 23:00:00	2019	972.647258	833.8707	1312.029	1291.144	999.8961
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01Apr2019 12:00:00	2019	1318.221933	885.488	1372.923	1636.74	1004.959
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02Apr2019 22:00:00	2019	1082.890785	888.0042	1371.878	1455.718	1001.75
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04Apr2019 12:00:00	2019	1302.861167	858.107	1450.39	1652.003	1072.253
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04Apr2019 15:00:00	2019	1291.052043	861.3687	1432.326	1643.734	1052.886
04Apr2019 16:00:00	2019	1293.725283	867.222	1435.163	1647.833	1059.371
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13Apr2019 3:00:00	2019	850.6574375	766.9909	1252.148	1151.837	1015.928
13Apr2019 4:00:00	2019	856.8387961	769.3466	1256.258	1146.748	1031.205
13Apr2019 5:00:00	2019	886.9425189	775.3036	1235.198	1186.481	1041.399
13Apr2019 6:00:00	2019	939.8653319	790.6152	1251.434	1223.363	1026.374
13Apr2019 7:00:00	2019	991.7311536	814.3287	1282.94	1296.208	1034.907
13Apr2019 8:00:00	2019	1067.763566	838.2174	1328.215	1390.037	1027.38
13Apr2019 9:00:00	2019	1119.892644	848.7854	1354.722	1449.95	1022.757
13Apr2019 10:00:00	2019	1151.791682	845.0049	1355.788	1475.966	1038.128
13Apr2019 11:00:00	2019	1167.161864	838.4473	1356.665	1484.378	1044.661
13Apr2019 12:00:00	2019	1171.112165	834.6257	1347.83	1483.374	1034.743
13Apr2019 13:00:00	2019	1161.469634	833.6762	1344.893	1474.512	1037.385
13Apr2019 14:00:00	2019	1145.015895	820.2902	1331.564	1450.647	1044.636

13Apr2019 15:00:00	2019	1135.297995	818.8236	1328.897	1448.395	1050.173
13Apr2019 16:00:00	2019	1136.031779	830.3427	1344.956	1442.508	1047.45
13Apr2019 17:00:00	2019	1139.863222	837.7277	1345.729	1462.194	1032.058
13Apr2019 18:00:00	2019	1119.98606	834.6809	1305.092	1434.739	995.5291
13Apr2019 19:00:00	2019	1101.724478	831.5311	1315.33	1413.846	994.926
13Apr2019 20:00:00	2019	1112.603011	841.2573	1342.77	1434.287	1013.181
13Apr2019 21:00:00	2019	1105.509286	839.9016	1353.456	1446.719	1038.089
13Apr2019 22:00:00	2019	1043.460898	822.899	1323.743	1369.09	1053.328
13Apr2019 23:00:00	2019	973.7098391	794.0189	1296.947	1309.237	1057.538
14Apr2019 0:00:00	2019	908.6237485	784.8265	1274.429	1243.186	1047.008
14Apr2019 1:00:00	2019	862.6333681	775.5718	1261.526	1200.077	1041.727
14Apr2019 2:00:00	2019	838.1114445	770.6922	1261.839	1171.85	1054.825
14Apr2019 3:00:00	2019	828.0732496	770.7603	1254.818	1166.639	1061.384
14Apr2019 4:00:00	2019	832.4730788	773.7142	1260.214	1166.091	1062.231
14Apr2019 5:00:00	2019	855.0181582	779.8247	1276.786	1177.827	1067.269
14Apr2019 6:00:00	2019	894.8110275	787.6242	1291.374	1208.83	1070.767
14Apr2019 7:00:00	2019	939.4404708	796.4112	1299.264	1248.751	1061.719
14Apr2019 8:00:00	2019	1012.819251	807.0629	1317.305	1295.533	1045.266
14Apr2019 9:00:00	2019	1079.701875	819.828	1344.114	1372.278	1042.08
14Apr2019 10:00:00	2019	1126.804943	832.2849	1362.659	1415.13	1032.173
14Apr2019 11:00:00	2019	1154.177332	836.7386	1345.653	1462.674	1019.324
14Apr2019 12:00:00	2019	1150.219219	835.3012	1358.534	1491.605	1026.74
14Apr2019 13:00:00	2019	1140.509113	834.5366	1355.728	1500.613	1027.281
14Apr2019 14:00:00	2019	1137.828259	830.4283	1357.472	1514.421	1015.371
14Apr2019 15:00:00	2019	1140.729093	834.4163	1362.858	1505.666	1008.819
14Apr2019 16:00:00	2019	1162.657672	840.6642	1376.365	1511.314	1023.399
14Apr2019 17:00:00	2019	1194.876808	848.5277	1389.162	1547.132	1026.665
14Apr2019 18:00:00	2019	1174.522821	849.3694	1371.143	1507.936	1034.551
14Apr2019 19:00:00	2019	1139.459875	839.0854	1352.214	1493.209	1035.265
14Apr2019 20:00:00	2019	1149.373341	847.5417	1361.243	1485.234	1056.025
14Apr2019 21:00:00	2019	1143.755095	848.2523	1357.569	1487.473	1059.694
14Apr2019 22:00:00	2019	1058.413218	828.2359	1317.295	1384.544	1060.602
14Apr2019 23:00:00	2019	959.4122481	804.7699	1291.3	1285.418	1057.543
15Apr2019 0:00:00	2019	895.1796903	782.8688	1279.629	1243.404	1052.682
15Apr2019 1:00:00	2019	860.8732825	770.3471	1248.237	1193.096	1054.66
15Apr2019 2:00:00	2019	847.5740069	765.6038	1237.865	1160.266	1056.228
15Apr2019 3:00:00	2019	846.9695374	766.7952	1247.615	1167.371	1050.313
15Apr2019 4:00:00	2019	869.9645075	775.6028	1260.109	1187.738	1046.725
15Apr2019 5:00:00	2019	952.64238	788.5468	1285.905	1266.346	1053.136
15Apr2019 6:00:00	2019	1111.234238	824.5959	1325.161	1397.958	1067.352
15Apr2019 7:00:00	2019	1225.555015	867.462	1359.635	1508.63	1071.894
15Apr2019 8:00:00	2019	1262.42824	879.5862	1382.158	1569.122	1044.631
15Apr2019 9:00:00	2019	1278.360723	830.3587	1380.206	1611.945	1035.99
15Apr2019 10:00:00	2019	1292.996647	853.1229	1323.941	1660.099	1035.703
15Apr2019 11:00:00	2019	1302.298987	849.2383	1327.349	1669.151	1003.255
15Apr2019 12:00:00	2019	1297.874543	846.8307	1345.473	1670.781	985.1861
15Apr2019 13:00:00	2019	1300.576194	845.4928	1343.208	1662.022	976.195

15Apr2019 14:00:00	2019	1290.165304	831.9809	1314.472	1646.156	981.1658
15Apr2019 15:00:00	2019	1285.379324	831.6714	1332.72	1631.835	992.6556
15Apr2019 16:00:00	2019	1295.34608	835.7987	1351.479	1638.804	991.8249
15Apr2019 17:00:00	2019	1301.586065	842.0087	1350.582	1633.411	992.4454
15Apr2019 18:00:00	2019	1247.568683	834.6217	1334.88	1559.845	989.0664
15Apr2019 19:00:00	2019	1207.617924	851.3805	1330.552	1546.278	1001.05
15Apr2019 20:00:00	2019	1209.791509	865.4131	1334.185	1546.018	1015.017
15Apr2019 21:00:00	2019	1190.654464	874.1869	1338.168	1544.009	1057.112
15Apr2019 22:00:00	2019	1088.335425	859.5576	1302.717	1447.619	1054.449
15Apr2019 23:00:00	2019	984.2455973	827.532	1270.115	1323.871	1047.42
16Apr2019 0:00:00	2019	912.9704805	808.3618	1217.547	1185.799	965.3214
16Apr2019 1:00:00	2019	877.0067815	801.4087	1206.407	1145.985	951.9751
16Apr2019 2:00:00	2019	861.2187801	798.1329	1201.474	1162.665	957.3084
16Apr2019 3:00:00	2019	859.4942618	796.688	1204.794	1152.502	959.4961
16Apr2019 4:00:00	2019	884.514569	804.2035	1233.604	1183.629	985.8701
16Apr2019 5:00:00	2019	966.812082	822.952	1262.539	1243.758	1059.262
16Apr2019 6:00:00	2019	1119.239463	851.2077	1297.511	1379.002	1075.64
16Apr2019 7:00:00	2019	1225.513655	863.3787	1316.537	1497.627	1053.087
16Apr2019 8:00:00	2019	1264.5844	858.8862	1309.835	1559.559	1042.013
16Apr2019 9:00:00	2019	1271.246212	858.4513	1325.62	1572.131	1031.659
16Apr2019 10:00:00	2019	1279.892619	851.286	1332.129	1623.358	1044.571
16Apr2019 11:00:00	2019	1284.525938	844.573	1338.177	1650.621	1041.212
16Apr2019 12:00:00	2019	1284.138112	828.2279	1326.965	1644.838	1013.134
16Apr2019 13:00:00	2019	1286.433295	823.6773	1351.372	1656.835	1002.231
16Apr2019 14:00:00	2019	1279.04749	819.1384	1355.416	1638.243	1002.778
16Apr2019 15:00:00	2019	1275.076626	816.8599	1343.84	1650.751	1001.657
16Apr2019 16:00:00	2019	1279.133292	818.932	1344.656	1655.513	1012.223
16Apr2019 17:00:00	2019	1280.782335	835.7461	1326.508	1638.669	1022.023
16Apr2019 18:00:00	2019	1225.805308	847.4563	1320.244	1567.722	1035.828
16Apr2019 19:00:00	2019	1200.671577	867.8081	1328.858	1554.908	1058.024
16Apr2019 20:00:00	2019	1205.89616	880.9912	1319.094	1559.192	1078.019
16Apr2019 21:00:00	2019	1183.847949	880.6743	1322.939	1565.428	1090.918
16Apr2019 22:00:00	2019	1078.14287	842.3917	1298.482	1466.566	1084.026
16Apr2019 23:00:00	2019	975.8272707	811.681	1269.988	1352.438	1093.512
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17Apr2019 1:00:00	2019	863.5573329	777.0442	1237.067	1239.99	1063.861
17Apr2019 2:00:00	2019	847.5271891	774.9125	1234.077	1216.321	1060.734
17Apr2019 3:00:00	2019	843.6101663	775.5183	1235.361	1181.561	1046.057
17Apr2019 4:00:00	2019	866.7074915	776.89	1236.71	1184.542	1042.387
17Apr2019 5:00:00	2019	946.4030213	795.624	1249.587	1237.115	1040.17
17Apr2019 6:00:00	2019	1098.114289	832.9679	1279.898	1357.135	1035.351
17Apr2019 7:00:00	2019	1210.590251	875.674	1308.045	1477.819	1036.271
17Apr2019 8:00:00	2019	1250.163714	870.2038	1335.456	1565.236	1056.877
17Apr2019 9:00:00	2019	1272.160372	853.2824	1333.596	1594.132	1074.889
17Apr2019 10:00:00	2019	1301.179694	839.9953	1331.704	1615.469	1075.496
17Apr2019 11:00:00	2019	1318.435075	809.1888	1294.069	1627.657	1072.585
17Apr2019 12:00:00	2019	1315.238733	807.0409	1303.13	1624.315	1081.112

17Apr2019 13:00:00	2019	1314.426748	805.1916	1326.547	1623.786	1078.274
17Apr2019 14:00:00	2019	1305.13837	802.2118	1306.274	1619.146	1087.675
17Apr2019 15:00:00	2019	1303.451863	803.8379	1306.471	1631.211	1091.802
17Apr2019 16:00:00	2019	1303.01987	811.8585	1330.698	1623.218	1091.6
17Apr2019 17:00:00	2019	1301.298876	825.2595	1294.326	1585.172	1106.885
17Apr2019 18:00:00	2019	1240.932444	841.1575	1312.631	1512.828	1110.745
17Apr2019 19:00:00	2019	1202.900019	854.7995	1307.681	1481.956	1107.015
17Apr2019 20:00:00	2019	1196.881443	874.9031	1312.749	1477.337	1103.188
17Apr2019 21:00:00	2019	1181.700721	875.4822	1306.982	1484.196	1118.886
17Apr2019 22:00:00	2019	1081.917576	845.2648	1274.04	1389.958	1111.979
17Apr2019 23:00:00	2019	973.7221114	813.5272	1248.405	1308.76	1111.365
18Apr2019 0:00:00	2019	898.9304857	792.1581	1215.172	1233.884	1097.479
18Apr2019 1:00:00	2019	855.4709032	783.6392	1201.485	1206.57	1096.054
18Apr2019 2:00:00	2019	838.6832955	785.5559	1212.867	1197.323	1095.643
18Apr2019 3:00:00	2019	840.5459182	787.5985	1206.868	1180.736	1101.922
18Apr2019 4:00:00	2019	860.4135955	789.8906	1218.912	1195.313	1105.38
18Apr2019 5:00:00	2019	939.7834308	811.9978	1243.492	1266.123	1105.742
18Apr2019 6:00:00	2019	1089.038491	846.3301	1277.771	1375.873	1096.439
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18Apr2019 8:00:00	2019	1237.538145	882.4986	1340.314	1582.109	1071.652
18Apr2019 9:00:00	2019	1270.167076	865.2765	1353.29	1600.238	1074.537
18Apr2019 10:00:00	2019	1289.629627	862.8921	1357.734	1615.441	1057.682
18Apr2019 11:00:00	2019	1312.171011	838.4595	1361.734	1651.578	1048.333
18Apr2019 12:00:00	2019	1324.493465	823.604	1347.825	1640.643	1038.102
18Apr2019 13:00:00	2019	1327.02411	827.8951	1342.738	1641.569	1043.84
18Apr2019 14:00:00	2019	1330.375118	829.0392	1332.097	1630.426	1047.491
18Apr2019 15:00:00	2019	1330.234209	845.2513	1331.3	1621.108	1062.837
18Apr2019 16:00:00	2019	1322.014921	869.9119	1332.698	1599.672	1115.218
18Apr2019 17:00:00	2019	1302.617063	883.6739	1317.945	1601.033	1159.325
18Apr2019 18:00:00	2019	1223.239942	875.8738	1284.228	1530.38	1142.586
18Apr2019 19:00:00	2019	1179.541442	874.4729	1293.538	1498.703	1145.385
18Apr2019 20:00:00	2019	1169.752836	883.3333	1306.52	1522.837	1174.498
18Apr2019 21:00:00	2019	1155.421691	884.7819	1315.67	1521.19	1176.682
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18Apr2019 23:00:00	2019	965.8882584	819.7427	1251.19	1306.233	1162.863
19Apr2019 0:00:00	2019	891.5677697	796.2771	1226.005	1240.636	1163.892
19Apr2019 1:00:00	2019	845.3100554	785.0482	1229.101	1212.136	1157.901
19Apr2019 2:00:00	2019	820.4176301	779.9807	1234.633	1205.91	1159.679
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19Apr2019 4:00:00	2019	816.702471	775.3418	1222.552	1196.02	1164.779
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19Apr2019 6:00:00	2019	897.5521178	794.9998	1228.618	1237.972	1151.849
19Apr2019 7:00:00	2019	940.6931257	809.902	1243.86	1254.853	1142.927
19Apr2019 8:00:00	2019	1006.669848	831.7319	1277.283	1339.613	1140.546
19Apr2019 9:00:00	2019	1075.488716	835.5213	1303.696	1390.922	1145.98
19Apr2019 10:00:00	2019	1126.897672	844.5829	1304.529	1427.192	1163.538
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19Apr2019 14:00:00	2019	1141.01679	840.5541	1296.868	1413.228	1154.144
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19Apr2019 16:00:00	2019	1148.451443	840.7765	1296.724	1441.661	1150.364
19Apr2019 17:00:00	2019	1163.907212	843.9769	1312.163	1468.298	1157.66
19Apr2019 18:00:00	2019	1143.724037	836.6032	1306.292	1442.626	1153.802
19Apr2019 19:00:00	2019	1133.619902	835.0925	1292.147	1427.922	1148.063
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20Apr2019 7:00:00	2019	930.2936872	825.6813	1231.199	1245.746	1091.468
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20Apr2019 13:00:00	2019	1121.313378	845.291	1278.208	1414.573	1051.185
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20Apr2019 18:00:00	2019	1075.317318	836.3673	1262.497	1419.916	1070.602
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21Apr2019 0:00:00	2019	883.6812574	787.3095	1226.681	1227.095	1104.081
21Apr2019 1:00:00	2019	841.8119925	776.613	1221.154	1187.915	1099.042
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21Apr2019 5:00:00	2019	830.1404099	783.5138	1221.679	1184.172	1112.724
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21Apr2019 9:00:00	2019	1025.330404	821.5446	1239.344	1351.922	1070.745
21Apr2019 10:00:00	2019	1063.178196	815.5926	1229.898	1381.989	1060.063

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21Apr2019 17:00:00	2019	1116.16059	816.628	1250.439	1365.399	1112.639
21Apr2019 18:00:00	2019	1082.15392	813.1772	1249.946	1366.366	1116.365
21Apr2019 19:00:00	2019	1057.019053	809.5411	1241.812	1368.553	1134.579
21Apr2019 20:00:00	2019	1068.518596	815.7781	1247.161	1378.316	1156.492
21Apr2019 21:00:00	2019	1087.035615	825.7438	1261.561	1408.489	1167.605
21Apr2019 22:00:00	2019	1016.298595	818.5014	1236.343	1335.019	1171.723
21Apr2019 23:00:00	2019	925.0973689	791.0942	1212.168	1259.654	1174.072
22Apr2019 0:00:00	2019	857.8634238	772.0632	1194.703	1194.169	1162.277
22Apr2019 1:00:00	2019	822.5268288	754.4911	1192.609	1172.3	1154.632
22Apr2019 2:00:00	2019	808.243133	749.9813	1188.935	1165.685	1164.5
22Apr2019 3:00:00	2019	806.9902558	746.6285	1185.416	1157.993	1154.379
22Apr2019 4:00:00	2019	829.3569631	750.3466	1191.47	1179.995	1170.265
22Apr2019 5:00:00	2019	903.6578259	768.0447	1201.296	1226.213	1168.922
22Apr2019 6:00:00	2019	1021.910953	794.682	1214.797	1276.576	1128.128
22Apr2019 7:00:00	2019	1114.455878	828.228	1249.817	1374.526	1157.832
22Apr2019 8:00:00	2019	1185.065413	832.6238	1272.034	1465.242	1173.087
22Apr2019 9:00:00	2019	1233.67686	833.8939	1280.6	1518.01	1168.433
22Apr2019 10:00:00	2019	1281.979989	829.731	1241.213	1581.268	1144.537
22Apr2019 11:00:00	2019	1312.97932	830.9784	1223.363	1621.35	1142.827
22Apr2019 12:00:00	2019	1329.791735	826.7831	1228.436	1625.225	1143.788
22Apr2019 13:00:00	2019	1338.161756	823.7661	1247	1630.022	1144.102
22Apr2019 14:00:00	2019	1325.04724	826.8291	1259.468	1635.537	1165.702
22Apr2019 15:00:00	2019	1319.148087	812.3124	1284.257	1603.132	1181.94
22Apr2019 16:00:00	2019	1317.407284	809.7684	1294.935	1601.588	1179.384
22Apr2019 17:00:00	2019	1318.909049	811.1458	1302.044	1592.239	1177.893
22Apr2019 18:00:00	2019	1253.804981	840.3554	1299.71	1547.475	1167.084
22Apr2019 19:00:00	2019	1215.28612	855.3553	1280.77	1495.568	1167.398
22Apr2019 20:00:00	2019	1189.918735	859.1376	1291.932	1475.841	1175.877
22Apr2019 21:00:00	2019	1174.108878	857.7844	1303.908	1508.201	1159.173
22Apr2019 22:00:00	2019	1065.151829	826.7797	1268.897	1389.562	1168.114
22Apr2019 23:00:00	2019	957.132935	793.3149	1230.653	1321.25	1159.435
23Apr2019 0:00:00	2019	884.039049	773.8199	1222.713	1256.326	1146.71
23Apr2019 1:00:00	2019	844.678819	760.9882	1208.706	1195.946	1148.913
23Apr2019 2:00:00	2019	822.8148463	755.2318	1205.863	1186.397	1146.673
23Apr2019 3:00:00	2019	817.7444869	754.4394	1214.901	1177.416	1162.34
23Apr2019 4:00:00	2019	838.1363403	759.9303	1212.518	1180.242	1165.679
23Apr2019 5:00:00	2019	914.4559954	770.9287	1183.81	1213.318	1140.525
23Apr2019 6:00:00	2019	1066.57367	798.273	1198.294	1304.226	1145.974
23Apr2019 7:00:00	2019	1175.696303	829.4278	1233.309	1428.743	1150.785
23Apr2019 8:00:00	2019	1237.108301	833.1154	1281.898	1506.821	1191.071
23Apr2019 9:00:00	2019	1275.69948	827.5077	1303.544	1553.831	1185.151

23Apr2019 10:00:00	2019	1304.876804	805.3185	1329.471	1576.35	1195.598
23Apr2019 11:00:00	2019	1321.374625	806.058	1337.12	1618.012	1183.308
23Apr2019 12:00:00	2019	1329.253458	809.6954	1300.181	1628.086	1165.472
23Apr2019 13:00:00	2019	1335.873239	807.718	1306.263	1640.772	1160.51
23Apr2019 14:00:00	2019	1331.961694	808.0062	1304.5	1643.751	1141.098
23Apr2019 15:00:00	2019	1330.465091	800.9675	1313.636	1658.014	1091.948
23Apr2019 16:00:00	2019	1328.655865	803.4544	1307.96	1652.425	1091.347
23Apr2019 17:00:00	2019	1326.146572	813.2742	1292.119	1632.187	1091.452
23Apr2019 18:00:00	2019	1260.554653	834.9565	1308.794	1588.569	1081.538
23Apr2019 19:00:00	2019	1214.061289	836.947	1319.912	1522.941	1081.735
23Apr2019 20:00:00	2019	1179.941242	840.5252	1329.883	1531.865	1095.499
23Apr2019 21:00:00	2019	1168.742648	855.829	1357.637	1531.451	1123.444
23Apr2019 22:00:00	2019	1062.991126	825.061	1327.727	1436.961	1125.767
23Apr2019 23:00:00	2019	958.1891537	794.6674	1294.503	1327.407	1132.19
24Apr2019 0:00:00	2019	887.0867332	784.1324	1242.653	1255.247	1083.171
24Apr2019 1:00:00	2019	848.2282548	776.8378	1236.4	1209.257	1056.452
24Apr2019 2:00:00	2019	830.3429776	769.9116	1240.276	1195.522	1059.639
24Apr2019 3:00:00	2019	825.4526324	768.6196	1235.989	1156.238	1051.272
24Apr2019 4:00:00	2019	848.1149089	772.8628	1235.5	1169.536	1033.336
24Apr2019 5:00:00	2019	927.5025326	789.3242	1243.237	1239.177	1053.278
24Apr2019 6:00:00	2019	1063.940018	814.1831	1236.118	1333.05	1054.794
24Apr2019 7:00:00	2019	1179.893451	841.5323	1239.903	1475.324	1051.106
24Apr2019 8:00:00	2019	1225.513565	839.044	1292.645	1538.008	1080.273
24Apr2019 9:00:00	2019	1253.520612	823.748	1329.74	1569.692	1108.969
24Apr2019 10:00:00	2019	1276.300372	791.3422	1319.385	1602.063	1103.037
24Apr2019 11:00:00	2019	1294.607517	805.9061	1305.3	1612.68	1089.118
24Apr2019 12:00:00	2019	1304.069921	801.1343	1308.04	1604.117	1076.125
24Apr2019 13:00:00	2019	1313.480703	806.4156	1303.937	1614.406	1064.89
24Apr2019 14:00:00	2019	1300.660839	807.7131	1330.702	1603.78	1066.681
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24Apr2019 17:00:00	2019	1280.029662	800.2537	1333.211	1635.687	1080.777
24Apr2019 18:00:00	2019	1218.471674	796.3692	1343.442	1589.535	1082.887
24Apr2019 19:00:00	2019	1181.131851	836.0799	1313.498	1547.68	1092.926
24Apr2019 20:00:00	2019	1173.134248	840.8315	1312.45	1537.232	1109.167
24Apr2019 21:00:00	2019	1172.837481	847.1545	1328.585	1568.036	1104.58
24Apr2019 22:00:00	2019	1071.959177	816.9271	1302.045	1473.851	1104.489
24Apr2019 23:00:00	2019	968.1423981	789.9676	1260.432	1348.521	1078.95
25Apr2019 0:00:00	2019	899.8500547	784.5002	1219.063	1272.406	1070.879
25Apr2019 1:00:00	2019	861.0565671	776.8205	1245.374	1234.413	1069.048
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25Apr2019 4:00:00	2019	863.4302313	773.9209	1267.094	1190.326	1061.707
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25Apr2019 6:00:00	2019	1085.960243	822.6597	1280.44	1340.237	1068.21
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25Apr2019 13:00:00	2019	1288.186795	817.5552	1346.151	1645.671	1055.495
25Apr2019 14:00:00	2019	1280.65417	812.2824	1339.527	1639.799	1054.758
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25Apr2019 16:00:00	2019	1284.125882	804.7482	1345.329	1620.694	1077.419
25Apr2019 17:00:00	2019	1276.33623	804.3259	1346.604	1610.059	1077.361
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25Apr2019 19:00:00	2019	1181.425035	826.745	1313.912	1525.256	1070.42
25Apr2019 20:00:00	2019	1176.523024	835.3474	1337.597	1519.313	1075.969
25Apr2019 21:00:00	2019	1162.1669	841.4985	1358.803	1543.033	1090.954
25Apr2019 22:00:00	2019	1062.801232	825.1854	1327.821	1458.788	1085.409
25Apr2019 23:00:00	2019	959.0542511	796.4009	1289.567	1356.059	1075.572
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26Apr2019 1:00:00	2019	851.4537225	764.3202	1244.146	1204.779	1057.97
26Apr2019 2:00:00	2019	835.8078644	761.5991	1225.355	1185.174	1049.29
26Apr2019 3:00:00	2019	834.7861713	760.324	1233.337	1170.033	1045.212
26Apr2019 4:00:00	2019	855.326024	766.2557	1251.643	1177.091	1058.075
26Apr2019 5:00:00	2019	929.5150368	785.521	1275.086	1246.397	1072.673
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26Apr2019 7:00:00	2019	1189.894992	844.3433	1307.731	1472.811	1045.561
26Apr2019 8:00:00	2019	1246.813246	868.3088	1417.095	1544.686	1056.361
26Apr2019 9:00:00	2019	1271.976117	871.5999	1428.428	1577.057	1060.279
26Apr2019 10:00:00	2019	1283.004431	841.3981	1443.35	1579.719	1074.255
26Apr2019 11:00:00	2019	1291.674534	826.9393	1448.332	1587.519	1093.921
26Apr2019 12:00:00	2019	1293.829959	820.0216	1435.159	1623.256	1085.745
26Apr2019 13:00:00	2019	1288.725689	818.3418	1411.696	1619.747	1086.603
26Apr2019 14:00:00	2019	1274.059059	811.7661	1398.927	1604.211	1084.125
26Apr2019 15:00:00	2019	1261.0648	823.1583	1399.006	1581.491	1074.448
26Apr2019 16:00:00	2019	1248.160385	820.0646	1416.909	1589.697	1079.08
26Apr2019 17:00:00	2019	1236.308515	845.317	1423.072	1560.724	1096.552
26Apr2019 18:00:00	2019	1183.315436	844.134	1404.026	1516.861	1087.562
26Apr2019 19:00:00	2019	1159.572773	843.1869	1393.881	1470.508	1091.7
26Apr2019 20:00:00	2019	1154.904224	844.6199	1391.145	1459.755	1090.576
26Apr2019 21:00:00	2019	1147.587767	856.8376	1402.755	1489.74	1106.528
26Apr2019 22:00:00	2019	1067.313526	830.2451	1384.195	1388.869	1105.726
26Apr2019 23:00:00	2019	976.3405753	797.7352	1346.464	1291.843	1102.155
27Apr2019 0:00:00	2019	906.9059965	788.9322	1324.126	1207.624	1072.975
27Apr2019 1:00:00	2019	863.4818219	778.5877	1318.339	1160.943	1065.775
27Apr2019 2:00:00	2019	839.3723725	774.1696	1318.527	1161.977	1068.743
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27Apr2019 4:00:00	2019	835.3923877	777.4141	1318.022	1169.843	1076.05
27Apr2019 5:00:00	2019	862.8955878	783.8928	1328.976	1203.93	1118.871
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27Apr2019 9:00:00	2019	1121.633957	839.6214	1412.182	1474.108	1117.052
27Apr2019 10:00:00	2019	1159.709919	839.8471	1410.398	1509.658	1120.019
27Apr2019 11:00:00	2019	1178.59047	826.2136	1328.232	1503.225	1068.146
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27Apr2019 13:00:00	2019	1172.476217	824.7924	1284.964	1511.844	1080.544
27Apr2019 14:00:00	2019	1164.390692	821.9839	1318.475	1490.244	1078.487
27Apr2019 15:00:00	2019	1171.08469	830.029	1350.825	1492.951	1054.574
27Apr2019 16:00:00	2019	1191.011296	856.016	1369.732	1497.932	1053.886
27Apr2019 17:00:00	2019	1209.022656	867.6359	1386.766	1509.738	1057.093
27Apr2019 18:00:00	2019	1175.126407	843.3212	1370.966	1471.646	1049.803
27Apr2019 19:00:00	2019	1129.695954	782.9687	1293.851	1448.77	1043.436
27Apr2019 20:00:00	2019	1124.124773	782.2126	1320.553	1433.652	1049.969
27Apr2019 21:00:00	2019	1119.643005	764.1024	1318.287	1487.816	1065.107
27Apr2019 22:00:00	2019	1049.210316	707.1563	1277.587	1431.927	1125.931
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28Apr2019 0:00:00	2019	902.6554574	530.18	1256.03	1280.361	1107.819
28Apr2019 1:00:00	2019	859.9572897	490.4546	1239.191	1223.646	1099.34
28Apr2019 2:00:00	2019	839.4542738	466.0564	1248.425	1204.425	1097.48
28Apr2019 3:00:00	2019	830.7455673	473.3972	1239.119	1202.748	1075.424
28Apr2019 4:00:00	2019	838.4107545	476.2093	1228.391	1213.829	1015.189
28Apr2019 5:00:00	2019	863.9306551	485.2482	1274.045	1229.29	1034.775
28Apr2019 6:00:00	2019	885.8298043	491.8503	1263.591	1188.155	1028.572
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28Apr2019 8:00:00	2019	998.113072	568.5834	1318.913	1318.014	1022.708
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28Apr2019 11:00:00	2019	1134.855189	655.4875	1405.464	1455.948	1017.54
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28Apr2019 13:00:00	2019	1141.803481	682.1232	1412.145	1485.819	1000.958
28Apr2019 14:00:00	2019	1131.435711	731.6022	1399.822	1473.798	1005.553
28Apr2019 15:00:00	2019	1128.244842	737.4028	1366.845	1440.998	1057.146
28Apr2019 16:00:00	2019	1144.101865	746.0867	1346.158	1473.307	1063.683
28Apr2019 17:00:00	2019	1163.670409	763.2275	1355.915	1519.744	1061.674
28Apr2019 18:00:00	2019	1140.545937	790.7383	1330.679	1470.45	1043.567
28Apr2019 19:00:00	2019	1120.547716	786.9574	1314.421	1401.846	1037.03
28Apr2019 20:00:00	2019	1125.925173	786.1553	1334.725	1405.823	1056.074
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29Apr2019 10:00:00	2019	1283.773375	828.6894	1358.135	1616.899	1097.12
29Apr2019 11:00:00	2019	1294.974472	792.8326	1360.751	1643.769	1082.402
29Apr2019 12:00:00	2019	1293.174211	786.495	1373.209	1654.17	1077.395
29Apr2019 13:00:00	2019	1286.532796	780.1643	1387.882	1655.56	1099.287
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29Apr2019 17:00:00	2019	1287.679898	792.0706	1349.638	1611.764	1105.684
29Apr2019 18:00:00	2019	1230.220597	782.2137	1330.049	1559.335	1104.551
29Apr2019 19:00:00	2019	1189.458758	773.0088	1336.306	1513.874	1105.273
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29Apr2019 22:00:00	2019	1077.979003	756.7615	1325.994	1435.793	1106.899
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30Apr2019 10:00:00	2019	1303.201954	804.2289	1405.787	1663.506	1042.485
30Apr2019 11:00:00	2019	1309.755941	805.7775	1390.881	1667.954	1030.614
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30Apr2019 13:00:00	2019	1298.299112	804.6857	1424.862	1623.621	1041.587
30Apr2019 14:00:00	2019	1282.888964	800.7836	1451.138	1608.051	1047.292
30Apr2019 15:00:00	2019	1280.780346	805.1661	1459	1602.085	1042.8
30Apr2019 16:00:00	2019	1297.693359	824.6416	1452.175	1622.011	1018.383
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02May2019 18:00:00	2019	1260.163414	817.3563	1310.729	1577.514	1035.776
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03May2019 11:00:00	2019	1308.970859	840.8441	1366.027	1668.911	1078.616
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09May2019 3:00:00	2019	862.6173181	787.4184	1243.598	1221.082	967.5585
09May2019 4:00:00	2019	882.4667298	800.9125	1263.373	1236.274	973.3346
09May2019 5:00:00	2019	954.6194101	819.3082	1264.295	1279.698	969.3048
09May2019 6:00:00	2019	1083.331145	847.6496	1273.564	1355.344	968.9039
09May2019 7:00:00	2019	1203.79693	872.6471	1337.256	1507.846	968.196
09May2019 8:00:00	2019	1247.343437	885.4752	1380.492	1582.669	987.9192
09May2019 9:00:00	2019	1273.467556	873.231	1379.205	1631.921	988.5468
09May2019 10:00:00	2019	1297.970763	869.1633	1364.172	1680.553	987.374
09May2019 11:00:00	2019	1318.399828	868.2583	1381.643	1676.234	975.9801
09May2019 12:00:00	2019	1323.237021	862.6311	1352.934	1649.398	977.2513
09May2019 13:00:00	2019	1326.851847	864.7857	1322.057	1642.756	1002.385
09May2019 14:00:00	2019	1329.048379	868.3575	1325.015	1648.818	1012.769
09May2019 15:00:00	2019	1330.590602	866.5025	1335.941	1679.89	1013.579
09May2019 16:00:00	2019	1330.028038	870.0208	1369.425	1667.764	1002.62
09May2019 17:00:00	2019	1318.523222	866.3586	1351.96	1646.583	999.0496
09May2019 18:00:00	2019	1254.404399	854.057	1357.479	1570.834	982.7895
09May2019 19:00:00	2019	1213.964641	864.0039	1341.312	1542.727	967.3581
09May2019 20:00:00	2019	1192.430767	878.3593	1341.525	1531.032	965.3504
09May2019 21:00:00	2019	1174.025055	894.3808	1339.995	1538.739	963.9093
09May2019 22:00:00	2019	1082.360668	866.2281	1312.984	1466.012	958.4165
09May2019 23:00:00	2019	973.6678533	828.6486	1255.729	1318.01	941.8056
10May2019 0:00:00	2019	900.703307	803.003	1222.255	1210.552	913.0822
10May2019 1:00:00	2019	860.07007	791.9753	1210.194	1167.783	952.9669
10May2019 2:00:00	2019	838.1347238	789.2812	1182.434	1154.296	966.9838
10May2019 3:00:00	2019	834.5502749	788.1413	1194.303	1144.971	928.4541
10May2019 4:00:00	2019	848.3074718	794.7442	1214.488	1159.766	935.4271
10May2019 5:00:00	2019	921.6147439	807.3316	1234.072	1214.285	944.44
10May2019 6:00:00	2019	1068.771463	832.2272	1267.973	1324.61	957.2374
10May2019 7:00:00	2019	1200.765704	870.1743	1314.112	1481.063	941.8436
10May2019 8:00:00	2019	1255.048175	893.2556	1347.027	1565.763	953.5719
10May2019 9:00:00	2019	1285.970787	895.7055	1373.727	1628.463	944.1668
10May2019 10:00:00	2019	1304.818761	900.7103	1385.654	1672.568	945.9911
10May2019 11:00:00	2019	1317.212911	863.3305	1387.557	1669.694	957.6927
10May2019 12:00:00	2019	1323.111957	859.5129	1385.094	1679.819	970.4755
10May2019 13:00:00	2019	1330.684361	864.1712	1358.326	1698.417	963.9483
10May2019 14:00:00	2019	1326.082982	873.6958	1334.307	1685.585	962.4906
10May2019 15:00:00	2019	1314.566593	871.2402	1352.648	1654.907	939.708
10May2019 16:00:00	2019	1308.120162	891.5372	1297.125	1619.682	948.8414
10May2019 17:00:00	2019	1292.675039	917.6598	1320.528	1597.764	967.1797
10May2019 18:00:00	2019	1224.437406	900.2266	1311.187	1563.874	957.6038
10May2019 19:00:00	2019	1184.518378	900.5333	1292.579	1519.573	961.3755
10May2019 20:00:00	2019	1150.786617	909.9965	1289.119	1487.108	967.0348
10May2019 21:00:00	2019	1139.182062	910.3783	1312.128	1481.913	948.8331
10May2019 22:00:00	2019	1077.711529	881.9163	1309.421	1458.201	955.5295
10May2019 23:00:00	2019	983.0856105	848.5463	1264.722	1348.975	926.2137
11May2019 0:00:00	2019	905.8758942	835.5434	1258.555	1299.354	913.6201

11May2019 1:00:00	2019	858.0704675	818.743	1248.472	1250.405	910.6916
11May2019 2:00:00	2019	830.8249942	817.5512	1240.842	1218.77	907.8932
11May2019 3:00:00	2019	823.6547747	815.4493	1235.056	1206.999	921.5691
11May2019 4:00:00	2019	826.0797818	815.7837	1236.851	1176.369	946.3934
11May2019 5:00:00	2019	847.0694029	817.8555	1229.491	1180.014	932.486
11May2019 6:00:00	2019	873.6628917	823.2998	1200.392	1186.503	910.621
11May2019 7:00:00	2019	946.7697367	836.3525	1224.324	1243.559	902.051
11May2019 8:00:00	2019	1031.239836	859.9717	1271.183	1307.052	910.9221
11May2019 9:00:00	2019	1097.766365	881.6224	1300.912	1414.96	917.0753
11May2019 10:00:00	2019	1138.318689	866.8056	1308.302	1458.824	912.3555
11May2019 11:00:00	2019	1163.891421	864.8234	1316.085	1496.392	914.2159
11May2019 12:00:00	2019	1168.065445	865.9531	1319.524	1501.311	926.4786
11May2019 13:00:00	2019	1167.645846	862.3879	1321.639	1489.624	933.6172
11May2019 14:00:00	2019	1164.647755	878.8461	1318.651	1488.457	963.9121
11May2019 15:00:00	2019	1166.552014	867.1654	1321.793	1486.496	967.6811
11May2019 16:00:00	2019	1177.668694	873.6702	1340.306	1519.587	959.5741
11May2019 17:00:00	2019	1192.903128	895.6334	1354.183	1514.895	950.9599
11May2019 18:00:00	2019	1178.95344	914.4027	1349.919	1493.576	944.2237
11May2019 19:00:00	2019	1152.939732	907.2294	1337.52	1508.039	934.3055
11May2019 20:00:00	2019	1123.232889	898.5022	1341.944	1501.116	938.8946
11May2019 21:00:00	2019	1118.279355	910.1572	1313.562	1463.154	956.1688
11May2019 22:00:00	2019	1068.722895	896.7392	1283.461	1411.943	953.5317
11May2019 23:00:00	2019	982.0180351	864.2816	1252.442	1326.369	945.2262
12May2019 0:00:00	2019	906.9917097	840.4201	1241.044	1278.675	940.8627
12May2019 1:00:00	2019	857.0420209	819.931	1195.772	1251.123	957.3176
12May2019 2:00:00	2019	827.7263011	812.2095	1194.744	1222.178	967.7247
12May2019 3:00:00	2019	815.8253268	808.425	1210.149	1210.744	964.8977
12May2019 4:00:00	2019	811.9443755	808.3475	1219.241	1184.948	962.9952
12May2019 5:00:00	2019	825.4552735	810.1932	1222.597	1193.701	955.052
12May2019 6:00:00	2019	842.2393711	812.8166	1223.358	1191.576	947.3945
12May2019 7:00:00	2019	895.9290964	836.1678	1259.886	1254.38	958.7822
12May2019 8:00:00	2019	977.6725923	858.0346	1284.295	1345.892	981.9904
12May2019 9:00:00	2019	1050.254609	878.9979	1300.784	1422.707	994.7373
12May2019 10:00:00	2019	1106.663856	886.6018	1326.381	1483.008	998.7312
12May2019 11:00:00	2019	1139.094847	895.3322	1350.24	1476.099	973.1463
12May2019 12:00:00	2019	1162.535523	896.3997	1342.941	1502.356	972.2271
12May2019 13:00:00	2019	1169.054382	896.8681	1348.079	1508.666	994.5989
12May2019 14:00:00	2019	1176.599959	898.3968	1347.268	1511.755	972.5583
12May2019 15:00:00	2019	1176.897158	898.7741	1355.948	1560.568	956.4947
12May2019 16:00:00	2019	1195.184463	913.0416	1360.305	1585.386	959.5253
12May2019 17:00:00	2019	1210.487165	920.9163	1360.113	1582.53	985.5889
12May2019 18:00:00	2019	1194.150779	912.617	1321.861	1529.645	991.9088
12May2019 19:00:00	2019	1169.691816	909.614	1333.617	1506.644	992.3244
12May2019 20:00:00	2019	1155.584778	909.2284	1338.829	1480.394	997.8984
12May2019 21:00:00	2019	1154.544528	917.2783	1353.506	1485.367	1017.096
12May2019 22:00:00	2019	1085.417552	885.4202	1330.035	1448.222	1030.271
12May2019 23:00:00	2019	977.8709807	844.9576	1272.599	1303.426	1019.063

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13May2019 1:00:00	2019	845.2943978	811.3275	1239.421	1191.606	1006.107
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13May2019 3:00:00	2019	817.3373416	806.8126	1224.853	1177.752	1012.351
13May2019 4:00:00	2019	831.8150328	812.8378	1229.637	1187.795	1003.772
13May2019 5:00:00	2019	902.8225437	829.5361	1221.139	1228.75	994.309
13May2019 6:00:00	2019	1032.095185	857.8343	1249.032	1330.445	1002.879
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13May2019 9:00:00	2019	1271.979385	942.0114	1366.642	1603.577	1019.193
13May2019 10:00:00	2019	1314.639171	927.3712	1364.385	1629.09	1038.321
13May2019 11:00:00	2019	1344.659963	929.9919	1337.311	1652.204	1031.358
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13May2019 14:00:00	2019	1381.291691	938.9779	1343.765	1640.991	1053.455
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13May2019 16:00:00	2019	1376.140303	951.8112	1329.735	1653.478	1056.246
13May2019 17:00:00	2019	1373.53153	957.7561	1314.101	1657.706	1017.264
13May2019 18:00:00	2019	1305.38625	947.2408	1298.655	1589.461	1012.068
13May2019 19:00:00	2019	1258.509139	956.2366	1318.387	1537.149	1031.717
13May2019 20:00:00	2019	1243.667716	966.2671	1312.639	1493.438	1035.284
13May2019 21:00:00	2019	1204.661358	965.7	1314.465	1471.891	1062.738
13May2019 22:00:00	2019	1108.906179	922.7702	1292.772	1431.48	1075.629
13May2019 23:00:00	2019	996.6286409	874.338	1227.661	1329.052	1052.511
14May2019 0:00:00	2019	918.6221551	848.6367	1227.297	1264.71	974.1245
14May2019 1:00:00	2019	871.2711082	838.7617	1222.156	1211.358	950.1159
14May2019 2:00:00	2019	850.2718017	831.5918	1212.345	1202.366	957.0726
14May2019 3:00:00	2019	842.6067081	829.8794	1218.058	1200.651	945.9327
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14May2019 8:00:00	2019	1242.503138	924.8234	1297.703	1537.739	922.6383
14May2019 9:00:00	2019	1280.261875	918.8864	1316.556	1596.02	910.4335
14May2019 10:00:00	2019	1316.493081	920.5448	1319.121	1633.849	906.5961
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14May2019 17:00:00	2019	1375.631052	916.8889	1332.094	1673.35	935.3098
14May2019 18:00:00	2019	1293.404875	904.3504	1310.684	1627.953	946.1785
14May2019 19:00:00	2019	1252.337777	919.8614	1297.438	1606.588	948.8492
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14May2019 22:00:00	2019	1106.075045	893.8973	1260.372	1461.045	980.1848

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15May2019 11:00:00	2019	1346.245702	916.6502	1301.193	1650.604	921.0448
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15May2019 18:00:00	2019	1278.168477	884.1847	1299.508	1582.805	976.4561
15May2019 19:00:00	2019	1232.13032	908.9926	1269.995	1521.23	978.2673
15May2019 20:00:00	2019	1213.250685	910.4325	1272.013	1488.74	977.2716
15May2019 21:00:00	2019	1181.876781	913.6894	1283.762	1481.028	987.5076
15May2019 22:00:00	2019	1090.240857	886.7926	1262.605	1413.868	1003.195
15May2019 23:00:00	2019	977.7857862	854.0789	1224.021	1306.851	990.5707
16May2019 0:00:00	2019	903.2724825	829.2704	1197.399	1236.093	979.3373
16May2019 1:00:00	2019	860.8705402	817.1314	1180.578	1222.458	969.3089
16May2019 2:00:00	2019	844.0377296	812.3798	1179.728	1233.266	977.6135
16May2019 3:00:00	2019	837.7229882	809.8718	1185.6	1224.704	974.9669
16May2019 4:00:00	2019	859.0203357	810.7696	1201.565	1243.796	989.4688
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16May2019 6:00:00	2019	1066.909952	857.7954	1226.284	1355.519	960.9135
16May2019 7:00:00	2019	1199.200139	907.9705	1285.89	1525.031	959.9482
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16May2019 9:00:00	2019	1287.002051	935.1977	1343.294	1653.789	961.4845
16May2019 10:00:00	2019	1307.443379	940.1489	1348.416	1676.466	962.8741
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16May2019 12:00:00	2019	1336.048101	910.3874	1317.497	1664.416	956.9174
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16May2019 17:00:00	2019	1319.739379	910.369	1358.172	1639.534	950.102
16May2019 18:00:00	2019	1264.356439	905.4589	1316.811	1574.026	957.3326
16May2019 19:00:00	2019	1227.067281	937.3834	1304.323	1537.121	945.4131
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16May2019 21:00:00	2019	1182.463126	932.6571	1318.255	1513.211	967.579

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16May2019 23:00:00	2019	992.3590259	861.259	1267.312	1332	912.9516
17May2019 0:00:00	2019	918.9564745	829.0946	1247.97	1278.333	904.9008
17May2019 1:00:00	2019	876.1458808	811.6568	1236.286	1234.028	891.3071
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17May2019 5:00:00	2019	931.4450267	824.653	1225.209	1231.926	902.4475
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17May2019 15:00:00	2019	1288.825289	911.5269	1299.741	1560.753	930.9034
17May2019 16:00:00	2019	1277.93369	914.7162	1323.199	1571.081	948.5386
17May2019 17:00:00	2019	1271.04491	916.4967	1332.467	1560.963	953.9491
17May2019 18:00:00	2019	1219.131951	905.2248	1321.589	1507.913	943.9855
17May2019 19:00:00	2019	1183.471024	910.9695	1311.142	1467.394	934.1816
17May2019 20:00:00	2019	1152.560317	911.0182	1302.898	1441.461	937.5708
17May2019 21:00:00	2019	1135.522881	907.6063	1317.678	1433.383	947.661
17May2019 22:00:00	2019	1066.195404	879.2747	1311.606	1429.107	960.1764
17May2019 23:00:00	2019	981.3772646	849.7005	1275.03	1341.59	953.2451
18May2019 0:00:00	2019	923.2085888	822.6919	1248.696	1262.243	924.6797
18May2019 1:00:00	2019	879.0783222	808.5661	1244.182	1210.57	912.3401
18May2019 2:00:00	2019	854.4311568	802.7452	1231.852	1179.712	920.7076
18May2019 3:00:00	2019	844.5165301	799.0399	1199.779	1170.672	933.5641
18May2019 4:00:00	2019	846.528265	797.0151	1211.278	1171.711	909.8669
18May2019 5:00:00	2019	864.320599	804.5208	1219.913	1155.719	903.873
18May2019 6:00:00	2019	893.0473299	810.9054	1222.273	1175.259	907.7237
18May2019 7:00:00	2019	953.7048139	835.0266	1242.337	1243.536	900.011
18May2019 8:00:00	2019	1025.749052	865.1437	1268.113	1353.81	887.8718
18May2019 9:00:00	2019	1090.293765	886.2524	1286.077	1403.433	880.5067
18May2019 10:00:00	2019	1133.00746	896.4018	1278.032	1394.39	889.8897
18May2019 11:00:00	2019	1154.336459	897.5023	1283.708	1410.137	918.1902
18May2019 12:00:00	2019	1164.74352	890.4363	1294.068	1436.713	876.9269
18May2019 13:00:00	2019	1158.146084	881.562	1290.632	1438.78	869.6221
18May2019 14:00:00	2019	1143.468572	876.5126	1291.55	1443.516	869.6916
18May2019 15:00:00	2019	1143.259524	873.8373	1296.702	1452.61	867.2041
18May2019 16:00:00	2019	1151.144911	876.6092	1301.967	1458.197	873.8828
18May2019 17:00:00	2019	1147.592204	879.3884	1307.837	1473.91	885.2285
18May2019 18:00:00	2019	1126.617198	867.6923	1308.719	1421.577	862.053
18May2019 19:00:00	2019	1097.539857	857.916	1296.156	1399.427	862.6393
18May2019 20:00:00	2019	1075.873133	851.5061	1276.063	1410.006	860.1831

18May2019 21:00:00	2019	1067.057361	856.3301	1286.861	1413.448	879.1856
18May2019 22:00:00	2019	1031.97605	841.1557	1282.553	1383.953	899.0411
18May2019 23:00:00	2019	961.0802488	808.7246	1261.387	1302.385	894.3469
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19May2019 1:00:00	2019	861.8735202	772.3666	1214.024	1198.933	907.436
19May2019 2:00:00	2019	837.2738791	765.4949	1204.637	1164.076	943.2141
19May2019 3:00:00	2019	827.4336015	764.1604	1205.57	1167.686	954.1529
19May2019 4:00:00	2019	827.3313132	766.8057	1199.485	1140.534	885.6967
19May2019 5:00:00	2019	836.031398	764.4283	1157.116	1107.393	876.3127
19May2019 6:00:00	2019	847.6765774	765.0481	1156.227	1088.829	852.2778
19May2019 7:00:00	2019	896.7049188	778.3323	1182.59	1143.503	841.6976
19May2019 8:00:00	2019	953.6676476	795.9023	1220.861	1245.415	862.4895
19May2019 9:00:00	2019	1009.038516	809.4091	1241.562	1303.134	894.0258
19May2019 10:00:00	2019	1055.58144	813.5015	1245.953	1345.292	908.3614
19May2019 11:00:00	2019	1081.700462	817.699	1245.642	1378.053	926.1874
19May2019 12:00:00	2019	1087.294194	822.0538	1250.194	1394.867	931.9983
19May2019 13:00:00	2019	1081.154927	816.8787	1237.616	1369.435	930.0472
19May2019 14:00:00	2019	1069.730802	818.3963	1231.662	1398.312	927.3691
19May2019 15:00:00	2019	1069.011384	820.4144	1231.689	1375.77	926.9818
19May2019 16:00:00	2019	1080.18786	830.8476	1239.626	1392.329	935.4426
19May2019 17:00:00	2019	1088.645873	839.1546	1265.522	1430.976	964.8292
19May2019 18:00:00	2019	1063.622838	836.8683	1260.584	1408.306	956.9672
19May2019 19:00:00	2019	1033.803061	830.4224	1258.301	1413.446	959.0424
19May2019 20:00:00	2019	1019.054747	823.9032	1267.78	1417.059	951.3863
19May2019 21:00:00	2019	1032.130685	837.0666	1270.75	1403.264	955.9611
19May2019 22:00:00	2019	1011.92104	830.2535	1272.717	1413.179	958.5547
19May2019 23:00:00	2019	940.350023	806.5782	1233.972	1330.279	944.1259
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20May2019 1:00:00	2019	842.2243884	782.5966	1197.958	1223.033	950.8563
20May2019 2:00:00	2019	821.2353403	776.0555	1194.592	1200.456	967.326
20May2019 3:00:00	2019	816.2081487	777.4131	1182.482	1166.385	979.1324
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20May2019 5:00:00	2019	847.4258502	779.2799	1168.032	1146.337	936.2686
20May2019 6:00:00	2019	872.35238	781.0516	1166.985	1153.041	928.1706
20May2019 7:00:00	2019	915.1811908	791.6119	1182.192	1202.249	918.1978
20May2019 8:00:00	2019	971.2432378	810.5768	1226.02	1285.191	918.2879
20May2019 9:00:00	2019	1031.603008	833.3933	1276.832	1382.967	913.5121
20May2019 10:00:00	2019	1084.373541	843.5108	1293.184	1437.766	948.4997
20May2019 11:00:00	2019	1114.562476	854.9478	1303.876	1478.683	951.7992
20May2019 12:00:00	2019	1131.241399	860.6583	1294.556	1489.185	947.5412
20May2019 13:00:00	2019	1138.539737	859.4406	1282.701	1488.779	940.8619
20May2019 14:00:00	2019	1142.517359	860.1976	1291.034	1488.373	926.0791
20May2019 15:00:00	2019	1152.401947	868.1895	1315.67	1484.053	914.2238
20May2019 16:00:00	2019	1176.452902	882.3259	1326.391	1511.566	935.8975
20May2019 17:00:00	2019	1202.075518	889.8144	1329.618	1557.525	988.7639
20May2019 18:00:00	2019	1166.660555	879.7088	1310.048	1532.983	979.1245
20May2019 19:00:00	2019	1136.164428	872.598	1296.535	1489.965	958.0279

20May2019 20:00:00	2019	1114.921993	869.1177	1292.196	1481.033	950.8447
20May2019 21:00:00	2019	1099.055273	871.5669	1288.363	1450.235	962.0275
20May2019 22:00:00	2019	1031.856012	841.5783	1275.136	1415.394	968.3605
20May2019 23:00:00	2019	933.2555408	807.0356	1235.29	1310.44	924.2869
21May2019 0:00:00	2019	864.651225	781.7136	1203.259	1212.803	899.6478
21May2019 1:00:00	2019	826.989458	764.0625	1179.333	1165.514	894.0447
21May2019 2:00:00	2019	811.4015518	757.0093	1166.585	1147.325	898.2575
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21May2019 6:00:00	2019	1049.795221	832.6249	1221.448	1310.16	846.8058
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21May2019 9:00:00	2019	1275.457546	916.8643	1321.014	1633.326	852.945
21May2019 10:00:00	2019	1309.343953	926.0147	1324.854	1672.002	834.2961
21May2019 11:00:00	2019	1325.874147	938.7333	1355.69	1679.567	896.0316
21May2019 12:00:00	2019	1331.906965	937.5046	1358.69	1666.767	897.2255
21May2019 13:00:00	2019	1333.540576	937.0555	1378.733	1686.357	919.3193
21May2019 14:00:00	2019	1324.304898	938.166	1387.777	1675.508	923.5072
21May2019 15:00:00	2019	1322.527132	927.8455	1394.598	1691.868	954.5388
21May2019 16:00:00	2019	1333.800277	930.461	1363.294	1718.717	945.9502
21May2019 17:00:00	2019	1333.629824	929.7433	1330.218	1687.498	923.375
21May2019 18:00:00	2019	1266.35689	923.8624	1317.236	1629.862	913.8175
21May2019 19:00:00	2019	1227.06399	937.1083	1306.393	1578.622	902.733
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21May2019 21:00:00	2019	1170.714912	921.3164	1287.443	1500.937	898.1648
21May2019 22:00:00	2019	1078.405815	890.9057	1258.058	1432.967	899.0619
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22May2019 0:00:00	2019	902.4477239	831.6693	1182.902	1237.387	860.0339
22May2019 1:00:00	2019	862.5911769	812.493	1170.684	1198.067	836.4571
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22May2019 4:00:00	2019	860.9315231	822.9279	1176.402	1181.78	866.0391
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22May2019 6:00:00	2019	1062.784611	855.7015	1207.846	1318.142	874.5435
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22May2019 9:00:00	2019	1262.368915	900.6395	1317.435	1623.711	858.6114
22May2019 10:00:00	2019	1286.213242	902.1526	1325.367	1671.767	851.4709
22May2019 11:00:00	2019	1306.857563	899.334	1337.811	1704.951	865.9796
22May2019 12:00:00	2019	1317.138106	899.3512	1343.824	1726.826	901.0826
22May2019 13:00:00	2019	1322.024046	907.7489	1352.419	1749.679	904.6424
22May2019 14:00:00	2019	1323.474825	910.7372	1350.317	1746.176	895.256
22May2019 15:00:00	2019	1332.22099	912.2725	1346.193	1736.077	880.9863
22May2019 16:00:00	2019	1335.575759	916.6931	1349.383	1740.735	867.8837
22May2019 17:00:00	2019	1332.200136	917.6311	1385.244	1720.477	889.2391
22May2019 18:00:00	2019	1261.433336	908.947	1370.418	1652.648	883.2826

22May2019 19:00:00	2019	1215.777169	902.0394	1359.586	1607.912	844.2957
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23May2019 0:00:00	2019	908.8438336	821.4476	1227.096	1305.913	848.7771
23May2019 1:00:00	2019	859.0613868	810.2497	1218.397	1264.717	848.2437
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23May2019 7:00:00	2019	1168.798273	888.3131	1291.842	1553.942	828.7581
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23May2019 9:00:00	2019	1276.0468	905.6978	1349.599	1637.2	858.8114
23May2019 10:00:00	2019	1314.504583	892.2526	1348.509	1682.213	862.9495
23May2019 11:00:00	2019	1339.581266	890.4752	1357.745	1715.894	855.4621
23May2019 12:00:00	2019	1350.764919	877.3438	1354.112	1702.626	867.4155
23May2019 13:00:00	2019	1361.977894	867.5291	1363.019	1707.003	895.9161
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23May2019 16:00:00	2019	1372.950438	886.6257	1315.882	1721.831	899.0501
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23May2019 18:00:00	2019	1284.39638	873.5085	1300.654	1621.224	888.8515
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23May2019 20:00:00	2019	1210.021495	867.6505	1293.271	1527.684	862.6615
23May2019 21:00:00	2019	1178.857651	863.2144	1291.809	1529.603	865.8197
23May2019 22:00:00	2019	1091.462255	844.8736	1306.494	1498.215	851.0354
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24May2019 4:00:00	2019	836.676312	805.946	1207.031	1225.343	874.0317
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24May2019 22:00:00	2019	1065.166755	906.9875	1277.307	1436.213	919.7118
24May2019 23:00:00	2019	975.1165281	877.7753	1230.322	1341.394	917.0882
25May2019 0:00:00	2019	903.9285051	851.9731	1219.206	1274.778	907.987
25May2019 1:00:00	2019	856.8122636	831.146	1196.531	1192.579	896.4165
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25May2019 11:00:00	2019	1177.580863	919.5887	1287.433	1530.49	933.1068
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25May2019 15:00:00	2019	1161.431912	913.3035	1300.124	1502.786	931.386
25May2019 16:00:00	2019	1160.488343	923.3581	1289.448	1517.416	933.9476
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25May2019 23:00:00	2019	960.0430439	865.6607	1235.51	1304.05	932.2436
26May2019 0:00:00	2019	894.8603394	842.3402	1206.031	1251.876	926.8407
26May2019 1:00:00	2019	852.4196559	828.0596	1181.88	1207.205	926.616
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26May2019 6:00:00	2019	842.1773232	816.0107	1176.323	1150.766	864.3916
26May2019 7:00:00	2019	896.7289682	839.2299	1196.962	1215.908	856.3774
26May2019 8:00:00	2019	963.4886382	860.3661	1212.101	1322.579	856.7498
26May2019 9:00:00	2019	1028.793746	872.9263	1240.098	1396.162	875.0539
26May2019 10:00:00	2019	1080.934674	879.9506	1259.347	1454.294	882.7741
26May2019 11:00:00	2019	1108.718904	879.8255	1292.001	1505	875.9453
26May2019 12:00:00	2019	1123.566477	880.9233	1294.352	1526.597	880.5024
26May2019 13:00:00	2019	1117.592153	876.654	1289.245	1513.296	876.5566
26May2019 14:00:00	2019	1112.240366	874.1984	1285.911	1535.306	870.2863
26May2019 15:00:00	2019	1115.342273	878.0669	1289.808	1556.446	868.7339
26May2019 16:00:00	2019	1133.59234	889.5218	1307.632	1565.035	880.4704

26May2019 17:00:00	2019	1155.21671	903.3898	1342.599	1642.576	887.1152
26May2019 18:00:00	2019	1142.822861	908.6132	1349.711	1645.855	899.8777
26May2019 19:00:00	2019	1126.715339	905.2782	1341.691	1619.861	890.5214
26May2019 20:00:00	2019	1107.839648	904.8086	1344.068	1571.826	893.2939
26May2019 21:00:00	2019	1100.386845	904.0126	1324.237	1543.111	870.3559
26May2019 22:00:00	2019	1051.788968	889.2791	1306.607	1511.277	857.0247
26May2019 23:00:00	2019	947.0834486	854.5638	1287.832	1407.634	830.8023
27May2019 0:00:00	2019	872.5466771	830.6133	1255.123	1317.394	824.1816
27May2019 1:00:00	2019	828.8215005	818.572	1225.698	1261.513	823.0442
27May2019 2:00:00	2019	808.2798584	812.286	1225.775	1250.962	799.49
27May2019 3:00:00	2019	808.7754713	814.6016	1227.315	1208.134	798.2232
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27May2019 7:00:00	2019	1168.082734	908.8463	1303.879	1465.285	825.0983
27May2019 8:00:00	2019	1232.932476	894.9173	1362.294	1573.686	849.6904
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27May2019 11:00:00	2019	1342.331196	896.1397	1350.737	1769.964	867.5012
27May2019 12:00:00	2019	1352.054787	890.8495	1354.966	1788.997	864.3856
27May2019 13:00:00	2019	1356.535537	899.394	1365.277	1824.861	865.2997
27May2019 14:00:00	2019	1354.167417	903.7975	1365.469	1834.655	865.6516
27May2019 15:00:00	2019	1361.231882	907.2625	1356.285	1852.276	865.4914
27May2019 16:00:00	2019	1370.864421	913.2707	1361.47	1861.684	883.2813
27May2019 17:00:00	2019	1367.292427	906.6606	1343.486	1855.081	884.7109
27May2019 18:00:00	2019	1301.203524	902.6944	1371.525	1800.865	885.3009
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27May2019 20:00:00	2019	1223.667326	907.1005	1351.536	1703.384	900.8877
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27May2019 22:00:00	2019	1104.842086	925.2737	1335.472	1582.094	915.1659
27May2019 23:00:00	2019	985.5903717	898.0184	1286.808	1459.054	899.6415
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28May2019 18:00:00	2019	1328.053583	956.5527	1333.493	1905.106	931.7528
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28May2019 20:00:00	2019	1239.580221	936.8261	1291.971	1795.765	936.1317
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12Jun2019 14:00:00	2019	1508.393739	1056.949	1314.547	1812.749	1034.647
12Jun2019 15:00:00	2019	1527.926981	1072.748	1331.73	1835.746	1028.843
12Jun2019 16:00:00	2019	1530.175064	1089.133	1343.358	1861.542	1032.348
12Jun2019 17:00:00	2019	1504.822696	1085.047	1306.299	1878.141	1047.307
12Jun2019 18:00:00	2019	1404.140021	1082.441	1319.096	1846.753	1036.787
12Jun2019 19:00:00	2019	1343.13866	1077.324	1350.49	1810.12	1044.535
12Jun2019 20:00:00	2019	1297.046596	1068.253	1319.673	1786.816	1051.258
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12Jun2019 22:00:00	2019	1181.290035	1023.416	1320.947	1662.017	1048.146
12Jun2019 23:00:00	2019	1063.534192	983.4237	1266.442	1522.962	1042.096
13Jun2019 0:00:00	2019	969.2558451	955.1297	1240.495	1423.508	1043.476
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13Jun2019 2:00:00	2019	876.451355	916.5168	1206.301	1285.664	1024.455
13Jun2019 3:00:00	2019	863.3253856	914.726	1196.794	1272.881	1023.89
13Jun2019 4:00:00	2019	878.1956534	912.6595	1197.839	1260.081	1008.687
13Jun2019 5:00:00	2019	940.7816387	911.3173	1179.422	1297.608	1006.858
13Jun2019 6:00:00	2019	1082.734462	933.1521	1215.127	1403.55	990.4085
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13Jun2019 8:00:00	2019	1311.883203	1030.129	1302.938	1670.067	1027.797
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13Jun2019 12:00:00	2019	1496.654934	1089.721	1355.697	1878.427	1054.861
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14Jun2019 6:00:00	2019	1051.587635	929.1387	1198.944	1327.547	1001.749
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14Jun2019 17:00:00	2019	1315.72748	1031.901	1366.842	1764.94	1113.96
14Jun2019 18:00:00	2019	1235.857951	1029.853	1352.977	1671.116	1101.924
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14Jun2019 23:00:00	2019	984.3986093	956.2175	1276.539	1424.681	1103.227
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15Jun2019 20:00:00	2019	1099.34246	980.5028	1232.974	1473.712	1050.266
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16Jun2019 2:00:00	2019	809.6136602	863.6819	1153.299	1189.759	1028.075
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21Jun2019 4:00:00	2019	830.6684181	894.785	1191.118	1223.884	910.6796
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21Jun2019 6:00:00	2019	1012.967069	927.007	1216.643	1341.652	871.6337
21Jun2019 7:00:00	2019	1147.112745	970.1174	1272.551	1501.986	901.4708
21Jun2019 8:00:00	2019	1226.35638	990.0931	1306.29	1575.751	902.7616
21Jun2019 9:00:00	2019	1273.895363	1003.554	1323.371	1636.085	913.6826
21Jun2019 10:00:00	2019	1303.981541	1004.452	1334.511	1637.056	923.5721
21Jun2019 11:00:00	2019	1322.180959	1011.531	1351.527	1678.776	931.782
21Jun2019 12:00:00	2019	1337.036822	1014.905	1343.173	1668.45	943.1961
21Jun2019 13:00:00	2019	1328.570375	1023.292	1350.135	1711.35	966.9085
21Jun2019 14:00:00	2019	1310.623063	1010.704	1327.504	1714.827	981.756
21Jun2019 15:00:00	2019	1300.644542	1006.039	1309.174	1709.148	975.8223
21Jun2019 16:00:00	2019	1288.397332	1007.95	1310.505	1650.667	975.1596
21Jun2019 17:00:00	2019	1270.476079	1004.146	1307.395	1645.913	971.8107
21Jun2019 18:00:00	2019	1196.090174	1002.514	1305.573	1574.997	957.0615
21Jun2019 19:00:00	2019	1150.527098	989.4019	1283.822	1538.67	959.732
21Jun2019 20:00:00	2019	1118.581841	986.212	1266.864	1504.321	962.4676
21Jun2019 21:00:00	2019	1074.359623	975.5545	1242.448	1482.129	982.3435
21Jun2019 22:00:00	2019	1036.700112	967.0337	1253.009	1446.461	980.8943
21Jun2019 23:00:00	2019	961.2695477	937.3195	1237.214	1370.446	976.5157
22Jun2019 0:00:00	2019	889.4747944	909.9888	1201.914	1285.858	963.5369
22Jun2019 1:00:00	2019	842.2102013	896.1131	1185.493	1228.386	960.6975
22Jun2019 2:00:00	2019	812.3663821	888.1069	1155.694	1164.155	911.6941
22Jun2019 3:00:00	2019	801.1735962	883.8107	1135.296	1143.516	877.4674
22Jun2019 4:00:00	2019	806.9240438	880.5477	1138.624	1163.793	894.6668
22Jun2019 5:00:00	2019	812.4657872	876.661	1164.695	1124.405	970.896
22Jun2019 6:00:00	2019	844.5801868	887.6047	1189.095	1152.705	982.9839
22Jun2019 7:00:00	2019	916.5433816	912.7427	1207.416	1207.486	993.7395
22Jun2019 8:00:00	2019	1005.536639	935.7155	1209.464	1289.828	947.4669
22Jun2019 9:00:00	2019	1067.504375	951.0546	1210.257	1369.011	944.8577
22Jun2019 10:00:00	2019	1108.614022	957.3443	1209.253	1412.36	944.4244
22Jun2019 11:00:00	2019	1141.571581	950.0377	1213.943	1457.428	980.4076
22Jun2019 12:00:00	2019	1154.634936	937.8064	1232.081	1487.154	990.2695
22Jun2019 13:00:00	2019	1156.30906	940.4485	1236.755	1495.511	978.1056
22Jun2019 14:00:00	2019	1148.236281	950.3595	1247.721	1491.899	984.4919
22Jun2019 15:00:00	2019	1145.815102	956.2443	1255.553	1496.659	951.5025
22Jun2019 16:00:00	2019	1150.053156	971.1999	1264.836	1507.014	947.126
22Jun2019 17:00:00	2019	1157.579697	979.9143	1263.732	1534.385	936.2602
22Jun2019 18:00:00	2019	1134.995834	981.2414	1265.256	1531.652	926.9393
22Jun2019 19:00:00	2019	1107.957705	974.9578	1254.858	1511.043	912.0292
22Jun2019 20:00:00	2019	1073.18167	959.7154	1245.237	1493.44	906.753
22Jun2019 21:00:00	2019	1052.300118	951.1053	1242.381	1442.6	917.8419
22Jun2019 22:00:00	2019	1033.92893	942.8179	1229.357	1423.344	927.9481
22Jun2019 23:00:00	2019	961.2826536	917.4557	1202.397	1345.369	931.2359
23Jun2019 0:00:00	2019	888.4496917	891.7518	1187.23	1302.197	932.2844
23Jun2019 1:00:00	2019	840.067889	872.9275	1185.286	1262.355	949.1927
23Jun2019 2:00:00	2019	808.7939408	859.5047	1171.385	1215.13	966.0847

23Jun2019 3:00:00	2019	790.9923509	851.6564	1164.295	1213.901	966.3348
23Jun2019 4:00:00	2019	785.9443443	851.5927	1156.771	1151.333	948.3984
23Jun2019 5:00:00	2019	791.9299268	834.2841	1140.673	1132.927	955.2815
23Jun2019 6:00:00	2019	810.0401946	844.4629	1144.499	1147.618	957.4092
23Jun2019 7:00:00	2019	862.5355576	863.9305	1164.609	1220.412	947.6342
23Jun2019 8:00:00	2019	941.1719426	887.0351	1202.914	1301.901	931.3247
23Jun2019 9:00:00	2019	1017.00399	907.971	1232.126	1377.857	942.4891
23Jun2019 10:00:00	2019	1077.524017	921.4647	1248.058	1439.148	941.6708
23Jun2019 11:00:00	2019	1112.900143	936.072	1263.574	1478.641	953.8582
23Jun2019 12:00:00	2019	1127.746542	934.374	1275.363	1516.008	958.0881
23Jun2019 13:00:00	2019	1141.858685	936.4272	1273.775	1527.36	951.9413
23Jun2019 14:00:00	2019	1146.917737	938.6359	1266.03	1522.535	957.2293
23Jun2019 15:00:00	2019	1154.519049	940.0273	1264.806	1545.069	959.072
23Jun2019 16:00:00	2019	1169.340297	953.1432	1289.022	1589.328	972.0236
23Jun2019 17:00:00	2019	1188.634055	971.0335	1311.985	1621.259	980.3467
23Jun2019 18:00:00	2019	1167.910087	967.3801	1298.192	1590.775	970.8137
23Jun2019 19:00:00	2019	1131.618189	955.5999	1284.139	1556.799	980.9656
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23Jun2019 21:00:00	2019	1079.491223	920.3246	1211.251	1461.503	997.8242
23Jun2019 22:00:00	2019	1028.821229	902.2696	1196.787	1447.583	995.3862
23Jun2019 23:00:00	2019	934.8323804	881.775	1176.484	1341.523	991.2303
24Jun2019 0:00:00	2019	864.2464877	863.4892	1180.518	1245.432	982.8631
24Jun2019 1:00:00	2019	823.0484997	853.7059	1165.877	1214.547	963.6585
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24Jun2019 3:00:00	2019	796.0307812	846.6843	1139.608	1179.168	975.4237
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24Jun2019 5:00:00	2019	874.8159745	851.0683	1146.074	1236.4	973.5678
24Jun2019 6:00:00	2019	1008.238068	881.0599	1171.401	1316.768	984.3569
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24Jun2019 10:00:00	2019	1290.783414	994.957	1328.332	1674.17	1014.598
24Jun2019 11:00:00	2019	1325.326627	1000.639	1345.572	1685.742	1011.475
24Jun2019 12:00:00	2019	1347.777265	1000.675	1351.334	1698.383	993.8368
24Jun2019 13:00:00	2019	1363.175242	1005.529	1357.067	1727.542	1011.105
24Jun2019 14:00:00	2019	1365.191767	1007.447	1343.178	1722.273	1015.63
24Jun2019 15:00:00	2019	1352.821146	1013.347	1347.55	1720.288	1031.355
24Jun2019 16:00:00	2019	1359.848349	1014.212	1353.218	1720.709	1025.665
24Jun2019 17:00:00	2019	1365.502406	1009.326	1357.647	1700.584	1015.006
24Jun2019 18:00:00	2019	1290.971264	993.8278	1329.951	1626.274	1023.146
24Jun2019 19:00:00	2019	1233.615813	975.6964	1300.349	1570.711	1015.712
24Jun2019 20:00:00	2019	1192.58787	965.6587	1298.185	1523.825	1006.783
24Jun2019 21:00:00	2019	1136.441442	953.9116	1286.616	1470.644	1009.306
24Jun2019 22:00:00	2019	1082.450233	933.84	1269.506	1417.746	1024.038
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25Jun2019 0:00:00	2019	902.4817501	883.3523	1217.695	1231.781	1010.407
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25Jun2019 2:00:00	2019	829.9836658	871.3817	1177.92	1169.861	1021.871
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25Jun2019 4:00:00	2019	839.0468216	863.5892	1197.379	1154.138	999.4458
25Jun2019 5:00:00	2019	886.6295987	867.048	1208.554	1209.537	1004.695
25Jun2019 6:00:00	2019	1019.497709	894.7663	1215.97	1323.369	987.807
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25Jun2019 13:00:00	2019	1367.151887	1022.283	1294.566	1668.976	1026.761
25Jun2019 14:00:00	2019	1361.074529	1013.87	1286.719	1667.466	1031.473
25Jun2019 15:00:00	2019	1349.07493	1015.428	1316.416	1695.896	1028.247
25Jun2019 16:00:00	2019	1344.64522	1029.264	1340.861	1690.416	1062.168
25Jun2019 17:00:00	2019	1346.976943	1032.392	1350.806	1672.503	1068.555
25Jun2019 18:00:00	2019	1281.550157	1027.491	1349.298	1637.015	1061.775
25Jun2019 19:00:00	2019	1231.757201	1016.799	1344.414	1619.656	1054.537
25Jun2019 20:00:00	2019	1186.507568	1001.912	1331.045	1583.619	1056.108
25Jun2019 21:00:00	2019	1138.217358	979.758	1301.878	1533.889	1087.765
25Jun2019 22:00:00	2019	1087.875166	963.1335	1290.82	1482.578	1077.122
25Jun2019 23:00:00	2019	986.472898	924.8812	1245.378	1383.346	1075.747
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26Jun2019 1:00:00	2019	851.8986752	899.8412	1203.099	1213.301	1024.597
26Jun2019 2:00:00	2019	825.9527632	901.2996	1208.525	1204.59	1032.949
26Jun2019 3:00:00	2019	816.7755403	899.3259	1188.316	1191.123	1025.078
26Jun2019 4:00:00	2019	832.5521935	897.7665	1208.096	1183.834	1039.61
26Jun2019 5:00:00	2019	885.1708647	893.7697	1200.966	1212.479	1018.464
26Jun2019 6:00:00	2019	1020.413472	929.4332	1223.31	1319.685	1006.284
26Jun2019 7:00:00	2019	1159.5033	973.718	1259.502	1447.577	1053.932
26Jun2019 8:00:00	2019	1233.685877	1010.097	1285.269	1542.053	1075.953
26Jun2019 9:00:00	2019	1288.183613	1030.996	1308.6	1620.277	1075.357
26Jun2019 10:00:00	2019	1328.945857	1044.672	1320.953	1683.944	1090.671
26Jun2019 11:00:00	2019	1367.362514	1046.082	1330.241	1722.153	1124.674
26Jun2019 12:00:00	2019	1384.881969	1051.118	1334.723	1738.768	1122.734
26Jun2019 13:00:00	2019	1395.458306	1060.306	1339.477	1748.938	1127.13
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26Jun2019 21:00:00	2019	1168.24731	1015.927	1280.552	1448.542	1106.954
26Jun2019 22:00:00	2019	1117.88084	1012.599	1277.768	1423.889	1066.964
26Jun2019 23:00:00	2019	1010.215315	968.7357	1247.535	1346.316	1072.575
27Jun2019 0:00:00	2019	924.565636	941.0923	1224.963	1288.454	1049.389

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27Jun2019 3:00:00	2019	831.4791388	907.3822	1185.419	1184.311	1035.848
27Jun2019 4:00:00	2019	840.5848909	909.4874	1192.037	1174.507	1030.064
27Jun2019 5:00:00	2019	907.0127219	913.987	1183.206	1186.723	1022.786
27Jun2019 6:00:00	2019	1031.941421	934.101	1221.885	1296.414	1029.535
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27Jun2019 22:00:00	2019	1055.25604	941.2839	1295.439	1451.397	1061.827
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28Jun2019 2:00:00	2019	820.0458116	875.3955	1197.674	1200.123	986.4337
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28Jun2019 4:00:00	2019	825.48657	873.507	1185.419	1193.207	1001.598
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28Jun2019 15:00:00	2019	1329.320883	976.8384	1402.359	1784.114	1110.847
28Jun2019 16:00:00	2019	1324.514372	984.9612	1382.801	1740.214	1111.363
28Jun2019 17:00:00	2019	1308.670857	989.2698	1389.781	1729.012	1093.045
28Jun2019 18:00:00	2019	1238.798122	981.9648	1378.286	1637.218	1076.189
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28Jun2019 20:00:00	2019	1146.398612	964.8697	1335.803	1527.835	1032.51
28Jun2019 21:00:00	2019	1092.663416	964.9397	1314.741	1449.384	980.9565
28Jun2019 22:00:00	2019	1053.091622	948.6801	1298.55	1390.847	961.0152
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29Jun2019 18:00:00	2019	1118.722106	954.8175	1282.92	1460.09	1030.502
29Jun2019 19:00:00	2019	1091.43313	948.376	1274.293	1413.349	1030.544
29Jun2019 20:00:00	2019	1051.829341	940.192	1256.98	1365.318	1028.227
29Jun2019 21:00:00	2019	1022.718481	925.9078	1245.126	1359.126	1017.962
29Jun2019 22:00:00	2019	1009.040346	916.4469	1241.957	1359.467	1008.626
29Jun2019 23:00:00	2019	944.0672502	891.5066	1222.191	1300.389	1015.05
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30Jun2019 1:00:00	2019	825.7777782	845.8305	1174.817	1191.017	1009.293
30Jun2019 2:00:00	2019	796.0629711	836.9768	1164.965	1148.149	1005.986
30Jun2019 3:00:00	2019	782.4716779	833.8521	1168.386	1132.861	999.9527
30Jun2019 4:00:00	2019	777.6769212	835.9755	1195.629	1141.202	1018.311
30Jun2019 5:00:00	2019	774.9607184	831.4246	1185.733	1105.942	1008.03
30Jun2019 6:00:00	2019	791.5977255	837.5903	1181.448	1107.004	1006.152
30Jun2019 7:00:00	2019	844.1926936	859.2475	1206.993	1158.954	1003.404
30Jun2019 8:00:00	2019	912.3024105	870.1333	1240.385	1272.662	1001.885
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30Jun2019 16:00:00	2019	1143.048628	943.0203	1327.478	1544.252	1071.198
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30Jun2019 18:00:00	2019	1134.802474	948.3029	1338.586	1521.78	1069.55
30Jun2019 19:00:00	2019	1108.928481	938.7155	1330.078	1485.445	1052.763
30Jun2019 20:00:00	2019	1082.540665	930.6516	1327.261	1493.741	1051.939
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30Jun2019 22:00:00	2019	1030.645666	921.4523	1311.699	1450.962	1065.594

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08Jul2019 14:00:00	2019	1379.628325	986.6333	1340.768	1727.02	1070.641
08Jul2019 15:00:00	2019	1376.525798	992.2909	1341.235	1731.649	1056.342
08Jul2019 16:00:00	2019	1372.492339	1003.148	1313.542	1719.548	977.4006
08Jul2019 17:00:00	2019	1367.002058	1010.458	1339.853	1721.04	985.2127
08Jul2019 18:00:00	2019	1291.921653	1007.854	1354.036	1690.509	993.8036

08Jul2019 19:00:00	2019	1245.042242	1002.941	1350.62	1630.457	986.8857
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08Jul2019 21:00:00	2019	1162.597494	967.3292	1269.748	1526.311	1005.248
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08Jul2019 23:00:00	2019	1011.681013	938.6924	1259.53	1371.729	1002.363
09Jul2019 0:00:00	2019	927.7667377	907.2728	1221.479	1275.686	1007.964
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09Jul2019 5:00:00	2019	898.5095676	870.7619	1171.15	1173.83	950.8611
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10Jul2019 2:00:00	2019	849.9774052	891.7322	1171.438	1213.487	954.4176
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10Jul2019 11:00:00	2019	1388.353938	1031.251	1337.908	1698.939	1010.752
10Jul2019 12:00:00	2019	1390.657116	1025.004	1326.432	1686.991	1020.757
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11Jul2019 20:00:00	2019	1284.432001	1128.555	1341.33	1616.303	1029.679
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17Jul2019 6:00:00	2019	1001.20992	999.2689	1179.834	1278.867	1008.157
17Jul2019 7:00:00	2019	1125.355789	1028.466	1221.546	1446.59	1018.158
17Jul2019 8:00:00	2019	1212.395353	1061.103	1268.324	1568.543	1035.238
17Jul2019 9:00:00	2019	1279.218102	1082.922	1289.855	1662.863	1056.161
17Jul2019 10:00:00	2019	1339.097083	1094.138	1306.693	1727.687	1077.111
17Jul2019 11:00:00	2019	1385.356477	1114.366	1334.033	1781.798	1095.948
17Jul2019 12:00:00	2019	1407.302116	1121.119	1349.354	1788.271	1104.429
17Jul2019 13:00:00	2019	1418.904698	1114.643	1364.523	1803.33	1126.166
17Jul2019 14:00:00	2019	1427.622744	1090.54	1365.415	1822.005	1118.862
17Jul2019 15:00:00	2019	1396.706055	1098.805	1385.339	1875.333	1127.032
17Jul2019 16:00:00	2019	1368.034143	1098.577	1393.555	1874.844	1130.726
17Jul2019 17:00:00	2019	1359.354409	1089.596	1363.479	1860.504	1142.044
17Jul2019 18:00:00	2019	1298.704506	1072.15	1327.241	1773.991	1130.86
17Jul2019 19:00:00	2019	1271.83273	1075.852	1316.126	1703.719	1132.244
17Jul2019 20:00:00	2019	1228.61394	1076.846	1308.61	1632.139	1115.436
17Jul2019 21:00:00	2019	1178.082731	1074.731	1272.023	1581.539	1096.641
17Jul2019 22:00:00	2019	1115.399432	1068.088	1246.68	1541.626	1084.373
17Jul2019 23:00:00	2019	1007.836379	1028.358	1230.468	1396.46	1062.938
18Jul2019 0:00:00	2019	922.8347325	993.6695	1204.091	1315.623	1054.753
18Jul2019 1:00:00	2019	870.2807275	977.9634	1188.467	1268.114	1049.533
18Jul2019 2:00:00	2019	841.0992351	969.0546	1160.288	1224.761	1058.016
18Jul2019 3:00:00	2019	828.4870412	962.1374	1146.752	1214.905	1048.207
18Jul2019 4:00:00	2019	838.9176214	958.1493	1145.089	1226.125	1006.617
18Jul2019 5:00:00	2019	898.7775673	967.0369	1155.261	1239.489	995.0829
18Jul2019 6:00:00	2019	1003.088909	985.309	1189.186	1343.293	990.5332
18Jul2019 7:00:00	2019	1121.6056	1011.76	1229.38	1461.052	996.7916
18Jul2019 8:00:00	2019	1200.083656	1032.788	1279.894	1575.583	1010.108
18Jul2019 9:00:00	2019	1256.097578	1055.765	1312.601	1653.027	1036.13
18Jul2019 10:00:00	2019	1294.620033	1066.26	1326.3	1682.658	1077.663
18Jul2019 11:00:00	2019	1320.804571	1070.806	1321.762	1709.817	1100.441
18Jul2019 12:00:00	2019	1348.548415	1079.634	1331.293	1698.922	1112.736
18Jul2019 13:00:00	2019	1360.905777	1077.736	1314.779	1684.931	1106.52

18Jul2019 14:00:00	2019	1348.183225	1071.486	1311.906	1696.415	1101.083
18Jul2019 15:00:00	2019	1301.915993	1079.045	1325.894	1680.453	1134.684
18Jul2019 16:00:00	2019	1280.702483	1073.26	1324.039	1673.174	1147.607
18Jul2019 17:00:00	2019	1279.679187	1068.013	1315.416	1645.502	1144.217
18Jul2019 18:00:00	2019	1225.108981	1036.103	1293.929	1584.624	1126.716
18Jul2019 19:00:00	2019	1179.724467	1031.709	1311.302	1570.623	1136.911
18Jul2019 20:00:00	2019	1130.908936	1043.76	1305.911	1538.822	1122.613
18Jul2019 21:00:00	2019	1099.639475	1046.695	1294.883	1505.701	1116.252
18Jul2019 22:00:00	2019	1056.110292	1029.224	1273.694	1470.018	1091.446
18Jul2019 23:00:00	2019	959.642694	993.5699	1236.455	1364.163	1068.615
19Jul2019 0:00:00	2019	879.6048825	973.2621	1207.025	1282.993	1052.282
19Jul2019 1:00:00	2019	831.3413877	956.1753	1196.726	1218.675	1036.638
19Jul2019 2:00:00	2019	807.8748453	945.3625	1188.301	1206.949	1050.58
19Jul2019 3:00:00	2019	803.4140068	941.117	1181.323	1194.784	1050.906
19Jul2019 4:00:00	2019	819.8582071	939.3411	1184.57	1179.943	1036.753
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19Jul2019 9:00:00	2019	1232.028015	1021.779	1319.253	1587.446	1038.672
19Jul2019 10:00:00	2019	1271.645272	1037.222	1341.259	1599.236	1056.604
19Jul2019 11:00:00	2019	1284.998396	1046.426	1357.251	1648.264	1067.689
19Jul2019 12:00:00	2019	1289.883792	1044.383	1377.976	1681.339	1076.164
19Jul2019 13:00:00	2019	1282.713699	1043.572	1382.875	1716.981	1096.981
19Jul2019 14:00:00	2019	1266.267933	1040.201	1365.644	1710.891	1086.939
19Jul2019 15:00:00	2019	1251.834871	1037.213	1352.609	1674.68	1108.857
19Jul2019 16:00:00	2019	1237.601897	1030.764	1360.41	1662.38	1117.271
19Jul2019 17:00:00	2019	1222.148986	1025.507	1358.457	1650.692	1106.786
19Jul2019 18:00:00	2019	1158.856641	1013.917	1347.945	1576.384	1095.582
19Jul2019 19:00:00	2019	1123.910823	1003.42	1348.114	1559.009	1065.544
19Jul2019 20:00:00	2019	1095.147035	997.0064	1339.943	1531.089	1048.192
19Jul2019 21:00:00	2019	1071.616713	992.0534	1327.757	1501.042	1032.913
19Jul2019 22:00:00	2019	1015.693694	997.5756	1307.576	1461.263	1029.682
19Jul2019 23:00:00	2019	934.1945859	977.955	1272.397	1371.374	1009.406
20Jul2019 0:00:00	2019	868.5324717	934.1028	1245.98	1294.506	987.4801
20Jul2019 1:00:00	2019	822.9127861	896.4018	1220.889	1238.822	971.977
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20Jul2019 3:00:00	2019	785.6249131	899.3099	1204.804	1176.548	975.8561
20Jul2019 4:00:00	2019	787.5281284	884.6894	1198.152	1178.972	962.1212
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20Jul2019 11:00:00	2019	1138.050525	970.1884	1323.876	1608.959	1020.362
20Jul2019 12:00:00	2019	1145.204017	963.2142	1333.22	1641.936	1032.073

20Jul2019 13:00:00	2019	1139.303946	956.6875	1337.512	1636.287	1041.5
20Jul2019 14:00:00	2019	1130.756911	942.8724	1322.505	1648.159	1039.503
20Jul2019 15:00:00	2019	1123.083188	938.3385	1325.641	1663.85	1042.196
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20Jul2019 17:00:00	2019	1129.395891	940.7825	1352.959	1644.523	1065.394
20Jul2019 18:00:00	2019	1104.398513	928.052	1336.362	1636.182	1057.519
20Jul2019 19:00:00	2019	1065.795509	901.8521	1318.395	1604.823	1053.326
20Jul2019 20:00:00	2019	1031.613199	873.0199	1302.649	1542.539	1066.932
20Jul2019 21:00:00	2019	1018.143637	867.6804	1275.941	1521.548	1055.788
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20Jul2019 23:00:00	2019	918.4841135	839.5487	1243.819	1426.714	1034.58
21Jul2019 0:00:00	2019	855.689698	813.5067	1242.868	1340.792	1008.253
21Jul2019 1:00:00	2019	811.9817851	798.4316	1214.956	1205.301	991.9667
21Jul2019 2:00:00	2019	786.5311067	787.0616	1202.486	1181.056	995.7959
21Jul2019 3:00:00	2019	772.7251563	787.6809	1192.526	1141.944	984.2916
21Jul2019 4:00:00	2019	774.2362095	789.875	1188.888	1140.992	964.855
21Jul2019 5:00:00	2019	783.2478199	794.6543	1186.247	1106.298	954.2675
21Jul2019 6:00:00	2019	795.3051689	797.9755	1180	1126.676	942.8081
21Jul2019 7:00:00	2019	845.8579932	809.2289	1182.279	1192.735	940.8786
21Jul2019 8:00:00	2019	918.6755944	813.7564	1212.78	1297.118	962.6333
21Jul2019 9:00:00	2019	998.52627	830.1102	1271.592	1401.513	993.2924
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21Jul2019 12:00:00	2019	1138.149093	852.2715	1322.268	1595.109	1078.968
21Jul2019 13:00:00	2019	1142.610515	852.7534	1329.151	1630.33	1085.584
21Jul2019 14:00:00	2019	1148.87237	855.428	1320.121	1643.423	1092.518
21Jul2019 15:00:00	2019	1159.272818	861.1806	1356.371	1682.595	1093.071
21Jul2019 16:00:00	2019	1181.911124	878.7118	1369.745	1711.969	1106.44
21Jul2019 17:00:00	2019	1201.573301	895.0746	1387.989	1729.738	1133.665
21Jul2019 18:00:00	2019	1185.998886	902.0313	1384.169	1708.825	1115.848
21Jul2019 19:00:00	2019	1161.938988	901.5988	1380.968	1685.704	1094.553
21Jul2019 20:00:00	2019	1135.494831	892.857	1362.292	1641.469	1108.857
21Jul2019 21:00:00	2019	1102.981179	879.5801	1326.492	1610.932	1112.214
21Jul2019 22:00:00	2019	1068.451036	863.9771	1319.493	1569.661	1112.226
21Jul2019 23:00:00	2019	968.550187	833.0234	1287.11	1446.419	1093.846
22Jul2019 0:00:00	2019	884.6166328	822.9062	1253.323	1327.637	1080.294
22Jul2019 1:00:00	2019	835.6517528	808.3654	1215.043	1263.03	1064.476
22Jul2019 2:00:00	2019	807.9170496	795.8943	1192.297	1223.912	1064.961
22Jul2019 3:00:00	2019	797.5980113	792.6548	1195.04	1208.231	1036.793
22Jul2019 4:00:00	2019	814.218748	789.1598	1158.255	1212.143	1036.456
22Jul2019 5:00:00	2019	872.1940676	800.8059	1187.318	1231.533	1034.907
22Jul2019 6:00:00	2019	982.9607907	832.6598	1219.519	1313.561	1023.842
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22Jul2019 8:00:00	2019	1212.385094	899.4078	1324.408	1585.329	1025.258
22Jul2019 9:00:00	2019	1295.334591	928.3575	1335.755	1677.308	1024.023
22Jul2019 10:00:00	2019	1360.267003	956.4945	1358.051	1758.784	1048.12
22Jul2019 11:00:00	2019	1418.353495	968.4834	1368.467	1819.209	1042.145

22Jul2019 12:00:00	2019	1453.988018	969.7329	1373.547	1857.002	1036.616
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22Jul2019 14:00:00	2019	1484.215497	992.9428	1370.914	1881.593	1080.201
22Jul2019 15:00:00	2019	1494.94809	1015.245	1379.083	1905.402	1089.609
22Jul2019 16:00:00	2019	1488.17725	1026.543	1374.77	1923.133	1075.824
22Jul2019 17:00:00	2019	1486.734979	1024.609	1373.25	1947.499	1092.827
22Jul2019 18:00:00	2019	1400.966698	1012.197	1417.246	1908.688	1108.329
22Jul2019 19:00:00	2019	1350.428186	995.7236	1374.145	1873.595	1113.936
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22Jul2019 21:00:00	2019	1264.247482	980.3896	1340.458	1731.326	1092.638
22Jul2019 22:00:00	2019	1201.899489	967.4786	1348.495	1662.718	1109.763
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23Jul2019 0:00:00	2019	987.3123759	878.9714	1259.531	1408.607	1083.596
23Jul2019 1:00:00	2019	918.193827	853.5824	1249.251	1363.482	1078.688
23Jul2019 2:00:00	2019	877.412753	840.7725	1230.367	1320.393	1058.304
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23Jul2019 4:00:00	2019	889.3770007	826.4651	1229.246	1283.709	1027.486
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23Jul2019 6:00:00	2019	1067.882306	856.5192	1253.805	1394.767	999.9869
23Jul2019 7:00:00	2019	1195.347613	904.4386	1302.406	1558.293	1021.423
23Jul2019 8:00:00	2019	1303.638685	940.6676	1347.779	1703.978	1051.266
23Jul2019 9:00:00	2019	1389.830375	958.9626	1385.077	1818.254	1068.717
23Jul2019 10:00:00	2019	1461.877332	984.3519	1388.264	1913.77	1106.341
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23Jul2019 15:00:00	2019	1646.053425	1076.636	1412.796	2036.25	1139.322
23Jul2019 16:00:00	2019	1658.926618	1085.384	1407.148	2040.861	1138.93
23Jul2019 17:00:00	2019	1661.554171	1081.615	1391.939	2021.396	1133.167
23Jul2019 18:00:00	2019	1590.510199	1069.475	1353.668	1944.235	1095.286
23Jul2019 19:00:00	2019	1540.912652	1037.912	1393.761	1880.141	1083.981
23Jul2019 20:00:00	2019	1486.650351	1020.76	1386.582	1839.722	1090.585
23Jul2019 21:00:00	2019	1437.230946	1020.156	1396.441	1807.561	1104.235
23Jul2019 22:00:00	2019	1343.493021	989.8	1383.115	1716.208	1100.57
23Jul2019 23:00:00	2019	1200.509576	944.1824	1339.234	1591.415	1090.812
24Jul2019 0:00:00	2019	1084.450655	908.5235	1296.737	1502.41	1085.563
24Jul2019 1:00:00	2019	1017.359163	888.4516	1267.803	1454.001	1078.089
24Jul2019 2:00:00	2019	976.835883	876.3122	1236.832	1396.562	1056.247
24Jul2019 3:00:00	2019	953.455665	864.8363	1209.864	1352.916	1053.726
24Jul2019 4:00:00	2019	962.5325199	862.3348	1197.128	1352.632	1029.042
24Jul2019 5:00:00	2019	1015.089712	868.83	1211.645	1404.147	1009.299
24Jul2019 6:00:00	2019	1113.200687	887.4196	1245.147	1482.123	1016.442
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24Jul2019 8:00:00	2019	1340.041054	967.0579	1310.762	1730.312	1031.106
24Jul2019 9:00:00	2019	1394.325118	996.7318	1350.946	1822.093	1020.876
24Jul2019 10:00:00	2019	1444.352057	1003.336	1365.781	1859.102	1049.252

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24Jul2019 16:00:00	2019	1426.458102	1014.181	1347.109	1821.674	1049.688
24Jul2019 17:00:00	2019	1419.762701	1026.196	1341.623	1755.442	1047.907
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24Jul2019 22:00:00	2019	1130.673418	952.8775	1222.889	1468.342	1055.823
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25Jul2019 0:00:00	2019	936.7093084	882.2524	1163.916	1283.845	1091.385
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25Jul2019 16:00:00	2019	1484.636021	1077.492	1390.3	1714.775	1060.85
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25Jul2019 18:00:00	2019	1411.67767	1082.422	1364.487	1664.393	1073.208
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25Jul2019 20:00:00	2019	1304.712807	1061.577	1339.076	1614.212	1059.822
25Jul2019 21:00:00	2019	1242.69372	1035.859	1325.604	1563.237	1090.519
25Jul2019 22:00:00	2019	1178.604751	1033.165	1312.317	1523.308	1087.171
25Jul2019 23:00:00	2019	1061.269796	969.7787	1264.874	1416.502	1057.259
26Jul2019 0:00:00	2019	964.1972342	930.7676	1230.47	1325.924	1040.579
26Jul2019 1:00:00	2019	901.7790413	916.9912	1198.71	1277.973	1032.806
26Jul2019 2:00:00	2019	866.431163	901.978	1182.309	1239.527	1031.336
26Jul2019 3:00:00	2019	849.1282035	894.6341	1175.157	1225.724	1020.539
26Jul2019 4:00:00	2019	857.1387018	895.3548	1171.649	1227.842	1002.091
26Jul2019 5:00:00	2019	910.0695324	900.8222	1176.996	1232.437	1003.867
26Jul2019 6:00:00	2019	1012.263381	916.1822	1188.787	1306.806	1008.345
26Jul2019 7:00:00	2019	1139.570262	951.7229	1245.448	1466.843	1026.155
26Jul2019 8:00:00	2019	1249.025992	978.968	1309.699	1598.362	1050.837
26Jul2019 9:00:00	2019	1320.320012	1004.811	1337.931	1690.95	1070.909

26Jul2019 10:00:00	2019	1383.291318	1023.122	1357.314	1772.134	1088.172
26Jul2019 11:00:00	2019	1430.99153	1030.424	1372.059	1818.427	1106.23
26Jul2019 12:00:00	2019	1456.928643	1046.621	1392.186	1848.091	1115.392
26Jul2019 13:00:00	2019	1484.102208	1064.588	1403.876	1841.926	1122.96
26Jul2019 14:00:00	2019	1500.84944	1075.498	1403.577	1878.994	1114.247
26Jul2019 15:00:00	2019	1514.378085	1088.243	1411.2	1884.114	1111.879
26Jul2019 16:00:00	2019	1527.670819	1103.697	1404.337	1889.489	1127.056
26Jul2019 17:00:00	2019	1522.732068	1116.529	1391.314	1883.649	1130.769
26Jul2019 18:00:00	2019	1458.215832	1118.177	1363.046	1828.853	1116.097
26Jul2019 19:00:00	2019	1407.83849	1114.688	1350.493	1779.791	1112.68
26Jul2019 20:00:00	2019	1348.998941	1084.575	1346.228	1695.899	1120.255
26Jul2019 21:00:00	2019	1286.8769	1072.128	1323.814	1618.738	1108.22
26Jul2019 22:00:00	2019	1221.14621	1051.117	1303.323	1556.714	1115.256
26Jul2019 23:00:00	2019	1112.046002	1008.967	1262.473	1489.236	1097.848
27Jul2019 0:00:00	2019	1012.145195	971.5228	1225.441	1369.906	1073.097
27Jul2019 1:00:00	2019	939.2785168	941.9076	1191.019	1300.313	1056.876
27Jul2019 2:00:00	2019	893.7916629	918.3062	1174.691	1252.38	1042.164
27Jul2019 3:00:00	2019	870.4872644	908.2916	1171.609	1245.892	1032.204
27Jul2019 4:00:00	2019	865.5958006	899.9256	1170.158	1225.012	1022.726
27Jul2019 5:00:00	2019	884.8208795	897.522	1180.698	1190.945	1012.67
27Jul2019 6:00:00	2019	910.7875246	900.3304	1190.541	1220.618	998.6014
27Jul2019 7:00:00	2019	963.2546207	930.2552	1215.264	1308.547	990.9585
27Jul2019 8:00:00	2019	1042.158797	959.5538	1245.147	1421.108	1003.08
27Jul2019 9:00:00	2019	1149.459105	984.5566	1254.986	1518.609	1015.326
27Jul2019 10:00:00	2019	1248.004154	1002.5	1277.612	1621.736	1036.201
27Jul2019 11:00:00	2019	1303.504788	1022.682	1324.216	1692.589	1058.155
27Jul2019 12:00:00	2019	1330.041514	1039.072	1350.223	1713.01	1061.349
27Jul2019 13:00:00	2019	1336.760883	1043.091	1345.681	1656.128	1072.083
27Jul2019 14:00:00	2019	1286.411551	1046.101	1329.98	1603.261	1081.406
27Jul2019 15:00:00	2019	1254.941845	1042.425	1308.423	1573.894	1080.383
27Jul2019 16:00:00	2019	1266.524805	1023.028	1293.668	1562.392	1086.534
27Jul2019 17:00:00	2019	1252.594988	1036.898	1313.037	1550.263	1083.569
27Jul2019 18:00:00	2019	1214.813953	1040.034	1293.664	1460.424	1090.413
27Jul2019 19:00:00	2019	1155.751592	1027.667	1279.338	1455.631	1077.403
27Jul2019 20:00:00	2019	1115.977204	1005.253	1260.661	1445.336	1080.019
27Jul2019 21:00:00	2019	1087.562071	991.5805	1264.805	1466.151	1063.287
27Jul2019 22:00:00	2019	1055.481739	979.2951	1238.571	1400.574	1042.04
27Jul2019 23:00:00	2019	975.1664288	945.4082	1185.877	1321.226	1005.452
28Jul2019 0:00:00	2019	901.8898814	919.6857	1165.292	1251.352	1003.829
28Jul2019 1:00:00	2019	850.2434329	904.7245	1161.303	1205.633	996.7147
28Jul2019 2:00:00	2019	819.3533665	888.9529	1175.889	1196.594	995.5081
28Jul2019 3:00:00	2019	801.3475746	883.8305	1172.37	1191.178	995.7947
28Jul2019 4:00:00	2019	799.5518778	877.3087	1173.467	1176.36	984.1467
28Jul2019 5:00:00	2019	811.1409673	877.2839	1180.677	1188.224	980.5003
28Jul2019 6:00:00	2019	822.0019142	875.3618	1167.506	1181.877	967.8633
28Jul2019 7:00:00	2019	866.7848423	896.5819	1179.383	1230.312	958.107
28Jul2019 8:00:00	2019	943.8281371	912.2887	1203.365	1292.839	969.9299

28Jul2019 9:00:00	2019	1025.696541	931.8534	1223.469	1374.061	994.91
28Jul2019 10:00:00	2019	1091.815735	945.1273	1252.199	1443.008	1006.148
28Jul2019 11:00:00	2019	1133.579053	958.2423	1276.039	1478.465	1026.675
28Jul2019 12:00:00	2019	1163.036654	971.3398	1290.283	1497.992	1058.106
28Jul2019 13:00:00	2019	1179.131082	975.9406	1318.564	1509.649	1064.746
28Jul2019 14:00:00	2019	1189.691909	985.8979	1336.03	1570.934	1075.019
28Jul2019 15:00:00	2019	1203.632411	1004.209	1338.225	1583.131	1076.639
28Jul2019 16:00:00	2019	1220.280255	1014.358	1351.057	1603.215	1078.03
28Jul2019 17:00:00	2019	1246.684677	1020.034	1377.517	1633.535	1090.458
28Jul2019 18:00:00	2019	1218.828058	1009.05	1393.256	1606.316	1101.109
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28Jul2019 20:00:00	2019	1160.664263	998.7022	1386.932	1541.42	1088.857
28Jul2019 21:00:00	2019	1143.034429	999.9471	1384.661	1537.853	1086.056
28Jul2019 22:00:00	2019	1094.664268	981.7619	1357.713	1502.806	1090.571
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29Jul2019 1:00:00	2019	859.4029363	898.3225	1255.941	1251.329	1037.878
29Jul2019 2:00:00	2019	833.1465321	879.4869	1220.537	1202.583	1042.211
29Jul2019 3:00:00	2019	824.6370173	873.0327	1208.963	1195.765	1029.947
29Jul2019 4:00:00	2019	839.5554971	881.6318	1240.799	1202.239	1031.16
29Jul2019 5:00:00	2019	903.603983	907.9175	1253.492	1259.188	1024.598
29Jul2019 6:00:00	2019	1008.289558	927.2732	1271.561	1340.803	1024.062
29Jul2019 7:00:00	2019	1127.570487	951.0337	1334.4	1449.34	1027.385
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29Jul2019 9:00:00	2019	1299.507048	1009.926	1411.286	1677.769	1041.346
29Jul2019 10:00:00	2019	1364.487423	1018.574	1433.662	1749.88	1043.148
29Jul2019 11:00:00	2019	1417.098399	1042.112	1445.614	1789.488	1064.423
29Jul2019 12:00:00	2019	1448.163696	1049.555	1440.811	1779.76	1086.487
29Jul2019 13:00:00	2019	1463.715285	1062.312	1443.004	1801.166	1110.027
29Jul2019 14:00:00	2019	1475.86135	1079.331	1453.822	1847.889	1142.571
29Jul2019 15:00:00	2019	1488.389176	1102.723	1465.939	1844.436	1151.828
29Jul2019 16:00:00	2019	1496.943831	1134.186	1463.325	1862.96	1132.807
29Jul2019 17:00:00	2019	1502.256754	1153.414	1456.682	1851.548	1151.436
29Jul2019 18:00:00	2019	1424.03933	1153.225	1441.328	1803.841	1138.476
29Jul2019 19:00:00	2019	1364.327709	1139.033	1387.808	1747.307	1115.993
29Jul2019 20:00:00	2019	1299.654847	1125.285	1329.493	1653.35	1099.375
29Jul2019 21:00:00	2019	1249.628656	1104.492	1307.783	1634.659	1100.13
29Jul2019 22:00:00	2019	1169.922643	1072.154	1282.459	1585.264	1093.219
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30Jul2019 5:00:00	2019	928.50155	962.274	1202.912	1328.468	1049.607
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31Jul2019 5:00:00	2019	924.9567833	950.5637	1191.183	1241.205	1099.921
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31Jul2019 9:00:00	2019	1313.34771	1046.141	1314.821	1616.044	1151.452
31Jul2019 10:00:00	2019	1374.461138	1055.651	1342.622	1720.049	1129.19
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31Jul2019 13:00:00	2019	1489.291793	1076.709	1387.225	1821.058	1124.321
31Jul2019 14:00:00	2019	1508.771802	1108.093	1406.186	1845.801	1143.491
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31Jul2019 17:00:00	2019	1458.214498	1149.15	1395.051	1816.92	1187.208
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31Jul2019 19:00:00	2019	1345.283248	1148.566	1337.106	1690.227	1178.873
31Jul2019 20:00:00	2019	1290.967068	1165.104	1314.72	1634.304	1174.359
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03Aug2019 13:00:00	2019	1243.735575	1063.723	1322.994	1575.857	1093.358
03Aug2019 14:00:00	2019	1244.579576	1069.945	1345.505	1574.408	1096.151
03Aug2019 15:00:00	2019	1242.780446	1077.785	1348.496	1554.515	1108.284
03Aug2019 16:00:00	2019	1250.035913	1086.522	1343.295	1542.535	1069.237
03Aug2019 17:00:00	2019	1245.757658	1093.238	1346.935	1541.132	1079.171
03Aug2019 18:00:00	2019	1219.186523	1084.759	1336.545	1518.462	1078.594
03Aug2019 19:00:00	2019	1177.235142	1065.956	1311.675	1494.324	1092.612
03Aug2019 20:00:00	2019	1116.709179	1033.809	1298.875	1445.209	1101.57
03Aug2019 21:00:00	2019	1096.476461	1032.755	1293.636	1435.199	1109.185
03Aug2019 22:00:00	2019	1053.259384	1003.148	1284.209	1420.017	1119.756
03Aug2019 23:00:00	2019	975.8749735	967.3181	1255.549	1340.172	1107.688
04Aug2019 0:00:00	2019	901.682829	936.5516	1235.576	1280.317	1099.765
04Aug2019 1:00:00	2019	857.9821107	920.8128	1223.325	1236.488	1090.556
04Aug2019 2:00:00	2019	825.7103666	907.9227	1211.431	1202.92	1098.801
04Aug2019 3:00:00	2019	810.3910671	904.5527	1209.118	1189.444	1091.69
04Aug2019 4:00:00	2019	803.0825074	905.2741	1207.098	1180.856	1076.823
04Aug2019 5:00:00	2019	810.0375052	895.3281	1192.632	1172.152	1074.685
04Aug2019 6:00:00	2019	813.7165403	888.0085	1182.009	1162.61	1059.239
04Aug2019 7:00:00	2019	851.3622528	908.476	1201.732	1210.634	1054.63
04Aug2019 8:00:00	2019	916.5072507	925.1942	1242.839	1307.467	1057.726
04Aug2019 9:00:00	2019	1008.632886	929.7037	1281.135	1366.499	1068.683
04Aug2019 10:00:00	2019	1075.084296	943.6352	1297.696	1427.702	1089.741
04Aug2019 11:00:00	2019	1120.058416	963.8297	1309.372	1471.282	1110.813
04Aug2019 12:00:00	2019	1149.270485	974.5856	1306.52	1477.057	1114.971
04Aug2019 13:00:00	2019	1168.008206	983.994	1312.281	1497.65	1123.116
04Aug2019 14:00:00	2019	1172.180731	986.5573	1315.753	1535.26	1140.09
04Aug2019 15:00:00	2019	1188.176818	1003.69	1320.235	1558.156	1143.968
04Aug2019 16:00:00	2019	1211.946094	1023.541	1339.88	1606.914	1152.94
04Aug2019 17:00:00	2019	1227.579292	1031.791	1361.225	1627.902	1158.765
04Aug2019 18:00:00	2019	1204.370121	1029.594	1353.395	1598.372	1166.084
04Aug2019 19:00:00	2019	1166.74877	1022.392	1333.974	1545.518	1163.336
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04Aug2019 21:00:00	2019	1123.085914	1002.891	1328.778	1533.507	1153.946
04Aug2019 22:00:00	2019	1083.778522	969.1841	1299.416	1502.044	1154.478
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05Aug2019 1:00:00	2019	864.8963867	902.4862	1131.645	1281.58	1075.351
05Aug2019 2:00:00	2019	831.1717485	892.7771	1106.032	1228.481	1062.796
05Aug2019 3:00:00	2019	815.5331004	884.4242	1124.316	1216.814	1048.245
05Aug2019 4:00:00	2019	816.0419662	883.4326	1174.807	1222.474	1056.613

05Aug2019 5:00:00	2019	840.0105037	890.5481	1181.66	1200.748	1059.542
05Aug2019 6:00:00	2019	861.2920179	892.7597	1182.2	1192.718	1048.119
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05Aug2019 18:00:00	2019	1346.575097	1077.286	1383.735	1768.441	1140.152
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05Aug2019 21:00:00	2019	1225.178239	1055.397	1339.341	1623.087	1115.354
05Aug2019 22:00:00	2019	1153.850256	1033.561	1317.826	1527.46	1118.414
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06Aug2019 1:00:00	2019	906.8215166	934.2283	1205.74	1252.239	1065.393
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06Aug2019 6:00:00	2019	1052.579177	928.4922	1248.353	1375.094	1052.115
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06Aug2019 12:00:00	2019	1456.650252	1044.149	1355.882	1727.49	1134.127
06Aug2019 13:00:00	2019	1460.872104	1063.249	1422.029	1744.266	1128.103
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06Aug2019 19:00:00	2019	1220.081191	1044.493	1332.005	1636.162	1138.301
06Aug2019 20:00:00	2019	1185.925728	1019.989	1321.66	1587.819	1128.435
06Aug2019 21:00:00	2019	1161.611381	1010.698	1318.734	1573.61	1147.054
06Aug2019 22:00:00	2019	1079.309773	983.8504	1293.41	1501.612	1136.285
06Aug2019 23:00:00	2019	980.8929481	945.1354	1252.078	1389.267	1111.309
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07Aug2019 2:00:00	2019	837.3405439	896.5397	1201.553	1190.471	1104.888
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07Aug2019 9:00:00	2019	1257.791844	1010.561	1444.336	1580.131	1159.603
07Aug2019 10:00:00	2019	1284.40146	1007.48	1421.347	1679.845	1166.459
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07Aug2019 16:00:00	2019	1413.742711	1050.003	1425.607	1838.229	1141.865
07Aug2019 17:00:00	2019	1430.250297	1067.59	1436.396	1828.838	1139.178
07Aug2019 18:00:00	2019	1364.554271	1064.824	1418.345	1754.93	1153.993
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07Aug2019 22:00:00	2019	1160.348848	1015.202	1368.466	1543.305	1160.7
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08Aug2019 4:00:00	2019	865.9765576	891.271	1210.41	1206.834	1090.141
08Aug2019 5:00:00	2019	929.9949744	903.1879	1212.932	1259.785	1096.495
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08Aug2019 7:00:00	2019	1152.144701	960.5902	1297.831	1473.758	1100.777
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08Aug2019 10:00:00	2019	1390.359193	1019.144	1413.504	1755.858	1160.176
08Aug2019 11:00:00	2019	1442.684783	1020.409	1425.954	1815.089	1168.077
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08Aug2019 13:00:00	2019	1504.462276	1048.504	1406.82	1905.76	1163.838
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08Aug2019 19:00:00	2019	1443.211381	1089.784	1408.107	1838.275	1207.801
08Aug2019 20:00:00	2019	1377.516281	1066.771	1407.722	1781.109	1175.098
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12Aug2019 4:00:00	2019	811.2250503	803.7859	1195.838	1191.011	1115.037
12Aug2019 5:00:00	2019	883.3005189	818.5992	1214.176	1250.845	1118.283
12Aug2019 6:00:00	2019	1014.865358	809.818	1222.758	1339.861	1103.059
12Aug2019 7:00:00	2019	1121.778352	837.4828	1255.301	1428.293	1105.357
12Aug2019 8:00:00	2019	1200.188921	862.1401	1280.386	1540.721	1106.456
12Aug2019 9:00:00	2019	1250.158158	880.2205	1320.017	1598.443	1121.414
12Aug2019 10:00:00	2019	1280.261752	891.0483	1350.09	1676.537	1129.405
12Aug2019 11:00:00	2019	1300.209634	903.714	1357.054	1690.445	1136.372
12Aug2019 12:00:00	2019	1308.794053	904.2568	1377.189	1700.095	1138.939
12Aug2019 13:00:00	2019	1311.402984	907.9765	1385.508	1699.5	1159.614
12Aug2019 14:00:00	2019	1308.059068	904.4623	1387.771	1699.642	1167.543
12Aug2019 15:00:00	2019	1299.800468	901.591	1379.179	1698.774	1157.251
12Aug2019 16:00:00	2019	1296.292015	900.9608	1375.071	1657.041	1157.89
12Aug2019 17:00:00	2019	1306.268216	893.1534	1354.825	1650.217	1153.981
12Aug2019 18:00:00	2019	1248.80257	875.9844	1332.609	1580.287	1134.096
12Aug2019 19:00:00	2019	1197.415456	863.2063	1324.159	1545.366	1121.209
12Aug2019 20:00:00	2019	1157.127575	859.3185	1328.994	1544.522	1110.877
12Aug2019 21:00:00	2019	1139.746556	866.2962	1352.922	1554.65	1104.187
12Aug2019 22:00:00	2019	1045.548239	871.0441	1308.493	1458.037	1096.906
12Aug2019 23:00:00	2019	956.6395131	834.9228	1270.415	1349.656	1077.759
13Aug2019 0:00:00	2019	890.2146754	805.6856	1232.195	1299.914	1074.021

13Aug2019 1:00:00	2019	843.937283	804.6465	1221.743	1263.394	1083.06
13Aug2019 2:00:00	2019	821.1141797	796.8961	1228.651	1209.531	1115.368
13Aug2019 3:00:00	2019	814.2786002	795.2562	1231.713	1193.716	1139.913
13Aug2019 4:00:00	2019	830.0974939	799.0837	1234.768	1196.488	1118.977
13Aug2019 5:00:00	2019	900.2508577	811.7459	1238.522	1248.845	1116.458
13Aug2019 6:00:00	2019	1023.610142	815.7399	1264.145	1320.859	1127.786
13Aug2019 7:00:00	2019	1130.118923	839.835	1285.08	1438.424	1131.708
13Aug2019 8:00:00	2019	1195.456169	838.9261	1327.128	1540.505	1134.301
13Aug2019 9:00:00	2019	1239.137632	852.5994	1351.453	1607.025	1128.5
13Aug2019 10:00:00	2019	1280.713695	859.3047	1336.565	1636.047	1147.268
13Aug2019 11:00:00	2019	1326.116541	876.427	1347.962	1693.553	1141.773
13Aug2019 12:00:00	2019	1360.888192	874.0635	1351.498	1680.878	1134.332
13Aug2019 13:00:00	2019	1381.2781	875.2922	1354.65	1717.165	1143.459
13Aug2019 14:00:00	2019	1365.378155	888.9604	1345.948	1725.773	1149.625
13Aug2019 15:00:00	2019	1357.771062	896.6294	1353.577	1741.007	1148.348
13Aug2019 16:00:00	2019	1360.73222	900.2523	1359.657	1747.762	1165.036
13Aug2019 17:00:00	2019	1335.169455	907.418	1372.776	1742.406	1171.103
13Aug2019 18:00:00	2019	1250.072562	900.9005	1353.478	1673.388	1163.981
13Aug2019 19:00:00	2019	1212.839489	889.1453	1338.492	1648.751	1159.134
13Aug2019 20:00:00	2019	1179.416964	877.7962	1320.902	1573.837	1153.011
13Aug2019 21:00:00	2019	1169.25304	867.9185	1295.778	1557.4	1174.05
13Aug2019 22:00:00	2019	1081.284161	836.1089	1250.461	1476.992	1167.887
13Aug2019 23:00:00	2019	972.6760837	843.5992	1236.823	1348.725	1127.149
14Aug2019 0:00:00	2019	896.3125246	820.7016	1211.455	1233.87	1098.602
14Aug2019 1:00:00	2019	848.9186709	805.3342	1197.493	1214.406	1098.994
14Aug2019 2:00:00	2019	823.1577209	792.4373	1190.304	1147.294	1106.559
14Aug2019 3:00:00	2019	814.9758315	793.6494	1192.273	1127.211	1095.77
14Aug2019 4:00:00	2019	831.3388121	794.8587	1195.449	1141.635	1092.272
14Aug2019 5:00:00	2019	900.6584616	806.9954	1208.571	1206.347	1088.991
14Aug2019 6:00:00	2019	1017.701295	825.0805	1224.228	1275.087	1088.467
14Aug2019 7:00:00	2019	1119.125591	858.1215	1259.952	1405.815	1096.478
14Aug2019 8:00:00	2019	1198.366333	884.6995	1313.566	1544.623	1128.316
14Aug2019 9:00:00	2019	1267.296261	908.2692	1324.137	1619.702	1128.027
14Aug2019 10:00:00	2019	1328.74693	921.3875	1335.048	1683.997	1132.977
14Aug2019 11:00:00	2019	1374.073131	934.7099	1325.086	1723.973	1151.132
14Aug2019 12:00:00	2019	1395.268268	934.9091	1353.135	1768.062	1156.766
14Aug2019 13:00:00	2019	1412.303798	947.7468	1386.521	1800.351	1168.382
14Aug2019 14:00:00	2019	1400.016939	954.0391	1395.995	1817.4	1175.883
14Aug2019 15:00:00	2019	1383.418218	963.7544	1388.22	1801.346	1184.343
14Aug2019 16:00:00	2019	1389.07692	961.284	1366.658	1796.25	1188.915
14Aug2019 17:00:00	2019	1376.215435	963.0242	1362.582	1787.953	1187.747
14Aug2019 18:00:00	2019	1305.289059	954.8754	1360.262	1726.11	1168.164
14Aug2019 19:00:00	2019	1264.408215	948.3951	1340.285	1669.029	1154.16
14Aug2019 20:00:00	2019	1235.003625	935.0703	1283.65	1613.552	1135.093
14Aug2019 21:00:00	2019	1213.757839	935.6132	1275.245	1602.254	1139.706
14Aug2019 22:00:00	2019	1110.323286	922.7076	1267.722	1511.544	1135.519
14Aug2019 23:00:00	2019	1004.983907	880.4949	1251.472	1416.592	1130.234

15Aug2019 0:00:00	2019	925.0278221	849.3832	1233.788	1327.611	1110.84
15Aug2019 1:00:00	2019	871.2023167	834.7042	1207.606	1269.278	1110.251
15Aug2019 2:00:00	2019	842.1964915	825.8196	1182.739	1231.167	1108.108
15Aug2019 3:00:00	2019	830.2091641	815.9994	1183.598	1215.561	1098.47
15Aug2019 4:00:00	2019	839.7321328	815.8449	1193.23	1220.074	1093.381
15Aug2019 5:00:00	2019	906.5051579	842.1499	1210.478	1275.427	1082.397
15Aug2019 6:00:00	2019	1021.616747	861.7979	1222.501	1353.317	1071.927
15Aug2019 7:00:00	2019	1121.194344	893.199	1237.82	1478.311	1071.402
15Aug2019 8:00:00	2019	1201.053855	908.7575	1288.964	1590.981	1065.758
15Aug2019 9:00:00	2019	1267.738068	928.6274	1332.912	1664.062	1074.462
15Aug2019 10:00:00	2019	1330.876702	947.1334	1357.116	1741.462	1092.112
15Aug2019 11:00:00	2019	1379.734838	963.7906	1381.084	1799.123	1102.679
15Aug2019 12:00:00	2019	1404.253086	969.1352	1385.698	1840.197	1129.715
15Aug2019 13:00:00	2019	1423.041012	966.0809	1371.204	1836.256	1146.707
15Aug2019 14:00:00	2019	1435.642225	973.8028	1390.557	1862.118	1151.644
15Aug2019 15:00:00	2019	1452.546188	970.0779	1409.235	1866.673	1163.135
15Aug2019 16:00:00	2019	1461.89413	976.2093	1399.441	1858.374	1168.47
15Aug2019 17:00:00	2019	1463.219026	987.5524	1416.539	1836.077	1157.125
15Aug2019 18:00:00	2019	1390.744027	984.7427	1396.804	1750.642	1147.526
15Aug2019 19:00:00	2019	1334.148252	975.7719	1390.997	1699.224	1161.297
15Aug2019 20:00:00	2019	1267.589714	952.5796	1362.675	1690.579	1158.634
15Aug2019 21:00:00	2019	1235.331427	938.5853	1345.69	1660.233	1158.178
15Aug2019 22:00:00	2019	1135.464174	910.2548	1307.204	1552.93	1154.127
15Aug2019 23:00:00	2019	1025.057628	871.1512	1285.505	1423.289	1137.606
16Aug2019 0:00:00	2019	943.0220844	835.1372	1242.58	1348.026	1126.33
16Aug2019 1:00:00	2019	886.8285157	814.256	1221.408	1295.646	1119.001
16Aug2019 2:00:00	2019	854.1133751	806.932	1216.736	1261.642	1117.333
16Aug2019 3:00:00	2019	842.8373103	802.3706	1212.983	1244.487	1120.833
16Aug2019 4:00:00	2019	854.547079	805.3369	1227.068	1246.715	1119.033
16Aug2019 5:00:00	2019	914.2081939	814.5175	1233.486	1301.687	1125.643
16Aug2019 6:00:00	2019	1044.811088	838.6696	1240.639	1359.959	1120.403
16Aug2019 7:00:00	2019	1143.554715	867.2116	1280.589	1447.813	1129.036
16Aug2019 8:00:00	2019	1212.711701	896.3688	1321.197	1557.763	1130.331
16Aug2019 9:00:00	2019	1266.595004	916.3562	1334.746	1604.886	1112.546
16Aug2019 10:00:00	2019	1285.338048	928.8727	1352.515	1646.79	1110.093
16Aug2019 11:00:00	2019	1294.936909	935.6615	1357.378	1653.868	1113.87
16Aug2019 12:00:00	2019	1292.955206	928.8993	1344.118	1667.486	1112.829
16Aug2019 13:00:00	2019	1283.935149	912.6363	1325.829	1665.644	1112.384
16Aug2019 14:00:00	2019	1269.610929	896.1668	1311.27	1659.833	1119.146
16Aug2019 15:00:00	2019	1255.958944	903.2068	1312.082	1652.356	1106.991
16Aug2019 16:00:00	2019	1241.789908	902.7735	1311.269	1627.979	1112.444
16Aug2019 17:00:00	2019	1228.827488	899.9568	1300.604	1602.056	1125.999
16Aug2019 18:00:00	2019	1165.824459	886.8491	1275.763	1532.523	1107.35
16Aug2019 19:00:00	2019	1118.918456	874.7979	1228.36	1500.5	1055.514
16Aug2019 20:00:00	2019	1093.019026	875.5195	1224.149	1480.339	1082.322
16Aug2019 21:00:00	2019	1091.157198	872.7501	1252.511	1485.768	1135.72
16Aug2019 22:00:00	2019	1021.297641	852.6168	1225.918	1425.536	1134.134

16Aug2019 23:00:00	2019	937.0074845	832.2486	1193.201	1346.509	1125.066
17Aug2019 0:00:00	2019	875.1655974	805.669	1167.209	1262.008	1117.089
17Aug2019 1:00:00	2019	829.0557682	793.8675	1140.964	1186.718	1105.747
17Aug2019 2:00:00	2019	802.3152648	787.0847	1142.386	1186.498	1112.882
17Aug2019 3:00:00	2019	788.4372519	780.0141	1158.482	1181.806	1111.618
17Aug2019 4:00:00	2019	791.5779061	779.9269	1159.099	1163.042	1103.677
17Aug2019 5:00:00	2019	815.283495	783.9144	1165.185	1193.57	1105.935
17Aug2019 6:00:00	2019	845.2633664	798.0363	1161.652	1212.624	1101.936
17Aug2019 7:00:00	2019	888.8278636	810.1728	1175.527	1257.433	1092.414
17Aug2019 8:00:00	2019	963.2194986	819.6379	1205.094	1331.605	1097.47
17Aug2019 9:00:00	2019	1030.375026	837.7934	1235.663	1370.953	1120.146
17Aug2019 10:00:00	2019	1079.724282	844.1101	1244.037	1417.301	1115.587
17Aug2019 11:00:00	2019	1104.409055	842.8703	1250.419	1419.013	1126.735
17Aug2019 12:00:00	2019	1115.919702	843.7531	1254.094	1429.171	1136.957
17Aug2019 13:00:00	2019	1116.832831	842.5593	1260.084	1433.133	1143.711
17Aug2019 14:00:00	2019	1108.704018	841.5388	1258.669	1442.337	1152.293
17Aug2019 15:00:00	2019	1112.843843	837.1358	1264.397	1464.129	1132.52
17Aug2019 16:00:00	2019	1119.547727	835.0389	1278.904	1481.162	1118.964
17Aug2019 17:00:00	2019	1126.833183	843.2699	1288.637	1501.536	1118.618
17Aug2019 18:00:00	2019	1095.48846	841.9516	1278.203	1475.662	1116.027
17Aug2019 19:00:00	2019	1062.946045	834.195	1270.53	1435.429	1095.482
17Aug2019 20:00:00	2019	1048.91912	834.5025	1263.108	1438.129	1102.784
17Aug2019 21:00:00	2019	1057.881184	844.1282	1266.919	1405.203	1120.06
17Aug2019 22:00:00	2019	1000.128839	822.1941	1233.124	1326.6	1130.414
17Aug2019 23:00:00	2019	927.9035464	795.7969	1186.576	1247.715	1120.967
18Aug2019 0:00:00	2019	863.4656584	785.4328	1154.21	1186.23	1117.509
18Aug2019 1:00:00	2019	818.3435346	771.2186	1136.249	1122.75	1103.007
18Aug2019 2:00:00	2019	791.7526857	752.8174	1137.469	1097.479	1111.115
18Aug2019 3:00:00	2019	780.0342659	751.6873	1135.747	1073.555	1092.421
18Aug2019 4:00:00	2019	778.2168455	759.2937	1166.931	1115.302	1091.693
18Aug2019 5:00:00	2019	793.4542273	761.3542	1181.81	1153.669	1104.379
18Aug2019 6:00:00	2019	812.0352815	767.4814	1179.36	1185.25	1105.092
18Aug2019 7:00:00	2019	838.8334654	779.5744	1195.592	1212.823	1074.876
18Aug2019 8:00:00	2019	916.8119368	795.8144	1214.699	1279.952	1082.35
18Aug2019 9:00:00	2019	999.7712029	796.6794	1235.202	1353.027	1107.377
18Aug2019 10:00:00	2019	1069.029074	798.8911	1249.543	1414.407	1078.287
18Aug2019 11:00:00	2019	1116.247482	815.7043	1272.353	1442.393	1074.125
18Aug2019 12:00:00	2019	1145.129201	824.8267	1276.731	1467.07	1098.927
18Aug2019 13:00:00	2019	1163.814576	833.1884	1284.746	1476.609	1099.884
18Aug2019 14:00:00	2019	1178.557254	846.2368	1278.689	1460.369	1107.869
18Aug2019 15:00:00	2019	1202.880724	864.1699	1289.234	1466.408	1104.627
18Aug2019 16:00:00	2019	1239.19094	889.7247	1306.612	1491.227	1106.756
18Aug2019 17:00:00	2019	1265.349842	912.25	1314.223	1510.106	1114.297
18Aug2019 18:00:00	2019	1250.329231	920.4844	1301.898	1482.641	1131.241
18Aug2019 19:00:00	2019	1217.251969	914.4026	1299.56	1467.147	1143.409
18Aug2019 20:00:00	2019	1179.316113	896.2291	1302.85	1480.918	1149.7
18Aug2019 21:00:00	2019	1165.645845	887.098	1308.01	1488.051	1158.437

18Aug2019 22:00:00	2019	1073.052562	855.7507	1267.529	1398.148	1138.186
18Aug2019 23:00:00	2019	963.2695639	816.4073	1228.26	1314.018	1134.406
19Aug2019 0:00:00	2019	879.6798468	797.3084	1206.899	1246.285	1121.455
19Aug2019 1:00:00	2019	831.1680094	780.7295	1181.957	1193.506	1100.634
19Aug2019 2:00:00	2019	806.2116327	768.9057	1175.135	1197.325	1098.778
19Aug2019 3:00:00	2019	799.6609853	764.8588	1149.599	1180.99	1102.581
19Aug2019 4:00:00	2019	815.7156701	770.8985	1154.26	1200.758	1094.057
19Aug2019 5:00:00	2019	883.4116581	782.2168	1178.919	1252.917	1097.742
19Aug2019 6:00:00	2019	996.4649137	804.7365	1214.231	1358.734	1108.54
19Aug2019 7:00:00	2019	1097.400719	840.1508	1263.101	1469.002	1118.083
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19Aug2019 9:00:00	2019	1235.107397	873.0445	1339.956	1624.176	1097.232
19Aug2019 10:00:00	2019	1282.105782	889.5289	1353.498	1675.293	1099.779
19Aug2019 11:00:00	2019	1324.466431	900.9012	1344.046	1702.306	1094.76
19Aug2019 12:00:00	2019	1357.142714	907.0875	1353.924	1716.843	1088.635
19Aug2019 13:00:00	2019	1370.786494	922.9603	1352.041	1702.482	1102.098
19Aug2019 14:00:00	2019	1380.294771	932.9983	1344.442	1700.881	1100.313
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19Aug2019 16:00:00	2019	1385.069068	962.6025	1367.836	1705.47	1101.882
19Aug2019 17:00:00	2019	1383.654316	969.5782	1366.161	1690.846	1101.261
19Aug2019 18:00:00	2019	1305.910449	954.5797	1341.033	1630.011	1092.047
19Aug2019 19:00:00	2019	1245.710694	938.3815	1319.146	1587.922	1089.982
19Aug2019 20:00:00	2019	1209.174786	923.7817	1303.815	1553.31	1080.207
19Aug2019 21:00:00	2019	1192.512433	928.7069	1302.842	1543.912	1106.224
19Aug2019 22:00:00	2019	1087.124456	898.8556	1272.913	1481.221	1131.123
19Aug2019 23:00:00	2019	979.0400782	847.6212	1201.594	1383.38	1123.062
20Aug2019 0:00:00	2019	902.6068793	814.3264	1150.805	1262.132	1108.42
20Aug2019 1:00:00	2019	853.6960442	803.5166	1167.189	1222.609	1101.667
20Aug2019 2:00:00	2019	825.5411555	800.7994	1174.934	1196.808	1103.56
20Aug2019 3:00:00	2019	815.0540851	795.1237	1180.793	1194.662	1096.352
20Aug2019 4:00:00	2019	829.3226203	792.6443	1181.302	1180.884	1093.786
20Aug2019 5:00:00	2019	895.0439756	805.5825	1198.739	1249.974	1095.594
20Aug2019 6:00:00	2019	1017.148875	823.5401	1182.474	1301.294	1098.349
20Aug2019 7:00:00	2019	1110.727816	877.177	1177.501	1422.06	1098.903
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20Aug2019 9:00:00	2019	1239.874579	907.6562	1231.012	1587.597	1095.068
20Aug2019 10:00:00	2019	1289.752917	918.8135	1249.87	1649.132	1115.755
20Aug2019 11:00:00	2019	1342.950893	927.723	1255.461	1724.68	1128.365
20Aug2019 12:00:00	2019	1393.3751	934.7747	1270.423	1743.594	1131.844
20Aug2019 13:00:00	2019	1429.386209	951.2527	1282.317	1771.182	1144.627
20Aug2019 14:00:00	2019	1450.33961	965.8792	1287.314	1787.079	1149.398
20Aug2019 15:00:00	2019	1468.737485	985.6472	1309.344	1812.23	1164.741
20Aug2019 16:00:00	2019	1479.764441	991.58	1303.289	1828.512	1137.763
20Aug2019 17:00:00	2019	1482.396323	994.3753	1293.903	1822.28	1146.492
20Aug2019 18:00:00	2019	1415.016433	989.7975	1279.558	1782.781	1157.325
20Aug2019 19:00:00	2019	1355.773147	995.3052	1284.639	1733.801	1157.078
20Aug2019 20:00:00	2019	1298.345606	979.7735	1279.476	1673.964	1155.972

20Aug2019 21:00:00	2019	1263.47784	971.6769	1306.092	1654.456	1175.517
20Aug2019 22:00:00	2019	1146.600149	946.4833	1268.893	1544.235	1168.99
20Aug2019 23:00:00	2019	1027.862355	900.2575	1230.188	1408.27	1162.789
21Aug2019 0:00:00	2019	941.1157752	863.6682	1181.749	1320.386	1153.999
21Aug2019 1:00:00	2019	886.4697978	843.5799	1147.186	1274.642	1133.185
21Aug2019 2:00:00	2019	853.7026483	832.9972	1150.302	1262.083	1118.958
21Aug2019 3:00:00	2019	840.5887467	829.7999	1155.622	1240.578	1116.685
21Aug2019 4:00:00	2019	853.1049107	829.809	1151.663	1248.012	1109.388
21Aug2019 5:00:00	2019	919.9138326	840.1611	1167.881	1298.635	1118.082
21Aug2019 6:00:00	2019	1042.787646	858.3044	1200.832	1386.256	1130.03
21Aug2019 7:00:00	2019	1142.728024	894.2586	1227.671	1473.465	1136.518
21Aug2019 8:00:00	2019	1218.586482	908.775	1262.711	1568.472	1125.831
21Aug2019 9:00:00	2019	1287.320767	925.2201	1265.36	1649.044	1132.865
21Aug2019 10:00:00	2019	1363.829729	949.3442	1264.548	1684.42	1145.241
21Aug2019 11:00:00	2019	1438.115029	981.3309	1305.201	1753.732	1166.937
21Aug2019 12:00:00	2019	1503.82079	1008.214	1316.115	1816.706	1173.382
21Aug2019 13:00:00	2019	1543.455685	1031.928	1333.264	1845.741	1177.854
21Aug2019 14:00:00	2019	1566.471455	1038.002	1315.369	1883.871	1201.27
21Aug2019 15:00:00	2019	1598.612714	1051.074	1297.43	1913.237	1218.821
21Aug2019 16:00:00	2019	1621.783381	1075.909	1308.012	1886.836	1219.653
21Aug2019 17:00:00	2019	1623.328688	1071.942	1316.042	1883.263	1197.004
21Aug2019 18:00:00	2019	1537.169461	1070.29	1356.33	1837.448	1193.685
21Aug2019 19:00:00	2019	1470.787548	1059.6	1358.383	1781.487	1201.473
21Aug2019 20:00:00	2019	1411.277513	1038.692	1347.159	1711.78	1193.908
21Aug2019 21:00:00	2019	1368.749045	1023.4	1347.713	1697.074	1193.118
21Aug2019 22:00:00	2019	1239.761733	994.4451	1317.42	1569.525	1170.579
21Aug2019 23:00:00	2019	1108.555065	941.0322	1274.423	1448.517	1167.338
22Aug2019 0:00:00	2019	1013.602503	906.866	1245.166	1375.642	1136.957
22Aug2019 1:00:00	2019	955.3562376	887.3921	1221.213	1335.673	1119.361
22Aug2019 2:00:00	2019	925.0733195	868.9692	1219.133	1308.21	1114.836
22Aug2019 3:00:00	2019	910.4968814	863.4552	1209.591	1267.934	1117.664
22Aug2019 4:00:00	2019	919.1476242	862.282	1208.06	1269.218	1115.106
22Aug2019 5:00:00	2019	986.9644227	875.0015	1221.355	1322.456	1096.89
22Aug2019 6:00:00	2019	1126.241309	896.4912	1227.38	1414.066	1046.841
22Aug2019 7:00:00	2019	1217.622513	925.3311	1259.269	1535.479	1032.699
22Aug2019 8:00:00	2019	1277.0407	940.3354	1298.745	1623.094	1056.276
22Aug2019 9:00:00	2019	1318.254913	957.4084	1344.006	1673.403	1075.332
22Aug2019 10:00:00	2019	1344.615648	968.5657	1372.063	1725.03	1081.578
22Aug2019 11:00:00	2019	1366.651799	975.6069	1394.103	1754.207	1089.016
22Aug2019 12:00:00	2019	1383.189775	969.9114	1377.841	1723.775	1108.434
22Aug2019 13:00:00	2019	1393.343477	956.9404	1376.257	1744.668	1101.814
22Aug2019 14:00:00	2019	1402.606061	949.0706	1390.99	1777.04	1107.092
22Aug2019 15:00:00	2019	1418.116222	957.269	1414.103	1791.974	1119.488
22Aug2019 16:00:00	2019	1424.387536	962.6927	1420.639	1769.426	1122.057
22Aug2019 17:00:00	2019	1411.46362	964.1858	1397.897	1774.083	1141.295
22Aug2019 18:00:00	2019	1333.252225	950.5759	1398.433	1725.767	1132.723
22Aug2019 19:00:00	2019	1288.360283	952.4957	1376.098	1677.877	1129.479

22Aug2019 20:00:00	2019	1250.969193	952.7623	1372.086	1625.293	1121.335
22Aug2019 21:00:00	2019	1189.850911	948.0211	1384.372	1615.63	1128.569
22Aug2019 22:00:00	2019	1090.015743	927.5625	1336.582	1510.081	1127.542
22Aug2019 23:00:00	2019	991.8941633	879.7917	1282.005	1390.883	1083.16
23Aug2019 0:00:00	2019	915.8712175	859.0952	1246.389	1297.634	1093.342
23Aug2019 1:00:00	2019	868.7503291	843.5359	1241.695	1246.484	1091.566
23Aug2019 2:00:00	2019	841.0705736	822.8862	1203.013	1219.093	1082.872
23Aug2019 3:00:00	2019	831.3732014	816.2807	1199.418	1204.405	1085.024
23Aug2019 4:00:00	2019	848.7461391	819.3934	1209.18	1206.867	1089.945
23Aug2019 5:00:00	2019	915.8706108	832.5448	1219.072	1249.231	1091.45
23Aug2019 6:00:00	2019	1042.843946	858.529	1231.228	1330.256	1090.821
23Aug2019 7:00:00	2019	1136.663507	890.2161	1284.733	1431.333	1105.02
23Aug2019 8:00:00	2019	1225.280935	905.8171	1331.467	1524.43	1117.547
23Aug2019 9:00:00	2019	1297.283917	921.1994	1355.147	1567.348	1111.181
23Aug2019 10:00:00	2019	1342.094777	928.465	1376.759	1607.103	1121.013
23Aug2019 11:00:00	2019	1370.566681	937.475	1384.504	1649.509	1118.685
23Aug2019 12:00:00	2019	1390.491617	945.4514	1383.665	1670.616	1132.767
23Aug2019 13:00:00	2019	1398.059703	954.6727	1389.3	1692.99	1134.25
23Aug2019 14:00:00	2019	1401.509231	964.916	1387.067	1710.932	1148.05
23Aug2019 15:00:00	2019	1403.778477	967.6532	1388.986	1675.815	1151.909
23Aug2019 16:00:00	2019	1379.612282	969.2864	1390.154	1663.948	1149.259
23Aug2019 17:00:00	2019	1360.000132	971.5577	1365.529	1675.082	1136.485
23Aug2019 18:00:00	2019	1271.864139	959.6854	1351.644	1642.25	1119.225
23Aug2019 19:00:00	2019	1215.123505	943.4636	1335.84	1567.426	1121.493
23Aug2019 20:00:00	2019	1190.439619	927.8992	1344.235	1543.464	1121.867
23Aug2019 21:00:00	2019	1167.034491	918.1341	1346.444	1543.975	1134.092
23Aug2019 22:00:00	2019	1083.782409	890.6047	1312.069	1469.127	1121.699
23Aug2019 23:00:00	2019	994.7378151	865.6645	1278.754	1381.994	1105.822
24Aug2019 0:00:00	2019	920.4243793	850.5824	1252.145	1303.932	1107.561
24Aug2019 1:00:00	2019	868.0487972	825.5647	1220.619	1269.18	1095.948
24Aug2019 2:00:00	2019	832.5375576	815.7609	1222.387	1235.418	1085.879
24Aug2019 3:00:00	2019	815.4010496	818.5955	1229.613	1225.35	1089.088
24Aug2019 4:00:00	2019	814.9769877	818.0007	1234.241	1226.319	1090.098
24Aug2019 5:00:00	2019	838.4143915	826.48	1246.112	1225.677	1095.975
24Aug2019 6:00:00	2019	871.3992109	829.0242	1247.102	1253.491	1096.731
24Aug2019 7:00:00	2019	913.2566496	826.8448	1224.148	1303.257	1069.705
24Aug2019 8:00:00	2019	994.8113528	841.4723	1259.07	1410.564	1053.719
24Aug2019 9:00:00	2019	1087.43298	870.184	1306.246	1469.674	1067.339
24Aug2019 10:00:00	2019	1159.138367	888.034	1331.065	1555.105	1092.899
24Aug2019 11:00:00	2019	1195.301566	899.9198	1355.095	1588.252	1115.935
24Aug2019 12:00:00	2019	1212.16999	885.1615	1359.422	1602.757	1100.14
24Aug2019 13:00:00	2019	1219.790752	887.0868	1361.106	1612.766	1089.4
24Aug2019 14:00:00	2019	1220.588378	891.4681	1362.166	1598.09	1118.805
24Aug2019 15:00:00	2019	1224.037642	918.6885	1364.816	1615.116	1131.051
24Aug2019 16:00:00	2019	1225.836707	928.2624	1392.154	1641.196	1147.129
24Aug2019 17:00:00	2019	1225.932953	933.5279	1392.499	1621.895	1130.866
24Aug2019 18:00:00	2019	1197.130999	921.925	1376.034	1542.654	1111.558

24Aug2019 19:00:00	2019	1142.45096	903.4157	1361.942	1504.489	1102.58
24Aug2019 20:00:00	2019	1109.64246	892.2072	1337.842	1440.577	1108.77
24Aug2019 21:00:00	2019	1089.630934	900.9853	1337.389	1456.641	1109.875
24Aug2019 22:00:00	2019	1024.091488	874.5762	1299.211	1397.924	1126.78
24Aug2019 23:00:00	2019	948.3583991	851.7358	1236.347	1300.275	1157.86
25Aug2019 0:00:00	2019	882.0085566	828.4205	1217.033	1227.765	1157.036
25Aug2019 1:00:00	2019	833.0628613	810.3519	1204.948	1193.986	1131.154
25Aug2019 2:00:00	2019	805.6731443	809.99	1199.281	1177.719	1105.879
25Aug2019 3:00:00	2019	790.6729628	801.3004	1200.733	1164.226	1112.671
25Aug2019 4:00:00	2019	791.4341312	800.0044	1209.633	1156.234	1117.215
25Aug2019 5:00:00	2019	809.3524827	803.4012	1222	1159.99	1114.644
25Aug2019 6:00:00	2019	832.6112554	806.1725	1228.741	1153.842	1111.472
25Aug2019 7:00:00	2019	864.5696516	811.9014	1239.968	1194.51	1108.207
25Aug2019 8:00:00	2019	930.922187	803.4343	1263.041	1295.975	1112.55
25Aug2019 9:00:00	2019	1005.14529	816.641	1297.875	1361.75	1124.367
25Aug2019 10:00:00	2019	1070.846682	828.2479	1323.69	1437.356	1126.489
25Aug2019 11:00:00	2019	1107.259871	841.7393	1323.69	1480.589	1142.967
25Aug2019 12:00:00	2019	1118.230827	842.6449	1324.384	1454.119	1145.541
25Aug2019 13:00:00	2019	1123.503425	836.1892	1322.982	1481.362	1149.261
25Aug2019 14:00:00	2019	1133.384179	841.0515	1313.899	1471.641	1153.123
25Aug2019 15:00:00	2019	1149.693798	848.9853	1320.967	1491.472	1146.909
25Aug2019 16:00:00	2019	1164.435382	857.8953	1330.955	1534.865	1138.647
25Aug2019 17:00:00	2019	1186.051437	867.678	1328.338	1551.816	1153.604
25Aug2019 18:00:00	2019	1167.541517	865.7643	1334.08	1539.479	1153.499
25Aug2019 19:00:00	2019	1122.736643	860.2329	1319.384	1491.422	1148.544
25Aug2019 20:00:00	2019	1114.306689	858.3709	1333.812	1468.794	1128.411
25Aug2019 21:00:00	2019	1093.394063	866.1651	1344.785	1520.344	1138.778
25Aug2019 22:00:00	2019	1014.569513	841.4209	1304.376	1413.554	1119.933
25Aug2019 23:00:00	2019	923.4999061	820.1668	1271.224	1342.468	1100.26
26Aug2019 0:00:00	2019	860.2532819	799.6086	1248.367	1243.143	1087.4
26Aug2019 1:00:00	2019	823.9656752	775.5998	1222.675	1188.089	1076.437
26Aug2019 2:00:00	2019	806.9094377	769.5053	1200.527	1187.514	1091.161
26Aug2019 3:00:00	2019	801.3951071	768.0496	1199.134	1163.235	1102.32
26Aug2019 4:00:00	2019	819.5449562	774.805	1213.944	1166.283	1114.375
26Aug2019 5:00:00	2019	893.1169167	792.3531	1239.331	1239.573	1118.144
26Aug2019 6:00:00	2019	1027.878174	821.19	1271.551	1339.965	1117.133
26Aug2019 7:00:00	2019	1133.513847	844.3274	1284.087	1428.61	1108.034
26Aug2019 8:00:00	2019	1200.939842	850.2557	1353.204	1542.287	1117.462
26Aug2019 9:00:00	2019	1249.042552	862.9598	1380.556	1613.31	1115.957
26Aug2019 10:00:00	2019	1287.683693	875.5555	1396.606	1693.152	1132.238
26Aug2019 11:00:00	2019	1315.841386	878.1532	1406.522	1728.925	1144.14
26Aug2019 12:00:00	2019	1329.906282	878.3744	1400	1688.321	1121.151
26Aug2019 13:00:00	2019	1325.231414	882.2185	1394.834	1721.344	1106.222
26Aug2019 14:00:00	2019	1322.287497	876.9562	1388.314	1714.247	1092.038
26Aug2019 15:00:00	2019	1306.827029	875.4162	1398.339	1680.147	1085.802
26Aug2019 16:00:00	2019	1318.149808	885.0291	1404.838	1702.092	1072.368
26Aug2019 17:00:00	2019	1331.576781	878.4335	1395.939	1696.911	1070.713

26Aug2019 18:00:00	2019	1270.546567	875.6043	1368.962	1624.005	1061.61
26Aug2019 19:00:00	2019	1217.511227	851.8903	1321.36	1572.733	1057.156
26Aug2019 20:00:00	2019	1190.111887	862.3799	1314.538	1555.756	1079.955
26Aug2019 21:00:00	2019	1172.211583	862.7923	1308.403	1548.221	1101.474
26Aug2019 22:00:00	2019	1063.534015	838.7469	1263.01	1433.779	1087.097
26Aug2019 23:00:00	2019	958.9587567	816.4864	1221.504	1309.085	1074.392
27Aug2019 0:00:00	2019	886.6841021	806.045	1194.576	1237.24	1063.835
27Aug2019 1:00:00	2019	843.7494688	791.0437	1191.964	1225.888	1060.91
27Aug2019 2:00:00	2019	822.5066446	787.3669	1205.917	1204.221	1068.879
27Aug2019 3:00:00	2019	813.8042813	784.487	1177.148	1188.788	1079.2
27Aug2019 4:00:00	2019	833.2177995	787.5599	1175.372	1184.65	1072.799
27Aug2019 5:00:00	2019	902.4143727	802.7568	1187.275	1249.566	1072.28
27Aug2019 6:00:00	2019	1033.74713	829.6354	1223.473	1345.101	1076.979
27Aug2019 7:00:00	2019	1129.034178	857.7432	1254.317	1438.615	1088.637
27Aug2019 8:00:00	2019	1190.756056	866.3872	1263.584	1506.688	1064.664
27Aug2019 9:00:00	2019	1247.104134	876.5016	1297.831	1576.876	1066.15
27Aug2019 10:00:00	2019	1293.260846	892.7417	1306.425	1633.342	1070.708
27Aug2019 11:00:00	2019	1318.827695	906.3966	1295.846	1683.726	1088.914
27Aug2019 12:00:00	2019	1343.667517	902.7454	1283.877	1712	1098.344
27Aug2019 13:00:00	2019	1360.942879	915.7983	1275.607	1717.223	1118.146
27Aug2019 14:00:00	2019	1373.566734	915.9928	1287.001	1723.396	1129.875
27Aug2019 15:00:00	2019	1391.81199	932.5052	1318.501	1740.339	1120.628
27Aug2019 16:00:00	2019	1406.778157	944.2976	1313.649	1760.152	1124.444
27Aug2019 17:00:00	2019	1415.558953	959.1165	1308.82	1757.481	1134.076
27Aug2019 18:00:00	2019	1347.436427	957.2517	1304.092	1673.444	1122.382
27Aug2019 19:00:00	2019	1291.133784	945.6172	1294.928	1615.885	1105.968
27Aug2019 20:00:00	2019	1256.828761	936.2773	1309.738	1632.698	1116.71
27Aug2019 21:00:00	2019	1224.602754	924.3166	1296.371	1623.253	1117.633
27Aug2019 22:00:00	2019	1113.052022	891.681	1252.117	1476.919	1098.698
27Aug2019 23:00:00	2019	997.8272245	858.1383	1217.499	1366.727	1064.491
28Aug2019 0:00:00	2019	916.3401712	834.3883	1229.591	1283.18	1042.457
28Aug2019 1:00:00	2019	868.2919047	822.2559	1197.337	1233.432	1023.369
28Aug2019 2:00:00	2019	842.3352992	804.0395	1178.726	1207.856	1030.213
28Aug2019 3:00:00	2019	834.0511296	800.5605	1186.053	1194.22	1026.653
28Aug2019 4:00:00	2019	853.5496123	799.638	1187.946	1197.545	1026.554
28Aug2019 5:00:00	2019	929.4394099	812.7081	1197.993	1248.842	1027.359
28Aug2019 6:00:00	2019	1066.970689	839.7664	1221.689	1340.698	1041.172
28Aug2019 7:00:00	2019	1165.614179	878.5141	1254.642	1446.725	1039.588
28Aug2019 8:00:00	2019	1236.040411	900.7512	1292.405	1545.689	1056.051
28Aug2019 9:00:00	2019	1280.585647	909.4614	1328.533	1622.222	1060.524
28Aug2019 10:00:00	2019	1311.911163	915.4688	1357.232	1669.39	1056.289
28Aug2019 11:00:00	2019	1332.147333	914.3602	1357.798	1681.274	1084.912
28Aug2019 12:00:00	2019	1342.90671	914.3774	1356.375	1677.113	1081.088
28Aug2019 13:00:00	2019	1358.598787	925.095	1344.685	1688.701	1083.601
28Aug2019 14:00:00	2019	1365.796354	936.5176	1320.651	1686.554	1085.398
28Aug2019 15:00:00	2019	1363.391788	944.9127	1338.601	1682.68	1070.346
28Aug2019 16:00:00	2019	1358.339899	952.0709	1326.09	1677.284	1076.638

28Aug2019 17:00:00	2019	1344.766012	958.5187	1318.969	1659.041	1074.797
28Aug2019 18:00:00	2019	1265.857564	948.6718	1290.358	1577.464	1062.811
28Aug2019 19:00:00	2019	1221.657736	939.7666	1278.516	1510.933	1049.358
28Aug2019 20:00:00	2019	1214.133466	940.0085	1279.457	1485.335	1049.003
28Aug2019 21:00:00	2019	1173.372151	924.6376	1293.236	1480.453	1069.635
28Aug2019 22:00:00	2019	1070.037436	897.8064	1260.976	1382.55	1064.694
28Aug2019 23:00:00	2019	962.7888468	871.218	1223.811	1274.809	1058.918
29Aug2019 0:00:00	2019	890.1886706	837.9259	1194.925	1192.167	1064.379
29Aug2019 1:00:00	2019	846.1144754	820.4637	1172.02	1142.204	1060.03
29Aug2019 2:00:00	2019	821.2401774	812.2524	1169.961	1125.116	1038.092
29Aug2019 3:00:00	2019	813.84849	810.2037	1207.68	1149.55	1038.739
29Aug2019 4:00:00	2019	830.4936037	815.3942	1224.478	1173.833	1041.519
29Aug2019 5:00:00	2019	899.1905875	828.6932	1243.333	1234.256	1038.168
29Aug2019 6:00:00	2019	1039.114165	853.9787	1265.693	1336.464	1050.602
29Aug2019 7:00:00	2019	1138.124883	877.3214	1299.295	1440.822	1041.141
29Aug2019 8:00:00	2019	1203.340076	900.2782	1333.775	1545.931	1028.627
29Aug2019 9:00:00	2019	1256.992067	919.8228	1353.071	1603.233	1013.019
29Aug2019 10:00:00	2019	1303.423435	933.1133	1375.702	1650.389	1013.925
29Aug2019 11:00:00	2019	1330.097704	941.0015	1387.422	1677.515	1003.551
29Aug2019 12:00:00	2019	1345.959312	947.5455	1379.884	1684.561	1005.947
29Aug2019 13:00:00	2019	1363.902927	954.9132	1398.572	1698.25	1013.194
29Aug2019 14:00:00	2019	1372.378896	963.3211	1390.486	1695.37	1018.612
29Aug2019 15:00:00	2019	1381.420436	970.8868	1372.282	1697.251	1028.05
29Aug2019 16:00:00	2019	1384.876388	985.7658	1361.584	1697.481	1023.154
29Aug2019 17:00:00	2019	1379.738134	997.2878	1349.733	1676.006	1075.237
29Aug2019 18:00:00	2019	1287.186223	981.4865	1333.838	1594.972	1102.436
29Aug2019 19:00:00	2019	1223.362716	963.5249	1323.005	1546.865	1104.041
29Aug2019 20:00:00	2019	1207.225312	955.8008	1329.257	1554.18	1114.917
29Aug2019 21:00:00	2019	1175.296657	936.8469	1309.941	1533.099	1110.839
29Aug2019 22:00:00	2019	1074.725127	906.2338	1264.59	1431.39	1097.112
29Aug2019 23:00:00	2019	971.7780993	870.3583	1230.894	1326.173	1098.658
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30Aug2019 1:00:00	2019	848.8757789	847.8212	1195.054	1222.799	1062.877
30Aug2019 2:00:00	2019	823.2426811	829.75	1193.145	1198.147	1072.975
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30Aug2019 4:00:00	2019	826.8702376	822.3901	1203.632	1157.384	1087.042
30Aug2019 5:00:00	2019	889.9414065	835.0332	1217.439	1194.063	1092.284
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30Aug2019 10:00:00	2019	1275.933783	933.3093	1334.916	1619.143	1089.043
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30Aug2019 18:00:00	2019	1244.295786	943.0708	1321.707	1499.368	1126.807
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30Aug2019 20:00:00	2019	1173.695265	928.4249	1296.2	1470.677	1150.619
30Aug2019 21:00:00	2019	1130.494838	917.6922	1315.161	1458.807	1140.833
30Aug2019 22:00:00	2019	1044.273578	895.4423	1290.039	1377.393	1117.058
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31Aug2019 1:00:00	2019	839.6100769	822.1208	1231.995	1173.585	1075.469
31Aug2019 2:00:00	2019	812.7107994	810.6515	1215.511	1139.324	1067.269
31Aug2019 3:00:00	2019	796.4356506	805.4309	1204.603	1120.57	1070.087
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31Aug2019 6:00:00	2019	843.3579972	831.3252	1220.219	1164.787	1086.228
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31Aug2019 13:00:00	2019	1114.231055	912.7754	1313.191	1453.379	1100.966
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31Aug2019 17:00:00	2019	1128.989724	922.4407	1315.714	1433.181	1098.247
31Aug2019 18:00:00	2019	1102.631201	928.5563	1306.347	1411.396	1106.901
31Aug2019 19:00:00	2019	1075.481707	915.9236	1293.356	1371.068	1096.4
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31Aug2019 21:00:00	2019	1043.96104	888.3266	1327.162	1438.955	1142.598
31Aug2019 22:00:00	2019	981.8364744	869.0618	1293.9	1373.865	1131.242
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02Sep2019 22:00:00	2019	1026.376214	849.0763	1268.621	1451.459	1153.682
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03Sep2019 8:00:00	2019	1185.996653	885.647	1319.083	1586.689	1143.228
03Sep2019 9:00:00	2019	1237.338381	899.2866	1351.868	1665.642	1124.608
03Sep2019 10:00:00	2019	1308.553943	915.3721	1373.573	1700.301	1120.361
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07Sep2019 3:00:00	2019	802.8302026	796.2119	1181.337	1217.213	1122.353
07Sep2019 4:00:00	2019	805.2324088	795.9114	1209.911	1227.057	1107.989
07Sep2019 5:00:00	2019	825.548282	800.8669	1225.72	1244.408	1111.092
07Sep2019 6:00:00	2019	874.8738743	814.5443	1227.173	1254.658	1114.752
07Sep2019 7:00:00	2019	926.8740917	830.8105	1248.63	1310.177	1109.756
07Sep2019 8:00:00	2019	1003.05124	855.7178	1284.753	1404.745	1096.86
07Sep2019 9:00:00	2019	1071.802046	870.9937	1324.489	1495.778	1103.688
07Sep2019 10:00:00	2019	1125.148256	877.0547	1339.941	1547.808	1115.123
07Sep2019 11:00:00	2019	1172.289196	889.3102	1346.359	1561.563	1111.309

07Sep2019 12:00:00	2019	1203.999931	899.0398	1349.584	1580.433	1114.203
07Sep2019 13:00:00	2019	1227.342467	913.4357	1353.969	1594.159	1140.405
07Sep2019 14:00:00	2019	1239.852807	909.05	1355.596	1598.308	1144.717
07Sep2019 15:00:00	2019	1242.709857	918.631	1364.822	1645.719	1128.396
07Sep2019 16:00:00	2019	1260.318791	931.8842	1362.77	1662.776	1135.552
07Sep2019 17:00:00	2019	1276.106038	942.6771	1366.115	1658.032	1139.619
07Sep2019 18:00:00	2019	1248.097815	932.2315	1354.082	1629.057	1130.94
07Sep2019 19:00:00	2019	1199.980089	914.6395	1342.652	1581.827	1146.679
07Sep2019 20:00:00	2019	1193.829523	914.7327	1330.582	1572.633	1158.385
07Sep2019 21:00:00	2019	1149.798688	904.2731	1312.605	1509.328	1148.313
07Sep2019 22:00:00	2019	1069.795224	875.2706	1283.319	1431.737	1152.244
07Sep2019 23:00:00	2019	981.8830356	847.0121	1251.303	1352.277	1140.633
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08Sep2019 1:00:00	2019	854.5207106	798.8787	1211.354	1231.915	1109.732
08Sep2019 2:00:00	2019	819.5289754	792.4802	1180.557	1202.752	1096.979
08Sep2019 3:00:00	2019	803.8612908	786.7127	1185.923	1169.253	1103.794
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08Sep2019 9:00:00	2019	1037.425682	847.9186	1329.234	1441.422	1163.476
08Sep2019 10:00:00	2019	1095.25734	851.4882	1350.091	1513.53	1165.972
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08Sep2019 13:00:00	2019	1147.159578	864.7839	1338.551	1544.333	1152.035
08Sep2019 14:00:00	2019	1145.673476	868.647	1317.28	1546.442	1181.67
08Sep2019 15:00:00	2019	1152.730305	874.924	1326.849	1562.852	1180.526
08Sep2019 16:00:00	2019	1178.327756	885.0945	1355.845	1598.117	1160.811
08Sep2019 17:00:00	2019	1194.870499	897.031	1347.231	1636.205	1167.198
08Sep2019 18:00:00	2019	1166.115453	887.1512	1327.638	1578.533	1157.487
08Sep2019 19:00:00	2019	1159.051678	881.1246	1325.939	1576.92	1153.414
08Sep2019 20:00:00	2019	1176.59649	889.169	1335.392	1586.088	1191.825
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08Sep2019 22:00:00	2019	1022.299594	834.6503	1263.652	1418.707	1183.408
08Sep2019 23:00:00	2019	923.8528411	799.3062	1222.547	1308.928	1165.939
09Sep2019 0:00:00	2019	855.7645758	777.7419	1199.582	1244.136	1165.966
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09Sep2019 4:00:00	2019	812.6318829	761.3776	1176.311	1217.184	1163.762
09Sep2019 5:00:00	2019	896.3345526	780.4125	1195.826	1250.311	1158.164
09Sep2019 6:00:00	2019	1055.126554	823.7094	1240.712	1398.452	1163.286
09Sep2019 7:00:00	2019	1191.280401	869.641	1310.398	1544.154	1160.122
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09Sep2019 9:00:00	2019	1265.730904	902.3063	1363.304	1647.027	1156.465
09Sep2019 10:00:00	2019	1290.794554	891.6641	1315.766	1697.438	1155.86

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09Sep2019 13:00:00	2019	1306.25192	889.0807	1367.503	1717.175	1169.916
09Sep2019 14:00:00	2019	1299.440064	887.3873	1358.267	1728.925	1165.727
09Sep2019 15:00:00	2019	1297.415885	889.795	1356.03	1742.829	1166.923
09Sep2019 16:00:00	2019	1309.330004	898.2149	1369.929	1752.195	1169.704
09Sep2019 17:00:00	2019	1320.685568	899.4783	1368.655	1746.629	1166.064
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09Sep2019 19:00:00	2019	1234.87672	874.885	1339.286	1657.287	1180.43
09Sep2019 20:00:00	2019	1225.103294	879.407	1335.665	1673.666	1170.255
09Sep2019 21:00:00	2019	1148.296415	879.0452	1322.151	1605.887	1162.383
09Sep2019 22:00:00	2019	1033.75175	846.5102	1292.233	1485.982	1158.443
09Sep2019 23:00:00	2019	929.2922764	813.169	1254.25	1384.25	1154.769
10Sep2019 0:00:00	2019	858.0870994	795.6568	1234.504	1313.802	1139.377
10Sep2019 1:00:00	2019	821.1812919	787.0621	1218.903	1253.876	1121.488
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10Sep2019 4:00:00	2019	815.0755003	781.5355	1182.149	1185.115	1111.916
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10Sep2019 7:00:00	2019	1185.564538	859.2728	1204.977	1539.858	1140.925
10Sep2019 8:00:00	2019	1220.346393	870.6766	1237.204	1602.268	1078.664
10Sep2019 9:00:00	2019	1255.467976	875.6809	1258.161	1635.534	1086.055
10Sep2019 10:00:00	2019	1276.975299	881.9454	1262.167	1649.043	1091.819
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10Sep2019 16:00:00	2019	1283.918718	894.6603	1326.321	1691.135	1109.194
10Sep2019 17:00:00	2019	1285.810667	893.6848	1315.098	1667.078	1100.748
10Sep2019 18:00:00	2019	1224.410756	884.1269	1297.211	1610.482	1080.555
10Sep2019 19:00:00	2019	1199.046084	890.7706	1291.258	1595.977	1096.5
10Sep2019 20:00:00	2019	1212.554566	896.9572	1301.265	1606.224	1115.359
10Sep2019 21:00:00	2019	1146.912219	875.5262	1275.26	1528.902	1106.217
10Sep2019 22:00:00	2019	1035.128285	844.2304	1251.272	1423.992	1137.078
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11Sep2019 0:00:00	2019	869.6575883	793.714	1194.394	1269.325	1076.446
11Sep2019 1:00:00	2019	831.7469067	783.7106	1178.679	1214.32	1068.473
11Sep2019 2:00:00	2019	812.1876795	778.0095	1165.256	1189.544	1069.66
11Sep2019 3:00:00	2019	807.5351897	765.9598	1153.733	1186.103	1116.585
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11Sep2019 5:00:00	2019	905.1523283	779.3605	1185.307	1266.798	1147.949
11Sep2019 6:00:00	2019	1065.275163	812.8824	1218.066	1412.552	1157.336
11Sep2019 7:00:00	2019	1189.413334	828.7601	1261.358	1534.322	1157.832
11Sep2019 8:00:00	2019	1227.912803	840.2514	1265.483	1602.172	1163.1
11Sep2019 9:00:00	2019	1251.763946	838.9067	1286.22	1662.948	1166.316

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12Sep2019 17:00:00	2019	1373.342036	880.4083	1326.751	1793.069	1110.204
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12Sep2019 19:00:00	2019	1250.934078	853.0834	1318.007	1652.375	1115.108
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13Sep2019 16:00:00	2019	1317.351717	877.677	1409.188	1765.578	1134.81
13Sep2019 17:00:00	2019	1305.229996	881.0239	1379.107	1762.785	1130.718
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15Sep2019 17:00:00	2019	1237.267158	892.5567	1508.879	1645.96	1078.263
15Sep2019 18:00:00	2019	1210.203215	876.1832	1491.687	1613.797	1078.997
15Sep2019 19:00:00	2019	1187.323199	867.7349	1508.418	1608.008	1092.864
15Sep2019 20:00:00	2019	1209.853419	868.3818	1519.12	1634.493	1090.193
15Sep2019 21:00:00	2019	1140.727665	839.017	1481.412	1559.806	1071.791
15Sep2019 22:00:00	2019	1033.196741	810.6702	1441.618	1437.947	1057.7
15Sep2019 23:00:00	2019	933.4976012	810.34	1417.138	1322.863	1036.529
16Sep2019 0:00:00	2019	862.7633858	785.7478	1389.689	1244.835	1030.015
16Sep2019 1:00:00	2019	821.1284027	771.7126	1371.612	1200.834	1021.575
16Sep2019 2:00:00	2019	801.9730971	768.181	1360.804	1181.375	1020.785
16Sep2019 3:00:00	2019	797.0541832	764.6318	1365.503	1176.004	1012.299
16Sep2019 4:00:00	2019	816.6420372	768.8197	1377.088	1179.664	1006.756
16Sep2019 5:00:00	2019	897.9630654	789.4893	1386.783	1223.883	985.5195
16Sep2019 6:00:00	2019	1060.018196	830.5691	1431.006	1367.653	982.2822
16Sep2019 7:00:00	2019	1188.921351	859.7168	1448.684	1491.383	986.9275
16Sep2019 8:00:00	2019	1227.840962	895.4007	1467.541	1565.465	992.3087
16Sep2019 9:00:00	2019	1264.742445	918.1656	1521.979	1632.13	1004.147
16Sep2019 10:00:00	2019	1302.071057	930.2194	1522.383	1670.877	1013.167
16Sep2019 11:00:00	2019	1328.467031	916.0356	1520.901	1696.648	1010.854
16Sep2019 12:00:00	2019	1347.346455	900.1954	1529.171	1700.253	998.304
16Sep2019 13:00:00	2019	1360.920699	898.3256	1534.136	1703.896	992.3474
16Sep2019 14:00:00	2019	1368.339504	912.8659	1539.829	1699.729	1000.149
16Sep2019 15:00:00	2019	1379.056812	922.4738	1534.163	1702.003	1006.786
16Sep2019 16:00:00	2019	1394.472022	933.9874	1545.447	1706.364	1004.889
16Sep2019 17:00:00	2019	1398.018099	939.6463	1532.006	1698.082	1011.151
16Sep2019 18:00:00	2019	1319.905425	927.3596	1498.604	1643.489	996.338
16Sep2019 19:00:00	2019	1292.20744	920.2855	1510.504	1654.912	1011.792
16Sep2019 20:00:00	2019	1279.616534	927.0561	1506.519	1679.358	1042.657
16Sep2019 21:00:00	2019	1189.365952	905.2017	1466.797	1600.135	1030.81
16Sep2019 22:00:00	2019	1063.886724	884.0892	1435.02	1484.33	1028.583
16Sep2019 23:00:00	2019	953.9830081	859.9318	1405.033	1378.932	1021.78
17Sep2019 0:00:00	2019	881.6876671	815.1622	1376.636	1320.14	1014.699
17Sep2019 1:00:00	2019	835.7173336	802.7358	1367.266	1252.229	1003.465
17Sep2019 2:00:00	2019	818.2296105	797.4332	1354.637	1252.093	993.5459
17Sep2019 3:00:00	2019	813.3423303	794.958	1350.932	1236.778	991.6599
17Sep2019 4:00:00	2019	828.4829254	795.3308	1357.753	1226.023	990.3988
17Sep2019 5:00:00	2019	903.69928	805.951	1353.466	1304.638	997.0923
17Sep2019 6:00:00	2019	1066.638266	832.0434	1394.458	1453.375	1013.687

17Sep2019 7:00:00	2019	1191.012278	870.902	1429.188	1600.222	1027.969
17Sep2019 8:00:00	2019	1232.186163	884.3519	1456.163	1652.525	1006.975
17Sep2019 9:00:00	2019	1256.520867	894.304	1480.864	1692.271	1013.591
17Sep2019 10:00:00	2019	1284.750016	907.9553	1465.257	1698.651	1003.477
17Sep2019 11:00:00	2019	1309.907855	914.1965	1414.917	1695.061	1006.54
17Sep2019 12:00:00	2019	1309.655805	910.1624	1426.701	1677.69	997.1234
17Sep2019 13:00:00	2019	1313.87465	911.1608	1499.117	1689.873	984.5341
17Sep2019 14:00:00	2019	1316.318173	907.0126	1511.952	1731.116	991.9354
17Sep2019 15:00:00	2019	1330.117971	906.4155	1503.535	1758.762	995.5675
17Sep2019 16:00:00	2019	1339.994502	913.1147	1507.367	1760.233	994.2544
17Sep2019 17:00:00	2019	1342.364368	911.8051	1484.697	1736.561	1000.239
17Sep2019 18:00:00	2019	1274.61895	903.1506	1463.524	1650.662	987.5261
17Sep2019 19:00:00	2019	1248.543041	897.9064	1460.711	1646.693	1010.346
17Sep2019 20:00:00	2019	1249.334978	909.2712	1486.115	1674.519	1030.855
17Sep2019 21:00:00	2019	1158.635797	880.305	1452.211	1593.542	1038.574
17Sep2019 22:00:00	2019	1040.090313	839.8042	1426.301	1464.873	1022.309
17Sep2019 23:00:00	2019	938.523231	804.8836	1396.043	1365.1	1017.727
18Sep2019 0:00:00	2019	871.1604486	793.9673	1377.75	1313.342	1012.382
18Sep2019 1:00:00	2019	829.5200034	784.6975	1341.033	1245.324	1017.945
18Sep2019 2:00:00	2019	808.8710346	777.9607	1330.25	1194.834	1027.268
18Sep2019 3:00:00	2019	801.5956814	783.9036	1312.137	1221.562	1030.39
18Sep2019 4:00:00	2019	820.7440796	795.8381	1327.446	1235.907	1030.283
18Sep2019 5:00:00	2019	898.6824134	811.7106	1359.091	1287.279	1025.148
18Sep2019 6:00:00	2019	1063.749467	854.0274	1417.672	1450.003	1031.65
18Sep2019 7:00:00	2019	1178.803552	861.9906	1425.326	1569.52	1038.51
18Sep2019 8:00:00	2019	1211.805866	875.5451	1446.248	1627.181	1026.755
18Sep2019 9:00:00	2019	1241.758842	876.0323	1450.318	1670.868	1005.69
18Sep2019 10:00:00	2019	1265.42915	871.2118	1442.377	1706.932	998.1819
18Sep2019 11:00:00	2019	1288.108987	878.3062	1443.004	1728.98	1002.317
18Sep2019 12:00:00	2019	1298.481273	871.9983	1428.637	1708.227	993.3488
18Sep2019 13:00:00	2019	1310.10353	877.9234	1471.607	1712.425	996.487
18Sep2019 14:00:00	2019	1312.777344	878.7697	1449.587	1707.407	994.6137
18Sep2019 15:00:00	2019	1315.212268	880.8892	1459.889	1727.255	1004.283
18Sep2019 16:00:00	2019	1320.115458	908.228	1467.67	1715.388	995.0639
18Sep2019 17:00:00	2019	1315.571404	911.8531	1466.86	1720.622	998.9578
18Sep2019 18:00:00	2019	1256.744156	904.41	1443.071	1644.797	997.9661
18Sep2019 19:00:00	2019	1234.925506	906.1205	1440.714	1631.96	1012.68
18Sep2019 20:00:00	2019	1232.583116	917.8823	1470.393	1670.009	1027.656
18Sep2019 21:00:00	2019	1150.658912	898.1264	1449.368	1596.23	1005.432
18Sep2019 22:00:00	2019	1042.350724	868.1768	1405.746	1468.272	998.0674
18Sep2019 23:00:00	2019	945.2549483	840.9506	1359.135	1334.549	980.0456
19Sep2019 0:00:00	2019	875.8306518	824.9069	1338.076	1260.894	993.8621
19Sep2019 1:00:00	2019	830.3040837	815.4522	1341.43	1219.248	992.3288
19Sep2019 2:00:00	2019	809.8252142	812.0266	1326.322	1180.658	991.5472
19Sep2019 3:00:00	2019	803.1019348	809.7115	1322.909	1174.823	994.0364
19Sep2019 4:00:00	2019	821.7034245	813.8833	1330.109	1186.577	997.5642
19Sep2019 5:00:00	2019	899.2643935	828.3872	1349.213	1252.545	999.2757

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19Sep2019 7:00:00	2019	1192.561034	896.1604	1424.307	1530.194	1001.422
19Sep2019 8:00:00	2019	1217.851744	915.0448	1466.099	1612.267	998.4648
19Sep2019 9:00:00	2019	1247.615654	922.3197	1497.7	1647.19	983.1247
19Sep2019 10:00:00	2019	1270.729831	914.369	1498.133	1676.653	959.0092
19Sep2019 11:00:00	2019	1287.870568	911.7123	1499.269	1709.403	943.7824
19Sep2019 12:00:00	2019	1302.404041	904.5354	1496.974	1718.123	935.3236
19Sep2019 13:00:00	2019	1307.741312	903.179	1473.647	1737.265	935.0406
19Sep2019 14:00:00	2019	1315.65205	895.4891	1496.633	1745.412	940.3084
19Sep2019 15:00:00	2019	1316.855346	890.9351	1502.461	1756.811	931.4579
19Sep2019 16:00:00	2019	1320.216089	896.6762	1514.181	1763.834	922.4232
19Sep2019 17:00:00	2019	1310.217887	898.2879	1486.747	1747.704	937.0674
19Sep2019 18:00:00	2019	1250.167892	887.2048	1481.345	1686.551	965.0786
19Sep2019 19:00:00	2019	1222.022051	885.271	1483.706	1663.728	972.5094
19Sep2019 20:00:00	2019	1230.397601	901.8205	1482.364	1650.012	972.2682
19Sep2019 21:00:00	2019	1159.238449	873.9618	1452.544	1567.694	955.7073
19Sep2019 22:00:00	2019	1047.274417	842.5378	1418.271	1442.898	946.6598
19Sep2019 23:00:00	2019	944.2010499	834.9366	1382.804	1334.907	955.1839
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20Sep2019 1:00:00	2019	839.6091783	788.0334	1348.613	1214.871	944.515
20Sep2019 2:00:00	2019	823.2552743	779.624	1328.398	1187.503	958.2709
20Sep2019 3:00:00	2019	818.8691392	781.7732	1314.048	1180.773	958.0131
20Sep2019 4:00:00	2019	834.3601181	787.3621	1326.703	1207.411	962.7832
20Sep2019 5:00:00	2019	908.7582373	804.6452	1363.554	1273.681	977.4175
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20Sep2019 7:00:00	2019	1178.804163	876.706	1410.035	1513.441	993.8947
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20Sep2019 17:00:00	2019	1279.863988	922.8218	1479.608	1629.674	975.746
20Sep2019 18:00:00	2019	1217.322575	917.9304	1467.172	1569.398	974.2466
20Sep2019 19:00:00	2019	1185.202539	921.9763	1462.682	1572.994	966.6113
20Sep2019 20:00:00	2019	1178.185652	921.1343	1454.277	1583.771	975.9468
20Sep2019 21:00:00	2019	1115.627512	892.816	1418.942	1553.561	975.3924
20Sep2019 22:00:00	2019	1033.604042	858.7741	1381.386	1455.971	975.1762
20Sep2019 23:00:00	2019	949.6717431	841.6381	1399.906	1341.263	973.1055
21Sep2019 0:00:00	2019	886.0003599	817.586	1410.092	1284.671	988.3577
21Sep2019 1:00:00	2019	840.2848087	800.4219	1392.907	1219.099	989.5493
21Sep2019 2:00:00	2019	814.8198068	792.3245	1377.085	1196.383	999.398
21Sep2019 3:00:00	2019	801.6065473	793.395	1386.018	1192.914	996.417
21Sep2019 4:00:00	2019	805.4467426	794.9262	1386.299	1164.179	979.5187

21Sep2019 5:00:00	2019	832.4540306	805.3208	1407.691	1172.3	980.2727
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21Sep2019 7:00:00	2019	944.4897459	834.0085	1438.538	1286.86	981.1266
21Sep2019 8:00:00	2019	1013.513167	853.0031	1456.363	1369.495	972.0864
21Sep2019 9:00:00	2019	1078.452	865.0232	1457.392	1451.979	969.6073
21Sep2019 10:00:00	2019	1120.675152	869.4566	1468.44	1482.366	970.8875
21Sep2019 11:00:00	2019	1149.560372	867.625	1470.611	1518.14	971.9215
21Sep2019 12:00:00	2019	1163.700638	865.8588	1459.366	1516.991	968.73
21Sep2019 13:00:00	2019	1158.867196	862.5842	1470.801	1495.654	965.7609
21Sep2019 14:00:00	2019	1150.373549	862.595	1482.466	1526.445	958.451
21Sep2019 15:00:00	2019	1155.213277	857.7409	1485.033	1539.339	964.2674
21Sep2019 16:00:00	2019	1165.693221	865.6767	1500.785	1578.261	1003.744
21Sep2019 17:00:00	2019	1177.508332	876.762	1521.222	1601.792	1006.992
21Sep2019 18:00:00	2019	1151.578904	875.5585	1512.355	1571.543	999.7366
21Sep2019 19:00:00	2019	1132.231453	877.5618	1511.821	1557.348	1008.969
21Sep2019 20:00:00	2019	1139.113922	883.2956	1523.334	1589.986	1007.667
21Sep2019 21:00:00	2019	1085.593052	864.5107	1488.008	1509.822	1004.113
21Sep2019 22:00:00	2019	1008.260952	837.2967	1458.216	1468.992	989.6507
21Sep2019 23:00:00	2019	931.2550953	820.4075	1414.557	1351.239	974.4842
22Sep2019 0:00:00	2019	866.6851849	799.2733	1380.607	1256.429	975.0248
22Sep2019 1:00:00	2019	823.8799776	784.3322	1357.495	1225.023	978.6492
22Sep2019 2:00:00	2019	795.8410039	770.4113	1326.34	1185.758	970.6177
22Sep2019 3:00:00	2019	786.6274932	766.7035	1328.637	1175.427	954.7358
22Sep2019 4:00:00	2019	786.6539598	766.8032	1345.511	1198.424	957.2525
22Sep2019 5:00:00	2019	803.3458902	771.0822	1351.719	1207.882	949.7432
22Sep2019 6:00:00	2019	843.3030996	785.4217	1372.576	1239.63	949.3665
22Sep2019 7:00:00	2019	881.5285914	798.5911	1386.716	1282.923	934.4674
22Sep2019 8:00:00	2019	945.1227658	807.9031	1413.319	1348.085	938.903
22Sep2019 9:00:00	2019	1024.259919	822.399	1463.707	1452.177	949.6976
22Sep2019 10:00:00	2019	1091.347846	835.5221	1439.817	1516.549	950.6551
22Sep2019 11:00:00	2019	1140.933696	841.7519	1399.685	1556.87	966.0283
22Sep2019 12:00:00	2019	1168.409438	847.0526	1374.763	1616.299	977.4364
22Sep2019 13:00:00	2019	1176.867916	846.8064	1365.515	1627.491	988.1684
22Sep2019 14:00:00	2019	1180.300289	855.734	1375.607	1617.925	996.795
22Sep2019 15:00:00	2019	1195.746266	863.0827	1392.386	1665.029	998.196
22Sep2019 16:00:00	2019	1221.740905	883.6935	1394.422	1686.34	990.7706
22Sep2019 17:00:00	2019	1229.996285	900.1593	1408.758	1676.917	989.151
22Sep2019 18:00:00	2019	1201.155956	892.846	1387.948	1629.859	976.5689
22Sep2019 19:00:00	2019	1182.930772	898.0505	1382.176	1635.651	985.0146
22Sep2019 20:00:00	2019	1183.196458	904.0133	1390.602	1648.315	979.9053
22Sep2019 21:00:00	2019	1114.230052	875.8258	1338.319	1564.569	964.2218
22Sep2019 22:00:00	2019	1017.829309	836.0472	1290.289	1456.661	943.4583
22Sep2019 23:00:00	2019	922.3649794	805.7157	1250.998	1330.993	925.1571
23Sep2019 0:00:00	2019	859.0920284	794.3901	1231.614	1263.973	926.1998
23Sep2019 1:00:00	2019	822.3567275	777.8106	1216.475	1240.313	918.1836
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23Sep2019 6:00:00	2019	1053.627335	833.1213	1260.11	1404.374	952.6549
23Sep2019 7:00:00	2019	1173.763632	875.5363	1323.9	1529.718	948.5494
23Sep2019 8:00:00	2019	1212.451854	887.6511	1351.299	1596.536	950.277
23Sep2019 9:00:00	2019	1254.426804	895.6205	1379.448	1651.073	959.5042
23Sep2019 10:00:00	2019	1293.07104	904.5491	1375.999	1672.022	977.8742
23Sep2019 11:00:00	2019	1323.092227	912.1608	1369.248	1721.272	991.7652
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23Sep2019 13:00:00	2019	1342.19798	907.5976	1380.015	1765.542	972.5898
23Sep2019 14:00:00	2019	1333.971995	906.7728	1402.249	1755.064	972.6406
23Sep2019 15:00:00	2019	1332.237225	917.0564	1402.857	1759.208	979.5825
23Sep2019 16:00:00	2019	1339.19852	930.9689	1417.74	1755.191	973.2845
23Sep2019 17:00:00	2019	1337.761157	934.9865	1414.37	1735.309	974.3245
23Sep2019 18:00:00	2019	1264.908606	926.3005	1395.114	1684.635	973.2559
23Sep2019 19:00:00	2019	1250.688559	928.5368	1398.829	1675.439	1051.679
23Sep2019 20:00:00	2019	1247.393499	929.6772	1403.778	1658.14	1061.613
23Sep2019 21:00:00	2019	1161.577118	904.9509	1360.186	1572.743	1055.587
23Sep2019 22:00:00	2019	1047.694435	871.2513	1318.667	1449.424	1043.538
23Sep2019 23:00:00	2019	946.9998533	834.7825	1280.086	1339.239	1029.415
24Sep2019 0:00:00	2019	879.1106919	812.5006	1249.11	1270.349	1032.536
24Sep2019 1:00:00	2019	837.8397645	799.3175	1242.831	1233.619	1032.114
24Sep2019 2:00:00	2019	816.5163666	788.6034	1245.443	1213.882	1031.318
24Sep2019 3:00:00	2019	813.4268874	787.2482	1254.135	1204.315	1030.536
24Sep2019 4:00:00	2019	830.5268003	791.3851	1260.587	1218.296	1029.202
24Sep2019 5:00:00	2019	903.5915801	807.0641	1256.22	1260.367	1038.875
24Sep2019 6:00:00	2019	1067.895869	842.0102	1260.796	1377.324	1058.684
24Sep2019 7:00:00	2019	1193.726866	885.9141	1297.004	1517.551	1052.103
24Sep2019 8:00:00	2019	1213.302958	898.4047	1273.171	1570.076	1035.443
24Sep2019 9:00:00	2019	1246.324335	895.1805	1300.549	1621.99	1044.05
24Sep2019 10:00:00	2019	1277.688918	894.0124	1318.665	1652.209	1046.963
24Sep2019 11:00:00	2019	1308.365764	903.9401	1348.885	1701.222	1044.609
24Sep2019 12:00:00	2019	1311.25548	897.4713	1353.902	1705.946	1034.565
24Sep2019 13:00:00	2019	1309.399437	896.5128	1347.303	1716.712	1031.453
24Sep2019 14:00:00	2019	1305.337761	892.9614	1347.462	1712.276	1031.632
24Sep2019 15:00:00	2019	1302.194044	883.2726	1362.283	1703.251	1022.561
24Sep2019 16:00:00	2019	1311.884814	902.4807	1379.3	1724.255	1017.552
24Sep2019 17:00:00	2019	1300.155144	902.3227	1376.885	1732.216	1013.931
24Sep2019 18:00:00	2019	1235.496711	895.1663	1350.427	1689.714	1011.055
24Sep2019 19:00:00	2019	1229.248047	907.4532	1362.491	1677.918	1028.347
24Sep2019 20:00:00	2019	1223.365314	908.9377	1368.981	1675.271	1065.626
24Sep2019 21:00:00	2019	1142.191199	890.2514	1334.615	1609.399	1101.466
24Sep2019 22:00:00	2019	1034.313184	854.2156	1305.691	1483.758	1092.178
24Sep2019 23:00:00	2019	932.6746566	827.8651	1272.759	1381.34	1105.313
25Sep2019 0:00:00	2019	866.9108292	811.3579	1248.264	1307.653	1092.027
25Sep2019 1:00:00	2019	829.9691092	803.789	1238.953	1275.611	1087.579
25Sep2019 2:00:00	2019	811.6641728	799.1547	1226.705	1229.125	1077.784

25Sep2019 3:00:00	2019	808.1319193	798.2334	1215.49	1180.397	1090.035
25Sep2019 4:00:00	2019	828.9273652	799.7528	1219.212	1197.517	1092.563
25Sep2019 5:00:00	2019	910.5619657	816.1368	1231.95	1276.751	1092.244
25Sep2019 6:00:00	2019	1078.842888	861.1424	1256.58	1419.612	1092.132
25Sep2019 7:00:00	2019	1213.373146	896.9712	1294.398	1544.664	1108.826
25Sep2019 8:00:00	2019	1236.531014	913.6372	1307.088	1595.066	1105.307
25Sep2019 9:00:00	2019	1257.742013	921.1051	1325.537	1626.307	1101.832
25Sep2019 10:00:00	2019	1274.494319	915.2547	1331.074	1659.558	1104.547
25Sep2019 11:00:00	2019	1294.404467	907.6073	1327.657	1663.941	1104.567
25Sep2019 12:00:00	2019	1303.059595	911.0564	1302.407	1661.816	1101.738
25Sep2019 13:00:00	2019	1315.395579	900.8378	1325.5	1703.934	1099.766
25Sep2019 14:00:00	2019	1310.446979	902.507	1327.16	1694.821	1092.51
25Sep2019 15:00:00	2019	1303.113272	908.8809	1335.027	1672.289	1086.202
25Sep2019 16:00:00	2019	1310.170227	920.9724	1355.067	1712.228	1091.996
25Sep2019 17:00:00	2019	1300.06579	927.7526	1357.665	1704.518	1090.573
25Sep2019 18:00:00	2019	1241.042614	919.8267	1362.934	1644.928	1090.802
25Sep2019 19:00:00	2019	1242.140218	926.5373	1376.732	1662.676	1111.281
25Sep2019 20:00:00	2019	1232.66192	931.1756	1377.376	1684.593	1133.279
25Sep2019 21:00:00	2019	1153.688501	904.1128	1344.138	1596.817	1135.41
25Sep2019 22:00:00	2019	1043.105401	863.775	1300.434	1460.434	1121.504
25Sep2019 23:00:00	2019	941.5246409	837.0571	1253.022	1336.307	1108.882
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26Sep2019 1:00:00	2019	832.63293	804.5797	1240.783	1240.702	1099.207
26Sep2019 2:00:00	2019	813.8029647	800.915	1240.467	1212.16	1098.867
26Sep2019 3:00:00	2019	813.2600672	797.8004	1239.858	1205.085	1101.168
26Sep2019 4:00:00	2019	831.0676881	804.5455	1260.421	1250.254	1104.363
26Sep2019 5:00:00	2019	910.2923056	818.4182	1278.143	1292.816	1114.657
26Sep2019 6:00:00	2019	1073.427537	861.9625	1317.106	1435.024	1119.583
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26Sep2019 8:00:00	2019	1231.872109	922.1722	1398.334	1632.139	1112.232
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26Sep2019 10:00:00	2019	1264.716058	895.5106	1378.015	1728.016	1111.164
26Sep2019 11:00:00	2019	1279.304682	893.2907	1384.871	1755.268	1110.264
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26Sep2019 13:00:00	2019	1283.786108	901.67	1388.651	1750.719	1103.83
26Sep2019 14:00:00	2019	1275.243033	909.0987	1396.228	1690.471	1109.704
26Sep2019 15:00:00	2019	1272.428122	912.9053	1419.553	1700.574	1103.615
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26Sep2019 17:00:00	2019	1285.055795	930.6441	1424.81	1701.642	1069.758
26Sep2019 18:00:00	2019	1236.418472	923.1412	1410.096	1680.34	1052.046
26Sep2019 19:00:00	2019	1240.918321	935.282	1412.301	1697.867	1072.1
26Sep2019 20:00:00	2019	1236.811194	939.001	1413.134	1654.673	1079.092
26Sep2019 21:00:00	2019	1160.001888	911.092	1375.871	1577.157	1074.48
26Sep2019 22:00:00	2019	1053.337048	873.7406	1317.707	1474.52	1070.372
26Sep2019 23:00:00	2019	955.6342119	843.6575	1277.511	1378.876	1057.212
27Sep2019 0:00:00	2019	888.4409734	820.7298	1261.533	1299.094	1048.486
27Sep2019 1:00:00	2019	847.1785177	806.1288	1253.337	1267.41	1048.618

27Sep2019 2:00:00	2019	829.601231	802.869	1270.872	1240.352	1046.568
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27Sep2019 4:00:00	2019	842.2273338	797.6048	1271.217	1261.799	1040.548
27Sep2019 5:00:00	2019	916.1254421	814.4942	1283.22	1322.379	1043.408
27Sep2019 6:00:00	2019	1073.797795	852.4979	1337.875	1479.42	1046.148
27Sep2019 7:00:00	2019	1217.066245	897.7505	1398.455	1643.35	1054.027
27Sep2019 8:00:00	2019	1258.763081	903.0834	1409.216	1679.423	1056.445
27Sep2019 9:00:00	2019	1288.930217	891.429	1410.556	1689.502	1056.126
27Sep2019 10:00:00	2019	1307.627869	879.003	1405.84	1746.487	1065.98
27Sep2019 11:00:00	2019	1315.420018	874.1944	1384.99	1789.08	1064.888
27Sep2019 12:00:00	2019	1314.419191	867.4479	1389.942	1760.692	1074.108
27Sep2019 13:00:00	2019	1313.990357	863.5185	1387.258	1743.233	1075.793
27Sep2019 14:00:00	2019	1303.043498	863.7376	1409.027	1732.734	1074.487
27Sep2019 15:00:00	2019	1295.69869	856.2732	1410.073	1730.632	1064.681
27Sep2019 16:00:00	2019	1293.491081	861.5525	1418.332	1732.936	1083.939
27Sep2019 17:00:00	2019	1293.950757	864.9363	1395.528	1730.026	1082.537
27Sep2019 18:00:00	2019	1253.533788	880.1228	1381.887	1703.632	1078.406
27Sep2019 19:00:00	2019	1250.137197	905.5776	1420.161	1700.596	1089.092
27Sep2019 20:00:00	2019	1222.802467	905.8654	1429.317	1697.031	1096.205
27Sep2019 21:00:00	2019	1160.553975	897.3139	1399.998	1623.527	1081.957
27Sep2019 22:00:00	2019	1073.023726	865.1702	1367.962	1529.727	1074.408
27Sep2019 23:00:00	2019	987.5085591	832.0484	1321.8	1426.71	1060.915
28Sep2019 0:00:00	2019	918.5294877	807.4987	1263.954	1339.75	1051.925
28Sep2019 1:00:00	2019	874.7552941	793.9389	1246.126	1289.483	1047.873
28Sep2019 2:00:00	2019	849.3839682	789.4972	1240.881	1256.189	1040.708
28Sep2019 3:00:00	2019	840.9401814	790.9425	1233.858	1239.249	1039.54
28Sep2019 4:00:00	2019	842.8799997	793.7363	1236.905	1223.55	1038.898
28Sep2019 5:00:00	2019	870.733507	803.9872	1247.893	1255.407	1042.122
28Sep2019 6:00:00	2019	923.8338437	821.184	1269.289	1319.222	1050.867
28Sep2019 7:00:00	2019	996.0946029	850.956	1303.437	1387.059	1054.01
28Sep2019 8:00:00	2019	1073.412944	868.1314	1331.865	1477.59	1058.594
28Sep2019 9:00:00	2019	1149.754278	882.4391	1316.342	1528.984	1063.613
28Sep2019 10:00:00	2019	1195.806416	894.0844	1316.92	1563.157	1044.366
28Sep2019 11:00:00	2019	1217.021387	901.8299	1331.436	1547.519	1032.002
28Sep2019 12:00:00	2019	1216.180331	907.1124	1336.291	1567.14	1030.717
28Sep2019 13:00:00	2019	1204.044783	901.6727	1336.43	1570.886	1035.509
28Sep2019 14:00:00	2019	1178.856066	891.9195	1374.473	1571.349	1043.238
28Sep2019 15:00:00	2019	1169.729348	887.0173	1403.24	1592.276	1056.35
28Sep2019 16:00:00	2019	1185.285374	892.7459	1414.079	1618.337	1065.456
28Sep2019 17:00:00	2019	1210.262383	901.0165	1398.71	1604.535	1068.872
28Sep2019 18:00:00	2019	1193.796349	898.2732	1400.641	1555.7	1068.575
28Sep2019 19:00:00	2019	1196.274539	898.0955	1406.995	1571.115	1080.511
28Sep2019 20:00:00	2019	1174.433437	890.4063	1375.196	1551.847	1064.485
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28Sep2019 22:00:00	2019	1052.292328	865.0205	1346.95	1432.142	1036.399
28Sep2019 23:00:00	2019	975.7439833	837.165	1320.093	1342.711	1021.449
29Sep2019 0:00:00	2019	911.3908638	814.885	1298.435	1284.693	1010.822

29Sep2019 1:00:00	2019	868.3697241	799.7159	1289.333	1260.031	1020.725
29Sep2019 2:00:00	2019	842.7581113	788.2681	1263.704	1228.091	1018.699
29Sep2019 3:00:00	2019	830.3590789	784.3253	1247.217	1220.023	1038.74
29Sep2019 4:00:00	2019	832.6360377	789.7094	1245.699	1209.616	1053.943
29Sep2019 5:00:00	2019	855.2471305	785.9163	1260.661	1236.949	1065.324
29Sep2019 6:00:00	2019	898.8887822	800.6609	1293.016	1276.45	1068.391
29Sep2019 7:00:00	2019	955.3952266	829.7291	1322.109	1326.564	1070.055
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29Sep2019 16:00:00	2019	1225.123062	877.5079	1448.739	1597.96	1051.438
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29Sep2019 18:00:00	2019	1249.635691	870.8461	1386.665	1583.242	1063.724
29Sep2019 19:00:00	2019	1252.839591	872.3075	1413.557	1613.215	1097.04
29Sep2019 20:00:00	2019	1224.460892	864.9192	1415.038	1596.758	1102.623
29Sep2019 21:00:00	2019	1152.747557	840.1875	1397.601	1549.715	1103.288
29Sep2019 22:00:00	2019	1056.690911	805.4118	1368.504	1446.963	1098.883
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30Sep2019 18:00:00	2019	1275.720606	865.8364	1371.397	1694.961	1086.982
30Sep2019 19:00:00	2019	1295.229501	900.7486	1402.685	1698.341	1096.842
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30Sep2019 21:00:00	2019	1200.459422	887.2895	1374.776	1580.237	1057.075
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03Oct2019 2:00:00	2019	857.3976888	841.4419	1274.942	1247.934	988.1234
03Oct2019 3:00:00	2019	850.6736782	840.0163	1270.632	1247.152	988.3212
03Oct2019 4:00:00	2019	875.1091113	846.3078	1273.397	1263.692	988.0277
03Oct2019 5:00:00	2019	960.0087296	860.109	1287.066	1338.75	993.7303
03Oct2019 6:00:00	2019	1121.456961	909.2779	1333.916	1485.11	1008.522
03Oct2019 7:00:00	2019	1250.91147	941.3334	1394.843	1628.545	1023.469
03Oct2019 8:00:00	2019	1266.494892	939.2742	1395.697	1632.978	1027.089
03Oct2019 9:00:00	2019	1275.539511	936.6298	1393.285	1645.657	1026.482
03Oct2019 10:00:00	2019	1287.359669	941.1934	1394.325	1671.619	1021.01
03Oct2019 11:00:00	2019	1299.145256	928.7844	1402.349	1675.786	1025.682
03Oct2019 12:00:00	2019	1295.520918	914.5266	1398.863	1675.116	1020.824
03Oct2019 13:00:00	2019	1292.600842	914.6873	1384.623	1669.973	1012.306
03Oct2019 14:00:00	2019	1284.727219	910.0412	1373.617	1674.485	1005.283
03Oct2019 15:00:00	2019	1279.875842	907.2303	1384.107	1666.027	1006.902
03Oct2019 16:00:00	2019	1285.249442	913.859	1392.731	1670.196	1012.217
03Oct2019 17:00:00	2019	1285.696212	924.5348	1390.529	1676.195	1011.994
03Oct2019 18:00:00	2019	1243.744209	923.3415	1385.003	1634.955	1014.646
03Oct2019 19:00:00	2019	1269.251246	944.6687	1408.035	1634.648	1032.09
03Oct2019 20:00:00	2019	1249.240368	945.5689	1391.932	1636.742	1032.548
03Oct2019 21:00:00	2019	1170.327589	924.7476	1362.731	1558.354	1025
03Oct2019 22:00:00	2019	1061.290314	903.2871	1321.513	1447.585	1011.395
03Oct2019 23:00:00	2019	967.3782434	878.1615	1284.268	1343.689	1004.672
04Oct2019 0:00:00	2019	900.7596053	855.3077	1270.299	1277.511	995.4918
04Oct2019 1:00:00	2019	863.7470688	850.0248	1262.414	1239.922	971.7852
04Oct2019 2:00:00	2019	843.4713541	845.3891	1265.686	1243.549	973.2294
04Oct2019 3:00:00	2019	838.9645067	840.9894	1267.093	1247.175	974.0731
04Oct2019 4:00:00	2019	858.8378538	852.6465	1272.532	1248.815	983.3496
04Oct2019 5:00:00	2019	935.6460725	866.6242	1293.366	1314.983	994.648
04Oct2019 6:00:00	2019	1093.195464	894.5614	1337.793	1438.509	1007.803
04Oct2019 7:00:00	2019	1237.635574	941.4932	1395.748	1615.517	1029.86
04Oct2019 8:00:00	2019	1263.621256	952.3188	1391.12	1638.253	1043.241
04Oct2019 9:00:00	2019	1278.643412	943.9979	1392.582	1679.656	1025.027
04Oct2019 10:00:00	2019	1284.545325	936.3163	1419.026	1710.033	1012.746
04Oct2019 11:00:00	2019	1294.174369	926.8804	1418.624	1724.093	1010.373
04Oct2019 12:00:00	2019	1293.67232	919.8793	1405.316	1720.254	1011.51
04Oct2019 13:00:00	2019	1292.986608	915.5976	1395.752	1699.826	1018.212
04Oct2019 14:00:00	2019	1281.727296	905.9753	1377.372	1655.487	1003.882
04Oct2019 15:00:00	2019	1272.913942	897.9949	1384.741	1629.259	993.9723
04Oct2019 16:00:00	2019	1265.144143	907.5247	1375.503	1604.231	994.1928
04Oct2019 17:00:00	2019	1254.7219	905.4748	1379.534	1606.441	999.6067
04Oct2019 18:00:00	2019	1202.296546	903.3571	1356.963	1573.037	1008.476
04Oct2019 19:00:00	2019	1217.38624	929.664	1400.28	1609.271	1030.065
04Oct2019 20:00:00	2019	1196.839312	939.1543	1396.896	1580.359	1030.397
04Oct2019 21:00:00	2019	1128.954189	937.6527	1378.124	1503.117	1028.08

04Oct2019 22:00:00	2019	1043.192716	910.2206	1352.655	1456.599	1022.858
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05Oct2019 2:00:00	2019	830.9400523	842.0086	1267.088	1205.11	1000.569
05Oct2019 3:00:00	2019	820.7663031	825.0291	1274.268	1199.906	1004.254
05Oct2019 4:00:00	2019	823.3766171	816.7865	1278.933	1196.304	999.7732
05Oct2019 5:00:00	2019	848.4097799	810.6304	1280.317	1191.128	1013.619
05Oct2019 6:00:00	2019	904.9115086	827.7247	1302.083	1274.56	1026.824
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05Oct2019 9:00:00	2019	1108.845078	886.5135	1374.899	1482.791	1048.166
05Oct2019 10:00:00	2019	1139.090934	878.5371	1373.883	1548.72	1042.027
05Oct2019 11:00:00	2019	1149.77199	874.0506	1384.497	1584.334	1036.806
05Oct2019 12:00:00	2019	1153.270857	867.2082	1354.8	1587.33	1032.886
05Oct2019 13:00:00	2019	1147.201498	856.3304	1365.911	1548.515	1031.513
05Oct2019 14:00:00	2019	1137.342184	856.3302	1370.431	1544.753	1035.103
05Oct2019 15:00:00	2019	1127.62077	855.045	1361.144	1520.542	1030.331
05Oct2019 16:00:00	2019	1129.091631	864.5433	1367.143	1520.486	1051.768
05Oct2019 17:00:00	2019	1141.969182	875.4115	1378.085	1529.762	1042.515
05Oct2019 18:00:00	2019	1127.300696	875.2551	1382.673	1519.916	1057.929
05Oct2019 19:00:00	2019	1153.444387	895.5299	1417.274	1562.14	1056.627
05Oct2019 20:00:00	2019	1132.210108	878.3707	1401.931	1539.014	1069.088
05Oct2019 21:00:00	2019	1083.318922	876.009	1383.135	1485.205	1079.98
05Oct2019 22:00:00	2019	1014.819453	854.4106	1370.373	1440.024	1077.973
05Oct2019 23:00:00	2019	942.169487	829.2169	1342.971	1361.154	1083.141
06Oct2019 0:00:00	2019	880.1285331	812.068	1317.794	1280.029	1076.312
06Oct2019 1:00:00	2019	838.9294619	800.9236	1314.369	1246.024	1075.468
06Oct2019 2:00:00	2019	814.4734401	795.4516	1307.747	1209.375	1067.918
06Oct2019 3:00:00	2019	802.1853282	792.4288	1299.693	1153.542	1063.37
06Oct2019 4:00:00	2019	806.1139975	791.5868	1284.34	1165.361	1055.429
06Oct2019 5:00:00	2019	826.076941	797.7356	1309.343	1185.861	1056.493
06Oct2019 6:00:00	2019	869.6267449	811.1861	1334.425	1209.531	1052.891
06Oct2019 7:00:00	2019	926.0962408	834.3103	1364.511	1290.825	1047.943
06Oct2019 8:00:00	2019	979.6947963	853.3858	1359.381	1338.692	1019.451
06Oct2019 9:00:00	2019	1040.55196	861.006	1383.111	1406.005	1010.269
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06Oct2019 11:00:00	2019	1116.684916	844.996	1408.207	1480.439	994.0547
06Oct2019 12:00:00	2019	1134.324959	834.7301	1414.189	1533.006	990.8055
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06Oct2019 14:00:00	2019	1129.9424	831.8098	1361.448	1531.27	991.2139
06Oct2019 15:00:00	2019	1141.094049	842.5702	1354.994	1545.975	1011.349
06Oct2019 16:00:00	2019	1163.992818	858.2576	1362.784	1558.255	1016.256
06Oct2019 17:00:00	2019	1188.599937	875.3918	1380.248	1610.463	1022.645
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06Oct2019 19:00:00	2019	1200.589335	897.2974	1405.695	1636.731	1037.154
06Oct2019 20:00:00	2019	1181.299149	891.8679	1411.376	1605.744	1046.517

06Oct2019 21:00:00	2019	1111.619717	883.0994	1415.927	1500.881	1042.381
06Oct2019 22:00:00	2019	1010.87822	850.8755	1388.238	1420.261	1030.288
06Oct2019 23:00:00	2019	918.6256055	821.2126	1348.92	1311.55	1014.539
07Oct2019 0:00:00	2019	855.1582716	804.3412	1317.509	1212.831	1001.749
07Oct2019 1:00:00	2019	824.0983694	798.5808	1300.76	1188.826	1012.494
07Oct2019 2:00:00	2019	810.7317383	794.6112	1305.375	1179.039	1014.866
07Oct2019 3:00:00	2019	809.2232608	793.508	1303.363	1158.116	1028.559
07Oct2019 4:00:00	2019	831.4644976	802.3567	1299.565	1196.563	1030.715
07Oct2019 5:00:00	2019	914.8185312	823.2	1336.368	1244.316	1040.863
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07Oct2019 14:00:00	2019	1317.416077	903.7597	1418.347	1678.123	1031.538
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07Oct2019 18:00:00	2019	1281.091483	885.8198	1455.924	1711.04	1095.888
07Oct2019 19:00:00	2019	1297.831654	901.8426	1477.99	1699.772	1112.258
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07Oct2019 21:00:00	2019	1162.950569	906.0996	1423.141	1572.296	1107.126
07Oct2019 22:00:00	2019	1048.578348	875.2263	1376.59	1455.058	1091.775
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08Oct2019 0:00:00	2019	890.5462947	821.6457	1319.808	1290.755	1078.397
08Oct2019 1:00:00	2019	851.8237753	812.7289	1313.18	1223.294	1078.642
08Oct2019 2:00:00	2019	835.2945599	809.4439	1305.427	1226.688	1075.674
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08Oct2019 5:00:00	2019	940.763327	836.6909	1377.01	1324.837	1066.417
08Oct2019 6:00:00	2019	1101.134832	850.9728	1404.365	1493.782	1077.04
08Oct2019 7:00:00	2019	1252.892679	878.9223	1468.91	1661.675	1091.178
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09Oct2019 10:00:00	2019	1324.320638	932.0401	1350.918	1695.236	1074.414
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09Oct2019 22:00:00	2019	1122.749696	946.8564	1339.98	1494.705	1055.049
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11Oct2019 16:00:00	2019	1266.456897	901.4048	1303.766	1614.876	1126.916
11Oct2019 17:00:00	2019	1263.571773	906.418	1297.011	1597.605	1128.442
11Oct2019 18:00:00	2019	1233.346476	909.742	1303.88	1580.112	1150.483
11Oct2019 19:00:00	2019	1263.285587	936.4371	1346.413	1623.958	1180.045
11Oct2019 20:00:00	2019	1235.52747	934.3587	1356.098	1586.492	1192.588
11Oct2019 21:00:00	2019	1173.570048	921.733	1334.283	1521.893	1185.744
11Oct2019 22:00:00	2019	1087.557913	905.2278	1294.733	1446.442	1167.289
11Oct2019 23:00:00	2019	1005.018063	878.5565	1267.304	1355.606	1158.002
12Oct2019 0:00:00	2019	939.4471735	856.7633	1246.604	1282.967	1157.231
12Oct2019 1:00:00	2019	893.7517246	841.8461	1238.464	1249.897	1162.224
12Oct2019 2:00:00	2019	869.5954434	833.7549	1231.326	1239.343	1165.094
12Oct2019 3:00:00	2019	858.3858561	834.4067	1205.059	1209.051	1162.711
12Oct2019 4:00:00	2019	864.8040193	838.3122	1210.765	1224.178	1164.754
12Oct2019 5:00:00	2019	887.8955129	846.9769	1221.706	1243.661	1164.464
12Oct2019 6:00:00	2019	940.4313342	866.8069	1243.038	1266.313	1161.704
12Oct2019 7:00:00	2019	1011.375044	894.7731	1282.794	1381.889	1173.099
12Oct2019 8:00:00	2019	1066.408804	910.8598	1283.816	1446.634	1169.396
12Oct2019 9:00:00	2019	1121.178068	915.9832	1297.623	1483.238	1148.631
12Oct2019 10:00:00	2019	1153.436058	912.3279	1304.25	1523.631	1135.277
12Oct2019 11:00:00	2019	1160.900222	879.7328	1321.04	1526.072	1131.854
12Oct2019 12:00:00	2019	1163.610327	863.9268	1315.692	1522.375	1121.614
12Oct2019 13:00:00	2019	1152.417163	878.7879	1307.984	1534.002	1123.774
12Oct2019 14:00:00	2019	1138.915002	882.5359	1297.984	1489.223	1054.303
12Oct2019 15:00:00	2019	1133.147663	879.9608	1290.559	1511.455	1028.405
12Oct2019 16:00:00	2019	1135.027053	885.6301	1292.973	1515.501	1023.211
12Oct2019 17:00:00	2019	1139.695658	895.6763	1304.93	1482.278	1027.95

12Oct2019 18:00:00	2019	1135.126112	902.348	1294.247	1485.609	1034.42
12Oct2019 19:00:00	2019	1161.744407	895.4466	1295.796	1555.112	1049.571
12Oct2019 20:00:00	2019	1132.650465	882.1188	1301.504	1527.071	1060.299
12Oct2019 21:00:00	2019	1091.584252	881.265	1299.615	1482.805	1062.23
12Oct2019 22:00:00	2019	1026.561079	866.4681	1280.232	1425.32	1066.101
12Oct2019 23:00:00	2019	953.3397872	848.7153	1250.273	1340.06	1057.723
13Oct2019 0:00:00	2019	895.6724791	828.3032	1225.74	1278.452	1044.471
13Oct2019 1:00:00	2019	854.9352458	815.5188	1207.566	1238.461	1033.948
13Oct2019 2:00:00	2019	830.433173	811.3493	1201.352	1200.371	1023.682
13Oct2019 3:00:00	2019	820.3507431	808.0128	1203.325	1194.188	977.5415
13Oct2019 4:00:00	2019	825.0732039	809.3442	1201.939	1185.045	977.807
13Oct2019 5:00:00	2019	845.4656919	819.8204	1205.401	1205.74	967.0293
13Oct2019 6:00:00	2019	886.0358004	840.3075	1222.484	1255.482	952.5503
13Oct2019 7:00:00	2019	947.1848035	865.7697	1251.389	1330.055	953.3261
13Oct2019 8:00:00	2019	999.1840141	887.5053	1283.12	1396.598	964.6108
13Oct2019 9:00:00	2019	1054.863412	899.74	1309.777	1440.546	976.1472
13Oct2019 10:00:00	2019	1111.814989	909.0683	1336.602	1484.895	985.9265
13Oct2019 11:00:00	2019	1142.379299	909.9978	1331.797	1506.812	994.4428
13Oct2019 12:00:00	2019	1158.906075	907.8633	1335.271	1517.837	991.8536
13Oct2019 13:00:00	2019	1163.211687	908.4117	1330.321	1519.149	988.6771
13Oct2019 14:00:00	2019	1158.769384	874.8306	1313.463	1519.551	999.5478
13Oct2019 15:00:00	2019	1154.305877	881.5937	1333.361	1523.69	1003.817
13Oct2019 16:00:00	2019	1154.370459	879.9679	1329.704	1566.107	1005.34
13Oct2019 17:00:00	2019	1138.087067	876.831	1359.604	1580.912	1009.067
13Oct2019 18:00:00	2019	1111.477145	872.9558	1357.872	1535.653	1019.889
13Oct2019 19:00:00	2019	1119.062671	878.7465	1358.522	1547.984	1062.308
13Oct2019 20:00:00	2019	1096.021089	887.8625	1351.733	1505.513	1092.38
13Oct2019 21:00:00	2019	1059.224062	881.4654	1320.74	1448.688	1104.034
13Oct2019 22:00:00	2019	999.231725	860.0666	1284.848	1386.304	1101.133
13Oct2019 23:00:00	2019	933.8693638	836.6678	1274.32	1322.456	1096.337
14Oct2019 0:00:00	2019	876.7848518	816.9912	1244.617	1254.131	1087.893
14Oct2019 1:00:00	2019	841.3583926	807.5524	1212.571	1180.695	1083.618
14Oct2019 2:00:00	2019	820.5036547	800.716	1242.976	1224.56	1097.209
14Oct2019 3:00:00	2019	813.0083776	797.4244	1261.343	1222.834	1107.314
14Oct2019 4:00:00	2019	821.4201057	797.4357	1263.999	1203.339	1077.464
14Oct2019 5:00:00	2019	855.4339092	807.621	1268.612	1259.238	1033.261
14Oct2019 6:00:00	2019	908.4847297	826.5413	1255.411	1285.944	1013.641
14Oct2019 7:00:00	2019	963.4625768	858.0118	1265.353	1366.945	1019.382
14Oct2019 8:00:00	2019	1003.025231	883.5347	1301.378	1405.236	1031.924
14Oct2019 9:00:00	2019	1072.253546	907.4046	1328.673	1510.234	1038.441
14Oct2019 10:00:00	2019	1136.016115	929.0775	1359.851	1570.96	1050.396
14Oct2019 11:00:00	2019	1177.776273	936.3594	1396.386	1639.891	1059.143
14Oct2019 12:00:00	2019	1200.629329	935.1323	1398.274	1633.761	1053.097
14Oct2019 13:00:00	2019	1203.777396	929.0501	1398.513	1627.619	1054.877
14Oct2019 14:00:00	2019	1201.191952	924.4481	1406.973	1622.459	1060.359
14Oct2019 15:00:00	2019	1200.834281	920.9741	1407.891	1621.677	1072.057
14Oct2019 16:00:00	2019	1218.116341	926.4676	1398.957	1602.659	1088.367

14Oct2019 17:00:00	2019	1233.247909	927.1761	1392.525	1604.674	1083.995
14Oct2019 18:00:00	2019	1218.670614	926.4617	1393.685	1594.436	1091.284
14Oct2019 19:00:00	2019	1225.234951	941.1813	1407.325	1597.039	1125.004
14Oct2019 20:00:00	2019	1190.637656	928.3135	1386.419	1561.243	1137.236
14Oct2019 21:00:00	2019	1124.75655	905.0287	1360.707	1493.09	1099.286
14Oct2019 22:00:00	2019	1029.166883	871.1101	1317.615	1415.181	1090.822
14Oct2019 23:00:00	2019	939.9136549	834.9726	1275.598	1296.926	1068.134
15Oct2019 0:00:00	2019	884.9985582	820.1437	1245.959	1232.306	1074.012
15Oct2019 1:00:00	2019	851.4746229	811.7865	1230.49	1200.841	1067.157
15Oct2019 2:00:00	2019	835.3498854	805.0262	1231.665	1202.489	1053.775
15Oct2019 3:00:00	2019	834.2515799	810.602	1220.898	1210.894	1075.201
15Oct2019 4:00:00	2019	858.1526857	825.3632	1220.937	1236.814	1077.709
15Oct2019 5:00:00	2019	940.4328058	848.7705	1250.408	1306.438	1084.953
15Oct2019 6:00:00	2019	1106.742044	894.0328	1300.23	1464.416	1074.65
15Oct2019 7:00:00	2019	1255.596047	948.9339	1369.434	1630.349	1053.819
15Oct2019 8:00:00	2019	1289.166339	958.2439	1383.875	1693.589	1032.77
15Oct2019 9:00:00	2019	1300.602198	941.9061	1397.715	1722.547	1008.776
15Oct2019 10:00:00	2019	1305.943927	932.5018	1389.311	1740.206	1028.414
15Oct2019 11:00:00	2019	1307.854684	919.9988	1399.688	1765.91	1037.374
15Oct2019 12:00:00	2019	1307.344968	908.7786	1394.649	1746.485	1046.106
15Oct2019 13:00:00	2019	1315.794313	912.5585	1388.524	1765.045	1037.076
15Oct2019 14:00:00	2019	1315.581886	913.2321	1383.146	1757.146	1047.916
15Oct2019 15:00:00	2019	1330.228422	919.4543	1370.745	1758.664	1058.552
15Oct2019 16:00:00	2019	1349.588297	915.7361	1377.9	1768.456	1076.063
15Oct2019 17:00:00	2019	1359.556136	918.4991	1373.83	1777.882	1122.522
15Oct2019 18:00:00	2019	1314.858573	921.7198	1373.234	1784.256	1145.051
15Oct2019 19:00:00	2019	1315.004518	930.9132	1394.485	1768.196	1139.966
15Oct2019 20:00:00	2019	1268.646151	937.6754	1385.065	1706.442	1126.91
15Oct2019 21:00:00	2019	1186.092068	925.0426	1366.68	1619.391	1148.285
15Oct2019 22:00:00	2019	1075.535638	888.5131	1327.566	1486.213	1142.257
15Oct2019 23:00:00	2019	970.2728907	854.7723	1296.056	1396.262	1109.095
16Oct2019 0:00:00	2019	900.48605	831.3797	1283.142	1324.916	1079.39
16Oct2019 1:00:00	2019	862.5137766	817.6023	1258.601	1261.354	1073.996
16Oct2019 2:00:00	2019	845.615812	806.0406	1254.979	1232.971	1056.163
16Oct2019 3:00:00	2019	841.4029401	805.7439	1248.755	1208.699	1044.764
16Oct2019 4:00:00	2019	860.8987996	813.6337	1246.781	1215.937	1052.308
16Oct2019 5:00:00	2019	941.8798295	828.4762	1267.484	1263.895	1081.217
16Oct2019 6:00:00	2019	1101.958667	874.3051	1313.591	1414.461	1095.407
16Oct2019 7:00:00	2019	1251.116018	921.5866	1366.532	1588.322	1094.644
16Oct2019 8:00:00	2019	1270.198069	926.3643	1371.833	1610.567	1082.076
16Oct2019 9:00:00	2019	1274.844688	918.4564	1370.498	1631.495	1078.009
16Oct2019 10:00:00	2019	1285.998157	912.3946	1372.139	1663.914	1066.433
16Oct2019 11:00:00	2019	1302.076374	891.6661	1350.568	1662.801	1071.208
16Oct2019 12:00:00	2019	1302.930634	875.5072	1371.953	1657.702	1077.176
16Oct2019 13:00:00	2019	1304.08109	872.5537	1382.498	1653.576	1073.654
16Oct2019 14:00:00	2019	1305.131622	871.5165	1372.449	1650.335	1059.428
16Oct2019 15:00:00	2019	1316.655729	878.5257	1382.969	1651.481	1057.997

16Oct2019 16:00:00	2019	1329.128813	893.8757	1393.239	1656.066	1049.061
16Oct2019 17:00:00	2019	1323.147644	896.6304	1378.34	1637.823	1061.074
16Oct2019 18:00:00	2019	1279.83943	905.8565	1395.53	1638.394	1082.38
16Oct2019 19:00:00	2019	1301.44527	929.5828	1429.18	1663.103	1095.608
16Oct2019 20:00:00	2019	1249.874523	921.8886	1426.115	1641.497	1091.876
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16Oct2019 23:00:00	2019	955.7945145	848.2116	1292.31	1344.581	1058.272
17Oct2019 0:00:00	2019	893.8984455	831.5302	1269.295	1271.124	1044.225
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17Oct2019 2:00:00	2019	833.4242608	807.262	1246.935	1199.004	1049.81
17Oct2019 3:00:00	2019	827.9798747	809.4995	1232.156	1163.195	1040.349
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17Oct2019 7:00:00	2019	1241.574799	922.8261	1388.612	1585.188	1047.658
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17Oct2019 11:00:00	2019	1319.493236	904.3924	1356.664	1674.515	997.766
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17Oct2019 16:00:00	2019	1304.505886	904.3729	1355.281	1649.1	981.3317
17Oct2019 17:00:00	2019	1305.486706	911.6028	1341.598	1637.138	1062.754
17Oct2019 18:00:00	2019	1276.418324	916.614	1344.658	1631.284	1069.697
17Oct2019 19:00:00	2019	1297.142106	945.1713	1370.234	1640.794	1083.496
17Oct2019 20:00:00	2019	1250.94998	936.083	1365.069	1591.553	1077.463
17Oct2019 21:00:00	2019	1170.979393	924.3571	1332.807	1513.104	1059.788
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18Oct2019 0:00:00	2019	909.0478226	837.7063	1242.648	1232.569	1034.072
18Oct2019 1:00:00	2019	869.6330694	825.9501	1237.201	1217.948	1037.431
18Oct2019 2:00:00	2019	846.3455838	819.9766	1229.58	1197.928	1043.994
18Oct2019 3:00:00	2019	845.2008611	818.7165	1229.016	1207.753	1042.929
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18Oct2019 6:00:00	2019	1097.648762	884.7202	1316.687	1454.587	1062.554
18Oct2019 7:00:00	2019	1245.410162	937.4041	1381.459	1615.323	1075.982
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18Oct2019 12:00:00	2019	1321.738697	913.7162	1456.912	1654.045	999.9345
18Oct2019 13:00:00	2019	1315.634257	909.6671	1418.462	1652.324	1026.277
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18Oct2019 17:00:00	2019	1270.206778	917.7994	1392.76	1597.669	1035.523
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18Oct2019 20:00:00	2019	1224.08107	929.1644	1389.21	1573.836	1034.424
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19Oct2019 12:00:00	2019	1171.797302	914.8867	1357.153	1536.827	1012.479
19Oct2019 13:00:00	2019	1154.262121	887.4252	1340.1	1524.467	1016.325
19Oct2019 14:00:00	2019	1140.022026	884.3793	1332.191	1513.045	1025.993
19Oct2019 15:00:00	2019	1136.294381	888.2804	1331.432	1507.715	1029.019
19Oct2019 16:00:00	2019	1143.424103	908.6637	1332.971	1483.613	1074.836
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20Oct2019 7:00:00	2019	987.805593	902.1417	1249.575	1247.942	1078.765
20Oct2019 8:00:00	2019	1041.629748	916.6744	1289.045	1318.085	1089.868
20Oct2019 9:00:00	2019	1088.8676	923.5517	1326.937	1389.193	1102.051
20Oct2019 10:00:00	2019	1129.589063	919.9553	1341.414	1431.683	1111.484
20Oct2019 11:00:00	2019	1157.64155	906.1295	1326.259	1454.169	1093.727
20Oct2019 12:00:00	2019	1164.344557	884.6066	1307.912	1470.644	1079.495
20Oct2019 13:00:00	2019	1159.164308	889.6124	1319.793	1466.93	1090.365

20Oct2019 14:00:00	2019	1147.675695	884.4679	1320.438	1442.3	1094.488
20Oct2019 15:00:00	2019	1148.462745	893.7247	1321.406	1451.315	1093.376
20Oct2019 16:00:00	2019	1176.275363	907.7861	1338.278	1486.083	1077.337
20Oct2019 17:00:00	2019	1214.54542	926.0294	1363.192	1535.437	1083.802
20Oct2019 18:00:00	2019	1239.070579	942.4115	1393.917	1591.344	1114.867
20Oct2019 19:00:00	2019	1248.131514	959.8779	1409.013	1610.052	1126.1
20Oct2019 20:00:00	2019	1211.016574	930.2422	1393.574	1599.485	1125.28
20Oct2019 21:00:00	2019	1140.812174	908.2843	1368.299	1538.275	1135.293
20Oct2019 22:00:00	2019	1043.34234	884.0501	1342.293	1433.191	1128.31
20Oct2019 23:00:00	2019	951.4409547	858.7369	1313.301	1315.865	1103.745
21Oct2019 0:00:00	2019	889.128398	843.8112	1292.531	1273.557	1096.986
21Oct2019 1:00:00	2019	857.6587881	834.2057	1280.497	1234.478	1100.381
21Oct2019 2:00:00	2019	842.9635765	832.2916	1278.583	1215.517	1107.886
21Oct2019 3:00:00	2019	843.2479034	832.2603	1276.696	1196.187	1110.838
21Oct2019 4:00:00	2019	867.3709772	842.2661	1276.637	1209.95	1106.104
21Oct2019 5:00:00	2019	952.7345779	860.9718	1305.729	1285.354	1109.865
21Oct2019 6:00:00	2019	1117.33679	903.0561	1359.941	1444.495	1105.51
21Oct2019 7:00:00	2019	1271.734148	960.832	1427.433	1631.542	1130.157
21Oct2019 8:00:00	2019	1288.362638	980.2221	1436.175	1668.205	1118.516
21Oct2019 9:00:00	2019	1289.222252	960.7966	1441.184	1694.397	1118.857
21Oct2019 10:00:00	2019	1298.886329	926.4241	1440.733	1716.103	1125.611
21Oct2019 11:00:00	2019	1306.99622	910.985	1447.738	1727.281	1114.559
21Oct2019 12:00:00	2019	1302.383792	904.0717	1425.863	1684.501	1112.571
21Oct2019 13:00:00	2019	1303.369743	890.0388	1419.878	1701.102	1103.233
21Oct2019 14:00:00	2019	1292.617016	887.1625	1417.077	1710.587	1120.128
21Oct2019 15:00:00	2019	1284.385749	881.7522	1434.99	1708.744	1136.693
21Oct2019 16:00:00	2019	1287.902519	890.7048	1434.985	1712.234	1147.222
21Oct2019 17:00:00	2019	1303.199995	910.5508	1434.914	1701.169	1154.977
21Oct2019 18:00:00	2019	1303.074057	921.6629	1449.623	1704.375	1166.85
21Oct2019 19:00:00	2019	1311.840477	926.8722	1457.906	1699.512	1209.582
21Oct2019 20:00:00	2019	1263.59183	927.9669	1438.084	1630.141	1224.509
21Oct2019 21:00:00	2019	1185.269858	951.3236	1406.621	1544.611	1191.954
21Oct2019 22:00:00	2019	1076.920654	914.7525	1357.34	1408.58	1174.844
21Oct2019 23:00:00	2019	977.6695428	884.6179	1310.156	1299.815	1171.104
22Oct2019 0:00:00	2019	911.400298	862.0306	1285.162	1237.437	1164.855
22Oct2019 1:00:00	2019	872.8711696	852.9099	1293.651	1219.628	1157.291
22Oct2019 2:00:00	2019	852.7315703	846.9996	1287.187	1179.131	1187.12
22Oct2019 3:00:00	2019	848.1212819	838.1159	1281.831	1178.991	1198.74
22Oct2019 4:00:00	2019	871.6398683	841.0676	1293.788	1226.674	1189.407
22Oct2019 5:00:00	2019	951.2692132	854.6546	1310.241	1296.57	1181.107
22Oct2019 6:00:00	2019	1113.178719	891.6239	1322.684	1451.515	1195.384
22Oct2019 7:00:00	2019	1261.717282	944.1565	1343.421	1588.489	1198.131
22Oct2019 8:00:00	2019	1290.540516	954.6909	1354.388	1673.109	1177.228
22Oct2019 9:00:00	2019	1296.57163	931.0481	1358.165	1673.147	1174.355
22Oct2019 10:00:00	2019	1303.386342	913.4219	1352.423	1689.615	1179.181
22Oct2019 11:00:00	2019	1318.292577	899.1984	1349.85	1712.075	1180.503
22Oct2019 12:00:00	2019	1317.392175	899.3332	1344.747	1696.477	1174.501

22Oct2019 13:00:00	2019	1316.69902	912.7695	1340.712	1704.752	1167.088
22Oct2019 14:00:00	2019	1305.719323	913.113	1351.786	1679.239	1160.113
22Oct2019 15:00:00	2019	1297.532921	914.8124	1347.646	1654.441	1142.32
22Oct2019 16:00:00	2019	1307.03734	897.4982	1356.135	1654.75	1148.091
22Oct2019 17:00:00	2019	1323.805178	887.2301	1356.332	1690.707	1162.569
22Oct2019 18:00:00	2019	1311.976796	890.1529	1368.603	1724.23	1160.738
22Oct2019 19:00:00	2019	1304.217604	902.6419	1385.495	1690.308	1178.183
22Oct2019 20:00:00	2019	1250.951241	915.8794	1366.204	1651.067	1178.748
22Oct2019 21:00:00	2019	1171.937172	915.2334	1345.973	1581.341	1174.259
22Oct2019 22:00:00	2019	1069.525297	885.7687	1296.344	1441.362	1178.656
22Oct2019 23:00:00	2019	968.8546691	852.0614	1274.438	1339.78	1185.38
23Oct2019 0:00:00	2019	903.2442948	829.038	1257.176	1298.233	1180.247
23Oct2019 1:00:00	2019	868.7403869	818.7099	1258.706	1243.141	1169.657
23Oct2019 2:00:00	2019	851.5574245	822.5165	1231.975	1210.551	1178.403
23Oct2019 3:00:00	2019	850.6991724	827.0051	1209.14	1206.947	1168.423
23Oct2019 4:00:00	2019	872.8128148	835.2778	1210.414	1211.767	1174.551
23Oct2019 5:00:00	2019	954.3953679	854.5161	1213.254	1260.979	1177.988
23Oct2019 6:00:00	2019	1117.913763	900.147	1260.456	1415.571	1179.893
23Oct2019 7:00:00	2019	1271.405801	956.2432	1312.109	1586.893	1196.07
23Oct2019 8:00:00	2019	1298.999633	941.6405	1291.099	1645.715	1187.416
23Oct2019 9:00:00	2019	1297.023467	946.5833	1312.179	1678.864	1150.248
23Oct2019 10:00:00	2019	1307.314334	941.7962	1330.819	1703.151	1135.604
23Oct2019 11:00:00	2019	1314.591609	914.9375	1330.806	1678.163	1137.208
23Oct2019 12:00:00	2019	1311.291849	906.2761	1347.232	1691.869	1119.769
23Oct2019 13:00:00	2019	1311.969896	908.8398	1365.67	1697.864	1117.188
23Oct2019 14:00:00	2019	1299.682421	907.4933	1354.728	1671.526	1136.485
23Oct2019 15:00:00	2019	1293.359567	909.8667	1369.252	1675.854	1141.081
23Oct2019 16:00:00	2019	1304.819627	899.466	1382.437	1665.823	1149.078
23Oct2019 17:00:00	2019	1313.998642	916.1215	1356.477	1671.581	1151.044
23Oct2019 18:00:00	2019	1308.134678	914.5452	1376.654	1691.775	1133.907
23Oct2019 19:00:00	2019	1316.743651	904.7393	1359.201	1688.811	1139.273
23Oct2019 20:00:00	2019	1270.362136	892.9452	1333.995	1648.153	1143.635
23Oct2019 21:00:00	2019	1194.213922	902.426	1387.163	1584.455	1146.267
23Oct2019 22:00:00	2019	1087.407369	880.1984	1374.706	1486.752	1122.964
23Oct2019 23:00:00	2019	989.1478521	840.1269	1328.395	1384.138	1111.408
24Oct2019 0:00:00	2019	922.3026756	815.8449	1310.109	1313.348	1127.009
24Oct2019 1:00:00	2019	885.2188249	797.444	1291.514	1258.042	1121.698
24Oct2019 2:00:00	2019	865.4001274	790.3528	1298.033	1247.065	1109.457
24Oct2019 3:00:00	2019	861.3520338	786.5292	1284.019	1239.987	1086.679
24Oct2019 4:00:00	2019	881.8071706	790.4692	1284.399	1248.942	1102.014
24Oct2019 5:00:00	2019	962.2377675	811.1162	1305.61	1321.347	1102.59
24Oct2019 6:00:00	2019	1128.897979	854.1107	1349.205	1452.488	1112.469
24Oct2019 7:00:00	2019	1271.077782	898.9783	1389.051	1605.614	1122.017
24Oct2019 8:00:00	2019	1299.45115	900.7531	1437.927	1670.669	1128.814
24Oct2019 9:00:00	2019	1311.473226	886.7063	1445.761	1681.146	1143.289
24Oct2019 10:00:00	2019	1315.3141	879.0543	1440.646	1696.208	1132.233
24Oct2019 11:00:00	2019	1315.955747	872.0981	1417.087	1701.023	1114.904

24Oct2019 12:00:00	2019	1324.981606	863.711	1408.112	1676.479	1110.062
24Oct2019 13:00:00	2019	1330.773648	864.8854	1399.079	1666.247	1107.584
24Oct2019 14:00:00	2019	1321.859315	858.4583	1392.119	1641.679	1086.744
24Oct2019 15:00:00	2019	1315.342317	865.3533	1395.434	1639.653	1073.244
24Oct2019 16:00:00	2019	1316.994092	872.8509	1399.635	1643.523	1076.753
24Oct2019 17:00:00	2019	1323.040874	877.2588	1405.593	1643.484	1084.512
24Oct2019 18:00:00	2019	1310.239943	883.7656	1450.228	1707.272	1108.511
24Oct2019 19:00:00	2019	1309.343642	872.8196	1461.952	1717.642	1115.286
24Oct2019 20:00:00	2019	1252.208405	869.0704	1434.802	1665.383	1101.616
24Oct2019 21:00:00	2019	1166.683585	881.0018	1405.798	1586.067	1091.607
24Oct2019 22:00:00	2019	1066.797297	847.3177	1375.865	1474.238	1093.633
24Oct2019 23:00:00	2019	969.9935959	814.6475	1354.15	1371.941	1097.916
25Oct2019 0:00:00	2019	904.976422	795.493	1314.581	1293.261	1089.686
25Oct2019 1:00:00	2019	863.842264	783.1202	1282.337	1231.14	1070.78
25Oct2019 2:00:00	2019	840.0836811	777.6395	1278.993	1203.838	1066.142
25Oct2019 3:00:00	2019	834.0562285	780.4439	1282.9	1222.073	1059.802
25Oct2019 4:00:00	2019	850.6638256	783.4375	1285.655	1211.83	1052.766
25Oct2019 5:00:00	2019	926.1264689	801.6024	1321.742	1302.428	1062.51
25Oct2019 6:00:00	2019	1082.691092	835.1955	1363.377	1442.943	1075.709
25Oct2019 7:00:00	2019	1232.841104	885.7138	1430.753	1615.749	1061.46
25Oct2019 8:00:00	2019	1272.300548	910.7625	1471.931	1720.9	1063.396
25Oct2019 9:00:00	2019	1281.744422	904.5904	1480.946	1700.02	1077.148
25Oct2019 10:00:00	2019	1290.992226	896.1905	1476.588	1703.535	1074.613
25Oct2019 11:00:00	2019	1314.578997	887.6674	1474.686	1713.821	1073.851
25Oct2019 12:00:00	2019	1323.270662	874.0153	1468.021	1719.181	1070.112
25Oct2019 13:00:00	2019	1323.043655	879.3539	1455.234	1721.447	1059.245
25Oct2019 14:00:00	2019	1311.65578	888.1372	1379.996	1678.52	1056.415
25Oct2019 15:00:00	2019	1298.090901	886.1347	1361.976	1697.318	1063.831
25Oct2019 16:00:00	2019	1289.879124	860.3642	1359.15	1719.815	1090.457
25Oct2019 17:00:00	2019	1280.787368	881.2762	1399.522	1726.703	1098.255
25Oct2019 18:00:00	2019	1277.107701	900.6424	1442.745	1728.288	1142.723
25Oct2019 19:00:00	2019	1269.286315	921.1143	1467.357	1688.515	1140.213
25Oct2019 20:00:00	2019	1224.135625	917.1769	1500.409	1613.588	1116.239
25Oct2019 21:00:00	2019	1160.462789	930.6239	1457.648	1542.045	1118.864
25Oct2019 22:00:00	2019	1078.660413	906.7821	1420.5	1450.094	1114.847
25Oct2019 23:00:00	2019	993.9938271	875.3825	1401.972	1371.777	1098.758
26Oct2019 0:00:00	2019	928.1497889	847.4681	1391.072	1319.177	1089.487
26Oct2019 1:00:00	2019	878.2913516	832.8212	1381.509	1283.879	1095.73
26Oct2019 2:00:00	2019	849.4551794	830.3494	1372.182	1252.711	1097.152
26Oct2019 3:00:00	2019	838.9784654	828.7612	1298.85	1227.582	1090.398
26Oct2019 4:00:00	2019	843.3938644	835.3773	1283.415	1187.126	1079.368
26Oct2019 5:00:00	2019	871.3312299	844.3702	1286.958	1220.019	1081.052
26Oct2019 6:00:00	2019	928.4216917	868.1399	1308.142	1285.416	1074.526
26Oct2019 7:00:00	2019	1014.969803	896.5821	1353.308	1401.382	1035.568
26Oct2019 8:00:00	2019	1084.547655	912.9938	1386.914	1470.059	1059.388
26Oct2019 9:00:00	2019	1136.858944	923.3134	1428.647	1531.858	1073.017
26Oct2019 10:00:00	2019	1189.997403	935.8895	1445.688	1577.707	1082.852

26Oct2019 11:00:00	2019	1228.42055	943.8019	1448.174	1600.228	1086.197
26Oct2019 12:00:00	2019	1238.198226	950.6067	1452.228	1593.39	1085.11
26Oct2019 13:00:00	2019	1232.144177	948.6387	1455.768	1570.612	1095.088
26Oct2019 14:00:00	2019	1207.999082	950.1667	1445.624	1566.313	1097.386
26Oct2019 15:00:00	2019	1192.601596	953.641	1455.639	1563.065	1082.438
26Oct2019 16:00:00	2019	1209.045641	960.9888	1475.529	1576.328	1073.907
26Oct2019 17:00:00	2019	1227.42409	957.5267	1484.981	1598.33	1109.657
26Oct2019 18:00:00	2019	1256.124923	957.5358	1478.691	1660.79	1118.403
26Oct2019 19:00:00	2019	1242.011046	944.5959	1471.747	1633.65	1124.645
26Oct2019 20:00:00	2019	1197.868012	929.9259	1456.594	1599.223	1120.169
26Oct2019 21:00:00	2019	1147.714618	918.3675	1436.564	1550.982	1120.342
26Oct2019 22:00:00	2019	1075.082478	892.7188	1407.045	1455.834	1117.304
26Oct2019 23:00:00	2019	999.7521348	897.282	1395.642	1376.535	1111.405
27Oct2019 0:00:00	2019	941.0132816	873.4862	1375.804	1309.996	1113.322
27Oct2019 1:00:00	2019	898.5344165	852.2071	1362.117	1272.407	1104.205
27Oct2019 2:00:00	2019	874.8409994	845.1312	1352.793	1260.295	1095.169
27Oct2019 3:00:00	2019	864.3462143	852.6509	1350.587	1246.679	1069.361
27Oct2019 4:00:00	2019	868.3972086	861.3983	1345.545	1222.46	1050.657
27Oct2019 5:00:00	2019	888.4429363	868.0242	1340.806	1221.27	1058.871
27Oct2019 6:00:00	2019	930.5838018	882.2672	1355.505	1275.068	1057.366
27Oct2019 7:00:00	2019	992.7354789	900.9918	1368.951	1352.307	1017.562
27Oct2019 8:00:00	2019	1048.095717	915.9994	1390.019	1399.852	1020.358
27Oct2019 9:00:00	2019	1098.598456	917.1878	1401.475	1447.41	1020.324
27Oct2019 10:00:00	2019	1147.416776	904.9514	1399.113	1490.781	1018.903
27Oct2019 11:00:00	2019	1172.794261	893.831	1411.367	1549.139	1023.608
27Oct2019 12:00:00	2019	1183.42368	891.9117	1424.831	1585.3	1039.407
27Oct2019 13:00:00	2019	1190.901714	881.0876	1420.391	1579.794	1056.338
27Oct2019 14:00:00	2019	1183.90244	883.2429	1394.437	1554.982	1078.733
27Oct2019 15:00:00	2019	1191.063634	887.8392	1396.121	1612.92	1066.237
27Oct2019 16:00:00	2019	1213.019101	900.4175	1425.348	1678.494	1075.528
27Oct2019 17:00:00	2019	1252.793832	913.1174	1461.644	1710.353	1111.609
27Oct2019 18:00:00	2019	1279.591684	927.1042	1482.566	1711.221	1130.915
27Oct2019 19:00:00	2019	1261.911053	918.1213	1487.422	1674.902	1152.519
27Oct2019 20:00:00	2019	1225.331031	909.1604	1450.27	1628.721	1154.44
27Oct2019 21:00:00	2019	1158.079664	887.5307	1429.012	1584.681	1145.939
27Oct2019 22:00:00	2019	1061.922139	871.8719	1411.963	1487.158	1125.237
27Oct2019 23:00:00	2019	969.4227702	851.2931	1372.726	1399.654	1089.278
28Oct2019 0:00:00	2019	913.3874428	836.7786	1371.187	1328.884	1108.696
28Oct2019 1:00:00	2019	885.2757729	832.4981	1361.905	1305.408	1120.774
28Oct2019 2:00:00	2019	873.1888614	838.358	1361.834	1287.041	1110.406
28Oct2019 3:00:00	2019	876.1112133	843.923	1353.759	1291.455	1104.243
28Oct2019 4:00:00	2019	902.4296045	849.3962	1360.075	1311.995	1101.427
28Oct2019 5:00:00	2019	987.7593441	876.1678	1376.152	1378.4	1116.257
28Oct2019 6:00:00	2019	1153.378943	915.4336	1406.207	1527.149	1129.218
28Oct2019 7:00:00	2019	1302.558917	948.1151	1483.094	1699.911	1138.892
28Oct2019 8:00:00	2019	1348.965007	949.3179	1481.072	1766.63	1128.601
28Oct2019 9:00:00	2019	1360.003114	952.7926	1479.944	1783.662	1111.409

28Oct2019 10:00:00	2019	1382.8189	966.6815	1496.127	1815.035	1111.525
28Oct2019 11:00:00	2019	1398.722766	972.3802	1510.579	1833.002	1107.337
28Oct2019 12:00:00	2019	1395.271974	961.883	1486.403	1821.701	1126.176
28Oct2019 13:00:00	2019	1391.917824	960.7363	1483.894	1818.474	1101.393
28Oct2019 14:00:00	2019	1386.061086	957.2651	1510.153	1832.397	1078.802
28Oct2019 15:00:00	2019	1383.452119	957.3675	1512.031	1845.011	1082.8
28Oct2019 16:00:00	2019	1400.424539	973.868	1524.01	1850.522	1083.654
28Oct2019 17:00:00	2019	1428.542024	981.9599	1506.071	1854.189	1083.231
28Oct2019 18:00:00	2019	1446.372319	992.7356	1515.262	1867.882	1102.559
28Oct2019 19:00:00	2019	1433.911285	995.8254	1494.04	1827.472	1111.712
28Oct2019 20:00:00	2019	1376.112957	983.7035	1483.856	1769.971	1115.912
28Oct2019 21:00:00	2019	1288.494835	957.5265	1445.125	1668.683	1115.181
28Oct2019 22:00:00	2019	1172.144538	963.3651	1433.639	1576.31	1103.188
28Oct2019 23:00:00	2019	1071.415617	938.5488	1388.234	1483.23	1084.192
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29Oct2019 2:00:00	2019	946.9078828	896.945	1381.527	1347.52	1093.772
29Oct2019 3:00:00	2019	946.5306781	902.0625	1373.444	1333.606	1092.221
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29Oct2019 5:00:00	2019	1052.888904	914.5757	1323.176	1421.554	1096.798
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29Oct2019 9:00:00	2019	1377.862685	957.6832	1406.534	1774.79	1056.737
29Oct2019 10:00:00	2019	1378.178758	948.9666	1451.813	1757.181	1042.111
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29Oct2019 12:00:00	2019	1366.223422	900.6424	1384.588	1731.253	1026.823
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06Nov2019 13:00:00	2019	1375.181262	963.7154	1439.29	1837.66	980.4152
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06Nov2019 15:00:00	2019	1357.549801	942.0348	1434.918	1826.681	1014.684
06Nov2019 16:00:00	2019	1390.442757	954.334	1441.201	1867.622	1044.708
06Nov2019 17:00:00	2019	1476.366697	991.2092	1477.37	1908.235	1048.883
06Nov2019 18:00:00	2019	1449.154892	991.6583	1463.322	1867.089	1026.211
06Nov2019 19:00:00	2019	1398.606921	1005.239	1457.947	1813.622	1035.835
06Nov2019 20:00:00	2019	1343.58739	1010.349	1456.522	1780.204	1042.869
06Nov2019 21:00:00	2019	1256.591632	979.6868	1427.609	1722.463	1030.962
06Nov2019 22:00:00	2019	1143.697791	959.8818	1374.074	1589.373	1011.764
06Nov2019 23:00:00	2019	1044.647349	921.5169	1338.535	1474.092	1005.513
07Nov2019 0:00:00	2019	984.5143502	899.6726	1335.746	1444.311	1001.267
07Nov2019 1:00:00	2019	949.1814886	889.1493	1336.326	1429.85	1013.23
07Nov2019 2:00:00	2019	934.6048202	885.905	1345.619	1412.442	1034.263
07Nov2019 3:00:00	2019	938.2584735	887.9048	1340.859	1390.826	1027.466
07Nov2019 4:00:00	2019	962.9691656	891.4744	1344.355	1403.985	1023.033

07Nov2019 5:00:00	2019	1038.165319	910.0653	1350.861	1459.028	1034.436
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07Nov2019 7:00:00	2019	1317.827452	992.3277	1436.493	1748.208	1055.47
07Nov2019 8:00:00	2019	1332.620158	980.8326	1438.038	1791.732	1059.553
07Nov2019 9:00:00	2019	1340.170932	969.9223	1465.109	1821.133	1058.82
07Nov2019 10:00:00	2019	1338.461776	961.9872	1462.864	1820.837	1060.399
07Nov2019 11:00:00	2019	1336.742275	952.6964	1461.056	1818.414	1062.847
07Nov2019 12:00:00	2019	1329.31438	938.8646	1434.824	1771.601	1059.394
07Nov2019 13:00:00	2019	1325.138105	937.3424	1425.256	1775.761	1071.455
07Nov2019 14:00:00	2019	1321.287581	932.6793	1419.732	1767.484	1071.079
07Nov2019 15:00:00	2019	1316.440483	934.4179	1421.842	1775.74	1087.1
07Nov2019 16:00:00	2019	1349.532807	939.8	1444.785	1799.742	1098.044
07Nov2019 17:00:00	2019	1434.11163	949.2147	1459.537	1862.483	1113.882
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07Nov2019 23:00:00	2019	995.3866792	866.6814	1313.909	1398.484	1050.291
08Nov2019 0:00:00	2019	927.2343263	845.0564	1296.906	1329.998	1069.846
08Nov2019 1:00:00	2019	885.6997045	829.6632	1280.601	1281.753	1051.597
08Nov2019 2:00:00	2019	867.1707272	823.2074	1271.82	1275.988	1043.592
08Nov2019 3:00:00	2019	866.4261329	819.7322	1279.141	1287.312	1040.991
08Nov2019 4:00:00	2019	885.1760188	825.3833	1281.668	1300.84	1034.381
08Nov2019 5:00:00	2019	957.0939321	844.5309	1290.534	1359.307	1037.64
08Nov2019 6:00:00	2019	1121.527495	881.9703	1326.635	1499.263	1043.645
08Nov2019 7:00:00	2019	1248.839395	925.2223	1386.261	1692.316	1062.468
08Nov2019 8:00:00	2019	1277.306739	933.0451	1403.97	1737.676	1051.865
08Nov2019 9:00:00	2019	1300.713295	921.2169	1412.547	1754.954	1047.136
08Nov2019 10:00:00	2019	1306.441167	910.1349	1409.761	1788.174	1036.248
08Nov2019 11:00:00	2019	1312.417762	907.2964	1399.738	1798.146	1016.946
08Nov2019 12:00:00	2019	1306.867447	897.9171	1417.551	1767.262	1016.491
08Nov2019 13:00:00	2019	1309.405492	897.2871	1431.213	1748.89	1022.867
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08Nov2019 15:00:00	2019	1308.254426	880.4468	1394.111	1703.713	1070.681
08Nov2019 16:00:00	2019	1322.748826	899.8917	1414.796	1749.322	1082.484
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08Nov2019 18:00:00	2019	1320.332632	913.164	1377.423	1711.871	1077.968
08Nov2019 19:00:00	2019	1269.317044	895.6615	1387.617	1650.796	1048.793
08Nov2019 20:00:00	2019	1212.681423	883.5719	1374.711	1622.199	1032.586
08Nov2019 21:00:00	2019	1147.228316	879.4945	1386.837	1557.209	1020.862
08Nov2019 22:00:00	2019	1062.354884	875.1952	1348.827	1475.202	1013.216
08Nov2019 23:00:00	2019	984.2554076	846.5294	1326.607	1393.532	1002.346
09Nov2019 0:00:00	2019	923.0745349	825.0608	1305.813	1331.062	997.2815
09Nov2019 1:00:00	2019	880.2964752	814.2049	1293.1	1302.138	1009.567
09Nov2019 2:00:00	2019	857.127878	804.636	1294.581	1282.409	1007.681
09Nov2019 3:00:00	2019	846.4449396	801.7641	1294.979	1299.818	1008.185

09Nov2019 4:00:00	2019	856.8136749	806.9169	1310.215	1322.166	1001.775
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09Nov2019 6:00:00	2019	959.062424	845.8893	1350.545	1406.098	1008.113
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09Nov2019 8:00:00	2019	1117.622239	917.8429	1394.597	1578.824	1034.47
09Nov2019 9:00:00	2019	1190.758215	942.8357	1414.713	1630.335	1042.107
09Nov2019 10:00:00	2019	1241.630334	930.0111	1403.234	1671.671	1053.187
09Nov2019 11:00:00	2019	1267.394044	940.2617	1395.459	1678.973	1051.686
09Nov2019 12:00:00	2019	1279.774694	944.8492	1374.79	1668.313	1060.267
09Nov2019 13:00:00	2019	1276.530576	946.9578	1381.366	1699.82	1069.773
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09Nov2019 15:00:00	2019	1280.608023	954.7211	1379.634	1649.074	1079.792
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09Nov2019 17:00:00	2019	1372.396649	988.749	1442.704	1818.857	1083.383
09Nov2019 18:00:00	2019	1335.304833	977.0646	1427.255	1769.068	1077.383
09Nov2019 19:00:00	2019	1286.485908	963.2802	1445.639	1734.857	1074.856
09Nov2019 20:00:00	2019	1243.067612	968.9522	1454.902	1684.525	1072.971
09Nov2019 21:00:00	2019	1189.93297	958.1568	1438.525	1623.435	1066.875
09Nov2019 22:00:00	2019	1122.947255	940.4071	1414.817	1547.929	1063.062
09Nov2019 23:00:00	2019	1048.752475	915.2903	1366.375	1473.319	1059.538
10Nov2019 0:00:00	2019	990.2218944	895.382	1363.637	1416.752	1058.137
10Nov2019 1:00:00	2019	949.1459798	883.1587	1350.143	1374.435	1054.446
10Nov2019 2:00:00	2019	925.986546	875.0576	1340.306	1350.441	1046.71
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10Nov2019 5:00:00	2019	945.1777025	886.153	1328.234	1361.378	1041.094
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10Nov2019 16:00:00	2019	1294.740241	960.645	1422.366	1670.156	1085.033
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10Nov2019 18:00:00	2019	1378.400599	992.9593	1469.639	1749.919	1063.78
10Nov2019 19:00:00	2019	1329.345006	979.6311	1460.529	1703.958	1055.713
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10Nov2019 23:00:00	2019	1075.148186	937.529	1367.147	1456.002	1015.883
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11Nov2019 1:00:00	2019	980.3754461	916.6184	1353.957	1367.832	1028.014
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11Nov2019 22:00:00	2019	1068.160058	939.9735	1417.125	1510.419	1140.829
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12Nov2019 0:00:00	2019	918.3163562	888.4015	1388.528	1355.131	1137.392
12Nov2019 1:00:00	2019	878.3915163	875.7893	1370.756	1321.206	1122.726
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12Nov2019 4:00:00	2019	887.724966	865.8565	1353.33	1338.105	1095.928
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12Nov2019 7:00:00	2019	1269.343044	948.0211	1429.356	1676.657	1124.686
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13Nov2019 8:00:00	2019	1291.876356	954.2175	1434.928	1723.304	1070.573
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15Nov2019 4:00:00	2019	876.7357233	855.071	1328.674	1314.315	1201.154
15Nov2019 5:00:00	2019	952.0805399	878.3199	1367.721	1363.79	1206.811
15Nov2019 6:00:00	2019	1106.302787	908.5201	1398.026	1519.477	1216.166
15Nov2019 7:00:00	2019	1254.448009	961.6585	1470.792	1638.955	1232.244
15Nov2019 8:00:00	2019	1294.31135	969.1504	1499.305	1698.449	1266.658
15Nov2019 9:00:00	2019	1308.57021	967.7706	1520.753	1734.602	1265.042
15Nov2019 10:00:00	2019	1335.505551	970.3058	1537.067	1756.201	1265.884
15Nov2019 11:00:00	2019	1345.942522	966.5023	1511.371	1756.009	1273.686
15Nov2019 12:00:00	2019	1353.612081	953.1014	1497.268	1742.242	1276.723
15Nov2019 13:00:00	2019	1357.801858	955.7677	1498.169	1762.279	1251.068
15Nov2019 14:00:00	2019	1350.576961	961.5869	1521.65	1776.166	1240.904
15Nov2019 15:00:00	2019	1335.184399	971.0422	1523.147	1795.703	1245.531
15Nov2019 16:00:00	2019	1349.722338	944.2484	1548.445	1843.533	1256.686
15Nov2019 17:00:00	2019	1404.859772	963.8008	1569.693	1853.549	1263.74
15Nov2019 18:00:00	2019	1344.488701	937.7856	1540.394	1795.804	1253.103
15Nov2019 19:00:00	2019	1295.599781	939.6557	1505.507	1749.022	1247.642
15Nov2019 20:00:00	2019	1240.110825	948.2375	1460.807	1696.244	1218.232
15Nov2019 21:00:00	2019	1169.797221	943.7912	1432.556	1653.568	1216.584
15Nov2019 22:00:00	2019	1087.923571	914.2276	1404.515	1555.919	1206.375
15Nov2019 23:00:00	2019	1004.527291	884.1145	1381.738	1474.544	1198.692
16Nov2019 0:00:00	2019	939.9110353	861.5831	1371.322	1398.125	1169.756
16Nov2019 1:00:00	2019	896.5017574	850.6628	1353.602	1351.539	1161.105
16Nov2019 2:00:00	2019	870.8221235	843.6822	1345.932	1327.527	1163.536
16Nov2019 3:00:00	2019	860.2336057	842.4714	1326.816	1290.898	1159.877
16Nov2019 4:00:00	2019	867.2071128	842.3566	1324.406	1289.856	1152.14
16Nov2019 5:00:00	2019	899.3214701	852.6325	1323.138	1281.302	1151.326
16Nov2019 6:00:00	2019	955.7476216	868.9726	1332.423	1327.659	1147.429
16Nov2019 7:00:00	2019	1032.718051	902.6226	1359.41	1421.193	1153.739
16Nov2019 8:00:00	2019	1090.311686	922.0096	1369.788	1466.905	1167.008
16Nov2019 9:00:00	2019	1138.936543	929.5859	1382.439	1530.119	1165.353
16Nov2019 10:00:00	2019	1173.880844	932.9106	1390.898	1568.713	1146.841
16Nov2019 11:00:00	2019	1189.102741	933.343	1405.458	1547.695	1153.304
16Nov2019 12:00:00	2019	1190.726095	930.1329	1397.728	1539.17	1171.963
16Nov2019 13:00:00	2019	1182.537427	924.9359	1378.596	1527.728	1165.68
16Nov2019 14:00:00	2019	1176.617565	925.4296	1362.848	1514.948	1177.355
16Nov2019 15:00:00	2019	1183.547716	939.8614	1364.617	1522.439	1182.244
16Nov2019 16:00:00	2019	1233.088225	965.7193	1390.233	1613.475	1207.276
16Nov2019 17:00:00	2019	1302.401091	997.3734	1446.394	1697.99	1227.062
16Nov2019 18:00:00	2019	1273.898531	983.6173	1430.163	1656.979	1224.502
16Nov2019 19:00:00	2019	1229.33248	966.6492	1407.251	1617.768	1215.581
16Nov2019 20:00:00	2019	1186.529321	953.4162	1375.955	1572.753	1199.948
16Nov2019 21:00:00	2019	1137.065579	932.373	1364.453	1519.537	1182.368
16Nov2019 22:00:00	2019	1068.94977	906.0241	1350.633	1485.746	1178.99
16Nov2019 23:00:00	2019	994.2360756	878.4999	1306.347	1387.493	1184.2

17Nov2019 0:00:00	2019	929.0373723	858.0113	1288.53	1343.52	1210.11
17Nov2019 1:00:00	2019	888.3271673	842.0817	1289.813	1300.061	1212.248
17Nov2019 2:00:00	2019	861.8377264	834.8426	1274.843	1266.141	1206.862
17Nov2019 3:00:00	2019	849.4089084	827.1938	1276.135	1295.522	1204.45
17Nov2019 4:00:00	2019	851.0317517	825.4751	1277.765	1292.284	1205.587
17Nov2019 5:00:00	2019	875.3820207	830.0696	1284.635	1311.329	1212.513
17Nov2019 6:00:00	2019	918.0242353	843.3522	1298.109	1352.127	1207.251
17Nov2019 7:00:00	2019	980.8092862	866.5883	1321.802	1416.849	1197.511
17Nov2019 8:00:00	2019	1035.237514	886.7824	1343.058	1469.997	1207.329
17Nov2019 9:00:00	2019	1086.256706	896.3286	1358.618	1514.25	1210.515
17Nov2019 10:00:00	2019	1145.383369	899.4211	1368.036	1542.707	1204.471
17Nov2019 11:00:00	2019	1175.481967	914.7697	1372.986	1560.015	1195.117
17Nov2019 12:00:00	2019	1186.776483	919.9738	1371.918	1557.351	1197.322
17Nov2019 13:00:00	2019	1184.696828	917.0781	1371.023	1575.011	1205.553
17Nov2019 14:00:00	2019	1176.272096	909.876	1365.96	1570.527	1202.101
17Nov2019 15:00:00	2019	1186.156171	914.2283	1359.283	1535.529	1200.491
17Nov2019 16:00:00	2019	1240.532908	938.2412	1399.955	1634.486	1214.252
17Nov2019 17:00:00	2019	1338.232851	978.2249	1445.965	1763.697	1211.469
17Nov2019 18:00:00	2019	1308.710281	971.0491	1435.768	1749.611	1183.474
17Nov2019 19:00:00	2019	1261.660668	954.8571	1422.516	1715.65	1186.45
17Nov2019 20:00:00	2019	1215.05595	939.6866	1403.621	1665.25	1202.846
17Nov2019 21:00:00	2019	1145.739541	914.3851	1379.271	1578.644	1196.467
17Nov2019 22:00:00	2019	1049.036016	881.8555	1343.58	1495.862	1177.831
17Nov2019 23:00:00	2019	957.6956641	852.2942	1308.746	1370.105	1154.007
18Nov2019 0:00:00	2019	898.4312114	835.9926	1220.383	1286.561	1132.926
18Nov2019 1:00:00	2019	871.4589879	834.0959	1201.34	1228.066	1124.858
18Nov2019 2:00:00	2019	856.146868	819.618	1202.785	1205.603	1122.939
18Nov2019 3:00:00	2019	855.1610078	819.4098	1230.935	1221.991	1122.647
18Nov2019 4:00:00	2019	878.4906387	830.0654	1298.467	1263.048	1126.295
18Nov2019 5:00:00	2019	963.7077266	852.8249	1307.382	1321.822	1123.717
18Nov2019 6:00:00	2019	1129.824239	901.426	1352.588	1461.553	1123.664
18Nov2019 7:00:00	2019	1275.253337	954.1624	1411.95	1606.23	1136.18
18Nov2019 8:00:00	2019	1291.989761	947.7328	1429.936	1622.419	1144.33
18Nov2019 9:00:00	2019	1305.870329	944.031	1432.978	1623.488	1146.259
18Nov2019 10:00:00	2019	1314.161023	939.9687	1441.625	1647.308	1154.318
18Nov2019 11:00:00	2019	1321.972952	936.2713	1439.621	1653.579	1162.078
18Nov2019 12:00:00	2019	1317.083703	924.461	1438.492	1639.131	1165.884
18Nov2019 13:00:00	2019	1320.913393	927.762	1445.197	1642.231	1183.577
18Nov2019 14:00:00	2019	1312.363954	933.3884	1441.957	1653.407	1194.247
18Nov2019 15:00:00	2019	1323.567712	932.2084	1461.472	1669.885	1211.672
18Nov2019 16:00:00	2019	1382.509241	942.4077	1520.805	1759.276	1231.376
18Nov2019 17:00:00	2019	1453.403065	970.3082	1542.644	1833.03	1244.593
18Nov2019 18:00:00	2019	1391.316943	957.3456	1511.144	1776.676	1235.37
18Nov2019 19:00:00	2019	1336.93951	951.3638	1505.653	1719.365	1220.637
18Nov2019 20:00:00	2019	1286.188495	959.8355	1483.737	1668.419	1216.615
18Nov2019 21:00:00	2019	1198.08991	945.8261	1443.565	1576.519	1208.029
18Nov2019 22:00:00	2019	1085.311427	924.3355	1400.818	1455.989	1193.187

18Nov2019 23:00:00	2019	987.0513728	887.0164	1370.409	1361.6	1178.069
19Nov2019 0:00:00	2019	923.1659502	868.1197	1343.733	1300.477	1165.098
19Nov2019 1:00:00	2019	886.5200888	846.4415	1311.562	1295.403	1161.213
19Nov2019 2:00:00	2019	868.5612382	841.2431	1341.509	1276.882	1173.104
19Nov2019 3:00:00	2019	865.9998269	837.3145	1352.311	1269.537	1172.48
19Nov2019 4:00:00	2019	889.6617811	847.9579	1363.233	1283.109	1168.968
19Nov2019 5:00:00	2019	975.5930133	867.0032	1380.363	1357.833	1175.536
19Nov2019 6:00:00	2019	1133.488954	897.7607	1361.808	1492.838	1189.171
19Nov2019 7:00:00	2019	1276.692271	928.9183	1436.757	1658.994	1205.031
19Nov2019 8:00:00	2019	1301.915222	915.9249	1456.346	1711.463	1225.559
19Nov2019 9:00:00	2019	1324.903143	919.3832	1459.744	1699.384	1229.502
19Nov2019 10:00:00	2019	1348.032499	902.1362	1456.336	1676.485	1230.162
19Nov2019 11:00:00	2019	1363.8498	901.4389	1447.532	1689.017	1234.866
19Nov2019 12:00:00	2019	1359.042487	893.6588	1450.28	1696.585	1232.444
19Nov2019 13:00:00	2019	1359.441926	901.3261	1462.922	1722.23	1222.805
19Nov2019 14:00:00	2019	1352.587385	901.209	1466.357	1724.651	1225.205
19Nov2019 15:00:00	2019	1360.343551	904.4682	1467.026	1752.286	1237.491
19Nov2019 16:00:00	2019	1409.003215	924.5405	1496.661	1832.759	1261.516
19Nov2019 17:00:00	2019	1481.671179	953.2676	1487.115	1869.22	1270.724
19Nov2019 18:00:00	2019	1423.803131	938.8612	1490.058	1813.734	1254.152
19Nov2019 19:00:00	2019	1367.582561	961.9776	1499.082	1754.976	1227.97
19Nov2019 20:00:00	2019	1310.750892	952.9691	1479.34	1706.11	1259.912
19Nov2019 21:00:00	2019	1224.882297	934.008	1427.294	1621.689	1270.469
19Nov2019 22:00:00	2019	1113.985948	901.1956	1384.868	1508.302	1262.516
19Nov2019 23:00:00	2019	1016.553078	872.2721	1333.032	1408.01	1232.371
20Nov2019 0:00:00	2019	951.6150185	849.5787	1325.768	1332.352	1219.582
20Nov2019 1:00:00	2019	911.5382491	841.68	1323.16	1290.064	1132.847
20Nov2019 2:00:00	2019	896.8416722	834.8169	1313.824	1268.754	1087.7
20Nov2019 3:00:00	2019	895.9235951	832.4093	1308.988	1271.988	1069.762
20Nov2019 4:00:00	2019	919.0890641	839.688	1312.351	1292.905	1050.112
20Nov2019 5:00:00	2019	1002.14594	857.6138	1312.468	1348.519	1077.903
20Nov2019 6:00:00	2019	1163.353234	895.0639	1336.39	1495.598	1097.354
20Nov2019 7:00:00	2019	1299.827033	902.0047	1378.104	1678.514	1123.409
20Nov2019 8:00:00	2019	1311.845042	907.1913	1361.564	1692.628	1124.722
20Nov2019 9:00:00	2019	1322.515833	902.7211	1342.829	1695.829	1121.351
20Nov2019 10:00:00	2019	1330.828544	900.0235	1357.795	1701.916	1129.805
20Nov2019 11:00:00	2019	1337.944095	895.7548	1366.471	1714.967	1112.919
20Nov2019 12:00:00	2019	1335.56262	886.7321	1351.082	1718.79	1103.302
20Nov2019 13:00:00	2019	1331.564804	879.601	1345.534	1731.54	1105.653
20Nov2019 14:00:00	2019	1324.160217	877.2483	1360.621	1733.458	1095.961
20Nov2019 15:00:00	2019	1329.551451	884.2869	1365.671	1724.177	1110.166
20Nov2019 16:00:00	2019	1376.08844	914.8681	1409.381	1811.316	1134.148
20Nov2019 17:00:00	2019	1471.991297	963.5328	1460.981	1903.053	1159.027
20Nov2019 18:00:00	2019	1432.812402	951.446	1448.096	1840.405	1152.449
20Nov2019 19:00:00	2019	1381.890601	933.3242	1431.239	1801.216	1145.722
20Nov2019 20:00:00	2019	1329.146523	919.9124	1438.018	1753.763	1132.294
20Nov2019 21:00:00	2019	1249.236098	945.1135	1430.03	1663.685	1117.093

20Nov2019 22:00:00	2019	1136.98085	916.3364	1371.261	1565.115	1101.196
20Nov2019 23:00:00	2019	1038.052616	883.871	1352.263	1467.149	1097.111
21Nov2019 0:00:00	2019	973.2290503	864.8436	1361.738	1405.506	1097.278
21Nov2019 1:00:00	2019	935.1209832	850.496	1356.317	1372.771	1099.323
21Nov2019 2:00:00	2019	914.6688864	843.916	1338.043	1319.846	1096.224
21Nov2019 3:00:00	2019	913.2724871	847.0442	1336.551	1333.898	1101.748
21Nov2019 4:00:00	2019	934.9739573	852.4578	1339.891	1343.395	1088.199
21Nov2019 5:00:00	2019	1019.153927	873.323	1353.308	1405.38	1113.586
21Nov2019 6:00:00	2019	1175.858402	916.7051	1398.085	1596.536	1125.09
21Nov2019 7:00:00	2019	1313.999958	964.4579	1455.936	1762.379	1141.773
21Nov2019 8:00:00	2019	1327.361139	960.8194	1459.794	1793.478	1133.406
21Nov2019 9:00:00	2019	1328.869368	943.446	1453.895	1804.229	1116.297
21Nov2019 10:00:00	2019	1337.862568	909.8611	1441.217	1794.19	1097.959
21Nov2019 11:00:00	2019	1341.850429	895.5238	1449.102	1800.086	1107.918
21Nov2019 12:00:00	2019	1334.360552	888.2076	1438.459	1774.487	1108.586
21Nov2019 13:00:00	2019	1330.859226	881.5889	1422.931	1740.077	1107.359
21Nov2019 14:00:00	2019	1319.756567	886.0375	1435.561	1747.376	1077.759
21Nov2019 15:00:00	2019	1319.889101	889.1532	1450.232	1747.132	1084.787
21Nov2019 16:00:00	2019	1358.565654	919.466	1486.563	1798.93	1117.522
21Nov2019 17:00:00	2019	1446.960009	958.6686	1518.943	1892.342	1123.044
21Nov2019 18:00:00	2019	1406.159434	971.3255	1517.178	1841.737	1107.299
21Nov2019 19:00:00	2019	1356.99438	968.6147	1470.784	1759.974	1078.449
21Nov2019 20:00:00	2019	1305.305114	961.8466	1427.82	1704.812	1069.509
21Nov2019 21:00:00	2019	1226.219977	948.6268	1395.298	1623.598	1083.786
21Nov2019 22:00:00	2019	1122.124586	907.319	1406.469	1513.128	1137.34
21Nov2019 23:00:00	2019	1019.667005	875.5624	1376.662	1410.111	1124.966
22Nov2019 0:00:00	2019	948.0693054	852.2009	1364.467	1375.432	1115.098
22Nov2019 1:00:00	2019	911.7469071	838.5152	1370.021	1380.436	1132.593
22Nov2019 2:00:00	2019	897.6989549	833.5057	1358.999	1361.813	1127.003
22Nov2019 3:00:00	2019	895.4188881	832.0077	1372.118	1342.159	1104.798
22Nov2019 4:00:00	2019	914.4856815	838.7172	1370.845	1353.207	1109.142
22Nov2019 5:00:00	2019	990.1456622	851.4249	1388.569	1431.153	1121.033
22Nov2019 6:00:00	2019	1137.084289	884.7523	1420.58	1571.182	1137.815
22Nov2019 7:00:00	2019	1270.309531	928.0023	1472.914	1718.661	1131.848
22Nov2019 8:00:00	2019	1299.060959	938.506	1474.346	1756.708	1127.589
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22Nov2019 10:00:00	2019	1320.718413	911.0653	1498.36	1764.174	1142.446
22Nov2019 11:00:00	2019	1331.078424	905.1039	1498.727	1771.325	1146.784
22Nov2019 12:00:00	2019	1327.629294	894.4075	1485.403	1768.7	1123.035
22Nov2019 13:00:00	2019	1320.877846	895.8827	1478.228	1743.045	1120.426
22Nov2019 14:00:00	2019	1313.864047	901.8277	1474.596	1736.309	1119.877
22Nov2019 15:00:00	2019	1311.611057	910.1405	1481.151	1747.191	1125.921
22Nov2019 16:00:00	2019	1342.034631	937.9253	1509.701	1805.756	1148.224
22Nov2019 17:00:00	2019	1408.143537	975.0827	1536.244	1860.452	1159.231
22Nov2019 18:00:00	2019	1351.971062	955.7498	1508.522	1788.363	1169.084
22Nov2019 19:00:00	2019	1298.483207	940.2266	1478.621	1722.272	1180.168
22Nov2019 20:00:00	2019	1250.060652	932.5298	1461.088	1688.212	1192.9

22Nov2019 21:00:00	2019	1180.104326	927.4082	1443.876	1608.645	1201.597
22Nov2019 22:00:00	2019	1093.877355	898.3258	1407.983	1518.054	1175.226
22Nov2019 23:00:00	2019	1002.296877	868.1767	1368.778	1421.432	1147.911
23Nov2019 0:00:00	2019	931.926423	842.5471	1325.705	1349.744	1134.627
23Nov2019 1:00:00	2019	887.5443543	824.6919	1294.335	1298.732	1122.499
23Nov2019 2:00:00	2019	862.7934747	815.0714	1281.045	1263.987	1122.382
23Nov2019 3:00:00	2019	852.6294554	814.3273	1284.189	1263.95	1118.536
23Nov2019 4:00:00	2019	854.4854687	814.3515	1275.782	1248.975	1107.736
23Nov2019 5:00:00	2019	885.1869343	816.7607	1291.984	1266.599	1124.442
23Nov2019 6:00:00	2019	939.2225133	836.3266	1311.311	1349.385	1125.343
23Nov2019 7:00:00	2019	1019.828266	872.4686	1345.761	1440.238	1148.568
23Nov2019 8:00:00	2019	1085.895427	894.9298	1363.376	1489.472	1155.878
23Nov2019 9:00:00	2019	1144.599386	907.3785	1363.991	1552.364	1147.464
23Nov2019 10:00:00	2019	1171.324247	915.9398	1377.443	1578.57	1138.182
23Nov2019 11:00:00	2019	1182.444998	917.2981	1394.364	1572.852	1123.754
23Nov2019 12:00:00	2019	1188.482106	912.7032	1393.403	1582.536	1116.832
23Nov2019 13:00:00	2019	1180.877911	908.7163	1385.18	1580.363	1114.523
23Nov2019 14:00:00	2019	1175.992022	914.3646	1370.867	1568.595	1118.519
23Nov2019 15:00:00	2019	1177.075964	920.3547	1359.857	1562.526	1114.896
23Nov2019 16:00:00	2019	1221.863577	937.5456	1382.713	1627.453	1156.185
23Nov2019 17:00:00	2019	1305.339179	967.324	1425.744	1737.978	1176.872
23Nov2019 18:00:00	2019	1272.490584	950.8323	1401.326	1675.337	1179.245
23Nov2019 19:00:00	2019	1225.386927	934.1453	1380.112	1617.653	1170.962
23Nov2019 20:00:00	2019	1183.720106	919.5254	1384.149	1571.889	1176.293
23Nov2019 21:00:00	2019	1128.633259	900.3018	1369.713	1508.249	1144.319
23Nov2019 22:00:00	2019	1058.308503	876.6364	1344.518	1463.005	1106.278
23Nov2019 23:00:00	2019	986.0020428	850.6262	1309.2	1379.496	1079.262
24Nov2019 0:00:00	2019	927.6320948	827.9627	1291.507	1310.231	1073.913
24Nov2019 1:00:00	2019	884.9041601	813.315	1274.467	1268.125	1080.862
24Nov2019 2:00:00	2019	859.3905923	800.0468	1263.755	1269.568	1109.773
24Nov2019 3:00:00	2019	845.3231555	797.8456	1265.829	1259.987	1087.97
24Nov2019 4:00:00	2019	845.9566716	796.8554	1256.39	1258.631	1087.167
24Nov2019 5:00:00	2019	870.1352591	804.173	1261.11	1267.14	1122.428
24Nov2019 6:00:00	2019	912.8443509	824.0072	1275.507	1310.494	1074.232
24Nov2019 7:00:00	2019	983.8078934	854.1917	1322.137	1383.596	1072.204
24Nov2019 8:00:00	2019	1043.468188	874.6218	1343.93	1451.853	1074.912
24Nov2019 9:00:00	2019	1109.092021	894.7547	1353.769	1503.56	1062.537
24Nov2019 10:00:00	2019	1140.527923	901.2514	1368.451	1569.953	1061.476
24Nov2019 11:00:00	2019	1170.579004	903.0031	1376.488	1617.629	1067.209
24Nov2019 12:00:00	2019	1195.580335	900.9005	1391.276	1636.077	1071.378
24Nov2019 13:00:00	2019	1203.671057	897.6845	1399.328	1619.282	1069.672
24Nov2019 14:00:00	2019	1205.460893	907.2419	1404.533	1613.263	1082.327
24Nov2019 15:00:00	2019	1224.037865	927.916	1420.657	1603.366	1091.398
24Nov2019 16:00:00	2019	1294.796899	958.9227	1460.759	1718.196	1134.713
24Nov2019 17:00:00	2019	1363.75779	988.5398	1496.732	1825.304	1150.76
24Nov2019 18:00:00	2019	1321.195832	979.2211	1469.493	1755.197	1140.038
24Nov2019 19:00:00	2019	1275.89617	962.4452	1453.933	1678.2	1126.718

24Nov2019 20:00:00	2019	1235.216393	947.1093	1434.484	1644.939	1122.242
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25Nov2019 1:00:00	2019	882.9752368	822.2834	1317.453	1310.905	1108.51
25Nov2019 2:00:00	2019	867.9363502	823.8415	1315.185	1272.886	1104.236
25Nov2019 3:00:00	2019	868.2786449	822.6672	1307.813	1267.867	1084.764
25Nov2019 4:00:00	2019	896.7262847	834.5212	1316.511	1301.956	1087.717
25Nov2019 5:00:00	2019	979.5224892	860.9824	1339.202	1381.053	1075.445
25Nov2019 6:00:00	2019	1137.553955	913.8545	1385.854	1539.105	1088.681
25Nov2019 7:00:00	2019	1288.88868	972.7838	1444.913	1705.033	1132.409
25Nov2019 8:00:00	2019	1312.005532	982.2043	1465.991	1752.932	1136.575
25Nov2019 9:00:00	2019	1324.975712	966.3262	1468.853	1765.638	1138.088
25Nov2019 10:00:00	2019	1345.797138	962.4061	1477.232	1783.936	1124.252
25Nov2019 11:00:00	2019	1355.3123	953.4104	1482.036	1800.559	1115.523
25Nov2019 12:00:00	2019	1347.653361	941.4362	1478.793	1794.819	1119.504
25Nov2019 13:00:00	2019	1339.465689	949.6594	1481.479	1794.92	1119.549
25Nov2019 14:00:00	2019	1333.800288	949.1116	1479.825	1766.857	1118.664
25Nov2019 15:00:00	2019	1356.374599	936.6106	1477.829	1776.183	1143.873
25Nov2019 16:00:00	2019	1424.48668	958.7861	1494.743	1843.922	1148.648
25Nov2019 17:00:00	2019	1493.033504	984.8675	1507.447	1891.327	1153.494
25Nov2019 18:00:00	2019	1434.565231	967.2177	1482.854	1846.656	1133.087
25Nov2019 19:00:00	2019	1378.455217	980.1807	1457.83	1774.232	1128.259
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25Nov2019 21:00:00	2019	1235.520207	967.4684	1402.655	1646.096	1100.221
25Nov2019 22:00:00	2019	1117.289258	926.8048	1369.938	1550.713	1082.554
25Nov2019 23:00:00	2019	1019.313722	893.1665	1336.059	1449.168	1076.963
26Nov2019 0:00:00	2019	958.7721924	869.6443	1317.285	1376.475	1074.438
26Nov2019 1:00:00	2019	921.6014238	856.199	1326.052	1358.287	1074.687
26Nov2019 2:00:00	2019	902.7415548	848.7527	1314.724	1329.689	1062.401
26Nov2019 3:00:00	2019	897.4718119	853.6329	1305.335	1330.727	1056.832
26Nov2019 4:00:00	2019	918.048125	863.1252	1300.827	1348.037	1053.718
26Nov2019 5:00:00	2019	1001.358963	883.0664	1318.033	1406.772	1077.008
26Nov2019 6:00:00	2019	1160.106734	919.0458	1347.517	1533.541	1090.085
26Nov2019 7:00:00	2019	1303.684758	969.8601	1414.783	1692.549	1103.143
26Nov2019 8:00:00	2019	1332.778072	988.6629	1429.323	1721.9	1110.433
26Nov2019 9:00:00	2019	1347.307391	975.9188	1435.607	1733.19	1103.153
26Nov2019 10:00:00	2019	1367.225926	973.6305	1431.772	1748.92	1084.28
26Nov2019 11:00:00	2019	1378.970058	970.5981	1433.137	1737.197	1105.592
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26Nov2019 13:00:00	2019	1379.07098	954.2488	1442.096	1770.167	1119.2
26Nov2019 14:00:00	2019	1378.019578	961.0646	1404.445	1770.446	1074.586
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26Nov2019 17:00:00	2019	1513.982283	984.7563	1510.061	1924.469	1116.623
26Nov2019 18:00:00	2019	1463.10103	967.1309	1501.552	1880.762	1117.318

26Nov2019 19:00:00	2019	1411.462695	980.5383	1512.565	1837.516	1108.559
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26Nov2019 21:00:00	2019	1265.52028	973.2297	1497.691	1748.745	1090.988
26Nov2019 22:00:00	2019	1148.4206	938.6513	1448.362	1631.499	1097.664
26Nov2019 23:00:00	2019	1048.111766	904.8834	1397.826	1501.939	1054.026
27Nov2019 0:00:00	2019	994.3628039	885.5721	1376.577	1455.392	1040.418
27Nov2019 1:00:00	2019	964.6121637	875.5908	1366.133	1427.617	1040.912
27Nov2019 2:00:00	2019	947.0199416	871.1975	1363.017	1408.036	1045.456
27Nov2019 3:00:00	2019	943.5564923	871.4841	1359.691	1399.644	1057.804
27Nov2019 4:00:00	2019	965.7448188	882.6062	1355.85	1407.254	1051.187
27Nov2019 5:00:00	2019	1054.26553	904.8035	1374.499	1471.947	1049.402
27Nov2019 6:00:00	2019	1213.98315	946.8926	1427.23	1624.634	1048.927
27Nov2019 7:00:00	2019	1355.925891	1003.823	1485.065	1773.402	1052.805
27Nov2019 8:00:00	2019	1391.7863	1016.438	1498.788	1803.312	1053.825
27Nov2019 9:00:00	2019	1407.10491	1007.616	1488.787	1817.292	1047.77
27Nov2019 10:00:00	2019	1428.263597	1014.117	1498.833	1828.149	1044.061
27Nov2019 11:00:00	2019	1445.155748	1017.788	1502.961	1841.059	1040.21
27Nov2019 12:00:00	2019	1440.561459	1011.352	1503.082	1841.657	1037.743
27Nov2019 13:00:00	2019	1443.242607	1016.258	1509.903	1846.646	1036.887
27Nov2019 14:00:00	2019	1441.080895	1015.137	1494.032	1867.153	1042.21
27Nov2019 15:00:00	2019	1452.093108	1005.302	1504.189	1882.889	1045.002
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27Nov2019 18:00:00	2019	1517.133815	1024.585	1510.487	1930.421	1104.768
27Nov2019 19:00:00	2019	1471.094523	1044.086	1511.058	1863.031	1099.757
27Nov2019 20:00:00	2019	1413.00059	1033.966	1491.09	1787.982	1100.35
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02Dec2019 12:00:00	2019	1355.920952	965.4326	1484.309	1738.111	1079.592
02Dec2019 13:00:00	2019	1352.683588	937.0105	1485.05	1733.956	1093.881
02Dec2019 14:00:00	2019	1350.460186	933.7416	1494.587	1722.64	1084.19
02Dec2019 15:00:00	2019	1372.936591	949.5278	1514.68	1748.149	1100.105

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11Dec2019 4:00:00	2019	961.3762132	927.3392	1410.981	1454.633	1165.802
11Dec2019 5:00:00	2019	1045.092513	944.1677	1427.689	1527.603	1170.102
11Dec2019 6:00:00	2019	1209.321303	984.2788	1463.297	1676.169	1181.72
11Dec2019 7:00:00	2019	1349.508095	1026.736	1498.953	1809.861	1183.986
11Dec2019 8:00:00	2019	1403.046591	1020.915	1515.491	1876.113	1187.591
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11Dec2019 11:00:00	2019	1419.703406	1018.042	1469.236	1902.363	1139.717
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11Dec2019 13:00:00	2019	1392.197266	975.5676	1524.538	1880.698	1149.061
11Dec2019 14:00:00	2019	1387.83506	973.7548	1525.633	1884.709	1140.818
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19Dec2019 19:00:00	2019	1397.91471	984.2227	1537.905	1844.615	1191.821
19Dec2019 20:00:00	2019	1347.680735	960.9994	1524.102	1801.962	1192.29
19Dec2019 21:00:00	2019	1275.240737	935.1041	1486.901	1729.574	1186.251
19Dec2019 22:00:00	2019	1168.1996	902.1355	1436.335	1614.005	1171.564
19Dec2019 23:00:00	2019	1063.228581	892.3102	1403.865	1501.019	1145.68
20Dec2019 0:00:00	2019	988.2544185	867.944	1388.522	1424.742	1130.191
20Dec2019 1:00:00	2019	944.4992922	856.0496	1376.79	1363.704	1106.522
20Dec2019 2:00:00	2019	923.6348234	856.0536	1372.069	1364.78	1101.399
20Dec2019 3:00:00	2019	917.6044289	855.387	1379.486	1366.101	1109.373
20Dec2019 4:00:00	2019	934.8860788	861.5648	1399.927	1387.459	1121.37
20Dec2019 5:00:00	2019	1005.830663	878.7653	1411.254	1445.928	1131.193
20Dec2019 6:00:00	2019	1148.914969	916.1014	1450.291	1575.291	1132.245

20Dec2019 7:00:00	2019	1280.047987	971.4294	1493.247	1744.759	1135.573
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20Dec2019 10:00:00	2019	1338.896194	983.7976	1518.288	1835.624	1135.336
20Dec2019 11:00:00	2019	1341.141027	971.6052	1503.933	1830.545	1138.454
20Dec2019 12:00:00	2019	1328.48521	960.1018	1491.259	1810.858	1141.602
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20Dec2019 18:00:00	2019	1388.910128	962.843	1547.319	1892.916	1193.122
20Dec2019 19:00:00	2019	1338.546816	962.923	1521.611	1827.641	1181.587
20Dec2019 20:00:00	2019	1286.796506	967.8115	1497.2	1753.901	1180.163
20Dec2019 21:00:00	2019	1223.772083	959.9407	1448.038	1680.381	1177.98
20Dec2019 22:00:00	2019	1131.810239	928.3075	1419.837	1601.533	1151.715
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21Dec2019 1:00:00	2019	915.4143605	851.8106	1369.179	1357.334	1111.767
21Dec2019 2:00:00	2019	885.4315637	845.7147	1362.629	1351.404	1120.318
21Dec2019 3:00:00	2019	876.8258123	842.6755	1361.535	1319.442	1118.22
21Dec2019 4:00:00	2019	882.6227419	844.7871	1364.449	1337.651	1111.369
21Dec2019 5:00:00	2019	914.5392535	853.6998	1372.834	1380	1108.251
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21Dec2019 7:00:00	2019	1047.506259	904.1141	1408.827	1507.042	1110.924
21Dec2019 8:00:00	2019	1134.334272	936.4086	1444.344	1625.234	1120.779
21Dec2019 9:00:00	2019	1189.6948	954.1548	1449.161	1649.729	1124.735
21Dec2019 10:00:00	2019	1227.481974	960.4158	1464.31	1706.555	1122.516
21Dec2019 11:00:00	2019	1242.716698	956.5754	1466.171	1726.748	1151.534
21Dec2019 12:00:00	2019	1243.027753	947.1852	1460.527	1713.761	1158.354
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21Dec2019 14:00:00	2019	1223.154211	944.9295	1443.529	1704.103	1150.795
21Dec2019 15:00:00	2019	1231.223715	949.2779	1455.381	1740.658	1160.775
21Dec2019 16:00:00	2019	1300.149677	981.1551	1495.538	1803.416	1197.823
21Dec2019 17:00:00	2019	1365.233194	1011.657	1521.105	1822.224	1203.325
21Dec2019 18:00:00	2019	1325.60298	998.1075	1498.301	1766.134	1196.237
21Dec2019 19:00:00	2019	1280.091785	976.3666	1464.903	1713.422	1166.732
21Dec2019 20:00:00	2019	1237.238023	961.9083	1455.179	1694.669	1147.681
21Dec2019 21:00:00	2019	1188.707567	942.9275	1450.199	1612.965	1143.217
21Dec2019 22:00:00	2019	1118.616181	916.4421	1430.052	1557.954	1129.378
21Dec2019 23:00:00	2019	1041.657054	890.1129	1397.209	1444.426	1111.842
22Dec2019 0:00:00	2019	970.3674963	867.7291	1365.792	1387.913	1098.011
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22Dec2019 2:00:00	2019	886.9554434	853.2019	1334.149	1306.494	1106.529
22Dec2019 3:00:00	2019	872.5265236	848.6527	1334.682	1284.118	1116.014
22Dec2019 4:00:00	2019	874.6173302	849.3091	1361.397	1286.893	1119.568
22Dec2019 5:00:00	2019	900.5812247	862.8104	1367.832	1313.783	1124.495

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23Dec2019 0:00:00	2019	958.1665442	882.6203	1426.114	1429.008	1144.022
23Dec2019 1:00:00	2019	917.4625314	871.3729	1408.237	1381.746	1136.727
23Dec2019 2:00:00	2019	897.3820802	864.5196	1393.153	1352.562	1131.317
23Dec2019 3:00:00	2019	893.2926397	863.7506	1381.939	1335.954	1131.716
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23Dec2019 5:00:00	2019	970.5533769	876.3372	1376.127	1400.648	1109.281
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23Dec2019 16:00:00	2019	1381.655596	967.8167	1488.973	1823.365	1146.325
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23Dec2019 22:00:00	2019	1174.647118	908.3064	1458.927	1656.633	1212.554
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25Dec2019 12:00:00	2019	1170.609824	935.3232	1436.166	1584.948	1159.981
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25Dec2019 14:00:00	2019	1166.99983	928.7172	1412.659	1564.372	1158.181
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25Dec2019 16:00:00	2019	1238.023584	956.8427	1465.551	1652.994	1193.097
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25Dec2019 21:00:00	2019	1128.581534	961.8628	1462.897	1541.247	1178.491
25Dec2019 22:00:00	2019	1082.666358	942.8993	1451.739	1508.829	1171.042
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26Dec2019 16:00:00	2019	1239.846351	957.2355	1445.674	1640.486	1204.424
26Dec2019 17:00:00	2019	1327.268015	998.6279	1528.178	1724.39	1217.937
26Dec2019 18:00:00	2019	1305.541889	993.4123	1501.706	1696.524	1205.816
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26Dec2019 20:00:00	2019	1226.881148	973.721	1500.769	1630.889	1206.307
26Dec2019 21:00:00	2019	1175.959625	954.1867	1468.915	1577.365	1213.347
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27Dec2019 0:00:00	2019	966.1371075	874.1411	1391.558	1357.81	1201.408
27Dec2019 1:00:00	2019	926.5377053	862.6972	1397.086	1344.383	1174.44
27Dec2019 2:00:00	2019	907.6662827	855.1753	1393.941	1319.664	1175.551
27Dec2019 3:00:00	2019	902.0211624	854.7558	1393.684	1309.265	1180.465
27Dec2019 4:00:00	2019	916.1614209	859.1508	1389.923	1313.296	1169.341
27Dec2019 5:00:00	2019	968.9233122	873.5966	1407.033	1371.969	1164.269
27Dec2019 6:00:00	2019	1055.411441	898.0664	1428.283	1460.996	1170.493
27Dec2019 7:00:00	2019	1140.512791	931.9103	1471.099	1559.024	1169.815
27Dec2019 8:00:00	2019	1213.554576	956.527	1504.331	1649.109	1186.463
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27Dec2019 11:00:00	2019	1281.573636	940.1876	1528.925	1707.258	1192.034
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27Dec2019 13:00:00	2019	1272.217868	924.8023	1491.646	1660.253	1172.256
27Dec2019 14:00:00	2019	1265.918618	926.7961	1495.193	1649.108	1173.346
27Dec2019 15:00:00	2019	1280.316427	939.6633	1508.796	1652.717	1167.307
27Dec2019 16:00:00	2019	1329.773708	961.3339	1532.268	1723.894	1194.545
27Dec2019 17:00:00	2019	1406.317557	994.1318	1554.784	1787.261	1205.263
27Dec2019 18:00:00	2019	1366.499411	986.0855	1529.371	1745.847	1196.043
27Dec2019 19:00:00	2019	1321.969529	974.539	1518.482	1715.064	1180.832
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27Dec2019 21:00:00	2019	1202.693192	958.4375	1487.166	1624.325	1163.308
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28Dec2019 5:00:00	2019	934.5761758	869.0119	1392.658	1344.306	1158.547
28Dec2019 6:00:00	2019	978.7553617	887.4307	1407.327	1391.916	1169.783
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28Dec2019 8:00:00	2019	1118.850809	943.2198	1472.352	1553.314	1154.863
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28Dec2019 10:00:00	2019	1189.955128	969.397	1492.556	1629.017	1152.384
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14Jan2020 18:00:00	2020	1663.721378	1033.382	1593.239	2123.632	1228.303
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14Jan2020 22:00:00	2020	1373.924877	953.6989	1527.832	1858.658	1206.401
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23Jan2020 9:00:00	2020	1369.56127	976.4571	1552.567	1832.729	1188.338
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01Feb2020 2:00:00	2020	881.5967078	818.7711	1309.36	1256.338	1155.559
01Feb2020 3:00:00	2020	867.9750791	819.0844	1307.708	1251.881	1150.233
01Feb2020 4:00:00	2020	863.481794	817.4558	1308.611	1248.421	1148.342
01Feb2020 5:00:00	2020	886.4149638	826.9893	1306.222	1253.439	1167.906
01Feb2020 6:00:00	2020	938.553716	846.1559	1327.875	1329.037	1167.607
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01Feb2020 9:00:00	2020	1127.831332	903.4367	1403.896	1552.831	1175.831
01Feb2020 10:00:00	2020	1174.874819	909.2598	1406.049	1578.456	1187.293
01Feb2020 11:00:00	2020	1200.394137	911.2503	1381.987	1593.768	1170.782
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01Feb2020 23:00:00	2020	1027.415972	841.096	1388.008	1465.324	1200.342
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02Feb2020 13:00:00	2020	1204.535388	894.8684	1423.954	1592.285	1190.188
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04Feb2020 7:00:00	2020	1378.515137	1014.232	1527.891	1758.88	1205.565
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09Feb2020 16:00:00	2020	1279.66528	946.5322	1413.146	1697.757	1248.643
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18Feb2020 7:00:00	2020	1351.875931	967.1193	1513.314	1788.691	1280.017
18Feb2020 8:00:00	2020	1371.906354	969.9599	1534.242	1830.421	1256.568
18Feb2020 9:00:00	2020	1394.23431	975.5293	1550.027	1855.728	1244.957
18Feb2020 10:00:00	2020	1407.925738	974.3666	1552.628	1869.124	1241.054
18Feb2020 11:00:00	2020	1407.724938	962.4115	1538.223	1872.003	1227.233
18Feb2020 12:00:00	2020	1401.708782	954.5063	1542.195	1856.495	1230.436
18Feb2020 13:00:00	2020	1391.325384	946.5804	1501.375	1879.158	1207.059
18Feb2020 14:00:00	2020	1377.514574	949.2274	1511.607	1868.77	1209.167
18Feb2020 15:00:00	2020	1369.570546	962.7028	1497.462	1861.122	1200.057
18Feb2020 16:00:00	2020	1388.946887	973.9765	1503.297	1875.545	1214.22
18Feb2020 17:00:00	2020	1432.567356	993.0659	1515.73	1876.331	1240.683
18Feb2020 18:00:00	2020	1464.952145	1016.645	1540.53	1914.728	1258.52
18Feb2020 19:00:00	2020	1435.355215	1013.856	1544.67	1886.323	1259.692
18Feb2020 20:00:00	2020	1379.748826	1012.563	1542.383	1845.484	1273.491
18Feb2020 21:00:00	2020	1297.845811	1048.947	1511.659	1726.839	1277.259
18Feb2020 22:00:00	2020	1191.151628	1022.653	1484.269	1644.275	1272.115
18Feb2020 23:00:00	2020	1095.151336	989.6046	1461.049	1548.698	1266.29

19Feb2020 0:00:00	2020	1030.676854	965.814	1449.565	1492.801	1260.996
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19Feb2020 2:00:00	2020	983.7091958	933.918	1415.273	1431.623	1230.341
19Feb2020 3:00:00	2020	979.7204888	936.2603	1406.374	1421.126	1215.327
19Feb2020 4:00:00	2020	1005.062523	949.5609	1416.219	1432.987	1217.318
19Feb2020 5:00:00	2020	1084.006177	964.8556	1441.302	1497.6	1225.65
19Feb2020 6:00:00	2020	1235.060028	992.5457	1482.87	1627.96	1231.779
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19Feb2020 11:00:00	2020	1372.855818	985.8345	1519.285	1800.636	1223.05
19Feb2020 12:00:00	2020	1359.102465	963.3825	1463.316	1776.991	1178.352
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19Feb2020 15:00:00	2020	1335.106766	949.4761	1502.61	1766.434	1242.287
19Feb2020 16:00:00	2020	1350.855886	954.7552	1517.319	1786.051	1248.857
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19Feb2020 18:00:00	2020	1412.609159	1018.079	1560.458	1851.868	1263.082
19Feb2020 19:00:00	2020	1388.351522	1018.472	1562.439	1810.143	1273.951
19Feb2020 20:00:00	2020	1340.156104	1008.049	1560.365	1768.455	1272.464
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19Feb2020 22:00:00	2020	1153.404218	975.64	1504.125	1578.448	1222.007
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20Feb2020 0:00:00	2020	991.9102624	925.6523	1453.156	1442.234	1212.367
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20Feb2020 2:00:00	2020	940.2718619	912.416	1449.776	1377.087	1238.072
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20Feb2020 10:00:00	2020	1338.562517	999.1809	1511.624	1739.237	1207.333
20Feb2020 11:00:00	2020	1336.982935	991.2812	1510.706	1735.446	1201.399
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20Feb2020 14:00:00	2020	1310.415338	946.5762	1476.726	1709.495	1180.551
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20Feb2020 17:00:00	2020	1340.914241	947.5117	1495.386	1733.107	1214.607
20Feb2020 18:00:00	2020	1363.227023	973.0028	1536.199	1783.844	1226.915
20Feb2020 19:00:00	2020	1343.504869	970.1967	1511.027	1753.855	1237.907
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20Feb2020 21:00:00	2020	1216.375336	948.1144	1474.585	1615.451	1213.428
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21Feb2020 1:00:00	2020	922.68874	859.5973	1386.332	1339.712	1176.626
21Feb2020 2:00:00	2020	904.7420291	851.1656	1381.862	1321.443	1176.207
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21Feb2020 4:00:00	2020	924.6499029	854.1802	1383.382	1326.976	1179.285
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21Feb2020 6:00:00	2020	1148.737733	903.2642	1415.604	1534.476	1197.519
21Feb2020 7:00:00	2020	1272.867226	946.7763	1478.492	1692.382	1200.062
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21Feb2020 10:00:00	2020	1339.562826	937.2806	1509.52	1783.386	1188.974
21Feb2020 11:00:00	2020	1346.669209	925.543	1510.086	1774.637	1183.73
21Feb2020 12:00:00	2020	1336.201437	892.1245	1465.714	1747.812	1158.919
21Feb2020 13:00:00	2020	1332.381053	892.3421	1437.703	1721.214	1150.124
21Feb2020 14:00:00	2020	1324.063723	898.3613	1437.118	1696.955	1116.775
21Feb2020 15:00:00	2020	1316.460749	897.706	1437.475	1693.818	1115.09
21Feb2020 16:00:00	2020	1322.297374	914.0117	1475.878	1689.296	1125.485
21Feb2020 17:00:00	2020	1339.643502	933.9629	1484.428	1710.669	1133.192
21Feb2020 18:00:00	2020	1342.092294	955.4119	1510.6	1754.879	1151.254
21Feb2020 19:00:00	2020	1303.312994	947.8563	1489.065	1747.552	1169.469
21Feb2020 20:00:00	2020	1251.064171	928.0927	1469.364	1694.87	1159.025
21Feb2020 21:00:00	2020	1183.419884	919.0557	1432.271	1622.518	1148.19
21Feb2020 22:00:00	2020	1098.107213	892.248	1400.702	1543.513	1150.218
21Feb2020 23:00:00	2020	1012.927681	862.2194	1374.166	1448.787	1143.393
22Feb2020 0:00:00	2020	945.767315	841.9015	1351.188	1367.83	1139.589
22Feb2020 1:00:00	2020	901.8725574	835.6805	1352.576	1340.654	1147.905
22Feb2020 2:00:00	2020	873.7252999	827.4323	1349.927	1291.917	1156.792
22Feb2020 3:00:00	2020	862.8387726	825.3306	1338.482	1281.279	1137.353
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22Feb2020 5:00:00	2020	899.9948679	835.046	1333.387	1286.353	1118.336
22Feb2020 6:00:00	2020	957.2949584	850.6452	1328.461	1306.419	1136.153
22Feb2020 7:00:00	2020	1025.412521	877.0944	1352.041	1392.64	1150.313
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22Feb2020 9:00:00	2020	1132.523085	910.199	1410.828	1505.382	1155.001
22Feb2020 10:00:00	2020	1160.895525	909.2629	1424.548	1543.14	1144.529
22Feb2020 11:00:00	2020	1178.327363	903.6866	1429.515	1563.139	1126.523
22Feb2020 12:00:00	2020	1186.704921	901.2928	1426.296	1587.158	1118.021
22Feb2020 13:00:00	2020	1181.133084	893.7139	1410.648	1560.454	1127.434
22Feb2020 14:00:00	2020	1163.518054	892.3675	1390.61	1559.614	1140.77
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22Feb2020 17:00:00	2020	1217.237177	918.9072	1446.093	1655.319	1154.79
22Feb2020 18:00:00	2020	1261.570153	953.1792	1487.135	1723.922	1169.434
22Feb2020 19:00:00	2020	1242.487709	938.167	1451.889	1682.649	1154.168
22Feb2020 20:00:00	2020	1202.855909	930.4352	1452.96	1625.074	1150.665
22Feb2020 21:00:00	2020	1153.613548	931.7777	1454.998	1589.574	1148.678

22Feb2020 22:00:00	2020	1088.755537	908.7664	1432.513	1508.388	1144.741
22Feb2020 23:00:00	2020	1014.206897	883.2747	1406.596	1438.191	1145.075
23Feb2020 0:00:00	2020	955.9841652	859.3639	1360.168	1369.939	1143.331
23Feb2020 1:00:00	2020	915.4571795	848.9437	1346.372	1327.978	1159.786
23Feb2020 2:00:00	2020	892.2303381	844.1635	1337.651	1305.546	1160.085
23Feb2020 3:00:00	2020	882.0292236	840.5324	1343.332	1300.355	1156.583
23Feb2020 4:00:00	2020	885.9119918	844.1287	1355.672	1297.538	1169.401
23Feb2020 5:00:00	2020	909.1367022	847.6514	1366.489	1324.22	1163.137
23Feb2020 6:00:00	2020	954.0017684	860.4139	1371.573	1383.084	1164.521
23Feb2020 7:00:00	2020	1007.163027	883.4846	1393.249	1439.988	1131.626
23Feb2020 8:00:00	2020	1055.145959	900.703	1412.957	1497.679	1119.419
23Feb2020 9:00:00	2020	1102.192152	902.9867	1406.798	1556.371	1118.911
23Feb2020 10:00:00	2020	1145.059106	906.3078	1403.686	1584.737	1124.801
23Feb2020 11:00:00	2020	1166.368833	905.2942	1396.227	1587.533	1129.596
23Feb2020 12:00:00	2020	1179.463836	907.4472	1381.837	1560.803	1128.117
23Feb2020 13:00:00	2020	1184.915905	907.2266	1386.25	1540.856	1108.888
23Feb2020 14:00:00	2020	1193.066414	906.8276	1387.262	1536.334	1120.018
23Feb2020 15:00:00	2020	1210.335294	918.9429	1407.19	1589.759	1130.778
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23Feb2020 17:00:00	2020	1315.618515	951.2462	1463.178	1711.186	1175.397
23Feb2020 18:00:00	2020	1330.870561	963.0716	1494.36	1764.913	1180.44
23Feb2020 19:00:00	2020	1302.694025	949.4384	1501.355	1744.54	1174.403
23Feb2020 20:00:00	2020	1257.16196	938.745	1488.411	1704.732	1179.097
23Feb2020 21:00:00	2020	1186.177804	917.944	1457	1630.679	1172.898
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24Feb2020 1:00:00	2020	907.3158947	847.9887	1336.984	1311.977	1181.616
24Feb2020 2:00:00	2020	891.9923578	843.8623	1325.824	1290.571	1186.704
24Feb2020 3:00:00	2020	891.999462	844.1512	1322.741	1288.306	1184.562
24Feb2020 4:00:00	2020	916.5609528	853.4626	1317.683	1312.693	1189.807
24Feb2020 5:00:00	2020	997.7793688	873.199	1333.299	1386.057	1194.188
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24Feb2020 12:00:00	2020	1348.635029	965.3187	1423.14	1755.444	1196.643
24Feb2020 13:00:00	2020	1338.246638	967.3626	1415.792	1745.264	1158.452
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24Feb2020 16:00:00	2020	1337.467265	978.7397	1455.307	1758.042	1171.823
24Feb2020 17:00:00	2020	1387.189198	995.5172	1464.94	1781.214	1189.648
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24Feb2020 19:00:00	2020	1382.442752	1012.142	1480.097	1805.637	1241.25
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24Feb2020 21:00:00	2020	1251.69289	980.4639	1441.873	1663.7	1195.111
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24Feb2020 23:00:00	2020	1041.948159	914.4217	1357.777	1434.23	1178.207
25Feb2020 0:00:00	2020	982.5343718	897.7333	1340.613	1375.695	1159.872
25Feb2020 1:00:00	2020	953.1361342	894.3461	1345.524	1336.322	1156.898
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25Feb2020 3:00:00	2020	938.0302699	890.0957	1351.315	1333.361	1155.462
25Feb2020 4:00:00	2020	959.4716575	899.3883	1362.791	1372.431	1150.78
25Feb2020 5:00:00	2020	1044.533327	915.4369	1368.953	1450.854	1167.051
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25Feb2020 13:00:00	2020	1343.498765	947.3931	1433.125	1739.659	1152.859
25Feb2020 14:00:00	2020	1326.046705	927.8829	1437.754	1739.723	1150.498
25Feb2020 15:00:00	2020	1327.849103	932.903	1457.157	1757.283	1143.263
25Feb2020 16:00:00	2020	1347.04915	950.5994	1485.783	1789.756	1152.696
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25Feb2020 18:00:00	2020	1402.067904	989.7223	1480.579	1826.681	1184.47
25Feb2020 19:00:00	2020	1380.7018	987.2126	1474.591	1799.207	1178.577
25Feb2020 20:00:00	2020	1324.560669	971.0597	1465.059	1774.649	1182.628
25Feb2020 21:00:00	2020	1245.790051	958.9045	1435.712	1696.191	1184.034
25Feb2020 22:00:00	2020	1130.841062	919.8662	1395.344	1571.585	1186.787
25Feb2020 23:00:00	2020	1030.73341	885.797	1353.19	1472.618	1175.046
26Feb2020 0:00:00	2020	965.3980747	862.9192	1338.752	1400.6	1159.168
26Feb2020 1:00:00	2020	927.5095282	850.0513	1324.782	1369.649	1157.443
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26Feb2020 18:00:00	2020	1366.012177	959.0426	1417.209	1738.314	1208.024
26Feb2020 19:00:00	2020	1355.829169	963.0901	1433.908	1740.173	1207.035

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26Feb2020 22:00:00	2020	1122.80237	887.636	1418.984	1532.143	1168.82
26Feb2020 23:00:00	2020	1023.571523	861.1595	1389.175	1421.829	1140.152
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27Feb2020 1:00:00	2020	923.3722817	824.3686	1355.31	1323.67	1132.538
27Feb2020 2:00:00	2020	905.9064791	820.2266	1363.872	1285.316	1145.885
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06Mar2020 15:00:00	2020	1273.843731	852.879	1439.499	1759.608	1178.266
06Mar2020 16:00:00	2020	1283.539581	861.2746	1418.689	1767.504	1188.786
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15Mar2020 7:00:00	2020	1114.512861	907.3153	1510.133	1550.839	1205.614
15Mar2020 8:00:00	2020	1158.619191	918.7191	1517.987	1566.323	1195.228
15Mar2020 9:00:00	2020	1216.896658	933.6142	1522.239	1631.158	1207.891
15Mar2020 10:00:00	2020	1265.269849	940.1529	1520.111	1661.925	1220.309
15Mar2020 11:00:00	2020	1290.473128	916.5534	1510.246	1698.387	1220.804

15Mar2020 12:00:00	2020	1297.861615	883.7191	1497.249	1724.228	1225.02
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15Mar2020 14:00:00	2020	1269.098821	874.5748	1450.459	1651.363	1219.153
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15Mar2020 16:00:00	2020	1270.740683	914.7847	1452.001	1660.115	1202.941
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15Mar2020 18:00:00	2020	1269.600423	929.362	1478.332	1694.296	1209.169
15Mar2020 19:00:00	2020	1276.668634	946.6155	1505.568	1711.991	1198.233
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15Mar2020 21:00:00	2020	1266.038013	942.2004	1516.761	1703.164	1215.135
15Mar2020 22:00:00	2020	1182.294145	960.0087	1492.985	1617.535	1211.67
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23Mar2020 21:00:00	2020	1186.02966	895.7682	1492.479	1594.72	1165.762
23Mar2020 22:00:00	2020	1098.61597	870.934	1454.826	1482.987	1166.042
23Mar2020 23:00:00	2020	1013.434321	844.5563	1415.572	1377.449	1154.92
24Mar2020 0:00:00	2020	951.8147362	828.5663	1375.045	1304.859	1145.808
24Mar2020 1:00:00	2020	916.6296296	822.878	1356.692	1257.482	1138.435
24Mar2020 2:00:00	2020	896.1799201	814.1806	1349.746	1247.76	1130.757
24Mar2020 3:00:00	2020	891.1165654	816.4484	1349.623	1228.54	1131.677
24Mar2020 4:00:00	2020	905.5027487	823.1044	1352.223	1218.086	1131.622
24Mar2020 5:00:00	2020	961.0746123	838.2176	1365.864	1271.223	1138.626
24Mar2020 6:00:00	2020	1069.686956	869.1779	1410.748	1401.555	1147.096
24Mar2020 7:00:00	2020	1172.274934	891.8334	1457.792	1513.956	1149.026
24Mar2020 8:00:00	2020	1231.58887	914.9033	1484.104	1591.012	1164.521
24Mar2020 9:00:00	2020	1271.370577	928.1055	1501.701	1638.839	1177.917
24Mar2020 10:00:00	2020	1291.617093	931.9051	1514.559	1695.949	1180.285
24Mar2020 11:00:00	2020	1312.505186	937.1184	1515.8	1721.938	1189.747
24Mar2020 12:00:00	2020	1328.454539	929.9517	1511.958	1723.482	1184.213
24Mar2020 13:00:00	2020	1316.241386	926.1855	1507.497	1726.656	1178.768
24Mar2020 14:00:00	2020	1306.461799	928.0078	1484.188	1697.135	1174.549
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24Mar2020 16:00:00	2020	1317.500559	938.0974	1499.036	1692.172	1162.408
24Mar2020 17:00:00	2020	1341.832236	947.544	1440.379	1680.347	1163.914
24Mar2020 18:00:00	2020	1294.073152	927.7521	1404.917	1661.339	1160.346
24Mar2020 19:00:00	2020	1263.88175	927.0369	1413.576	1633.236	1171.472
24Mar2020 20:00:00	2020	1263.47203	928.7721	1428.244	1666	1186.218
24Mar2020 21:00:00	2020	1196.017216	905.4174	1407.273	1607.052	1191.658
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26Mar2020 12:00:00	2020	1291.5748	898.7485	1414.314	1713.844	1217.706
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01Apr2020 13:00:00	2020	1334.771667	852.5394	1337.769	1725.026	1194.582
01Apr2020 14:00:00	2020	1317.439474	844.8475	1353.556	1712.102	1193.419
01Apr2020 15:00:00	2020	1305.556306	832.4812	1350.195	1698.209	1196.252
01Apr2020 16:00:00	2020	1307.871692	845.1957	1345.62	1697.11	1197.821
01Apr2020 17:00:00	2020	1324.487728	864.4126	1342.998	1705.916	1191.077
01Apr2020 18:00:00	2020	1277.32979	854.8558	1335.497	1659.503	1183.647
01Apr2020 19:00:00	2020	1258.045798	853.6635	1327.652	1631.876	1179.977
01Apr2020 20:00:00	2020	1275.412678	865.8892	1352.151	1679.313	1203.478
01Apr2020 21:00:00	2020	1234.262603	877.087	1359.464	1644.408	1195.206
01Apr2020 22:00:00	2020	1147.462275	877.4217	1349.624	1552.957	1199.143
01Apr2020 23:00:00	2020	1061.619997	844.4038	1338.158	1445.548	1185.251
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02Apr2020 1:00:00	2020	965.5942984	815.293	1303.854	1358.174	1173.684
02Apr2020 2:00:00	2020	945.39407	815.2974	1297.433	1332.532	1173.265

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10Apr2020 5:00:00	2020	857.9831493	729.2318	1177.244	1209.68	1043.242
10Apr2020 6:00:00	2020	897.0966921	740.0027	1187.292	1230.588	1041.831
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10Apr2020 10:00:00	2020	1109.369021	800.4586	1251.301	1400.574	1056.422
10Apr2020 11:00:00	2020	1164.73484	815.9619	1253.093	1411.219	1049.326
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10Apr2020 15:00:00	2020	1175.948082	835.335	1233.4	1420.849	1048.375
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10Apr2020 18:00:00	2020	1199.146744	857.3887	1241.294	1461.521	1042.519
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18Apr2020 21:00:00	2020	1099.139668	816.061	1172.46	1370.028	1028.311
18Apr2020 22:00:00	2020	1039.37477	795.4337	1146.968	1319.584	1041.528
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19Apr2020 0:00:00	2020	909.3414194	750.8559	1142.862	1183.735	1039.938
19Apr2020 1:00:00	2020	866.3551921	737.7567	1121.288	1151.009	1039.886
19Apr2020 2:00:00	2020	843.554902	732.8583	1126.457	1162.667	1041.532
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19Apr2020 11:00:00	2020	1059.085919	770.1441	1197.644	1380.682	1031.38
19Apr2020 12:00:00	2020	1077.126628	766.0113	1203.857	1398.956	1029.882
19Apr2020 13:00:00	2020	1064.217535	757.0506	1200.05	1402.815	1029.649
19Apr2020 14:00:00	2020	1047.901206	750.3735	1185.211	1396.711	1029.158
19Apr2020 15:00:00	2020	1042.303814	748.413	1179.501	1388.855	1026.164
19Apr2020 16:00:00	2020	1066.228966	756.569	1183.741	1425.796	1028.243
19Apr2020 17:00:00	2020	1104.977288	766.1933	1197.778	1444.236	1026.159

19Apr2020 18:00:00	2020	1088.78239	765.3103	1177.454	1440.95	1019.644
19Apr2020 19:00:00	2020	1059.758945	764.4554	1168.195	1380.359	1015.242
19Apr2020 20:00:00	2020	1056.013821	764.7088	1166.584	1381.764	1013.64
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19Apr2020 22:00:00	2020	994.4566414	762.5096	1144.129	1310.695	1024.793
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20Apr2020 12:00:00	2020	1247.11239	787.5324	1224.242	1537.603	1028.917
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20Apr2020 19:00:00	2020	1121.330382	768.455	1183.548	1408.989	1008.222
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21Apr2020 6:00:00	2020	953.2218194	731.5087	1124.923	1208.525	1015.899
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21Apr2020 8:00:00	2020	1119.613894	782.252	1191.521	1422.36	970.9623
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21Apr2020 13:00:00	2020	1249.684603	789.2333	1226.008	1581.411	954.4483
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22Apr2020 1:00:00	2020	835.8371498	676.2657	1090.305	1147.907	1005.95
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27Apr2020 13:00:00	2020	1238.068568	812.058	1201.296	1497.789	1064.425

27Apr2020 14:00:00	2020	1219.133962	808.9087	1194.64	1509.166	1048.822
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06May2020 5:00:00	2020	863.2777537	681.1655	986.2233	1107.213	966.4953
06May2020 6:00:00	2020	934.7882556	701.828	996.3257	1159.174	958.1922
06May2020 7:00:00	2020	1037.124844	734.8886	1029.597	1273.041	956.6328
06May2020 8:00:00	2020	1110.018305	754.6936	1063.412	1379.131	952.5693
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14May2020 20:00:00	2020	1065.380861	833.9319	1132.018	1366.323	978.2033
14May2020 21:00:00	2020	1070.665831	838.4665	1139.701	1361.338	982.1682
14May2020 22:00:00	2020	1020.049817	820.7573	1133.679	1362.607	998.8698
14May2020 23:00:00	2020	937.7400967	788.9626	1100.841	1264.896	991.587
15May2020 0:00:00	2020	874.3590504	769.3338	1078.186	1194.843	981.617
15May2020 1:00:00	2020	831.504501	758.288	1069.227	1169.676	963.3035
15May2020 2:00:00	2020	809.6073579	755.4494	1066.165	1127.379	960.7696
15May2020 3:00:00	2020	805.2226353	755.4736	1061.516	1131.562	994.3111
15May2020 4:00:00	2020	810.12647	756.4648	1067.949	1142.583	996.5713

15May2020 5:00:00	2020	845.9848872	761.4033	1076.803	1159.869	986.2229
15May2020 6:00:00	2020	917.8783724	778.8288	1087.729	1210.274	975.907
15May2020 7:00:00	2020	1011.654798	818.4833	1131.306	1340.699	988.8985
15May2020 8:00:00	2020	1083.812641	837.3013	1158.948	1443.736	992.5324
15May2020 9:00:00	2020	1127.763163	813.1125	1170.097	1475.564	983.8255
15May2020 10:00:00	2020	1160.970864	799.1801	1165.134	1487.645	1001.658
15May2020 11:00:00	2020	1187.162235	797.3137	1148.489	1498.267	1003.393
15May2020 12:00:00	2020	1203.79203	796.4149	1146.442	1505.426	990.6054
15May2020 13:00:00	2020	1199.595307	790.9455	1133.865	1498.842	982.2489
15May2020 14:00:00	2020	1185.63413	786.1321	1139.842	1460.766	981.9774
15May2020 15:00:00	2020	1181.211531	783.7699	1143.78	1448.725	976.9131
15May2020 16:00:00	2020	1174.242193	787.9771	1160.563	1451.759	977.1498
15May2020 17:00:00	2020	1162.741616	799.2198	1161.38	1447.417	981.6312
15May2020 18:00:00	2020	1115.685705	793.0206	1151.945	1407.285	970.4989
15May2020 19:00:00	2020	1082.748896	842.8062	1146.021	1371.911	963.9763
15May2020 20:00:00	2020	1057.026547	841.9359	1139.552	1370.347	968.7175
15May2020 21:00:00	2020	1047.457648	845.5248	1151.506	1372.868	969.5614
15May2020 22:00:00	2020	1001.311399	832.0907	1145.673	1345.215	986.6318
15May2020 23:00:00	2020	928.3102117	797.5283	1113.943	1263.834	985.2553
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16May2020 1:00:00	2020	822.0559224	757.0554	1080.023	1155.157	980.7535
16May2020 2:00:00	2020	797.7616969	752.6951	1076.374	1127.906	982.2039
16May2020 3:00:00	2020	788.8099489	749.1782	1070.898	1099.325	987.5555
16May2020 4:00:00	2020	784.5214551	745.7406	1065.157	1089.885	990.1067
16May2020 5:00:00	2020	788.1922183	746.7019	1059.39	1071.945	982.9338
16May2020 6:00:00	2020	799.6424955	751.1453	1050.002	1073.115	965.6415
16May2020 7:00:00	2020	845.4608149	764.4102	1068.896	1149.328	963.8023
16May2020 8:00:00	2020	906.3828999	782.1843	1093.719	1209.593	967.9575
16May2020 9:00:00	2020	965.2732024	801.0079	1113.242	1293.67	966.1867
16May2020 10:00:00	2020	1010.49169	813.8755	1125.965	1337.701	966.7656
16May2020 11:00:00	2020	1040.183187	817.8188	1132.583	1374.224	970.1178
16May2020 12:00:00	2020	1057.414465	819.0133	1143.181	1403.915	964.6184
16May2020 13:00:00	2020	1051.13632	817.9243	1142.292	1412.912	964.9864
16May2020 14:00:00	2020	1043.74068	818.4084	1145.73	1401.674	961.4503
16May2020 15:00:00	2020	1040.567708	820.9254	1150.357	1400.328	971.3077
16May2020 16:00:00	2020	1048.924404	833.3956	1153.91	1399.123	958.0697
16May2020 17:00:00	2020	1070.16686	846.4228	1163.094	1427.321	959.3485
16May2020 18:00:00	2020	1053.845099	843.0814	1151.412	1431.775	965.0867
16May2020 19:00:00	2020	1024.703963	835.0451	1114.24	1373.317	975.6472
16May2020 20:00:00	2020	1005.584882	825.6755	1104.913	1347.137	969.0969
16May2020 21:00:00	2020	1005.569267	831.5163	1127.455	1343.001	968.8842
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17May2020 1:00:00	2020	803.547281	766.8562	1072.99	1119.474	970.8491
17May2020 2:00:00	2020	777.8762508	759.2315	1061.591	1089.104	963.1579
17May2020 3:00:00	2020	764.526489	752.9582	1052.522	1072.96	962.7471

17May2020 4:00:00	2020	759.498929	750.8557	1053.304	1065.815	961.6336
17May2020 5:00:00	2020	760.7449679	752.33	1047.156	1042.851	954.5779
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17May2020 12:00:00	2020	1037.130229	828.9276	1113.116	1343.392	960.1801
17May2020 13:00:00	2020	1034.802126	822.1505	1125.88	1356.851	960.4484
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17May2020 15:00:00	2020	1032.298664	815.4477	1136.259	1378.668	965.211
17May2020 16:00:00	2020	1054.863666	829.1546	1142.201	1408.572	969.7066
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23May2020 9:00:00	2020	986.7842365	737.5247	1139.515	1333.976	944.645
23May2020 10:00:00	2020	1031.237532	750.6168	1148.433	1383.147	944.8325
23May2020 11:00:00	2020	1074.476861	760.6335	1163.133	1430.805	939.0687
23May2020 12:00:00	2020	1094.106726	758.5157	1142.113	1438.83	941.0273
23May2020 13:00:00	2020	1078.383041	756.6435	1134.554	1419.422	945.5886
23May2020 14:00:00	2020	1064.274142	750.2013	1143.048	1401.103	952.6397
23May2020 15:00:00	2020	1054.378696	752.4695	1137.511	1390.051	977.2483
23May2020 16:00:00	2020	1048.266837	757.4794	1146.672	1405.713	1019.503
23May2020 17:00:00	2020	1082.481734	764.1257	1134.272	1402.835	1009.064
23May2020 18:00:00	2020	1064.939905	763.5824	1123.014	1380.328	1011.088
23May2020 19:00:00	2020	1035.06978	758.1493	1121.003	1305.023	998.0923
23May2020 20:00:00	2020	1018.405934	758.7915	1123.584	1302.142	996.9914
23May2020 21:00:00	2020	1017.830414	761.7371	1128.095	1309.207	989.1801
23May2020 22:00:00	2020	991.7331356	752.6237	1132.841	1308.396	1007.175
23May2020 23:00:00	2020	925.4916566	723.386	1093.752	1250.737	1003.396
24May2020 0:00:00	2020	862.960864	699.6063	1070.293	1191.593	1034.542
24May2020 1:00:00	2020	818.6116666	684.4424	1056.282	1155.832	1016.005
24May2020 2:00:00	2020	792.6435081	676.1421	1049.296	1124.529	1013.571
24May2020 3:00:00	2020	780.6129809	672.2129	1044.029	1105.743	1002.265
24May2020 4:00:00	2020	780.0240766	672.6127	1056.994	1093.995	1011.074
24May2020 5:00:00	2020	779.5777652	668.9578	1047.679	1083.053	1000.19
24May2020 6:00:00	2020	791.0653353	665.7887	1042.728	1073.896	995.28
24May2020 7:00:00	2020	831.7780756	674.1662	1055.912	1143.216	1036.935
24May2020 8:00:00	2020	889.2244329	686.0497	1081.562	1211.788	1014.66
24May2020 9:00:00	2020	950.1439465	703.2953	1104.114	1273.455	976.4554
24May2020 10:00:00	2020	999.223956	713.7914	1097.591	1320.804	971.6433
24May2020 11:00:00	2020	1032.465115	722.5916	1110.116	1368.321	977.7282
24May2020 12:00:00	2020	1050.366502	718.6596	1129.396	1404.052	987.6948
24May2020 13:00:00	2020	1044.897961	715.8625	1123.103	1381.65	986.0573
24May2020 14:00:00	2020	1033.10457	712.7584	1121.823	1393.845	994.655
24May2020 15:00:00	2020	1033.691326	717.3544	1121.062	1399.853	991.4131
24May2020 16:00:00	2020	1056.720303	729.7685	1116.683	1423.39	992.1845
24May2020 17:00:00	2020	1085.662054	741.7705	1141.979	1465.538	1005.184
24May2020 18:00:00	2020	1073.43769	742.114	1149.257	1458.883	1004.884
24May2020 19:00:00	2020	1047.334703	735.9682	1150.067	1430.285	1005.518
24May2020 20:00:00	2020	1026.455804	732.5701	1138.463	1388.963	1003.98
24May2020 21:00:00	2020	1020.731322	730.9982	1126.001	1352.112	1006.642
24May2020 22:00:00	2020	999.2009454	723.1929	1123.314	1345.141	1029.207
24May2020 23:00:00	2020	915.8573994	698.5786	1089.689	1271.54	1008.378

25May2020 0:00:00	2020	849.9372113	682.5015	1077.18	1191.217	1034.304
25May2020 1:00:00	2020	807.3380911	671.9496	1059.431	1145.73	1054.121
25May2020 2:00:00	2020	782.9675729	664.7071	1049.612	1119.528	1059.583
25May2020 3:00:00	2020	775.2740229	662.6542	1049.245	1116.232	1063.55
25May2020 4:00:00	2020	788.4245816	659.7123	1051.622	1114.872	1024.34
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25May2020 6:00:00	2020	904.4938019	684.0144	1056.442	1187.18	1013.658
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25May2020 8:00:00	2020	1103.941834	741.0104	1148.968	1435.687	1016.729
25May2020 9:00:00	2020	1162.176315	743.9457	1175.925	1510.471	1020.659
25May2020 10:00:00	2020	1206.121281	758.0276	1193.674	1557.634	1025.959
25May2020 11:00:00	2020	1249.752637	764.5848	1197.06	1604.82	999.7153
25May2020 12:00:00	2020	1273.905849	767.1764	1204.992	1649.42	1001.041
25May2020 13:00:00	2020	1280.704725	745.8568	1201.083	1649.574	1010.789
25May2020 14:00:00	2020	1268.123297	741.228	1187.548	1624.315	1019.018
25May2020 15:00:00	2020	1257.171589	745.2269	1166.673	1602.861	1031.441
25May2020 16:00:00	2020	1251.582619	760.8627	1168.608	1594.218	1038.081
25May2020 17:00:00	2020	1256.966922	769.3861	1164.243	1590.227	1034.896
25May2020 18:00:00	2020	1194.429854	763.4392	1112.393	1529.188	1014.519
25May2020 19:00:00	2020	1139.588791	772.4889	1094.68	1465.841	1029.051
25May2020 20:00:00	2020	1100.247395	778.7697	1075.546	1406.514	1040.66
25May2020 21:00:00	2020	1077.503957	768.7451	1093.109	1377.118	998.3365
25May2020 22:00:00	2020	1026.040766	742.9897	1085.48	1360.976	1012.383
25May2020 23:00:00	2020	941.2825187	714.8496	1064.41	1277.471	1008.255
26May2020 0:00:00	2020	871.2199706	691.2396	1048.498	1192.181	1034.942
26May2020 1:00:00	2020	828.5166005	679.0289	1037.189	1141.312	1033.777
26May2020 2:00:00	2020	806.0719336	673.183	1033.808	1123.986	1026.724
26May2020 3:00:00	2020	797.5190819	669.7123	1031.635	1114.497	1013.089
26May2020 4:00:00	2020	805.3069151	680.0449	1029.387	1114.871	1028.414
26May2020 5:00:00	2020	833.2038901	672.0728	1029.514	1143.072	1021.368
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26May2020 8:00:00	2020	1125.725381	748.6544	1144.983	1458.264	1043.041
26May2020 9:00:00	2020	1180.547029	756.4476	1115.704	1489.987	1013.648
26May2020 10:00:00	2020	1210.160682	758.1479	1097.378	1530.682	1009.897
26May2020 11:00:00	2020	1241.351011	756.256	1120.135	1546.228	1015.004
26May2020 12:00:00	2020	1253.659131	769.2993	1162.385	1548.571	1014.838
26May2020 13:00:00	2020	1243.450458	783.0483	1220.62	1557.735	1003.428
26May2020 14:00:00	2020	1231.970616	781.7061	1205.564	1548.568	1020.659
26May2020 15:00:00	2020	1239.909678	773.8719	1199.436	1544.137	1030.979
26May2020 16:00:00	2020	1262.924045	784.1645	1198.411	1530.403	1047.538
26May2020 17:00:00	2020	1248.887905	788.1762	1185.262	1518.865	1042.892
26May2020 18:00:00	2020	1160.301181	771.0401	1151.577	1456.423	1048.072
26May2020 19:00:00	2020	1108.111677	768.6086	1140.993	1399.815	1032.205
26May2020 20:00:00	2020	1070.953274	763.437	1135.521	1357.59	993.9545
26May2020 21:00:00	2020	1050.376869	767.5366	1145.531	1333.628	980.9983
26May2020 22:00:00	2020	1027.71792	758.8064	1149.188	1355.949	990.3282

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27May2020 0:00:00	2020	878.599173	701.5016	1073.115	1192.133	972.5045
27May2020 1:00:00	2020	836.297026	686.9813	1053.014	1144.834	964.5293
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27May2020 3:00:00	2020	809.2743199	681.2513	1025.477	1088.581	999.6717
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27May2020 6:00:00	2020	936.2932314	716.5284	1054.239	1198.288	964.1939
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27May2020 9:00:00	2020	1160.565776	735.1089	1149.815	1474.883	1001.829
27May2020 10:00:00	2020	1193.892719	731.7236	1158.406	1511.784	1015.854
27May2020 11:00:00	2020	1223.951038	733.1255	1174.649	1565.735	1018.219
27May2020 12:00:00	2020	1244.128984	735.2392	1173.863	1548.697	1017.797
27May2020 13:00:00	2020	1238.712866	732.8674	1173.584	1543.804	994.9986
27May2020 14:00:00	2020	1228.076066	730.7126	1159.133	1533.868	988.6755
27May2020 15:00:00	2020	1218.822959	728.6041	1142.973	1520.932	987.1561
27May2020 16:00:00	2020	1217.333927	738.8274	1148.559	1514.774	1013.737
27May2020 17:00:00	2020	1220.525047	743.1937	1143.5	1512.195	1048.857
27May2020 18:00:00	2020	1166.749967	736.7137	1131.427	1464.43	1037.595
27May2020 19:00:00	2020	1118.458385	743.5084	1125.791	1419.549	1022.493
27May2020 20:00:00	2020	1085.247614	739.0145	1118.05	1394.141	1017.108
27May2020 21:00:00	2020	1062.30012	735.4213	1115.804	1371.765	1026.152
27May2020 22:00:00	2020	1036.859413	727.0354	1113.025	1357.364	1039.12
27May2020 23:00:00	2020	947.5199958	691.9719	1076.261	1274.921	1040.978
28May2020 0:00:00	2020	876.3989176	664.5004	1058.623	1198.914	1019.229
28May2020 1:00:00	2020	829.9401396	674.2672	1044.623	1150.641	1012.615
28May2020 2:00:00	2020	808.0888874	674.667	1040.661	1127.151	999.2494
28May2020 3:00:00	2020	798.6827092	676.229	1042.367	1115.084	1018.939
28May2020 4:00:00	2020	811.7573749	681.9937	1042.461	1120.327	1031.362
28May2020 5:00:00	2020	843.4781836	688.207	1043.714	1115.402	1016.658
28May2020 6:00:00	2020	923.3499107	705.1694	1055.019	1178.511	1016.568
28May2020 7:00:00	2020	1036.575698	740.614	1091.186	1311.609	1010.585
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28May2020 9:00:00	2020	1161.028562	768.7496	1144.876	1479.527	1015.253
28May2020 10:00:00	2020	1198.946256	768.846	1159.228	1518.802	1015.713
28May2020 11:00:00	2020	1236.793837	774.8354	1174.781	1551.283	1007.813
28May2020 12:00:00	2020	1254.372191	747.3718	1166.143	1570.209	1008.828
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28May2020 14:00:00	2020	1250.920407	740.4981	1167.308	1573.243	1027.282
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28May2020 18:00:00	2020	1181.23506	754.0044	1110.222	1491.067	1022.061
28May2020 19:00:00	2020	1140.029527	791.834	1120.036	1439.192	1008.994
28May2020 20:00:00	2020	1107.598551	784.6273	1114.905	1400.476	1007.38
28May2020 21:00:00	2020	1081.489772	780.9112	1108.981	1381.94	1008.248

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28May2020 23:00:00	2020	944.2823473	735.9353	1072.223	1287.907	1004.354
29May2020 0:00:00	2020	875.7268128	713.4247	1052.196	1211.622	1041.189
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29May2020 2:00:00	2020	809.526856	682.3785	1028.006	1115.808	1048.989
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29May2020 7:00:00	2020	1016.44133	741.6205	1064.921	1339.281	1017.658
29May2020 8:00:00	2020	1098.038636	774.4098	1105.752	1455.821	1027.835
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29May2020 11:00:00	2020	1239.893937	799.9215	1165.426	1524.961	1048.812
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29May2020 13:00:00	2020	1267.613591	781.6817	1160.757	1553.031	1048.498
29May2020 14:00:00	2020	1264.519117	780.0475	1156.457	1548.212	1036.648
29May2020 15:00:00	2020	1256.797079	786.2667	1119.587	1544.223	1046.836
29May2020 16:00:00	2020	1247.907095	791.4834	1112.896	1525.71	1063.622
29May2020 17:00:00	2020	1236.099567	798.7955	1124.92	1511.297	1073.658
29May2020 18:00:00	2020	1174.930261	795.4136	1118.836	1463.004	1076.05
29May2020 19:00:00	2020	1135.41378	827.3925	1116.43	1417.45	1057.154
29May2020 20:00:00	2020	1096.920852	819.3583	1114.829	1379.129	1046.291
29May2020 21:00:00	2020	1072.595369	809.8545	1111.194	1357.561	1039.204
29May2020 22:00:00	2020	1046.047883	800.466	1105.593	1347.319	1050.142
29May2020 23:00:00	2020	965.4117031	769.1963	1079.69	1268.946	1041.382
30May2020 0:00:00	2020	892.4871832	739.5268	1052.462	1195.156	1037.067
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31May2020 1:00:00	2020	852.592735	726.1824	1055.793	1175.199	1067.78
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31May2020 10:00:00	2020	1036.447639	779.6198	1109.45	1376.01	1077.715
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31May2020 18:00:00	2020	1143.451456	807.9911	1115.735	1505.02	1059.815
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31May2020 20:00:00	2020	1048.495308	781.632	1083.562	1432.407	1109.088
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01Jun2020 0:00:00	2020	846.1301671	704.8202	1021.924	1171.794	1090.755
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01Jun2020 5:00:00	2020	819.3697117	689.8422	1056.509	1116.631	1130.125
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09Jun2020 20:00:00	2020	1080.33317	778.0875	1138.31	1428.501	1171.387
09Jun2020 21:00:00	2020	1049.060215	769.2125	1105.161	1372.408	1164.455
09Jun2020 22:00:00	2020	1019.814526	760.588	1098.146	1343.295	1168.632
09Jun2020 23:00:00	2020	940.5869505	730.87	1096.934	1259.894	1158.54
10Jun2020 0:00:00	2020	869.5209257	706.0271	1090.639	1195.608	1116.072
10Jun2020 1:00:00	2020	822.0832977	690.393	1090.256	1163.033	1095.232
10Jun2020 2:00:00	2020	798.7230762	684.336	1083.357	1126.857	1121.543
10Jun2020 3:00:00	2020	789.6262302	681.9816	1086.458	1110.66	1099.845
10Jun2020 4:00:00	2020	802.4286012	682.1573	1086.372	1110.419	1113.977
10Jun2020 5:00:00	2020	829.0080205	684.9733	1069.878	1114.054	1129.606
10Jun2020 6:00:00	2020	914.6261523	703.5329	1080.759	1187.643	1102.766
10Jun2020 7:00:00	2020	1033.478035	739.6414	1122.5	1313.409	1101.695
10Jun2020 8:00:00	2020	1128.300371	763.3538	1167.473	1432.216	1122.263
10Jun2020 9:00:00	2020	1185.238002	760.9367	1174.306	1485.453	1122.346
10Jun2020 10:00:00	2020	1229.226662	768.4865	1172.116	1521.044	1118.532
10Jun2020 11:00:00	2020	1265.207946	761.7749	1174.707	1562.482	1121.439
10Jun2020 12:00:00	2020	1289.559591	763.5675	1179.74	1593.206	1090.148
10Jun2020 13:00:00	2020	1295.566858	763.9076	1202.245	1613.243	1107.642
10Jun2020 14:00:00	2020	1290.601978	765.4531	1203.125	1615.691	1123.723
10Jun2020 15:00:00	2020	1287.015463	768.056	1207.61	1629.004	1116.942
10Jun2020 16:00:00	2020	1288.343582	776.8729	1217.388	1641.689	1118.333
10Jun2020 17:00:00	2020	1297.909788	789.7827	1210.909	1645.482	1120.939
10Jun2020 18:00:00	2020	1241.510131	789.2614	1190.592	1588.767	1117.856
10Jun2020 19:00:00	2020	1195.012453	811.1696	1189.236	1540.825	1108.214
10Jun2020 20:00:00	2020	1149.441208	811.2138	1175.058	1508.973	1098.586
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11Jun2020 1:00:00	2020	842.8111308	698.2678	1057.094	1205.492	1086.98
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11Jun2020 3:00:00	2020	800.3583307	684.0659	1044.062	1150.895	1072.623
11Jun2020 4:00:00	2020	810.405185	685.4766	1023.653	1140.508	1055.846
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11Jun2020 8:00:00	2020	1147.963259	783.3351	1134.129	1528.058	1096.124
11Jun2020 9:00:00	2020	1212.56785	788.4026	1164.928	1581.446	1111.912
11Jun2020 10:00:00	2020	1265.479778	802.5222	1171.67	1654.661	1112.711
11Jun2020 11:00:00	2020	1308.130441	800.7353	1165.734	1667.203	1107.267
11Jun2020 12:00:00	2020	1336.390041	806.091	1162.218	1668.083	1114.167
11Jun2020 13:00:00	2020	1341.543621	813.8556	1174.15	1675.94	1122.647
11Jun2020 14:00:00	2020	1340.390553	825.1211	1172.843	1680.406	1124.12

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11Jun2020 17:00:00	2020	1322.404688	836.8998	1180.614	1679.778	1141.999
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11Jun2020 21:00:00	2020	1113.788345	849.0894	1172.487	1483.358	1108.787
11Jun2020 22:00:00	2020	1082.620096	840.1215	1163.88	1453.082	1109.722
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12Jun2020 3:00:00	2020	817.7162301	733.3509	1052.958	1152.102	1113.351
12Jun2020 4:00:00	2020	823.8161432	734.8656	1078.582	1153.026	1107.296
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12Jun2020 10:00:00	2020	1288.067928	858.4624	1199.542	1593.261	1146.794
12Jun2020 11:00:00	2020	1353.194912	841.9676	1193.866	1655.331	1145.074
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12Jun2020 13:00:00	2020	1402.30359	856.7691	1200.368	1700.62	1135.188
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12Jun2020 19:00:00	2020	1177.28179	908.8492	1203.172	1612.729	1150.222
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13Jun2020 20:00:00	2020	1032.94538	795.3875	1183.705	1460.493	1111.886
13Jun2020 21:00:00	2020	1015.600073	789.8365	1171.365	1418.76	1116.376
13Jun2020 22:00:00	2020	980.0164386	767.1171	1122.808	1411.492	1134.687
13Jun2020 23:00:00	2020	915.2535791	734.3063	1095.127	1359.722	1128.051
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14Jun2020 3:00:00	2020	763.1929339	677.5092	1053.728	1142.586	1098.941
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15Jun2020 2:00:00	2020	782.7751822	655.1589	1102.068	1156.781	1072.592
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18Jun2020 12:00:00	2020	1254.380784	770.1757	1176.482	1557.881	1075.955
18Jun2020 13:00:00	2020	1255.897036	756.3473	1183.426	1568.696	1075.969
18Jun2020 14:00:00	2020	1253.469655	749.301	1170.306	1564.064	1081.948
18Jun2020 15:00:00	2020	1243.764019	750.0733	1187.513	1562.549	1088.424
18Jun2020 16:00:00	2020	1236.798854	761.3642	1186.137	1563.036	1118.007
18Jun2020 17:00:00	2020	1234.857723	765.327	1170.447	1567.141	1131.236
18Jun2020 18:00:00	2020	1174.144536	748.6256	1130.951	1516.143	1137.093
18Jun2020 19:00:00	2020	1125.963185	763.8903	1135.76	1464.746	1155.162
18Jun2020 20:00:00	2020	1090.684057	780.6539	1164.329	1444.583	1139
18Jun2020 21:00:00	2020	1059.423501	781.3352	1166.578	1405.786	1116.97
18Jun2020 22:00:00	2020	1030.710414	785.2405	1163.122	1371.03	1117.283
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19Jun2020 0:00:00	2020	887.1817504	726.2248	1113.113	1245.067	1084.036
19Jun2020 1:00:00	2020	840.8499655	708.2411	1103.972	1187.177	1088.508
19Jun2020 2:00:00	2020	815.3452556	698.399	1100.578	1154.204	1097.816
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19Jun2020 4:00:00	2020	817.8375487	692.9583	1106.196	1125.299	1096.229
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19Jun2020 10:00:00	2020	1250.853383	773.1527	1190.324	1597.371	1171.564

19Jun2020 11:00:00	2020	1288.904225	777.2185	1188.736	1606.276	1173.542
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19Jun2020 16:00:00	2020	1256.65235	767.231	1177.457	1608.664	1189.925
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21Jun2020 18:00:00	2020	1142.704943	868.6069	1220.514	1569.782	1218.013
21Jun2020 19:00:00	2020	1097.923415	853.6089	1206.147	1543.819	1226.313
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21Jun2020 22:00:00	2020	1019.963948	826.419	1165.875	1431.561	1191.449
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27Jun2020 0:00:00	2020	907.0789187	901.9804	1139.067	1342.847	1043.3
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27Jun2020 4:00:00	2020	796.1331689	854.959	1110.597	1231.513	1006.304
27Jun2020 5:00:00	2020	793.4459778	846.9134	1096.839	1228.537	999.8002
27Jun2020 6:00:00	2020	810.6114724	846.0604	1081.622	1212.656	980.9168

27Jun2020 7:00:00	2020	867.2023326	865.2052	1103.429	1273.622	978.024
27Jun2020 8:00:00	2020	938.4741125	884.8644	1134.571	1368.832	1012.947
27Jun2020 9:00:00	2020	1009.652531	897.6036	1163.833	1430.279	1034.798
27Jun2020 10:00:00	2020	1070.524162	911.1627	1174.617	1483.832	1051.28
27Jun2020 11:00:00	2020	1109.916736	923.0515	1189.388	1512.754	1072.788
27Jun2020 12:00:00	2020	1134.776428	930.0795	1198.876	1531.593	1073.726
27Jun2020 13:00:00	2020	1132.994318	941.7866	1201.921	1522.278	1074.669
27Jun2020 14:00:00	2020	1118.759276	945.2216	1188.147	1500.288	1079.375
27Jun2020 15:00:00	2020	1114.691679	962.3756	1191.825	1497.156	1102.893
27Jun2020 16:00:00	2020	1126.155223	963.7693	1200.691	1508.163	1099.244
27Jun2020 17:00:00	2020	1131.068653	955.1361	1215.65	1562.092	1108.212
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27Jun2020 20:00:00	2020	1014.253935	900.6145	1179.72	1435.99	1047.933
27Jun2020 21:00:00	2020	994.4148275	887.9347	1176.614	1389.559	1086.28
27Jun2020 22:00:00	2020	961.2892033	877.8179	1177.936	1383.474	1131.289
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28Jun2020 3:00:00	2020	757.6353136	786.4956	1093.635	1160.938	1088.152
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28Jun2020 5:00:00	2020	766.7793026	783.3858	1075.115	1111.56	1066.738
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29Jun2020 16:00:00	2020	1228.470092	850.4366	1264.959	1676.577	1122.435
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05Jul2020 20:00:00	2020	1106.865894	845.2395	1191.72	1504.309	985.3094
05Jul2020 21:00:00	2020	1071.072574	833.7075	1181.493	1459.66	990.4899
05Jul2020 22:00:00	2020	1041.574036	816.2455	1182.359	1437.655	984.0264
05Jul2020 23:00:00	2020	957.9215971	780.8224	1147.932	1373.917	999.4621
06Jul2020 0:00:00	2020	876.7592362	751.1947	1099.619	1274.592	969.2363
06Jul2020 1:00:00	2020	826.4135155	735.0801	1068.936	1220.366	980.9591
06Jul2020 2:00:00	2020	797.4578471	722.7704	1025.921	1158.398	969.5536
06Jul2020 3:00:00	2020	786.0702344	721.8507	1023.67	1155.007	947.8803
06Jul2020 4:00:00	2020	798.7652988	692.5755	1029.697	1180.462	950.4782
06Jul2020 5:00:00	2020	827.5960256	704.6059	1034.815	1193.884	946.6855
06Jul2020 6:00:00	2020	914.6156432	720.9225	1054.963	1271.197	951.1498
06Jul2020 7:00:00	2020	1041.173471	758.3551	1112.546	1416.876	959.1825
06Jul2020 8:00:00	2020	1139.112236	778.8578	1159.83	1545.587	972.957
06Jul2020 9:00:00	2020	1211.137356	811.4258	1191.762	1629.079	994.3311
06Jul2020 10:00:00	2020	1268.480705	830.8693	1227.758	1695.008	1004.933
06Jul2020 11:00:00	2020	1320.834502	841.6073	1236.387	1743.318	1030.364
06Jul2020 12:00:00	2020	1349.351155	845.2101	1225.28	1735.207	1051.31
06Jul2020 13:00:00	2020	1361.271584	850.8291	1230.768	1754.122	1058.337
06Jul2020 14:00:00	2020	1367.355461	857.8284	1223.951	1776.575	1073.895
06Jul2020 15:00:00	2020	1375.331186	865.4661	1223.587	1776.968	1098.141
06Jul2020 16:00:00	2020	1385.624915	885.785	1241.243	1798.331	1096.77
06Jul2020 17:00:00	2020	1383.523886	903.8954	1261.507	1799.657	1090.68
06Jul2020 18:00:00	2020	1313.22676	901.5602	1253.515	1731.97	1076.202
06Jul2020 19:00:00	2020	1261.394607	906.603	1240.417	1666.918	1062.526
06Jul2020 20:00:00	2020	1206.872104	932.2038	1200.587	1605.04	1071.305
06Jul2020 21:00:00	2020	1155.345443	909.0272	1188.603	1538.663	1065.359
06Jul2020 22:00:00	2020	1109.798921	887.4722	1182.545	1506.627	1042.643
06Jul2020 23:00:00	2020	1015.738602	845.2093	1145.017	1411.286	1040.703
07Jul2020 0:00:00	2020	930.188406	809.9553	1115.155	1333.496	1023.492
07Jul2020 1:00:00	2020	873.1219391	786.5527	1096.117	1281.02	1014.674

07Jul2020 2:00:00	2020	840.8886847	776.0455	1097.362	1246.16	1004.812
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07Jul2020 5:00:00	2020	861.7275141	769.4791	1075.876	1238.943	967.0737
07Jul2020 6:00:00	2020	942.6729152	787.9186	1094.089	1317.217	976.9385
07Jul2020 7:00:00	2020	1062.06304	826.5903	1136.123	1465.08	986.659
07Jul2020 8:00:00	2020	1153.930278	858.1235	1162.118	1581.623	1003.476
07Jul2020 9:00:00	2020	1206.069825	879.9174	1175.284	1616.29	1019.603
07Jul2020 10:00:00	2020	1252.565093	882.5154	1191.937	1656.204	1028.513
07Jul2020 11:00:00	2020	1286.060993	877.19	1211.648	1699.235	1055.221
07Jul2020 12:00:00	2020	1305.134992	869.4517	1208.493	1738.418	1058.014
07Jul2020 13:00:00	2020	1301.762571	866.5263	1206.79	1740.233	1068.809
07Jul2020 14:00:00	2020	1292.066209	859.8226	1195.12	1741.377	1060.502
07Jul2020 15:00:00	2020	1283.306404	848.1127	1223.859	1755.421	1062.006
07Jul2020 16:00:00	2020	1274.226537	853.8523	1218.446	1715.928	1070.696
07Jul2020 17:00:00	2020	1265.730464	860.1307	1171.832	1727.415	1073.305
07Jul2020 18:00:00	2020	1192.619207	840.5562	1148.996	1658.935	1045.778
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07Jul2020 20:00:00	2020	1092.883373	848.4224	1179.177	1551.674	1051.276
07Jul2020 21:00:00	2020	1073.172241	869.9448	1170.398	1538.441	1044.149
07Jul2020 22:00:00	2020	1024.935531	858.793	1148.929	1468.077	1035.759
07Jul2020 23:00:00	2020	937.1042334	826.3573	1111.959	1408.915	1022.295
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08Jul2020 1:00:00	2020	826.2115774	791.1709	1063.837	1241.031	1014.023
08Jul2020 2:00:00	2020	804.5815229	781.5488	1047.208	1218.394	1030.048
08Jul2020 3:00:00	2020	795.2013649	774.3374	1060.192	1192.773	1053.023
08Jul2020 4:00:00	2020	807.7002738	771.4073	1078.941	1207.691	1049.237
08Jul2020 5:00:00	2020	854.8967763	775.959	1075.188	1227.616	1048.096
08Jul2020 6:00:00	2020	940.688337	790.1868	1076.337	1267.393	1050.332
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08Jul2020 8:00:00	2020	1135.382666	860.2118	1149.536	1495.318	1014.939
08Jul2020 9:00:00	2020	1182.154545	884.0609	1180.246	1553.932	1028.275
08Jul2020 10:00:00	2020	1224.038421	889.91	1175.828	1601.529	1024.663
08Jul2020 11:00:00	2020	1254.815456	892.8775	1186.905	1651.319	1018.793
08Jul2020 12:00:00	2020	1271.631033	888.3507	1164.5	1659.145	1022.845
08Jul2020 13:00:00	2020	1272.919712	885.4695	1171.045	1658.699	1029.974
08Jul2020 14:00:00	2020	1265.343013	877.5505	1191.135	1655.273	1034.371
08Jul2020 15:00:00	2020	1261.691511	859.9061	1195.221	1645.358	1030.438
08Jul2020 16:00:00	2020	1262.390764	869.5215	1204.05	1636.526	1038.749
08Jul2020 17:00:00	2020	1262.104207	872.1612	1213.38	1631.381	1052.622
08Jul2020 18:00:00	2020	1193.978564	853.0315	1190.952	1571.802	1099.773
08Jul2020 19:00:00	2020	1140.718874	847.3078	1183.436	1518.178	1090.91
08Jul2020 20:00:00	2020	1099.194935	851.5812	1184.577	1493.433	1088.972
08Jul2020 21:00:00	2020	1073.331235	849.4325	1172.52	1458.601	1088.86
08Jul2020 22:00:00	2020	1040.268036	839.3654	1147.992	1428.963	1080.094
08Jul2020 23:00:00	2020	956.3424688	806.069	1135.176	1351.878	1062.362
09Jul2020 0:00:00	2020	887.6161119	774.5932	1094.798	1266.307	1055.722

09Jul2020 1:00:00	2020	835.3142841	756.3528	1081.623	1217.718	1039.602
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09Jul2020 3:00:00	2020	797.6943293	742.2701	1065.02	1168.6	1023.566
09Jul2020 4:00:00	2020	809.6751316	747.9587	1089.997	1189.967	1029.6
09Jul2020 5:00:00	2020	841.8219389	751.1372	1079.73	1200.859	1036.571
09Jul2020 6:00:00	2020	926.0254502	760.0894	1081.228	1242.595	1029.653
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09Jul2020 8:00:00	2020	1129.108214	818.5443	1175.816	1512.158	1045.817
09Jul2020 9:00:00	2020	1192.416205	833.3739	1174.659	1586.398	1065.037
09Jul2020 10:00:00	2020	1246.643331	829.9697	1194.476	1655.433	1079.197
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09Jul2020 13:00:00	2020	1322.46601	861.3431	1248.334	1726.654	1097.459
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09Jul2020 15:00:00	2020	1320.192632	872.4551	1262.164	1725.102	1105.487
09Jul2020 16:00:00	2020	1319.464863	881.827	1271.944	1713.42	1107.548
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09Jul2020 18:00:00	2020	1265.884559	885.2001	1263.414	1666.165	1102.573
09Jul2020 19:00:00	2020	1220.545076	879.2312	1253.239	1591.318	1092.217
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09Jul2020 21:00:00	2020	1113.508471	878.1239	1223.055	1547.542	1069.949
09Jul2020 22:00:00	2020	1068.634923	860.4837	1216.81	1497.231	1080.449
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10Jul2020 0:00:00	2020	902.8125017	783.7342	1152.855	1313.716	1074.543
10Jul2020 1:00:00	2020	852.0477029	765.3018	1131.188	1245.486	1063.448
10Jul2020 2:00:00	2020	825.1367279	752.822	1117.836	1224.669	1055.424
10Jul2020 3:00:00	2020	813.19927	742.4969	1108.591	1202.862	1052.415
10Jul2020 4:00:00	2020	820.7774363	742.3037	1106.02	1202.032	1046.309
10Jul2020 5:00:00	2020	851.5475103	744.5986	1103.811	1204.51	1044.623
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10Jul2020 10:00:00	2020	1251.659841	845.6335	1216.121	1664.509	1079.013
10Jul2020 11:00:00	2020	1296.90472	850.4412	1248.377	1724.152	1078.938
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10Jul2020 13:00:00	2020	1321.877947	866.9659	1258.006	1696.28	1056.35
10Jul2020 14:00:00	2020	1319.310653	870.5239	1238.626	1686.219	1067.845
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10Jul2020 16:00:00	2020	1318.063076	887.3175	1260.739	1681.349	1068.572
10Jul2020 17:00:00	2020	1312.599582	892.7108	1258.273	1678.332	1074.244
10Jul2020 18:00:00	2020	1251.571103	892.3647	1245.146	1644.165	1054.311
10Jul2020 19:00:00	2020	1205.439553	902.9197	1236.813	1603.336	1075.42
10Jul2020 20:00:00	2020	1156.859258	897.6253	1220.27	1575.743	1077.433
10Jul2020 21:00:00	2020	1110.231703	880.2173	1202.895	1529.944	1058.45
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13Jul2020 12:00:00	2020	1291.325546	889.7636	1234.529	1633.842	1068.694
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13Jul2020 19:00:00	2020	1164.318449	939.6025	1176.543	1519.852	1123.13
13Jul2020 20:00:00	2020	1125.678564	927.1613	1160.844	1470.797	1133.4
13Jul2020 21:00:00	2020	1086.02508	917.7908	1162.858	1421.475	1155.079
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14Jul2020 6:00:00	2020	923.5698374	818.553	1094.281	1277.672	1139.937
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14Jul2020 10:00:00	2020	1248.318432	906.2876	1173.192	1676.521	1121.33
14Jul2020 11:00:00	2020	1285.976636	916.7628	1186.87	1701.397	1127.758
14Jul2020 12:00:00	2020	1313.638933	925.6261	1193.065	1697.174	1148.637
14Jul2020 13:00:00	2020	1325.695115	927.6477	1198.841	1708.761	1157.717
14Jul2020 14:00:00	2020	1332.71011	929.372	1189.453	1714.539	1158.336
14Jul2020 15:00:00	2020	1338.315024	935.468	1201.927	1740.038	1170.138
14Jul2020 16:00:00	2020	1347.847448	924.6885	1219.855	1774.01	1172.008
14Jul2020 17:00:00	2020	1358.349444	940.0193	1224.345	1781.254	1175.434
14Jul2020 18:00:00	2020	1298.449563	939.9482	1211.256	1728.99	1179.072
14Jul2020 19:00:00	2020	1246.962208	941.7742	1220.427	1663.001	1168.168
14Jul2020 20:00:00	2020	1192.870218	977.6829	1216.226	1609.792	1171.466
14Jul2020 21:00:00	2020	1143.031413	963.1996	1199.216	1546.291	1161.32

14Jul2020 22:00:00	2020	1098.00583	945.0464	1196.787	1498.592	1130.945
14Jul2020 23:00:00	2020	994.7864368	901.1605	1152.536	1409.823	1093.666
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15Jul2020 1:00:00	2020	859.2884257	847.4889	1099.595	1267.853	1092.92
15Jul2020 2:00:00	2020	827.3367171	836.0764	1092.895	1218.821	1099.066
15Jul2020 3:00:00	2020	812.9290252	826.9474	1076.708	1198.667	1119.872
15Jul2020 4:00:00	2020	822.7660641	822.4425	1065.476	1197.773	1125.699
15Jul2020 5:00:00	2020	861.9287706	819.4386	1060.054	1211.978	1122.9
15Jul2020 6:00:00	2020	947.4894502	841.8504	1051.848	1273.42	1126.741
15Jul2020 7:00:00	2020	1058.934003	877.0587	1074.833	1396.651	1134.64
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15Jul2020 9:00:00	2020	1208.402081	928.5615	1141.869	1543.01	1163.884
15Jul2020 10:00:00	2020	1272.934625	930.1043	1162.485	1621.797	1182.072
15Jul2020 11:00:00	2020	1330.030129	943.3658	1184.281	1672.559	1177.68
15Jul2020 12:00:00	2020	1375.914466	942.1738	1193.771	1694.34	1159.214
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16Jul2020 6:00:00	2020	950.759433	858.6797	1070.122	1313.515	1155.158
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16Jul2020 19:00:00	2020	1303.215486	1032.485	1185.969	1580.18	1103.737
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16Jul2020 21:00:00	2020	1158.74371	1007.574	1169.644	1459.316	1094.726
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23Jul2020 3:00:00	2020	894.1267158	892.2533	1122.619	1262.816	1055.367
23Jul2020 4:00:00	2020	901.1492394	888.6947	1107.954	1265.827	1057.25
23Jul2020 5:00:00	2020	949.1653793	892.1577	1108.124	1286.439	1023.388
23Jul2020 6:00:00	2020	1038.512546	902.9314	1121.155	1334.603	1024.558
23Jul2020 7:00:00	2020	1149.00632	942.2513	1177.939	1478.313	1026.38
23Jul2020 8:00:00	2020	1228.874317	978.3367	1213.172	1590.763	1044.56
23Jul2020 9:00:00	2020	1288.732391	982.6807	1231.62	1657.622	1052.64
23Jul2020 10:00:00	2020	1356.54435	996.6391	1258.864	1710.971	1075.324
23Jul2020 11:00:00	2020	1418.23617	1018.146	1278.626	1751.648	1091.758
23Jul2020 12:00:00	2020	1461.325966	1022.615	1262.669	1764.309	1106.846
23Jul2020 13:00:00	2020	1483.239272	1030.918	1281.162	1779.448	1127.293
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23Jul2020 15:00:00	2020	1458.60474	1034.626	1291.275	1818.731	1116.661
23Jul2020 16:00:00	2020	1461.285712	1044.252	1291.64	1823.744	1090.297
23Jul2020 17:00:00	2020	1410.389045	1039.496	1302.887	1761.156	1065.752
23Jul2020 18:00:00	2020	1342.745419	1060.088	1277.046	1693.182	1054.302
23Jul2020 19:00:00	2020	1294.014699	1064.604	1239.662	1640.733	1077.816
23Jul2020 20:00:00	2020	1221.871827	1064.616	1227.709	1605.25	1092.783
23Jul2020 21:00:00	2020	1167.60797	1031.399	1204.05	1564.269	1095.485
23Jul2020 22:00:00	2020	1118.060639	994.6503	1176.553	1558.81	1100.24
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24Jul2020 1:00:00	2020	877.7108653	907.8155	1088.037	1247.299	1027.083
24Jul2020 2:00:00	2020	844.6479319	895.7827	1082.901	1206.466	1030.529
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31Jul2020 20:00:00	2020	1339.559021	1098.047	1277.278	1715.849	1085.497
31Jul2020 21:00:00	2020	1295.542847	1074.356	1277.035	1718.252	1080.605
31Jul2020 22:00:00	2020	1242.982259	1048.413	1261.031	1694.682	1082.449
31Jul2020 23:00:00	2020	1146.362658	998.5944	1209.972	1556.439	1068.062
01Aug2020 0:00:00	2020	1057.461589	960.7987	1172.969	1452.007	1050.937
01Aug2020 1:00:00	2020	989.2618842	931.4165	1142.602	1382.509	1039.193
01Aug2020 2:00:00	2020	941.1474908	909.4415	1125.734	1342.966	1047.215
01Aug2020 3:00:00	2020	905.2015747	895.0029	1111.761	1301.015	1047.13
01Aug2020 4:00:00	2020	891.5522013	886.0435	1100.443	1278.243	1072.199
01Aug2020 5:00:00	2020	891.9193108	878.7353	1091.052	1281.272	1077.628
01Aug2020 6:00:00	2020	897.0972948	876.3959	1089.264	1278.387	1128.604
01Aug2020 7:00:00	2020	947.1580481	890.4713	1111.928	1361.311	1073.608
01Aug2020 8:00:00	2020	1020.477545	920.1079	1144.109	1476.796	1068.97
01Aug2020 9:00:00	2020	1087.961692	937.7452	1192.446	1601.865	1100.953
01Aug2020 10:00:00	2020	1155.087845	954.1506	1226.464	1680.827	1137.542
01Aug2020 11:00:00	2020	1220.493605	964.6647	1235.021	1740.307	1151.197
01Aug2020 12:00:00	2020	1261.657177	979.6993	1222.653	1753.753	1149.633

01Aug2020 13:00:00	2020	1293.903952	994.806	1234.061	1798.588	1167.802
01Aug2020 14:00:00	2020	1318.917447	1006.405	1268.769	1838.754	1173.229
01Aug2020 15:00:00	2020	1342.170987	1008.134	1259.949	1859.003	1180.846
01Aug2020 16:00:00	2020	1363.271132	1020.325	1273.308	1855.799	1171.788
01Aug2020 17:00:00	2020	1366.349937	1028.719	1277.051	1866.701	1167.724
01Aug2020 18:00:00	2020	1326.556251	1021.978	1255.121	1813.688	1168.021
01Aug2020 19:00:00	2020	1290.811884	1025.041	1258.749	1743.181	1153.442
01Aug2020 20:00:00	2020	1275.109953	996.5548	1238.801	1681.057	1153.462
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02Aug2020 1:00:00	2020	929.1579743	858.5192	1139.234	1398.251	1079.46
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02Aug2020 3:00:00	2020	872.2113816	829.0983	1087.687	1336.835	1049.962
02Aug2020 4:00:00	2020	866.8585938	822.754	1093.524	1322.577	1072.27
02Aug2020 5:00:00	2020	868.7657947	823.9345	1087.994	1301.17	1054.913
02Aug2020 6:00:00	2020	864.9720594	820.6608	1073.74	1277.103	1031.562
02Aug2020 7:00:00	2020	907.7303708	827.7422	1100.316	1337.724	1041.868
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02Aug2020 9:00:00	2020	1056.170619	878.1137	1183.755	1540.855	1079.935
02Aug2020 10:00:00	2020	1143.682113	904.2813	1209.41	1605.93	1105.99
02Aug2020 11:00:00	2020	1217.952496	924.029	1209.581	1642.802	1108.519
02Aug2020 12:00:00	2020	1267.576799	959.6983	1256.899	1695.961	1100.419
02Aug2020 13:00:00	2020	1299.166539	979.6092	1267.497	1755.917	1077.412
02Aug2020 14:00:00	2020	1322.623306	992.4639	1252	1780.471	1090.098
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02Aug2020 16:00:00	2020	1367.722019	1002.473	1263.757	1841.964	1087.649
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02Aug2020 20:00:00	2020	1302.681984	1021.31	1287.033	1777.412	1089.331
02Aug2020 21:00:00	2020	1285.567732	1010.43	1276.336	1730.91	1091.254
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02Aug2020 23:00:00	2020	1145.407932	939.4978	1223.326	1562.612	1066.62
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03Aug2020 3:00:00	2020	920.7981547	835.1541	1144.068	1309.49	1053.914
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03Aug2020 5:00:00	2020	931.2430404	819.0571	1087.174	1300.185	1035.329
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03Aug2020 9:00:00	2020	1178.214537	905.9226	1199.869	1525.04	1075.685
03Aug2020 10:00:00	2020	1262.224713	938.9059	1240.697	1577.868	1088.392
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03Aug2020 12:00:00	2020	1334.155915	969.0067	1271.896	1674.791	1082.567
03Aug2020 13:00:00	2020	1360.265632	985.6916	1295.28	1707.467	1095.085
03Aug2020 14:00:00	2020	1384.070372	995.2138	1284.72	1724.036	1100.272
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03Aug2020 18:00:00	2020	1276.510425	999.271	1240.586	1677.052	1112.913
03Aug2020 19:00:00	2020	1224.562091	977.7827	1173.139	1585.95	1096.313
03Aug2020 20:00:00	2020	1178.591963	952.8836	1184.262	1516.519	1070.778
03Aug2020 21:00:00	2020	1148.96146	933.923	1201.215	1510.663	1054.606
03Aug2020 22:00:00	2020	1096.347583	914.8444	1178.262	1477.718	1054.455
03Aug2020 23:00:00	2020	999.548214	871.876	1132.202	1384.352	1072.482
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04Aug2020 2:00:00	2020	838.6508574	816.2769	1112.58	1230.348	1058.479
04Aug2020 3:00:00	2020	827.4984728	812.5588	1122.024	1219.009	1043.143
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04Aug2020 20:00:00	2020	1319.717816	1050.503	1249.28	1718.712	1069.29
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09Aug2020 11:00:00	2020	1059.143465	842.1806	1143.737	1454.491	1031.571
09Aug2020 12:00:00	2020	1086.554341	848.7392	1160.689	1471.038	1078.728
09Aug2020 13:00:00	2020	1093.908189	849.7664	1179.505	1486.166	1088.253
09Aug2020 14:00:00	2020	1098.33026	852.5552	1181.087	1497.329	1115.116
09Aug2020 15:00:00	2020	1111.333943	859.6436	1183.955	1506.317	1120.237
09Aug2020 16:00:00	2020	1143.867257	879.6584	1203.746	1524.983	1117.219
09Aug2020 17:00:00	2020	1176.382627	906.6084	1229.29	1562.959	1121.497
09Aug2020 18:00:00	2020	1166.682474	912.8775	1225.874	1567.801	1119.739
09Aug2020 19:00:00	2020	1139.946266	906.0975	1190.514	1534.046	1091.469
09Aug2020 20:00:00	2020	1105.726573	898.503	1171.443	1513.467	1083.631
09Aug2020 21:00:00	2020	1093.403231	889.7738	1147.034	1462.261	1088.559
09Aug2020 22:00:00	2020	1037.267848	867.4242	1142.571	1415.187	1091.061
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10Aug2020 1:00:00	2020	828.5746357	783.0636	1097.082	1175.327	1064.388
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10Aug2020 11:00:00	2020	1347.731693	887.0268	1171.167	1675.59	1079.673
10Aug2020 12:00:00	2020	1381.408441	893.6305	1155.637	1681.283	1090.094
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10Aug2020 14:00:00	2020	1424.416287	926.1118	1187.376	1700.055	1088.136
10Aug2020 15:00:00	2020	1441.870594	942.4475	1171.439	1708.143	1073.98
10Aug2020 16:00:00	2020	1454.14966	971.563	1195.252	1717.943	1075.663
10Aug2020 17:00:00	2020	1460.509113	990.8854	1227.22	1717.161	1038.308
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10Aug2020 19:00:00	2020	1306.631491	973.5676	1208.185	1580.118	1043.691
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11Aug2020 1:00:00	2020	885.4895722	834.2873	1083.206	1191.522	1032.59
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11Aug2020 4:00:00	2020	845.5732007	807.0421	1061.361	1155.678	1016.349
11Aug2020 5:00:00	2020	890.751455	815.6253	1082.863	1192.18	1028.014
11Aug2020 6:00:00	2020	977.3441299	831.4865	1064.306	1237.453	1035.755
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11Aug2020 19:00:00	2020	1261.245807	987.7671	1175.738	1503.492	1148.469
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11Aug2020 22:00:00	2020	1113.908254	943.7212	1150.279	1388.743	1160.088
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12Aug2020 1:00:00	2020	887.4424303	845.6404	1076.401	1196.394	1086.807
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12Aug2020 18:00:00	2020	1285.429896	963.1511	1219.561	1619.904	1109.514
12Aug2020 19:00:00	2020	1227.82578	953.6639	1212.946	1561.354	1099.73
12Aug2020 20:00:00	2020	1173.589483	941.0429	1180.24	1488.702	1130.335
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13Aug2020 5:00:00	2020	877.6845286	819.5125	1134.569	1221.342	1184.236
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18Aug2020 2:00:00	2020	943.1988045	859.7572	1103.168	1327.149	1122.547
18Aug2020 3:00:00	2020	923.6341404	853.5218	1091.878	1307.847	1123.457
18Aug2020 4:00:00	2020	933.4281712	847.8967	1086.118	1319.604	1123.534
18Aug2020 5:00:00	2020	982.4289669	853.5931	1081.6	1346.94	1122.414
18Aug2020 6:00:00	2020	1066.817367	868.8661	1081.105	1381.394	1094.881
18Aug2020 7:00:00	2020	1168.476982	897.2441	1104.342	1496.791	1098.625
18Aug2020 8:00:00	2020	1276.977915	930.5248	1165.319	1628.328	1114.367
18Aug2020 9:00:00	2020	1371.96663	969.525	1214.979	1738.191	1111.973
18Aug2020 10:00:00	2020	1468.824376	988.3216	1243.474	1843.032	1122.42
18Aug2020 11:00:00	2020	1563.531246	1013.311	1269.718	1923.894	1148.386
18Aug2020 12:00:00	2020	1630.583208	1002.159	1264.676	1981.421	1169.737
18Aug2020 13:00:00	2020	1670.838358	1010.808	1236.238	2021.798	1204.921
18Aug2020 14:00:00	2020	1701.524507	1035.506	1255.361	2041.549	1222.932
18Aug2020 15:00:00	2020	1709.346173	1034.037	1276.877	2065.307	1252.285
18Aug2020 16:00:00	2020	1710.243346	1049.048	1258.76	2071.654	1258.273
18Aug2020 17:00:00	2020	1695.987665	1059.264	1251.382	2070.911	1263.173
18Aug2020 18:00:00	2020	1613.233891	1064.907	1270.005	2036.346	1279.909
18Aug2020 19:00:00	2020	1547.712181	1067.923	1297.022	1983.375	1254.042
18Aug2020 20:00:00	2020	1468.606389	1067.708	1275.824	1917.139	1224.531
18Aug2020 21:00:00	2020	1418.60919	1067.305	1251.141	1863.689	1233.005
18Aug2020 22:00:00	2020	1303.654283	1018.937	1208.7	1736.597	1233.81
18Aug2020 23:00:00	2020	1173.039243	965.2488	1161.729	1588.015	1203.519
19Aug2020 0:00:00	2020	1072.349595	925.3708	1137.669	1489.471	1150.214
19Aug2020 1:00:00	2020	1005.239266	902.327	1121.337	1416.595	1123.993
19Aug2020 2:00:00	2020	963.1066798	883.3835	1098.094	1357.37	1114.18
19Aug2020 3:00:00	2020	940.2607837	874.0546	1091.618	1308.763	1112.644

19Aug2020 4:00:00	2020	948.0291422	860.6432	1081.742	1295.743	1124.958
19Aug2020 5:00:00	2020	991.4252136	860.0339	1072.727	1335.114	1119.887
19Aug2020 6:00:00	2020	1076.010792	872.9129	1081.371	1376.271	1104.544
19Aug2020 7:00:00	2020	1161.471202	895.7706	1108	1493.294	1127.683
19Aug2020 8:00:00	2020	1249.57691	914.2283	1126.169	1607.442	1105.171
19Aug2020 9:00:00	2020	1318.748862	946.7255	1138.059	1676.064	1114.583
19Aug2020 10:00:00	2020	1374.046548	949.033	1152.471	1754.405	1142.267
19Aug2020 11:00:00	2020	1418.681106	963.2108	1167.387	1829.836	1186.06
19Aug2020 12:00:00	2020	1462.708017	966.2886	1187.393	1864.713	1214.674
19Aug2020 13:00:00	2020	1491.885073	983.8549	1194.529	1870.251	1251.316
19Aug2020 14:00:00	2020	1511.076251	994.6769	1192.181	1896.121	1249.587
19Aug2020 15:00:00	2020	1519.043165	1011.475	1198.552	1925.029	1216.367
19Aug2020 16:00:00	2020	1533.119161	1038.442	1245.94	1920.923	1189.946
19Aug2020 17:00:00	2020	1539.917968	1051.522	1259.113	1910.807	1187.556
19Aug2020 18:00:00	2020	1453.429779	1044.228	1246.264	1887.817	1184.646
19Aug2020 19:00:00	2020	1375.866289	1053.609	1265.804	1829.653	1160.631
19Aug2020 20:00:00	2020	1334.048682	1061.364	1227.522	1734.906	1155.956
19Aug2020 21:00:00	2020	1306.499419	1043.521	1221.217	1752.507	1162.765
19Aug2020 22:00:00	2020	1211.311637	998.9893	1208.683	1648.506	1145.997
19Aug2020 23:00:00	2020	1100.515914	946.4581	1158.777	1520.721	1124.873
20Aug2020 0:00:00	2020	1014.6987	905.9069	1107.149	1425.37	1114.539
20Aug2020 1:00:00	2020	960.877093	882.1309	1089.542	1363.087	1107.127
20Aug2020 2:00:00	2020	923.9945267	869.4952	1083.791	1331.771	1091.075
20Aug2020 3:00:00	2020	906.1586174	864.6905	1078.792	1297.177	1090.514
20Aug2020 4:00:00	2020	916.9747245	858.0559	1075.663	1323.576	1070.334
20Aug2020 5:00:00	2020	960.5592351	858.869	1083.446	1301.206	1060.259
20Aug2020 6:00:00	2020	1052.485673	878.8574	1083.238	1363.278	1051.705
20Aug2020 7:00:00	2020	1151.988538	907.093	1100.181	1499.184	1052.474
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20Aug2020 9:00:00	2020	1311.480527	964.8567	1184.205	1704.929	1080.424
20Aug2020 10:00:00	2020	1388.193323	979.7851	1213.435	1773.33	1097.764
20Aug2020 11:00:00	2020	1453.47754	998.8192	1241.478	1827.363	1103.524
20Aug2020 12:00:00	2020	1492.917471	1014.768	1275.23	1869.465	1114.942
20Aug2020 13:00:00	2020	1510.74941	1026.652	1288.822	1889.574	1149.519
20Aug2020 14:00:00	2020	1513.851496	1031.499	1292.857	1882.695	1167.834
20Aug2020 15:00:00	2020	1502.490777	1023.999	1297.489	1884.854	1181.989
20Aug2020 16:00:00	2020	1503.468956	1037.91	1300.447	1844.961	1198.414
20Aug2020 17:00:00	2020	1493.233336	1033.288	1283.999	1834.225	1211.264
20Aug2020 18:00:00	2020	1412.970889	1014.566	1257.78	1779.245	1204.746
20Aug2020 19:00:00	2020	1331.438355	993.2115	1235.619	1717.644	1195.375
20Aug2020 20:00:00	2020	1277.889676	993.1801	1225.252	1691.245	1198.12
20Aug2020 21:00:00	2020	1263.324231	991.5235	1215.878	1630.671	1217.717
20Aug2020 22:00:00	2020	1178.783218	956.1123	1199.282	1552.778	1204.158
20Aug2020 23:00:00	2020	1070.615573	909.0454	1164.032	1446.802	1188.052
21Aug2020 0:00:00	2020	977.094868	876.9166	1118.324	1345.137	1185.354
21Aug2020 1:00:00	2020	914.4365027	855.9643	1055.692	1314.286	1185.146
21Aug2020 2:00:00	2020	877.3799904	833.501	1035.555	1284.843	1181.067

21Aug2020 3:00:00	2020	860.1901928	825.6796	1042.326	1263.434	1192.569
21Aug2020 4:00:00	2020	867.7179554	832.0179	1052.702	1268.242	1185.757
21Aug2020 5:00:00	2020	910.1622695	844.2841	1062.416	1292.829	1169.677
21Aug2020 6:00:00	2020	988.772376	859.3444	1079.38	1346.777	1170.684
21Aug2020 7:00:00	2020	1078.4286	883.6466	1111.706	1437.936	1168.525
21Aug2020 8:00:00	2020	1161.480006	909.4519	1151.759	1550.744	1195.914
21Aug2020 9:00:00	2020	1233.648164	929.3311	1179.235	1644.472	1215.852
21Aug2020 10:00:00	2020	1308.354151	931.699	1195.556	1737.382	1226.629
21Aug2020 11:00:00	2020	1367.071442	956.7577	1211.269	1798.991	1229.786
21Aug2020 12:00:00	2020	1408.144048	971.8159	1219.231	1839.869	1230.743
21Aug2020 13:00:00	2020	1439.062124	986.7689	1220.141	1857.095	1210.666
21Aug2020 14:00:00	2020	1458.604471	1005.665	1201.572	1848.647	1212.246
21Aug2020 15:00:00	2020	1478.853859	1013.957	1207.396	1839.652	1226.034
21Aug2020 16:00:00	2020	1487.289647	1031.7	1234.927	1813.716	1236.75
21Aug2020 17:00:00	2020	1474.349563	1051.616	1245.576	1772.66	1239.915
21Aug2020 18:00:00	2020	1396.002187	1048.176	1230.76	1728.871	1238.832
21Aug2020 19:00:00	2020	1340.925122	1035.848	1213.085	1660.67	1240.198
21Aug2020 20:00:00	2020	1273.860396	1027.156	1200.223	1604.272	1232.25
21Aug2020 21:00:00	2020	1249.836494	1001.96	1195.549	1615.825	1257.94
21Aug2020 22:00:00	2020	1166.776649	955.3052	1164.634	1524.676	1261.235
21Aug2020 23:00:00	2020	1069.599746	920.6201	1129.808	1410.755	1238.569
22Aug2020 0:00:00	2020	987.8211583	891.8456	1106.835	1319.165	1208.925
22Aug2020 1:00:00	2020	928.5714748	866.3721	1089.223	1263.771	1182.536
22Aug2020 2:00:00	2020	892.8280141	847.7421	1059.98	1233.959	1176.842
22Aug2020 3:00:00	2020	869.9027958	838.3611	1035.37	1216.896	1165.483
22Aug2020 4:00:00	2020	859.1912559	832.8411	1057.373	1243.281	1148.403
22Aug2020 5:00:00	2020	864.5113769	833.4851	1062.977	1228.749	1165.05
22Aug2020 6:00:00	2020	888.7438121	840.612	1068.573	1270.748	1172.253
22Aug2020 7:00:00	2020	927.4683124	848.7543	1080.696	1317.374	1188.264
22Aug2020 8:00:00	2020	1006.045946	876.96	1110.046	1392.511	1188.782
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22Aug2020 10:00:00	2020	1124.298233	916.2101	1158.98	1524.95	1162.285
22Aug2020 11:00:00	2020	1180.422161	924.7874	1152.783	1561.402	1143.633
22Aug2020 12:00:00	2020	1206.488241	933.5635	1134.184	1586.232	1132.649
22Aug2020 13:00:00	2020	1214.206811	942.6278	1130.152	1563.09	1074.808
22Aug2020 14:00:00	2020	1218.349198	949.9721	1133.296	1542.699	1058.549
22Aug2020 15:00:00	2020	1228.139405	961.8523	1161.104	1540.607	1052.197
22Aug2020 16:00:00	2020	1250.026188	981.3117	1167.166	1562.232	1074.221
22Aug2020 17:00:00	2020	1269.749449	994.6264	1181.652	1593.716	1096.628
22Aug2020 18:00:00	2020	1245.371451	1000.025	1180.261	1575.638	1095.605
22Aug2020 19:00:00	2020	1195.95453	989.2883	1168.048	1507.424	1098.006
22Aug2020 20:00:00	2020	1150.408209	967.9234	1166.888	1493.831	1094.347
22Aug2020 21:00:00	2020	1134.819517	950.4184	1187.399	1506.604	1098.43
22Aug2020 22:00:00	2020	1064.167225	914.3749	1156.27	1433.49	1116.34
22Aug2020 23:00:00	2020	979.098646	868.2574	1085.696	1342.581	1121.821
23Aug2020 0:00:00	2020	907.7666081	833.5517	1044.626	1255.906	1128.54
23Aug2020 1:00:00	2020	854.7931383	814.8924	1024.049	1217.113	1112.466

23Aug2020 2:00:00	2020	820.2493193	811.4032	1057.111	1190.997	1096.208
23Aug2020 3:00:00	2020	803.3625549	801.7176	1055.339	1166.757	1088.439
23Aug2020 4:00:00	2020	796.4571661	796.4922	1050.857	1131.209	1077.793
23Aug2020 5:00:00	2020	804.100538	804.375	1056.446	1158.248	1099.196
23Aug2020 6:00:00	2020	814.529634	801.6006	1050.467	1154.504	1099.48
23Aug2020 7:00:00	2020	837.969653	800.095	1051.001	1166.727	1104.96
23Aug2020 8:00:00	2020	895.2755514	818.4388	1074.587	1243.69	1105.725
23Aug2020 9:00:00	2020	958.1435561	842.9316	1104.451	1353.668	1124.292
23Aug2020 10:00:00	2020	1023.035685	860.8472	1105.122	1426.677	1153.579
23Aug2020 11:00:00	2020	1080.575687	876.3572	1122.075	1473.885	1165.951
23Aug2020 12:00:00	2020	1122.461811	890.9891	1154.6	1505.431	1172.097
23Aug2020 13:00:00	2020	1131.452837	899.7391	1126.2	1518.121	1166.108
23Aug2020 14:00:00	2020	1148.836007	907.9395	1128.949	1535.933	1158.217
23Aug2020 15:00:00	2020	1170.252165	930.3366	1160.714	1530.708	1164.509
23Aug2020 16:00:00	2020	1205.071612	959.1579	1182.704	1557.36	1176.432
23Aug2020 17:00:00	2020	1244.580924	985.3797	1201.255	1602.872	1185.969
23Aug2020 18:00:00	2020	1217.064637	993.2789	1189.748	1597.398	1192.396
23Aug2020 19:00:00	2020	1169.802484	982.4883	1171.833	1537.207	1169.524
23Aug2020 20:00:00	2020	1152.081361	965.0953	1167.61	1509.992	1161.736
23Aug2020 21:00:00	2020	1149.473337	948.0909	1180.703	1533.979	1169.989
23Aug2020 22:00:00	2020	1069.63623	908.4423	1144.032	1441.191	1110.965
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24Aug2020 0:00:00	2020	896.242302	835.6929	1076.029	1239.916	1055.434
24Aug2020 1:00:00	2020	849.2988804	819.9196	1077.846	1186.614	1059.092
24Aug2020 2:00:00	2020	825.4662433	808.5837	1049.351	1177.489	1062.225
24Aug2020 3:00:00	2020	815.9731876	801.4755	1008.939	1162.371	1067.699
24Aug2020 4:00:00	2020	834.5846122	803.603	1024.187	1169.166	1066.999
24Aug2020 5:00:00	2020	886.6631142	816.9948	1055.28	1223.966	1085.571
24Aug2020 6:00:00	2020	977.6717816	840.7425	1016.762	1297.974	1070.83
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24Aug2020 11:00:00	2020	1342.62429	945.4818	1189.467	1698.808	1104.657
24Aug2020 12:00:00	2020	1384.79343	948.6958	1197.939	1724.12	1124.482
24Aug2020 13:00:00	2020	1412.93088	963.572	1212.067	1748.959	1129.546
24Aug2020 14:00:00	2020	1445.086005	975.5823	1211.379	1713.625	1142.21
24Aug2020 15:00:00	2020	1479.528265	995.3794	1199.35	1717.862	1154.489
24Aug2020 16:00:00	2020	1515.066401	1012.231	1233.271	1717.365	1135.785
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24Aug2020 18:00:00	2020	1454.722676	1015.119	1196.03	1653.441	1107.999
24Aug2020 19:00:00	2020	1344.234617	999.6094	1145.14	1576.725	1108.47
24Aug2020 20:00:00	2020	1248.573501	1001.547	1122.584	1510.126	1119.577
24Aug2020 21:00:00	2020	1209.456291	986.1573	1118.149	1491.28	1120.839
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24Aug2020 23:00:00	2020	1000.822358	904.3843	1099.208	1326.518	1064.482
25Aug2020 0:00:00	2020	923.8679401	863.7901	1099.349	1243.592	1029.872

25Aug2020 1:00:00	2020	876.0796525	840.9942	1085.197	1201.721	1021.774
25Aug2020 2:00:00	2020	847.5060154	833.6414	1067.469	1166.867	1011.548
25Aug2020 3:00:00	2020	834.2089793	823.9126	1059.654	1156.827	992.7144
25Aug2020 4:00:00	2020	847.1722876	808.9025	1063.746	1176.642	983.803
25Aug2020 5:00:00	2020	898.4661086	812.2615	1068.47	1215.536	996.0372
25Aug2020 6:00:00	2020	994.0564239	837.4114	1062.412	1274.252	997.0347
25Aug2020 7:00:00	2020	1087.90276	863.2162	1093.988	1383.411	998.9636
25Aug2020 8:00:00	2020	1166.044973	881.2811	1127.226	1484.088	990.2985
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25Aug2020 12:00:00	2020	1373.693392	966.5436	1160.294	1679.124	1079.735
25Aug2020 13:00:00	2020	1395.116988	981.3327	1180.203	1699.515	1098.683
25Aug2020 14:00:00	2020	1407.922703	1000.144	1194.583	1712.178	1107.143
25Aug2020 15:00:00	2020	1422.238182	1002.417	1184.454	1712.934	1107.533
25Aug2020 16:00:00	2020	1440.757537	1025.217	1192.738	1710.68	1128.733
25Aug2020 17:00:00	2020	1448.485338	1044.279	1201.375	1716.393	1129.176
25Aug2020 18:00:00	2020	1365.991409	1036.003	1194.299	1671.171	1131.702
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25Aug2020 20:00:00	2020	1235.844924	1005.871	1166.883	1580.331	1133.19
25Aug2020 21:00:00	2020	1202.052618	983.0772	1170.801	1552.842	1142.114
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25Aug2020 23:00:00	2020	995.9240374	890.7587	1064.545	1292.424	1078.694
26Aug2020 0:00:00	2020	921.1045173	858.3816	1032.806	1210.468	1039.697
26Aug2020 1:00:00	2020	877.605763	838.039	1021.463	1158.868	1046.785
26Aug2020 2:00:00	2020	847.041624	827.4046	1056.656	1146.216	1051.552
26Aug2020 3:00:00	2020	834.061316	819.9575	1020.087	1124.171	1032.339
26Aug2020 4:00:00	2020	843.3894628	812.8213	920.0548	1104.559	968.946
26Aug2020 5:00:00	2020	893.679732	821.8744	929.2895	1157.024	972.4968
26Aug2020 6:00:00	2020	987.7933001	842.3194	932.4736	1231.929	978.7503
26Aug2020 7:00:00	2020	1075.426188	876.8673	959.2357	1333.868	993.7435
26Aug2020 8:00:00	2020	1157.753874	904.2619	1012.43	1447.164	1028.981
26Aug2020 9:00:00	2020	1227.201018	933.1673	1070.371	1510.17	1053.284
26Aug2020 10:00:00	2020	1291.925798	954.0302	1096.439	1565.258	1087.803
26Aug2020 11:00:00	2020	1350.245073	982.5909	1121.153	1632.054	1081.42
26Aug2020 12:00:00	2020	1387.702499	988.5078	1169.428	1665.135	1103.378
26Aug2020 13:00:00	2020	1408.190374	996.0251	1185.062	1689.993	1122.765
26Aug2020 14:00:00	2020	1419.519792	1009.408	1220.621	1748.906	1115.034
26Aug2020 15:00:00	2020	1437.740156	1025.968	1220.743	1766.085	1099.749
26Aug2020 16:00:00	2020	1451.689942	1042.52	1223.894	1766.894	1096.873
26Aug2020 17:00:00	2020	1453.355802	1046.31	1213.433	1759.006	1158.696
26Aug2020 18:00:00	2020	1373.27454	1038.248	1194.395	1658.321	1157.981
26Aug2020 19:00:00	2020	1305.208552	1033.663	1193.275	1579.044	1218.561
26Aug2020 20:00:00	2020	1252.131723	1010.79	1190.637	1551.235	1199.775
26Aug2020 21:00:00	2020	1220.633116	990.6371	1190.096	1547.22	1216.538
26Aug2020 22:00:00	2020	1119.092993	946.1032	1145.064	1446.117	1202.374
26Aug2020 23:00:00	2020	1006.703762	898.0888	1088.923	1363.604	1202.953

27Aug2020 0:00:00	2020	928.3819679	860.951	1032.878	1279.886	1187.354
27Aug2020 1:00:00	2020	877.2317766	846.0479	1023.778	1230.147	1107.931
27Aug2020 2:00:00	2020	847.4069124	839.0939	1032.822	1181.704	1083.178
27Aug2020 3:00:00	2020	833.3995406	832.7721	1042.691	1165.77	1076.348
27Aug2020 4:00:00	2020	844.1730272	833.7512	1034.652	1174.881	1093.938
27Aug2020 5:00:00	2020	893.6002456	841.7597	1027.429	1189.849	1079.752
27Aug2020 6:00:00	2020	991.3461667	863.6854	1049.396	1270.949	1073.979
27Aug2020 7:00:00	2020	1085.579867	898.4718	1120.453	1376.505	1081.131
27Aug2020 8:00:00	2020	1162.808728	924.6067	1171.927	1484.291	1096.098
27Aug2020 9:00:00	2020	1216.383358	937.1081	1187.015	1539.404	1106.059
27Aug2020 10:00:00	2020	1267.282042	947.047	1202.882	1585.607	1113.275
27Aug2020 11:00:00	2020	1316.12904	963.6787	1183.065	1632.327	1130.093
27Aug2020 12:00:00	2020	1338.641444	962.1787	1204.288	1652.668	1135.732
27Aug2020 13:00:00	2020	1349.50747	963.4229	1215.827	1666.932	1168.385
27Aug2020 14:00:00	2020	1361.497924	938.2838	1184.822	1669.664	1185.253
27Aug2020 15:00:00	2020	1365.873442	939.3966	1136.694	1663.373	1168.228
27Aug2020 16:00:00	2020	1363.388545	954.5605	1111.426	1661.87	1160.676
27Aug2020 17:00:00	2020	1349.505382	960.1291	1107.225	1654.152	1154.923
27Aug2020 18:00:00	2020	1273.102624	957.7418	1130.255	1597.296	1129.943
27Aug2020 19:00:00	2020	1210.526786	950.1653	1153.288	1557.797	1097.687
27Aug2020 20:00:00	2020	1178.647931	945.9262	1165.932	1533.978	1088.137
27Aug2020 21:00:00	2020	1159.052491	934.0977	1168.42	1521.569	1109.463
27Aug2020 22:00:00	2020	1069.104122	899.323	1130.837	1428.031	1100.348
27Aug2020 23:00:00	2020	975.2737478	861.4599	1093.952	1314.279	1105.408
28Aug2020 0:00:00	2020	902.3764866	832.2111	1073.16	1226.544	1097.841
28Aug2020 1:00:00	2020	859.3336248	815.2101	1057.542	1178.462	1108.689
28Aug2020 2:00:00	2020	831.0507542	803.2671	1052.044	1146.926	1108.847
28Aug2020 3:00:00	2020	817.1303578	794.2429	1029.601	1135.889	1101.058
28Aug2020 4:00:00	2020	829.145897	790.5763	1019.686	1143.766	1114.778
28Aug2020 5:00:00	2020	876.6135599	797.3727	1030.244	1179.518	1123.248
28Aug2020 6:00:00	2020	971.6009147	819.4686	1046.816	1249.028	1125.308
28Aug2020 7:00:00	2020	1060.754207	843.7282	1071.436	1346.347	1122.847
28Aug2020 8:00:00	2020	1140.554599	879.6922	1121.395	1448.601	1120.51
28Aug2020 9:00:00	2020	1203.512374	896.0103	1148.692	1528.208	1110.367
28Aug2020 10:00:00	2020	1262.848497	909.5451	1161.724	1595.102	1096.219
28Aug2020 11:00:00	2020	1317.754469	918.4965	1162.385	1617.152	1072.587
28Aug2020 12:00:00	2020	1354.816962	916.0734	1166.63	1630.052	1087.523
28Aug2020 13:00:00	2020	1377.525877	924.7378	1183.319	1636.956	1079.696
28Aug2020 14:00:00	2020	1394.745037	938.3882	1196.088	1631.679	1082.757
28Aug2020 15:00:00	2020	1406.777277	949.8235	1196.775	1631.48	1093.026
28Aug2020 16:00:00	2020	1418.216615	971.6603	1182.281	1645.346	1115.79
28Aug2020 17:00:00	2020	1413.996085	993.029	1151.992	1616.652	1107.931
28Aug2020 18:00:00	2020	1330.923752	988.2004	1132.198	1548.102	1101.451
28Aug2020 19:00:00	2020	1256.400328	978.8023	1110.605	1485.262	1080.562
28Aug2020 20:00:00	2020	1220.778401	960.393	1122.46	1473.873	1077.721
28Aug2020 21:00:00	2020	1185.778729	941.5596	1117.633	1488.168	1083.79
28Aug2020 22:00:00	2020	1100.271745	897.5768	1105.228	1414.987	1081.287

28Aug2020 23:00:00	2020	1004.442121	857.1182	1076.851	1335.518	1074.061
29Aug2020 0:00:00	2020	930.285166	828.5654	1045.215	1243.537	1080.168
29Aug2020 1:00:00	2020	877.8786966	806.2837	1022.092	1187.697	1095.347
29Aug2020 2:00:00	2020	842.0578372	793.944	1032.92	1174.245	1115.671
29Aug2020 3:00:00	2020	820.2411492	785.2739	1049.439	1195.288	1115.505
29Aug2020 4:00:00	2020	815.768541	782.06	1054.076	1179.22	1111.522
29Aug2020 5:00:00	2020	829.3737729	780.1361	1057.935	1192.285	1119.038
29Aug2020 6:00:00	2020	867.0256075	790.3467	1061.852	1217.585	1110.455
29Aug2020 7:00:00	2020	904.2836946	803.7347	1080.463	1244.558	1081.246
29Aug2020 8:00:00	2020	965.3487077	832.3913	1103.745	1318.114	1050.854
29Aug2020 9:00:00	2020	1017.791023	858.1482	1114.682	1393.361	1064.719
29Aug2020 10:00:00	2020	1068.103529	872.7102	1135.026	1442.507	1054.139
29Aug2020 11:00:00	2020	1100.635497	871.9932	1150.632	1480.617	1063.21
29Aug2020 12:00:00	2020	1113.96449	875.9429	1135.111	1488.891	1061.855
29Aug2020 13:00:00	2020	1108.102439	875.1223	1133.502	1467.615	1056.718
29Aug2020 14:00:00	2020	1101.084996	881.7477	1123.537	1453.56	1050.255
29Aug2020 15:00:00	2020	1092.149447	885.0453	1128.488	1467.68	1046.88
29Aug2020 16:00:00	2020	1098.791535	890.4951	1139.458	1486.852	1049.589
29Aug2020 17:00:00	2020	1115.197909	897.6794	1135.28	1504.902	1053.878
29Aug2020 18:00:00	2020	1107.273235	890.6449	1113.5	1495.333	1044.955
29Aug2020 19:00:00	2020	1073.236123	883.8749	1099.274	1454.335	1054.286
29Aug2020 20:00:00	2020	1046.029158	881.5754	1127.663	1456.019	1034.806
29Aug2020 21:00:00	2020	1034.810212	866.2129	1129.644	1458.68	1047.956
29Aug2020 22:00:00	2020	974.2158044	837.1328	1095.442	1390.457	1042.079
29Aug2020 23:00:00	2020	906.2672031	808.788	1073.644	1299.233	1040.524
30Aug2020 0:00:00	2020	849.5214304	786.9193	1068.784	1241.13	1049.929
30Aug2020 1:00:00	2020	809.2051249	767.8269	1043.902	1198.024	1059.645
30Aug2020 2:00:00	2020	784.6527526	754.5511	1027.929	1137.368	1061.955
30Aug2020 3:00:00	2020	771.7796743	751.4565	1004.855	1120.979	1072.299
30Aug2020 4:00:00	2020	770.7121471	747.8691	1013.787	1120.652	1080.377
30Aug2020 5:00:00	2020	782.4791661	749.1429	1027.306	1131.54	1099.567
30Aug2020 6:00:00	2020	809.5396883	756.8319	1023.129	1136.111	1085.566
30Aug2020 7:00:00	2020	835.1859694	775.8682	1024.464	1156.015	1076.213
30Aug2020 8:00:00	2020	895.1803242	793.1839	1036.226	1249.978	1064.773
30Aug2020 9:00:00	2020	960.7676097	797.6616	1055.439	1315.564	1056.035
30Aug2020 10:00:00	2020	1015.398557	803.2585	1079.356	1374.155	1083.837
30Aug2020 11:00:00	2020	1054.150363	812.5677	1100.236	1429.511	1093.724
30Aug2020 12:00:00	2020	1074.251567	816.7522	1105.533	1458.362	1072.119
30Aug2020 13:00:00	2020	1078.652879	816.762	1096.633	1456.088	1054.368
30Aug2020 14:00:00	2020	1081.327313	823.5149	1103.403	1465.653	1048.851
30Aug2020 15:00:00	2020	1096.856284	829.9357	1109.277	1486.196	1046.706
30Aug2020 16:00:00	2020	1127.618658	846.1637	1125.192	1519.984	1045.311
30Aug2020 17:00:00	2020	1161.046957	862.5389	1144.018	1528.127	1043.903
30Aug2020 18:00:00	2020	1145.438379	863.2348	1133.064	1520.233	1005.615
30Aug2020 19:00:00	2020	1110.92648	865.6085	1124.192	1476.695	1002.525
30Aug2020 20:00:00	2020	1108.384537	867.435	1135.995	1471.199	1005.284
30Aug2020 21:00:00	2020	1086.759263	856.4972	1146.239	1473.127	997.391

30Aug2020 22:00:00	2020	1005.143345	821.104	1114.499	1409.966	1001.984
30Aug2020 23:00:00	2020	912.4084332	783.58	1068.603	1284.24	998.2148
31Aug2020 0:00:00	2020	847.7562087	765.42	1014.583	1225.408	990.7968
31Aug2020 1:00:00	2020	808.665814	749.8556	1065.466	1199.181	985.1953
31Aug2020 2:00:00	2020	788.4744499	743.8101	1074.791	1184.43	985.129
31Aug2020 3:00:00	2020	782.6260079	741.5087	1064.261	1167.252	977.8165
31Aug2020 4:00:00	2020	801.735506	743.3371	1073.107	1175.037	980.006
31Aug2020 5:00:00	2020	856.8430374	762.1539	1080.151	1216.6	995.3761
31Aug2020 6:00:00	2020	968.8026752	798.8975	1105.761	1312.501	1000.489
31Aug2020 7:00:00	2020	1065.313489	838.2197	1132.725	1409.206	1005.1
31Aug2020 8:00:00	2020	1140.565674	851.5951	1115.627	1491.018	1001.035
31Aug2020 9:00:00	2020	1194.426109	854.9554	1124.581	1546.555	1003.83
31Aug2020 10:00:00	2020	1246.270141	867.7743	1144.397	1609.381	1001.201
31Aug2020 11:00:00	2020	1285.119066	870.4947	1186.213	1655.294	980.5198
31Aug2020 12:00:00	2020	1307.220654	870.7879	1203.171	1661.055	972.0646
31Aug2020 13:00:00	2020	1314.121081	871.5578	1201.486	1656.334	985.3429
31Aug2020 14:00:00	2020	1319.943784	876.5296	1205.67	1640.792	988.6873
31Aug2020 15:00:00	2020	1328.24776	878.458	1211.148	1647.667	993.1224
31Aug2020 16:00:00	2020	1330.521505	890.8182	1215.035	1645.122	990.0924
31Aug2020 17:00:00	2020	1341.546021	903.3061	1204.794	1617.565	989.0451
31Aug2020 18:00:00	2020	1266.323988	896.7534	1189.163	1555.185	981.6191
31Aug2020 19:00:00	2020	1210.229637	896.5862	1177.087	1514.83	986.8274
31Aug2020 20:00:00	2020	1186.099172	897.3494	1176.622	1522.868	1003.836
31Aug2020 21:00:00	2020	1149.444541	886.1369	1160.393	1483.285	996.9314
31Aug2020 22:00:00	2020	1050.181294	854.2092	1144.394	1383.924	971.8714
31Aug2020 23:00:00	2020	953.8188393	815.5005	1124.576	1281.86	947.5937
01Sep2020 0:00:00	2020	891.7632386	793.6978	1096.111	1210.158	920.9165
01Sep2020 1:00:00	2020	854.2203853	781.2095	1033.962	1166.51	899.3309
01Sep2020 2:00:00	2020	830.3703157	771.6174	1034.716	1142.19	898.2288
01Sep2020 3:00:00	2020	820.2992794	758.027	1053.054	1141.064	905.5399
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01Sep2020 5:00:00	2020	893.1766435	768.39	1085.269	1213.942	939.0911
01Sep2020 6:00:00	2020	1009.797665	791.8515	1110.453	1304.176	954.9115
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01Sep2020 9:00:00	2020	1241.074207	867.0082	1202.538	1596.48	958.9675
01Sep2020 10:00:00	2020	1288.727687	857.2149	1189.767	1641.536	978.3263
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01Sep2020 12:00:00	2020	1364.310229	841.8698	1207.574	1690.092	1011.55
01Sep2020 13:00:00	2020	1382.75306	853.2861	1210.782	1691.196	989.3789
01Sep2020 14:00:00	2020	1394.409933	854.1694	1178.615	1651.874	974.0544
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01Sep2020 17:00:00	2020	1425.705855	887.1688	1125.257	1642.423	964.5222
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01Sep2020 19:00:00	2020	1277.970768	913.766	1164.206	1529.935	986.5166
01Sep2020 20:00:00	2020	1239.340563	922.7956	1172.81	1532.325	997.6559

01Sep2020 21:00:00	2020	1196.637036	903.9156	1173.129	1511.462	982.3156
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01Sep2020 23:00:00	2020	991.6943659	826.8111	1089.946	1308.871	967.2709
02Sep2020 0:00:00	2020	921.3028233	805.3045	1057.777	1233.284	953.3918
02Sep2020 1:00:00	2020	876.7811303	790.0517	1072.891	1208.57	976.7634
02Sep2020 2:00:00	2020	851.2619964	780.2074	1065.334	1168.889	969.4857
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02Sep2020 4:00:00	2020	848.1270941	777.3133	1049.823	1162.239	982.3791
02Sep2020 5:00:00	2020	902.0010751	782.8106	1043.161	1214.16	988.0622
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02Sep2020 12:00:00	2020	1287.386726	870.1606	1180.705	1679.707	973.8956
02Sep2020 13:00:00	2020	1284.287059	855.3552	1177.162	1665.022	1006.233
02Sep2020 14:00:00	2020	1280.274392	851.5658	1176.042	1660.134	994.5826
02Sep2020 15:00:00	2020	1286.646174	847.1532	1173.358	1660.144	958.5819
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02Sep2020 17:00:00	2020	1305.392591	858.009	1175.632	1629.5	962.8745
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02Sep2020 20:00:00	2020	1170.081301	898.861	1173.469	1500.613	998.1489
02Sep2020 21:00:00	2020	1132.261771	888.4827	1160.457	1471.779	1009.218
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03Sep2020 0:00:00	2020	864.2712225	784.9523	1037.648	1220.517	982.7225
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03Sep2020 9:00:00	2020	1185.864824	877.7318	1164.291	1523.641	1003.168
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03Sep2020 14:00:00	2020	1352.539093	864.5265	1200.027	1640.529	1004.549
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03Sep2020 19:00:00	2020	1240.433339	895.5963	1194.243	1521.581	999.8714

03Sep2020 20:00:00	2020	1215.148188	938.1592	1196.206	1529.656	1011.837
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04Sep2020 9:00:00	2020	1196.571131	886.1451	1162.215	1530.824	992.8912
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04Sep2020 11:00:00	2020	1284.623114	879.3949	1174.718	1617.028	982.5503
04Sep2020 12:00:00	2020	1331.118066	863.41	1174.611	1644.273	985.9711
04Sep2020 13:00:00	2020	1366.422436	858.2452	1112.41	1625.79	1004.429
04Sep2020 14:00:00	2020	1383.202989	863.5387	1084.774	1626.055	1014.619
04Sep2020 15:00:00	2020	1402.278491	877.6458	1093.571	1636.137	994.3594
04Sep2020 16:00:00	2020	1416.268023	893.0914	1120.049	1655.677	990.1788
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04Sep2020 19:00:00	2020	1264.899216	868.9664	1128.657	1503.928	1012.93
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04Sep2020 22:00:00	2020	1089.797691	840.5132	1104.084	1392.533	1040.608
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13Sep2020 4:00:00	2020	772.7202751	728.4012	1075.407	1143.755	1061.05
13Sep2020 5:00:00	2020	786.9770122	733.2125	1090.389	1187.543	1063.005
13Sep2020 6:00:00	2020	816.1625968	743.4605	1106.516	1208.422	1065.552
13Sep2020 7:00:00	2020	851.5342665	753.6668	1117.811	1255.945	1067.021
13Sep2020 8:00:00	2020	907.6962286	771.3273	1142.067	1327.919	1058.48
13Sep2020 9:00:00	2020	976.8969198	789.5592	1164.485	1409.659	1071.122
13Sep2020 10:00:00	2020	1035.92805	791.8691	1183.117	1472.104	1088.037
13Sep2020 11:00:00	2020	1074.573443	804.083	1168.691	1521.938	1102.758
13Sep2020 12:00:00	2020	1101.395334	813.1542	1172.54	1546.396	1127.147
13Sep2020 13:00:00	2020	1102.882098	812.4263	1165.024	1510.993	1123.457
13Sep2020 14:00:00	2020	1101.16471	815.3822	1171.893	1494.291	1123.303

13Sep2020 15:00:00	2020	1104.530586	823.8607	1175.333	1488.016	1140.01
13Sep2020 16:00:00	2020	1127.323864	837.8362	1186.493	1528.575	1151.708
13Sep2020 17:00:00	2020	1152.714212	854.4403	1197.914	1553.593	1149.2
13Sep2020 18:00:00	2020	1132.147305	853.8081	1187.698	1490.63	1138.563
13Sep2020 19:00:00	2020	1119.682784	853.2675	1195.443	1460.964	1154.56
13Sep2020 20:00:00	2020	1127.730896	857.7775	1210.195	1496.674	1175.481
13Sep2020 21:00:00	2020	1068.040917	829.1812	1187.521	1447.104	1158.576
13Sep2020 22:00:00	2020	978.9925582	791.5692	1149.292	1352.862	1137.061
13Sep2020 23:00:00	2020	895.1412823	760.843	1127.649	1259.855	1130.296
14Sep2020 0:00:00	2020	835.6668017	744.2434	1105.338	1197.797	1128.685
14Sep2020 1:00:00	2020	799.5475118	732.6691	1097.54	1178.144	1135.605
14Sep2020 2:00:00	2020	782.4823125	725.337	1097.572	1171.239	1128.156
14Sep2020 3:00:00	2020	781.2104646	725.2167	1091.538	1148.625	1128.694
14Sep2020 4:00:00	2020	800.4855516	725.118	1083.285	1146.137	1139.741
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14Sep2020 6:00:00	2020	998.0130629	782.8162	1136.113	1344.174	1178.481
14Sep2020 7:00:00	2020	1127.516514	834.1734	1196.664	1495.314	1190.931
14Sep2020 8:00:00	2020	1182.893226	845.3978	1186.263	1565.021	1186.699
14Sep2020 9:00:00	2020	1210.202202	854.0978	1190.168	1579.244	1180.029
14Sep2020 10:00:00	2020	1243.626605	853.4973	1198.651	1643.133	1151.83
14Sep2020 11:00:00	2020	1265.660828	850.4539	1193.193	1667.721	1174.152
14Sep2020 12:00:00	2020	1278.353313	844.5965	1190.763	1670.038	1180.471
14Sep2020 13:00:00	2020	1275.615579	847.6907	1198.151	1622.954	1168.805
14Sep2020 14:00:00	2020	1263.407266	843.7219	1182.3	1615.343	1134.563
14Sep2020 15:00:00	2020	1255.546013	842.1568	1165.967	1585.002	1152.751
14Sep2020 16:00:00	2020	1266.624104	848.407	1205.115	1597.519	1154.919
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14Sep2020 18:00:00	2020	1219.184352	843.8019	1194.728	1585.52	1136.16
14Sep2020 19:00:00	2020	1182.241409	852.5208	1178.337	1533.78	1144.043
14Sep2020 20:00:00	2020	1176.757823	856.6817	1177.148	1539.782	1137.186
14Sep2020 21:00:00	2020	1103.926942	835.2966	1167.117	1473.358	1132.851
14Sep2020 22:00:00	2020	1003.022897	798.8981	1130.132	1367.234	1125.625
14Sep2020 23:00:00	2020	913.5174201	764.0068	1107.543	1302.352	1160.066
15Sep2020 0:00:00	2020	851.0453845	743.7951	1091.111	1236.175	1152.852
15Sep2020 1:00:00	2020	815.8351129	734.6731	1089.146	1190.642	1150.68
15Sep2020 2:00:00	2020	797.4289405	729.4195	1097.244	1174.827	1142.889
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15Sep2020 4:00:00	2020	806.5734022	736.4986	1104.175	1177.709	1132.884
15Sep2020 5:00:00	2020	865.3992919	748.4569	1097.385	1212.712	1144.752
15Sep2020 6:00:00	2020	1001.509397	788.884	1128.976	1306.219	1163.564
15Sep2020 7:00:00	2020	1131.811857	818.2076	1168.082	1458.216	1178.765
15Sep2020 8:00:00	2020	1185.476582	826.7732	1151.088	1520.698	1192.519
15Sep2020 9:00:00	2020	1220.32245	839.0408	1163.782	1557.295	1190.385
15Sep2020 10:00:00	2020	1245.87776	829.2372	1171.074	1598.796	1195.154
15Sep2020 11:00:00	2020	1263.187357	844.1882	1192.112	1620.65	1198.491
15Sep2020 12:00:00	2020	1270.520289	839.1472	1196.618	1601.531	1197.208
15Sep2020 13:00:00	2020	1261.036454	830.2703	1200.85	1608.205	1202.248

15Sep2020 14:00:00	2020	1251.430865	834.7176	1211.1	1605.008	1210.535
15Sep2020 15:00:00	2020	1252.395284	839.3925	1203.697	1562.338	1183.497
15Sep2020 16:00:00	2020	1266.328789	850.5549	1219.246	1581.556	1163.459
15Sep2020 17:00:00	2020	1271.04211	854.1172	1220.233	1587.719	1160.719
15Sep2020 18:00:00	2020	1214.031419	842.2917	1195.74	1548.441	1165.484
15Sep2020 19:00:00	2020	1191.681132	849.3416	1202.407	1513.735	1173.727
15Sep2020 20:00:00	2020	1177.728371	854.0099	1209.76	1548.4	1204.617
15Sep2020 21:00:00	2020	1103.478721	835.8083	1180.305	1494.934	1204.209
15Sep2020 22:00:00	2020	1008.573196	799.9058	1146.901	1400.687	1193.553
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16Sep2020 1:00:00	2020	825.0974115	732.8249	1084.938	1193.817	1186.261
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16Sep2020 9:00:00	2020	1214.909502	840.2104	1182.386	1586.41	1194.531
16Sep2020 10:00:00	2020	1241.964502	835.7013	1173.385	1618.3	1195.079
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16Sep2020 12:00:00	2020	1280.610242	837.9264	1156.235	1666.49	1183.618
16Sep2020 13:00:00	2020	1281.751046	836.9439	1167.143	1632.276	1180.179
16Sep2020 14:00:00	2020	1289.517383	841.1563	1180.033	1656.424	1179.323
16Sep2020 15:00:00	2020	1307.192179	847.3287	1184.82	1658.636	1187.198
16Sep2020 16:00:00	2020	1326.968118	855.4437	1195.744	1665.342	1198.379
16Sep2020 17:00:00	2020	1333.089868	847.355	1199.506	1658.726	1188.775
16Sep2020 18:00:00	2020	1259.36119	848.3698	1186.303	1606.379	1194.408
16Sep2020 19:00:00	2020	1217.860028	857.5187	1189.829	1572.835	1199.506
16Sep2020 20:00:00	2020	1214.574884	865.7462	1199.292	1601.081	1202.499
16Sep2020 21:00:00	2020	1140.268399	839.8827	1183.166	1551.106	1188.74
16Sep2020 22:00:00	2020	1038.118187	800.7605	1154.514	1434.622	1160.909
16Sep2020 23:00:00	2020	941.6158257	763.9765	1113.176	1335.087	1138.442
17Sep2020 0:00:00	2020	875.3228533	739.823	1093.32	1265.431	1133.219
17Sep2020 1:00:00	2020	835.5718624	730.1499	1081.87	1206.003	1137.709
17Sep2020 2:00:00	2020	813.560148	721.5709	1074.791	1203.581	1146.144
17Sep2020 3:00:00	2020	806.0137455	718.6676	1069.257	1191.946	1167.32
17Sep2020 4:00:00	2020	824.7963286	720.5508	1075.058	1207.528	1168.28
17Sep2020 5:00:00	2020	878.1721258	736.1573	1085.94	1239.018	1177.853
17Sep2020 6:00:00	2020	1011.381911	774.2806	1133.184	1373.926	1187.9
17Sep2020 7:00:00	2020	1128.613397	818.7825	1142.798	1453.57	1181.237
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17Sep2020 11:00:00	2020	1295.591785	810.7835	1169.379	1655.571	1168.951
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17Sep2020 13:00:00	2020	1332.087582	804.5896	1168.724	1642.404	1197.619
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17Sep2020 15:00:00	2020	1346.738849	810.9004	1190.469	1631.102	1213.195
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17Sep2020 17:00:00	2020	1343.46171	829.9632	1201.378	1673.941	1207.503
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18Sep2020 2:00:00	2020	814.4890127	734.3096	1107.845	1184.979	1193.688
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18Sep2020 4:00:00	2020	820.040845	737.866	1100.459	1199.309	1201.695
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18Sep2020 6:00:00	2020	994.4302556	786.5138	1154.153	1378.968	1213.886
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18Sep2020 9:00:00	2020	1214.728658	854.315	1234.056	1602.566	1212.096
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20Sep2020 14:00:00	2020	1141.068677	785.4163	1184.576	1548.913	1207.563
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21Sep2020 18:00:00	2020	1282.129663	851.532	1247.574	1600.526	1128.537
21Sep2020 19:00:00	2020	1249.918256	859.8087	1248.213	1555.649	1139.981
21Sep2020 20:00:00	2020	1220.707036	862.4096	1237.915	1548.421	1128.03
21Sep2020 21:00:00	2020	1133.323166	846.695	1215.026	1494.92	1112.913
21Sep2020 22:00:00	2020	1030.208987	810.2164	1173.586	1410.015	1109.187
21Sep2020 23:00:00	2020	936.1593647	775.874	1132.612	1299.52	1165.44
22Sep2020 0:00:00	2020	870.7936552	756.584	1109.646	1212.828	1230.441
22Sep2020 1:00:00	2020	835.2987142	744.2517	1111.398	1200.397	1220.039
22Sep2020 2:00:00	2020	813.6978495	738.09	1100.724	1161.137	1216.847
22Sep2020 3:00:00	2020	806.1961792	733.1608	1089.681	1167.404	1218.192
22Sep2020 4:00:00	2020	822.9397686	738.4866	1080.138	1141.34	1221.761
22Sep2020 5:00:00	2020	878.5609133	757.0316	1100.754	1186.124	1221.693
22Sep2020 6:00:00	2020	1013.786667	793.3837	1141.013	1303.511	1233.421
22Sep2020 7:00:00	2020	1140.182229	825.3409	1190.94	1462.878	1230.458
22Sep2020 8:00:00	2020	1188.216873	838.1138	1239.143	1550.341	1217.63
22Sep2020 9:00:00	2020	1218.822298	831.1495	1258.567	1596.895	1206.663
22Sep2020 10:00:00	2020	1246.839425	834.6455	1261.309	1623.631	1205.012
22Sep2020 11:00:00	2020	1275.657227	840.2696	1278.188	1659.186	1203.09
22Sep2020 12:00:00	2020	1290.624506	844.3834	1273.087	1678.53	1212.387
22Sep2020 13:00:00	2020	1290.290485	845.699	1274.809	1678.058	1216.369
22Sep2020 14:00:00	2020	1286.64391	849.234	1286.179	1687.271	1213.678
22Sep2020 15:00:00	2020	1289.552546	847.6731	1287.858	1719.485	1216.264
22Sep2020 16:00:00	2020	1304.187427	851.9929	1301.885	1724.891	1214.34
22Sep2020 17:00:00	2020	1303.669349	858.6448	1303.826	1716.4	1215.819
22Sep2020 18:00:00	2020	1231.476133	845.6632	1284.611	1633.726	1206.041
22Sep2020 19:00:00	2020	1203.851582	869.9033	1280.737	1621.303	1212.311
22Sep2020 20:00:00	2020	1194.044652	878.0412	1271.517	1613.563	1228.089
22Sep2020 21:00:00	2020	1115.947409	853.5059	1253.706	1527.683	1216.567
22Sep2020 22:00:00	2020	1018.223952	825.5489	1229.036	1417.302	1204.117
22Sep2020 23:00:00	2020	927.5373265	791.0205	1187.382	1316.056	1204.451
23Sep2020 0:00:00	2020	866.1427482	771.4128	1156.376	1250.97	1198.131
23Sep2020 1:00:00	2020	831.0365319	764.525	1148.336	1209.727	1193.3
23Sep2020 2:00:00	2020	812.6819486	753.3428	1136.402	1181.863	1184.903
23Sep2020 3:00:00	2020	807.6531543	750.5454	1113.635	1145.626	1168.417
23Sep2020 4:00:00	2020	824.9868769	751.5467	1111.171	1150.165	1193.115
23Sep2020 5:00:00	2020	883.0397839	776.9565	1128.073	1201.769	1211.205
23Sep2020 6:00:00	2020	1021.477131	814.414	1166.609	1322.698	1214.581
23Sep2020 7:00:00	2020	1145.209409	855.1774	1193.461	1457.511	1210.8
23Sep2020 8:00:00	2020	1184.714131	859.5038	1199.573	1545.646	1204.2
23Sep2020 9:00:00	2020	1210.481942	869.0115	1199.144	1592.175	1210.018

23Sep2020 10:00:00	2020	1241.792308	856.1816	1195.29	1634.414	1213.79
23Sep2020 11:00:00	2020	1280.882256	859.5407	1224.102	1669.469	1223.787
23Sep2020 12:00:00	2020	1315.19893	863.1746	1243.857	1679.714	1204.532
23Sep2020 13:00:00	2020	1334.380139	858.9483	1244.8	1699.692	1187.291
23Sep2020 14:00:00	2020	1334.192538	850.241	1249.125	1697.086	1193.035
23Sep2020 15:00:00	2020	1336.475732	843.2405	1245.258	1686.34	1180.454
23Sep2020 16:00:00	2020	1344.482136	856.1891	1253.158	1692.091	1173.024
23Sep2020 17:00:00	2020	1334.359742	865.0437	1248.541	1681.552	1174.672
23Sep2020 18:00:00	2020	1257.088448	862.6112	1237.593	1628.403	1155.257
23Sep2020 19:00:00	2020	1245.825219	906.0398	1255.125	1618.041	1174.274
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23Sep2020 21:00:00	2020	1130.025454	888.3693	1223.768	1518.892	1187.222
23Sep2020 22:00:00	2020	1033.384564	853.2902	1182.659	1390.091	1187.3
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24Sep2020 0:00:00	2020	880.4039838	795.2509	1107.791	1241.972	1169.43
24Sep2020 1:00:00	2020	844.8461322	782.5265	1108.854	1194.095	1166.542
24Sep2020 2:00:00	2020	824.4314913	774.5013	1125.047	1178.811	1148.868
24Sep2020 3:00:00	2020	816.3469556	774.1168	1124.111	1163.913	1142.772
24Sep2020 4:00:00	2020	831.0952355	777.0923	1124.826	1178.502	1150.611
24Sep2020 5:00:00	2020	889.6264042	792.8093	1139.351	1231.195	1140.374
24Sep2020 6:00:00	2020	1028.273349	829.7627	1171.694	1350.303	1119.668
24Sep2020 7:00:00	2020	1147.832654	873.8563	1203.342	1466.168	1111.854
24Sep2020 8:00:00	2020	1187.715585	890.7287	1213.975	1533.451	1102.202
24Sep2020 9:00:00	2020	1224.928675	892.3093	1237.826	1583.377	1096.579
24Sep2020 10:00:00	2020	1270.055257	878.0055	1256.242	1662.574	1108.14
24Sep2020 11:00:00	2020	1304.576385	872.856	1258.196	1701.893	1135.852
24Sep2020 12:00:00	2020	1326.941527	866.8873	1259.158	1711.792	1123.147
24Sep2020 13:00:00	2020	1328.631201	866.5682	1249.671	1720.773	1120.849
24Sep2020 14:00:00	2020	1326.347355	867.1006	1251.472	1708.336	1114.373
24Sep2020 15:00:00	2020	1326.154175	859.9067	1277.852	1699.583	1101.614
24Sep2020 16:00:00	2020	1329.844315	855.4589	1289.246	1721.026	1099.083
24Sep2020 17:00:00	2020	1322.196156	868.0981	1286.222	1706.556	1086.959
24Sep2020 18:00:00	2020	1243.650858	883.4176	1265.415	1628.105	1087.057
24Sep2020 19:00:00	2020	1216.180331	918.5994	1269.95	1615.806	1092.335
24Sep2020 20:00:00	2020	1201.834435	916.4247	1269.473	1607.139	1093.47
24Sep2020 21:00:00	2020	1123.986249	887.4325	1247.305	1528.593	1067.099
24Sep2020 22:00:00	2020	1025.101179	853.7905	1203.631	1399.045	1051.141
24Sep2020 23:00:00	2020	932.3943379	819.0815	1168.625	1294.456	1063.892
25Sep2020 0:00:00	2020	868.3584275	797.7236	1128.624	1231.893	1065.117
25Sep2020 1:00:00	2020	832.1262872	786.4682	1107.205	1216.154	1080.6
25Sep2020 2:00:00	2020	811.8743325	781.4097	1117.258	1177.2	1094.565
25Sep2020 3:00:00	2020	804.049423	780.8553	1124.198	1186.874	1109.592
25Sep2020 4:00:00	2020	819.7955107	783.6642	1130.4	1176.34	1116.293
25Sep2020 5:00:00	2020	872.1531213	797.0192	1154.479	1225.568	1109.7
25Sep2020 6:00:00	2020	996.2541741	827.7194	1195.588	1353.827	1116.721
25Sep2020 7:00:00	2020	1111.307695	868.6037	1231.78	1490.785	1111.694
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25Sep2020 11:00:00	2020	1291.116916	887.0858	1279.622	1693.71	1075.761
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25Sep2020 13:00:00	2020	1290.422778	879.0541	1309.221	1680.351	1098.979
25Sep2020 14:00:00	2020	1282.572392	875.6574	1332.491	1694.008	1090.696
25Sep2020 15:00:00	2020	1270.782089	877.6574	1336.974	1680.235	1105.938
25Sep2020 16:00:00	2020	1262.176433	869.7856	1352.008	1637.862	1115.814
25Sep2020 17:00:00	2020	1256.046214	878.6942	1351.427	1626.323	1116.947
25Sep2020 18:00:00	2020	1184.120375	870.1573	1287.036	1603.475	1097.977
25Sep2020 19:00:00	2020	1173.858728	893.8763	1275.911	1590.946	1103.408
25Sep2020 20:00:00	2020	1164.47146	908.4752	1265.152	1561.658	1115.805
25Sep2020 21:00:00	2020	1101.505189	889.745	1242.814	1498.724	1113.527
25Sep2020 22:00:00	2020	1019.03152	858.6652	1198.139	1396.465	1091.243
25Sep2020 23:00:00	2020	938.1469753	829.7911	1165.643	1302.832	1047.079
26Sep2020 0:00:00	2020	877.3583097	808.8181	1145.858	1232.064	1036.208
26Sep2020 1:00:00	2020	837.1908863	794.5787	1119.466	1152.756	1038.508
26Sep2020 2:00:00	2020	813.5029351	786.7151	1106.695	1124.691	1039.575
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26Sep2020 5:00:00	2020	825.6225548	790.5558	1119.116	1166.4	1051.852
26Sep2020 6:00:00	2020	875.3533036	807.6371	1138.626	1208.872	1054.173
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26Sep2020 10:00:00	2020	1089.857521	855.1051	1169.557	1462.912	1022.218
26Sep2020 11:00:00	2020	1119.731762	851.662	1155.71	1500.767	1023.684
26Sep2020 12:00:00	2020	1135.707912	850.9518	1154.859	1504.381	1022.685
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26Sep2020 17:00:00	2020	1141.047642	889.4414	1215.736	1527.152	1057.706
26Sep2020 18:00:00	2020	1116.920146	890.7613	1192.035	1457.794	1047.954
26Sep2020 19:00:00	2020	1111.571103	896.9504	1203.215	1449.547	1041.84
26Sep2020 20:00:00	2020	1106.454444	895.579	1225.45	1448.248	1070.134
26Sep2020 21:00:00	2020	1056.218986	876.4326	1207.2	1394.584	1073.451
26Sep2020 22:00:00	2020	989.9817682	847.8635	1167.189	1324.475	1070.457
26Sep2020 23:00:00	2020	917.7412807	821.3082	1142.953	1248.681	1082.989
27Sep2020 0:00:00	2020	861.0383015	802.973	1117.803	1180.241	1123.385
27Sep2020 1:00:00	2020	822.6755867	798.8747	1116.202	1141.656	1127.516
27Sep2020 2:00:00	2020	799.5822081	794.3068	1121.256	1145.784	1124.913
27Sep2020 3:00:00	2020	790.7938147	785.0093	1123.115	1133.853	1133.183
27Sep2020 4:00:00	2020	793.5965194	783.9695	1122.885	1131.74	1139.506
27Sep2020 5:00:00	2020	812.6620749	789.778	1128.43	1142.271	1138.853
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27Sep2020 8:00:00	2020	949.0155407	823.5967	1154.183	1294.603	1135.693
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27Sep2020 10:00:00	2020	1060.940599	830.0152	1173.385	1427.066	1140.224
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27Sep2020 16:00:00	2020	1150.337806	849.1635	1203.898	1518.07	1167.193
27Sep2020 17:00:00	2020	1180.046129	865.9823	1223.091	1545.07	1154.381
27Sep2020 18:00:00	2020	1162.569593	875.9055	1215.686	1513.304	1140.061
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27Sep2020 21:00:00	2020	1094.204533	865.9024	1226.589	1473.372	1172.072
27Sep2020 22:00:00	2020	1004.017959	833.2078	1182.464	1373.77	1171.044
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28Sep2020 0:00:00	2020	855.8622665	783.3207	1124.115	1181.429	1143.53
28Sep2020 1:00:00	2020	821.9999917	777.5358	1117.454	1154.061	1138.242
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28Sep2020 8:00:00	2020	1215.728444	902.3687	1255.983	1578.186	1185.336
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30Sep2020 15:00:00	2020	1275.719336	867.2043	1175.955	1626.954	1168.1
30Sep2020 16:00:00	2020	1281.00278	879.6851	1183.415	1627.288	1138.57
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30Sep2020 18:00:00	2020	1215.3937	893.2745	1179.856	1575.777	1126.171
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02Oct2020 13:00:00	2020	1324.360496	836.6751	1237.26	1685.851	1141.489
02Oct2020 14:00:00	2020	1322.137661	845.223	1242.495	1645.461	1123.678
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02Oct2020 21:00:00	2020	1100.999755	833.3866	1215.579	1492.885	1100.1
02Oct2020 22:00:00	2020	1018.791054	814.886	1186.519	1401.652	1125.763
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03Oct2020 9:00:00	2020	1037.478044	827.3142	1183.472	1422.826	1081.998
03Oct2020 10:00:00	2020	1085.52616	835.9493	1175.466	1463.032	1085.808
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03Oct2020 12:00:00	2020	1145.327121	830.7298	1148.028	1516.647	1056.996
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03Oct2020 16:00:00	2020	1169.098541	862.1812	1203.454	1573.933	1047.906
03Oct2020 17:00:00	2020	1182.530451	875.1063	1214.57	1592.055	1048.475
03Oct2020 18:00:00	2020	1156.282432	881.8682	1203.808	1566.878	1050.308
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04Oct2020 17:00:00	2020	1196.970365	884.737	1205.64	1595.376	1101.642
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09Oct2020 4:00:00	2020	826.0637658	764.0215	1129.598	1170.315	1124.454
09Oct2020 5:00:00	2020	882.285569	777.7011	1139.48	1208.14	1142.221
09Oct2020 6:00:00	2020	1007.496659	809.6707	1200.029	1328.383	1117.105
09Oct2020 7:00:00	2020	1143.242172	850.3728	1257.325	1496.674	1124.271
09Oct2020 8:00:00	2020	1197.882896	866.8194	1292.896	1553.089	1144.302
09Oct2020 9:00:00	2020	1222.04962	881.1218	1320.608	1612.326	1150.129
09Oct2020 10:00:00	2020	1246.987629	873.4691	1331.723	1665.756	1175.375
09Oct2020 11:00:00	2020	1268.637514	861.1798	1287.312	1669.026	1195.593
09Oct2020 12:00:00	2020	1281.860392	855.938	1254.836	1649.946	1209.27
09Oct2020 13:00:00	2020	1270.934775	854.7098	1239.022	1624.923	1208.281
09Oct2020 14:00:00	2020	1257.140121	847.9004	1249.136	1595.112	1181.918
09Oct2020 15:00:00	2020	1244.195332	854.4687	1278.171	1533.416	1179.84
09Oct2020 16:00:00	2020	1250.295437	867.0027	1301.625	1543.295	1198.135
09Oct2020 17:00:00	2020	1262.748001	889.2262	1303.852	1556.685	1190.812
09Oct2020 18:00:00	2020	1204.315961	877.2998	1301.917	1576.293	1200.358
09Oct2020 19:00:00	2020	1201.319658	874.0479	1307.677	1588.585	1209.76
09Oct2020 20:00:00	2020	1155.088248	865.3052	1297.583	1520.852	1196.361
09Oct2020 21:00:00	2020	1092.122278	847.6022	1269.486	1454.852	1201.702
09Oct2020 22:00:00	2020	1017.088291	815.6688	1229.443	1372.748	1187.52
09Oct2020 23:00:00	2020	938.4402646	786.2664	1194.633	1290.495	1188.769
10Oct2020 0:00:00	2020	875.5998768	762.1816	1167.52	1216.785	1186.576
10Oct2020 1:00:00	2020	833.804947	748.7381	1154.689	1178.442	1189.832
10Oct2020 2:00:00	2020	806.6811179	741.4902	1141.256	1155.514	1165.702
10Oct2020 3:00:00	2020	794.418274	735.7405	1129.135	1114.304	1158.438
10Oct2020 4:00:00	2020	794.5836687	731.9505	1127.425	1112.066	1154.662
10Oct2020 5:00:00	2020	816.7251555	734.1229	1132.578	1133.284	1135.649
10Oct2020 6:00:00	2020	864.5476031	751.4289	1147.446	1179.293	1142.061
10Oct2020 7:00:00	2020	930.5936985	775.5817	1175.114	1278.172	1155.682
10Oct2020 8:00:00	2020	986.3891553	794.034	1186.952	1344.709	1160.481
10Oct2020 9:00:00	2020	1063.926755	815.9414	1186.905	1422.385	1144.854
10Oct2020 10:00:00	2020	1116.03062	833.6183	1199.085	1481.063	1124.552
10Oct2020 11:00:00	2020	1146.097546	838.0082	1229.962	1498.583	1130.088
10Oct2020 12:00:00	2020	1158.907397	832.6471	1230.235	1506.454	1128.817
10Oct2020 13:00:00	2020	1153.840699	824.3389	1212.823	1507.12	1121.468
10Oct2020 14:00:00	2020	1144.002942	816.3842	1207.619	1475.39	1128.506
10Oct2020 15:00:00	2020	1141.420507	807.7435	1208.709	1472.439	1131.689
10Oct2020 16:00:00	2020	1141.758684	812.8137	1218.333	1487.02	1123.427
10Oct2020 17:00:00	2020	1140.390516	823.1249	1229.605	1510.2	1123.672
10Oct2020 18:00:00	2020	1123.187377	829.484	1244.641	1510.662	1133.134
10Oct2020 19:00:00	2020	1139.782904	845.5595	1256.656	1501.427	1142.91
10Oct2020 20:00:00	2020	1098.094726	835.9532	1238.641	1461.482	1159.871
10Oct2020 21:00:00	2020	1042.724414	814.4529	1214.087	1405.505	1158.52
10Oct2020 22:00:00	2020	977.4357657	787.9298	1196.448	1341.298	1183.025
10Oct2020 23:00:00	2020	906.9472206	763.0664	1174.062	1293.669	1154.39
11Oct2020 0:00:00	2020	849.5645739	743.8038	1146.199	1253.62	1137.756

11Oct2020 1:00:00	2020	809.7568969	730.4784	1138.448	1219.624	1135.843
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11Oct2020 3:00:00	2020	772.9466916	724.9002	1129.861	1164.477	1105.222
11Oct2020 4:00:00	2020	775.5277897	729.6189	1123.707	1179.341	1069.793
11Oct2020 5:00:00	2020	794.1922783	725.2126	1125.096	1161.929	1091.534
11Oct2020 6:00:00	2020	835.6030383	741.8392	1136.697	1198.93	1105.415
11Oct2020 7:00:00	2020	888.6701357	765.1759	1162.213	1255.19	1110.471
11Oct2020 8:00:00	2020	936.1142718	783.1878	1185.537	1311.195	1129.019
11Oct2020 9:00:00	2020	999.6807399	782.9604	1217.336	1377.741	1146.557
11Oct2020 10:00:00	2020	1057.056239	789.641	1234.794	1439.306	1136.604
11Oct2020 11:00:00	2020	1099.802784	792.9077	1240.927	1478.655	1163.956
11Oct2020 12:00:00	2020	1127.980289	790.8452	1243.449	1515.164	1141.737
11Oct2020 13:00:00	2020	1131.953106	786.2853	1246.25	1535.677	1145.251
11Oct2020 14:00:00	2020	1128.563801	782.5094	1244.649	1525.473	1142.426
11Oct2020 15:00:00	2020	1128.103753	787.1893	1238.36	1518.716	1133.987
11Oct2020 16:00:00	2020	1134.616763	794.2251	1247.989	1525.288	1149.582
11Oct2020 17:00:00	2020	1121.997537	796.8746	1240.175	1498.783	1163.801
11Oct2020 18:00:00	2020	1087.174736	801.2582	1239.538	1472.906	1185.518
11Oct2020 19:00:00	2020	1104.478579	815.7298	1258.326	1498.422	1206.985
11Oct2020 20:00:00	2020	1076.612056	810.1457	1251.414	1469.501	1216.008
11Oct2020 21:00:00	2020	1033.791057	792.6497	1228.559	1427.615	1223.156
11Oct2020 22:00:00	2020	974.8220224	770.338	1188.476	1359.406	1215.695
11Oct2020 23:00:00	2020	904.9747921	748.8534	1165.934	1286.243	1179.693
12Oct2020 0:00:00	2020	849.9132256	732.4546	1146.258	1233.486	1150.563
12Oct2020 1:00:00	2020	813.7220041	723.9947	1127.104	1174.879	1157.763
12Oct2020 2:00:00	2020	789.25445	715.6839	1121.084	1151.359	1213.005
12Oct2020 3:00:00	2020	781.675413	717.5782	1113.187	1131.966	1171.521
12Oct2020 4:00:00	2020	789.6877844	721.3039	1116.019	1141.376	1163.962
12Oct2020 5:00:00	2020	816.2577635	730.6455	1125.312	1170.67	1162.647
12Oct2020 6:00:00	2020	867.7922615	733.9602	1133.756	1219.976	1163.566
12Oct2020 7:00:00	2020	923.2249701	753.3817	1161.118	1267.272	1146.311
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12Oct2020 9:00:00	2020	1046.546782	801.5601	1203.014	1316.895	1161.358
12Oct2020 10:00:00	2020	1113.637769	829.3882	1225.798	1376.46	1155.537
12Oct2020 11:00:00	2020	1155.275744	840.1491	1238.024	1411.67	1160.383
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12Oct2020 13:00:00	2020	1175.291022	828.9272	1233.83	1427.294	1171.961
12Oct2020 14:00:00	2020	1174.950329	827.9374	1231.504	1432.937	1158.424
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12Oct2020 16:00:00	2020	1201.613667	844.8054	1241.199	1490.086	1138.34
12Oct2020 17:00:00	2020	1192.682384	855.4905	1233.307	1498.087	1105.81
12Oct2020 18:00:00	2020	1157.690833	849.7884	1234.101	1478.197	1102.369
12Oct2020 19:00:00	2020	1184.602125	869.771	1250.188	1514.802	1125.589
12Oct2020 20:00:00	2020	1151.476363	856.7089	1242.478	1481.001	1159.608
12Oct2020 21:00:00	2020	1089.204228	841.8778	1226.909	1428.047	1189.029
12Oct2020 22:00:00	2020	1001.287886	810.4473	1195.598	1335.921	1173.761
12Oct2020 23:00:00	2020	916.0572748	779.6669	1168.66	1245.201	1156.032

13Oct2020 0:00:00	2020	861.0741412	763.2171	1167.824	1188.49	1142.847
13Oct2020 1:00:00	2020	828.9740928	758.4006	1159.34	1149.082	1119.12
13Oct2020 2:00:00	2020	814.3290495	755.4929	1146.792	1100.442	1108.126
13Oct2020 3:00:00	2020	811.8241	756.4431	1144.521	1088.157	1097.583
13Oct2020 4:00:00	2020	834.983746	770.2756	1152.896	1101.415	1111.797
13Oct2020 5:00:00	2020	899.5847923	790.5156	1172.352	1164.57	1119.871
13Oct2020 6:00:00	2020	1038.996923	814.8529	1211.673	1292.119	1130.783
13Oct2020 7:00:00	2020	1190.230713	863.8931	1270.682	1444.404	1149.256
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13Oct2020 9:00:00	2020	1259.454631	877.0369	1265.866	1524.329	1126.066
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13Oct2020 12:00:00	2020	1320.012657	890.4698	1282.313	1596.773	1062.225
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13Oct2020 18:00:00	2020	1281.099294	857.6044	1310.881	1607.624	1119.243
13Oct2020 19:00:00	2020	1284.519567	866.7939	1299.404	1611.89	1115.267
13Oct2020 20:00:00	2020	1226.249397	890.3248	1291.883	1554.882	1098.107
13Oct2020 21:00:00	2020	1148.470798	889.1418	1265.963	1463.434	1090.01
13Oct2020 22:00:00	2020	1051.268434	855.0554	1212.948	1356.976	1089.776
13Oct2020 23:00:00	2020	960.3273988	822.1283	1171.084	1260.364	1082.101
14Oct2020 0:00:00	2020	899.504852	800.7125	1157.372	1200.425	1080.233
14Oct2020 1:00:00	2020	863.1920267	792.0659	1152.688	1163.864	1076.399
14Oct2020 2:00:00	2020	844.296764	787.0844	1141.689	1136.5	1070.939
14Oct2020 3:00:00	2020	839.4419479	788.4136	1141.922	1128.218	1069.692
14Oct2020 4:00:00	2020	858.7835093	796.6945	1141.253	1141.714	1089.156
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14Oct2020 7:00:00	2020	1216.853293	886.7588	1245.131	1504.557	1137.233
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14Oct2020 9:00:00	2020	1276.468807	868.7051	1207.435	1578.58	1142.716
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14Oct2020 11:00:00	2020	1281.97846	863.5138	1195.352	1618.404	1195.237
14Oct2020 12:00:00	2020	1287.521776	860.934	1187.672	1622.464	1195.647
14Oct2020 13:00:00	2020	1281.38794	884.8547	1177.59	1616.797	1207.975
14Oct2020 14:00:00	2020	1264.347939	857.4886	1187.341	1602.316	1188.443
14Oct2020 15:00:00	2020	1257.05761	849.3213	1204.457	1606.361	1153.04
14Oct2020 16:00:00	2020	1268.505621	856.0266	1216.13	1650.388	1098.083
14Oct2020 17:00:00	2020	1283.59704	863.9502	1229.05	1671.841	1088.379
14Oct2020 18:00:00	2020	1260.557734	864.5931	1218.241	1661.213	1083.236
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14Oct2020 20:00:00	2020	1227.992187	904.6299	1225.117	1608.916	1082.697
14Oct2020 21:00:00	2020	1151.200158	900.935	1187.799	1527.896	1119.496
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15Oct2020 3:00:00	2020	843.1031295	809.7771	1114.988	1195.421	1119.97
15Oct2020 4:00:00	2020	864.1814272	810.473	1105.135	1207.422	1124.862
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15Oct2020 8:00:00	2020	1250.612541	915.1695	1247.56	1600.987	1118.377
15Oct2020 9:00:00	2020	1261.161355	872.9812	1235.248	1625.222	1122.13
15Oct2020 10:00:00	2020	1274.089145	861.3522	1243.343	1641.33	1122.448
15Oct2020 11:00:00	2020	1288.817236	849.3243	1232.547	1651.457	1109.226
15Oct2020 12:00:00	2020	1287.193348	844.1788	1250.69	1660.902	1093.561
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15Oct2020 14:00:00	2020	1268.344176	833.5437	1248.577	1635.535	1067.775
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15Oct2020 16:00:00	2020	1266.745742	828.9608	1259.883	1601.228	987.9905
15Oct2020 17:00:00	2020	1280.236697	845.6113	1255.315	1638.478	992.4569
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15Oct2020 19:00:00	2020	1283.23388	919.823	1242.407	1625.189	1050.427
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15Oct2020 22:00:00	2020	1059.279241	875.3354	1202.016	1447.037	1104.669
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16Oct2020 11:00:00	2020	1301.021928	894.0144	1307.954	1711.475	1106.055
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17Oct2020 0:00:00	2020	919.9207836	812.2868	1165.269	1283.048	1159.004
17Oct2020 1:00:00	2020	878.8246943	798.5857	1148.111	1218.441	1143.38
17Oct2020 2:00:00	2020	856.6962505	786.2912	1140.576	1196.546	1140.96
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17Oct2020 16:00:00	2020	1185.731001	884.8774	1312.694	1596.726	1211.86
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17Oct2020 18:00:00	2020	1233.915532	887.1462	1343.478	1628.366	1224.993
17Oct2020 19:00:00	2020	1239.172889	890.3892	1328.649	1616.139	1234.394
17Oct2020 20:00:00	2020	1195.337063	885.5812	1323.664	1566.703	1231.048
17Oct2020 21:00:00	2020	1142.265523	905.2682	1312.648	1512.896	1232.023
17Oct2020 22:00:00	2020	1068.37983	876.0543	1271.723	1435.452	1209.151
17Oct2020 23:00:00	2020	991.9261591	843.7961	1227.951	1347.149	1190.837
18Oct2020 0:00:00	2020	929.3804114	819.6891	1201.356	1283.295	1184.521
18Oct2020 1:00:00	2020	886.1042468	807.2336	1188.692	1239.429	1181.121
18Oct2020 2:00:00	2020	861.8567502	800.0553	1181.426	1215.849	1182.404
18Oct2020 3:00:00	2020	851.3873368	802.328	1178.512	1194.139	1175.513
18Oct2020 4:00:00	2020	856.4509454	808.1585	1182.96	1181.46	1169.472
18Oct2020 5:00:00	2020	877.2032286	817.6368	1186.857	1204.486	1179.505
18Oct2020 6:00:00	2020	918.6107022	832.1619	1200.355	1236.075	1178.844
18Oct2020 7:00:00	2020	978.6577617	853.3176	1222.353	1302.656	1188.723
18Oct2020 8:00:00	2020	1039.030918	870.1731	1240.345	1404.711	1133.304
18Oct2020 9:00:00	2020	1111.228278	876.6932	1272.329	1479.81	1137.897
18Oct2020 10:00:00	2020	1171.174104	872.8172	1274.442	1543.84	1132.58
18Oct2020 11:00:00	2020	1216.396628	870.077	1306.145	1597.932	1124.377
18Oct2020 12:00:00	2020	1240.630136	867.1195	1314.166	1645.429	1140.387
18Oct2020 13:00:00	2020	1235.915658	836.7787	1295.339	1639.292	1190.37
18Oct2020 14:00:00	2020	1228.491275	829.292	1295.411	1625.755	1188.808
18Oct2020 15:00:00	2020	1230.678192	838.4129	1299.269	1614.663	1189.952
18Oct2020 16:00:00	2020	1259.375691	868.9689	1319.058	1627.511	1191.865
18Oct2020 17:00:00	2020	1293.494605	890.7905	1330.173	1663.74	1189.611
18Oct2020 18:00:00	2020	1293.249406	882.9964	1340.469	1667.986	1188.284
18Oct2020 19:00:00	2020	1283.127525	887.815	1339.969	1648.046	1190.564
18Oct2020 20:00:00	2020	1231.612008	877.6644	1316.668	1599.999	1191.946

18Oct2020 21:00:00	2020	1165.257718	848.3459	1319.164	1526.278	1180.681
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18Oct2020 23:00:00	2020	985.1076775	833.0842	1278.989	1325.073	1168.171
19Oct2020 0:00:00	2020	926.6539819	814.8508	1253.445	1252.385	1150.994
19Oct2020 1:00:00	2020	893.3780161	811.4709	1238.526	1213.981	1093.818
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19Oct2020 8:00:00	2020	1299.725834	952.8649	1364.037	1636.805	1181.08
19Oct2020 9:00:00	2020	1325.657955	912.7911	1374.524	1657.096	1176.617
19Oct2020 10:00:00	2020	1355.894106	907.508	1364.258	1664.667	1182.727
19Oct2020 11:00:00	2020	1377.997861	895.6319	1369.106	1658.247	1174.182
19Oct2020 12:00:00	2020	1378.831873	883.1573	1363.214	1667.888	1169.237
19Oct2020 13:00:00	2020	1364.477223	875.3605	1361.253	1665.208	1178.18
19Oct2020 14:00:00	2020	1349.798293	869.9491	1376.87	1665.301	1183.074
19Oct2020 15:00:00	2020	1343.76894	857.106	1372.905	1659.134	1193.509
19Oct2020 16:00:00	2020	1352.17032	858.451	1380.075	1663.24	1205.92
19Oct2020 17:00:00	2020	1358.041074	863.7382	1344.823	1687.897	1215.705
19Oct2020 18:00:00	2020	1349.337504	867.3577	1360.728	1693.948	1229.65
19Oct2020 19:00:00	2020	1342.791736	878.4122	1381.72	1677.245	1234.185
19Oct2020 20:00:00	2020	1279.549054	867.8366	1382.195	1641.446	1221.142
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20Oct2020 12:00:00	2020	1305.780997	811.7512	1311.804	1685.111	1134.194
20Oct2020 13:00:00	2020	1290.809542	788.7005	1303.79	1673.398	1144.539
20Oct2020 14:00:00	2020	1276.362562	788.773	1281.581	1664.928	1158.277
20Oct2020 15:00:00	2020	1270.760533	782.6861	1288.765	1681.146	1184.806
20Oct2020 16:00:00	2020	1282.62637	799.0577	1324.847	1680.717	1174.978
20Oct2020 17:00:00	2020	1305.77284	818.2241	1342.842	1688.514	1148.663
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20Oct2020 19:00:00	2020	1306.98691	857.6102	1364.142	1689.241	1189.177

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20Oct2020 22:00:00	2020	1075.500136	838.6311	1296.796	1441.272	1205.033
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21Oct2020 1:00:00	2020	888.3196784	780.1309	1241.19	1241.581	1203.734
21Oct2020 2:00:00	2020	868.5110226	772.7775	1233.284	1209.676	1199.296
21Oct2020 3:00:00	2020	865.7635662	772.6332	1232.303	1207.14	1202.408
21Oct2020 4:00:00	2020	885.2646697	777.4179	1224.02	1214.143	1208.183
21Oct2020 5:00:00	2020	950.9089027	791.2891	1227.358	1270.591	1195.244
21Oct2020 6:00:00	2020	1090.392525	832.0882	1251.329	1379.207	1194.933
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21Oct2020 8:00:00	2020	1292.285226	877.0159	1348.416	1631.707	1179.633
21Oct2020 9:00:00	2020	1315.31344	903.3422	1361.802	1656.081	1163.488
21Oct2020 10:00:00	2020	1343.039963	908.4108	1357.389	1678.716	1150.455
21Oct2020 11:00:00	2020	1365.480214	902.8167	1383.462	1696.035	1125.621
21Oct2020 12:00:00	2020	1367.127568	890.5728	1380.977	1725.163	1117.051
21Oct2020 13:00:00	2020	1360.945907	881.9254	1381.383	1735.151	1137.885
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21Oct2020 15:00:00	2020	1327.56392	883.294	1360.942	1700.499	1145.675
21Oct2020 16:00:00	2020	1350.305235	896.149	1380.41	1739.158	1165.636
21Oct2020 17:00:00	2020	1388.961695	909.2532	1381.576	1735.301	1163.688
21Oct2020 18:00:00	2020	1372.002547	912.0366	1358.976	1693.688	1179.02
21Oct2020 19:00:00	2020	1354.31115	924.3782	1357.447	1660.536	1181.901
21Oct2020 20:00:00	2020	1292.035509	915.3635	1355.098	1603.718	1179.627
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21Oct2020 22:00:00	2020	1114.990778	883.8059	1351.909	1473.293	1164.881
21Oct2020 23:00:00	2020	1020.388908	854.405	1318.386	1375.041	1221.282
22Oct2020 0:00:00	2020	960.3284242	834.0292	1287.277	1308.798	1235.515
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22Oct2020 2:00:00	2020	904.2594117	824.3356	1279.182	1246.305	1267.679
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22Oct2020 8:00:00	2020	1317.737833	910.2009	1392.154	1691.49	1257.604
22Oct2020 9:00:00	2020	1334.311414	911.7961	1399.487	1722.788	1238.595
22Oct2020 10:00:00	2020	1354.126189	905.2575	1406.025	1740.705	1248.313
22Oct2020 11:00:00	2020	1368.279558	895.7352	1412.784	1752.419	1234.756
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22Oct2020 19:00:00	2020	1361.192806	914.2645	1412.932	1697.342	1271.154
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23Oct2020 0:00:00	2020	973.7900682	849.063	1307.744	1305.096	1226.788
23Oct2020 1:00:00	2020	936.5496007	839.9557	1296.059	1267.005	1177.907
23Oct2020 2:00:00	2020	916.4474061	839.3402	1298.231	1244.569	1160.753
23Oct2020 3:00:00	2020	912.0582144	842.5526	1302.28	1243.361	1164.592
23Oct2020 4:00:00	2020	930.7376811	846.5877	1294.98	1266.297	1161.279
23Oct2020 5:00:00	2020	988.7276679	863.9147	1298.522	1322.657	1159.427
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23Oct2020 9:00:00	2020	1338.962886	920.2868	1406.976	1666.907	1196.836
23Oct2020 10:00:00	2020	1367.866366	927.3651	1420.388	1694.815	1194.398
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23Oct2020 17:00:00	2020	1368.039439	922.7276	1403.54	1682.283	1245.99
23Oct2020 18:00:00	2020	1369.449729	928.3566	1410.006	1687.728	1256.021
23Oct2020 19:00:00	2020	1347.705951	933.4638	1417.685	1650.845	1264.277
23Oct2020 20:00:00	2020	1287.15923	919.4961	1408.215	1612.222	1254.826
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23Oct2020 23:00:00	2020	1054.465741	884.3222	1356.421	1423.449	1209.854
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24Oct2020 4:00:00	2020	923.5364733	833.1232	1310.958	1273.496	1166.602
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24Oct2020 12:00:00	2020	1262.733956	910.5173	1376.92	1595.714	1248.254
24Oct2020 13:00:00	2020	1248.322215	895.193	1363.591	1576.654	1243.633
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25Oct2020 0:00:00	2020	994.8230343	867.9399	1329.914	1313.899	1221.357
25Oct2020 1:00:00	2020	955.5519813	855.6	1305.809	1256.235	1210.111
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25Oct2020 4:00:00	2020	931.5498483	848.9924	1307.809	1245.633	1201.494
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25Oct2020 12:00:00	2020	1241.496533	901.591	1423.478	1571.461	1195.873
25Oct2020 13:00:00	2020	1224.150662	891.8276	1415.96	1560.283	1211.262
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25Oct2020 15:00:00	2020	1206.952476	884.011	1392.839	1531.023	1245.621
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25Oct2020 23:00:00	2020	1002.398448	847.8658	1336.624	1338.147	1241.844
26Oct2020 0:00:00	2020	942.9639158	824.2772	1306.699	1263.376	1237.242
26Oct2020 1:00:00	2020	906.2264899	812.5192	1294.447	1217.084	1236.545
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26Oct2020 9:00:00	2020	1312.771576	921.2519	1443.461	1677.143	1252.434
26Oct2020 10:00:00	2020	1328.955288	918.6577	1437.624	1688.427	1253.292
26Oct2020 11:00:00	2020	1346.815134	887.3049	1441.482	1690.395	1242.638
26Oct2020 12:00:00	2020	1342.861512	871.4386	1456.952	1682.169	1219.083
26Oct2020 13:00:00	2020	1325.962326	862.8501	1428.373	1652.118	1219.453
26Oct2020 14:00:00	2020	1303.159996	852.602	1410.715	1631.088	1215.875
26Oct2020 15:00:00	2020	1295.861711	854.0146	1429.314	1664.96	1221.145
26Oct2020 16:00:00	2020	1315.76547	874.4544	1422.185	1682.748	1220.474

26Oct2020 17:00:00	2020	1351.515366	879.6308	1428.618	1705.03	1230.532
26Oct2020 18:00:00	2020	1352.71836	886.3425	1426.174	1713.041	1246.514
26Oct2020 19:00:00	2020	1326.609392	884.2913	1411.995	1651.592	1246.449
26Oct2020 20:00:00	2020	1262.952367	899.1865	1409.257	1579.425	1247.609
26Oct2020 21:00:00	2020	1181.386983	892.2666	1385.336	1517.273	1252.285
26Oct2020 22:00:00	2020	1078.016782	857.0609	1355.549	1445.063	1230.65
26Oct2020 23:00:00	2020	983.3353177	823.1809	1311.85	1338.182	1195.848
27Oct2020 0:00:00	2020	926.9972807	799.3573	1285.156	1270.578	1177.572
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27Oct2020 3:00:00	2020	859.772904	781.8701	1266.618	1190.738	1189.625
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27Oct2020 5:00:00	2020	939.3605229	803.0446	1275.08	1270.255	1200.764
27Oct2020 6:00:00	2020	1078.397995	839.0529	1308.392	1394.617	1214.027
27Oct2020 7:00:00	2020	1223.892103	894.4156	1372.269	1563.416	1231.865
27Oct2020 8:00:00	2020	1267.320086	894.264	1418.454	1631.912	1229.378
27Oct2020 9:00:00	2020	1262.886876	884.2922	1412.367	1648.463	1206.872
27Oct2020 10:00:00	2020	1279.444733	876.8242	1410.967	1691.919	1218.615
27Oct2020 11:00:00	2020	1294.000959	860.801	1386.037	1708.568	1252.825
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27Oct2020 13:00:00	2020	1296.59773	849.1495	1411.874	1706.716	1234.037
27Oct2020 14:00:00	2020	1286.929297	835.8331	1390.423	1688.369	1246.238
27Oct2020 15:00:00	2020	1282.087273	835.258	1388.783	1678.632	1239.709
27Oct2020 16:00:00	2020	1294.720665	849.0313	1371.028	1665.081	1225.042
27Oct2020 17:00:00	2020	1313.044912	873.3888	1384.565	1683.21	1239.136
27Oct2020 18:00:00	2020	1308.798941	893.5525	1429.167	1685.348	1226.543
27Oct2020 19:00:00	2020	1288.869432	891.9783	1430.025	1662.932	1226.638
27Oct2020 20:00:00	2020	1222.453696	878.8178	1409.939	1606.044	1237.678
27Oct2020 21:00:00	2020	1147.084739	861.5427	1365.652	1558.605	1227.62
27Oct2020 22:00:00	2020	1052.224734	825.8781	1327.199	1450.521	1214.898
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28Oct2020 6:00:00	2020	1068.229444	834.1916	1293.684	1414.377	1220.008
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28Oct2020 11:00:00	2020	1341.421483	862.6855	1389.183	1690.45	1231.782
28Oct2020 12:00:00	2020	1342.708678	841.6839	1368.554	1663.502	1221.181
28Oct2020 13:00:00	2020	1326.352255	838.2506	1368.515	1664.847	1213.833
28Oct2020 14:00:00	2020	1307.347578	835.3203	1372.166	1666.989	1227.863
28Oct2020 15:00:00	2020	1312.846265	832.9566	1364.326	1702.236	1248.423

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28Oct2020 20:00:00	2020	1243.731774	896.3357	1397.398	1629.177	1267.58
28Oct2020 21:00:00	2020	1163.765255	881.2259	1367.733	1550.504	1231.249
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29Oct2020 1:00:00	2020	878.2049357	776.1527	1279.284	1259.037	1211.994
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04Nov2020 5:00:00	2020	913.8848758	783.4043	1245.06	1277.043	1140.649
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04Nov2020 7:00:00	2020	1195.362191	872.8595	1352.159	1570.178	1193.069
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04Nov2020 19:00:00	2020	1267.698105	899.0784	1417.552	1661.002	1213.889
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12Nov2020 18:00:00	2020	1405.008552	930.5053	1420.316	1855.259	1305.823
12Nov2020 19:00:00	2020	1344.292764	909.015	1442.354	1787.693	1305.693
12Nov2020 20:00:00	2020	1282.149401	922.9605	1436.262	1722.609	1308.68
12Nov2020 21:00:00	2020	1200.708914	915.5628	1400.824	1640.778	1314.848
12Nov2020 22:00:00	2020	1103.910275	888.481	1356.928	1546.067	1292.616
12Nov2020 23:00:00	2020	1013.99719	852.5346	1335.053	1471.582	1268.441
13Nov2020 0:00:00	2020	955.642225	830.2231	1316.436	1417.726	1254.74
13Nov2020 1:00:00	2020	921.0157979	820.0622	1306.512	1380.199	1245.206
13Nov2020 2:00:00	2020	898.604165	816.7405	1292.838	1360.807	1249.505
13Nov2020 3:00:00	2020	894.9516849	814.4796	1279.755	1357.188	1250.661
13Nov2020 4:00:00	2020	915.35619	811.499	1290.345	1377.275	1250.397
13Nov2020 5:00:00	2020	973.0799146	825.9711	1293.689	1407.171	1245.604
13Nov2020 6:00:00	2020	1096.993781	862.1062	1324.655	1518.519	1253.654
13Nov2020 7:00:00	2020	1223.16968	907.8014	1367.597	1632.421	1266.454

13Nov2020 8:00:00	2020	1265.646363	915.4207	1396.465	1695.083	1303.855
13Nov2020 9:00:00	2020	1290.537806	915.4477	1400.516	1737.467	1313.301
13Nov2020 10:00:00	2020	1312.418695	910.9244	1404.415	1771.735	1333.602
13Nov2020 11:00:00	2020	1326.865905	905.6639	1406.031	1787.128	1332.202
13Nov2020 12:00:00	2020	1334.898138	902.7752	1386.122	1782.774	1328.349
13Nov2020 13:00:00	2020	1319.513539	902.1893	1387.264	1763.585	1310.651
13Nov2020 14:00:00	2020	1307.673439	894.0778	1385.945	1761.144	1320.673
13Nov2020 15:00:00	2020	1310.594232	891.0602	1389.183	1762.126	1353.294
13Nov2020 16:00:00	2020	1345.343803	892.6387	1415.823	1800.115	1396.944
13Nov2020 17:00:00	2020	1412.613463	914.6334	1432.329	1850.435	1426.265
13Nov2020 18:00:00	2020	1354.640259	897.6951	1390.636	1793.267	1429.692
13Nov2020 19:00:00	2020	1289.836668	874.5158	1409.495	1737.459	1427.815
13Nov2020 20:00:00	2020	1230.863238	881.7354	1405.293	1698.576	1412.626
13Nov2020 21:00:00	2020	1166.858574	883.2171	1366.866	1622.421	1410.532
13Nov2020 22:00:00	2020	1083.26393	852.916	1344.987	1539.264	1421.014
13Nov2020 23:00:00	2020	1001.26971	823.8928	1324.446	1455.63	1427.206
14Nov2020 0:00:00	2020	941.8664726	801.0053	1294.134	1388.189	1426.459
14Nov2020 1:00:00	2020	901.0952614	788.7146	1269.554	1340.441	1408.85
14Nov2020 2:00:00	2020	876.7833282	791.3736	1270.303	1311.969	1372.043
14Nov2020 3:00:00	2020	864.8807703	795.1217	1277.933	1294.593	1379.255
14Nov2020 4:00:00	2020	871.3236125	802.4705	1274.633	1289.151	1373.956
14Nov2020 5:00:00	2020	900.217735	812.3456	1276.398	1316.591	1383.346
14Nov2020 6:00:00	2020	950.6380905	828.2795	1287.801	1356.907	1389.951
14Nov2020 7:00:00	2020	1014.657104	850.8009	1297.065	1409.766	1406.023
14Nov2020 8:00:00	2020	1070.358733	863.2933	1294.035	1470.275	1412.127
14Nov2020 9:00:00	2020	1129.738228	872.8761	1301.552	1535.818	1411.858
14Nov2020 10:00:00	2020	1165.999857	872.0154	1316.111	1580.542	1435.738
14Nov2020 11:00:00	2020	1183.678978	872.2584	1329.277	1599.679	1447.842
14Nov2020 12:00:00	2020	1185.226961	857.7056	1322.503	1629.507	1447.473
14Nov2020 13:00:00	2020	1173.439452	844.9019	1318.318	1609.948	1449.453
14Nov2020 14:00:00	2020	1160.632083	847.5916	1327.277	1605.243	1430.669
14Nov2020 15:00:00	2020	1163.874169	863.9449	1332.03	1611.893	1386.794
14Nov2020 16:00:00	2020	1222.40809	902.5048	1368.084	1674.494	1411.776
14Nov2020 17:00:00	2020	1331.041337	939.0516	1423.809	1786.079	1442.127
14Nov2020 18:00:00	2020	1303.373118	922.6462	1394.443	1744.045	1438.531
14Nov2020 19:00:00	2020	1251.678826	919.1516	1395.57	1681.552	1439.374
14Nov2020 20:00:00	2020	1204.577479	910.6008	1386.933	1649.344	1464.394
14Nov2020 21:00:00	2020	1146.221522	895.0458	1366.216	1593.688	1450.682
14Nov2020 22:00:00	2020	1078.294781	873.3962	1339.76	1537.381	1448.082
14Nov2020 23:00:00	2020	1002.923788	843.611	1311.515	1481.333	1407.088
15Nov2020 0:00:00	2020	946.3095177	812.4729	1242.874	1423.528	1401.879
15Nov2020 1:00:00	2020	904.2699757	802.2321	1243.19	1363.958	1394.611
15Nov2020 2:00:00	2020	881.0255548	802.5508	1265.237	1353.47	1384.946
15Nov2020 3:00:00	2020	871.1499742	808.5115	1270.745	1335.589	1377.122
15Nov2020 4:00:00	2020	874.9642365	811.7757	1265.123	1341.35	1373.662
15Nov2020 5:00:00	2020	901.2736816	821.8305	1276.914	1365.719	1360.209
15Nov2020 6:00:00	2020	945.3805295	839.5961	1287.319	1371.757	1356.877

15Nov2020 7:00:00	2020	995.8041337	854.7672	1317.154	1434.444	1392.71
15Nov2020 8:00:00	2020	1039.49395	855.667	1313.035	1484.482	1401.689
15Nov2020 9:00:00	2020	1088.102707	845.8686	1320.698	1538.427	1409.091
15Nov2020 10:00:00	2020	1131.236059	845.3357	1332.763	1569.325	1416.985
15Nov2020 11:00:00	2020	1159.425126	848.8135	1355.422	1597.151	1436.167
15Nov2020 12:00:00	2020	1170.228943	857.1284	1346.457	1609.592	1415.938
15Nov2020 13:00:00	2020	1163.263207	855.4981	1316.495	1618.78	1427.405
15Nov2020 14:00:00	2020	1160.356999	856.5144	1317.104	1614.361	1424.214
15Nov2020 15:00:00	2020	1176.351289	871.3615	1340.651	1678.245	1404.897
15Nov2020 16:00:00	2020	1251.587075	903.3297	1403.194	1778.755	1417.218
15Nov2020 17:00:00	2020	1364.871679	907.7102	1429.297	1894.975	1448.509
15Nov2020 18:00:00	2020	1323.172559	890.5177	1422.582	1855.277	1443.721
15Nov2020 19:00:00	2020	1266.219676	893.908	1431.806	1790.139	1424.092
15Nov2020 20:00:00	2020	1211.483782	899.4826	1415.735	1733.359	1378.456
15Nov2020 21:00:00	2020	1140.895256	890.4333	1388.279	1633.279	1414.779
15Nov2020 22:00:00	2020	1053.439186	855.2654	1339.082	1548.342	1426.619
15Nov2020 23:00:00	2020	968.9557037	826.1888	1324.725	1457.971	1401.387
16Nov2020 0:00:00	2020	915.2426012	809.9774	1314.302	1398.016	1391.225
16Nov2020 1:00:00	2020	885.9670171	800.2294	1301.961	1360.412	1408.643
16Nov2020 2:00:00	2020	872.2560766	796.1589	1287.447	1345.963	1404.203
16Nov2020 3:00:00	2020	873.3102647	797.6804	1284.457	1346.316	1405.623
16Nov2020 4:00:00	2020	897.480435	807.0141	1290.01	1365.863	1399.22
16Nov2020 5:00:00	2020	963.2658146	825.8343	1302.786	1416.521	1404.21
16Nov2020 6:00:00	2020	1094.516291	874.7157	1339.567	1521.554	1425.195
16Nov2020 7:00:00	2020	1233.00566	927.9257	1404.774	1684.28	1429.252
16Nov2020 8:00:00	2020	1276.66	937.2345	1429.866	1749.408	1425.64
16Nov2020 9:00:00	2020	1298.065103	920.4426	1436.129	1779.798	1416.917
16Nov2020 10:00:00	2020	1314.152413	895.5336	1413.049	1811.788	1410.776
16Nov2020 11:00:00	2020	1319.923792	883.8915	1425.062	1831.034	1389.722
16Nov2020 12:00:00	2020	1327.635133	886.8625	1372.181	1806.731	1384.06
16Nov2020 13:00:00	2020	1323.237272	890.6522	1395.816	1833.302	1376.648
16Nov2020 14:00:00	2020	1321.764996	904.1911	1426.294	1836.63	1352.795
16Nov2020 15:00:00	2020	1332.055158	924.9704	1432.772	1838.113	1350.445
16Nov2020 16:00:00	2020	1391.168527	929.4184	1458.992	1886.514	1361.719
16Nov2020 17:00:00	2020	1467.782729	947.0585	1451.567	1950.807	1371.059
16Nov2020 18:00:00	2020	1396.503891	925.4138	1416.295	1898.015	1363.828
16Nov2020 19:00:00	2020	1331.298995	913.7585	1416.662	1816.324	1332.258
16Nov2020 20:00:00	2020	1264.288376	892.6205	1397.95	1751.206	1355.965
16Nov2020 21:00:00	2020	1183.474506	912.7843	1381.82	1662.916	1340.88
16Nov2020 22:00:00	2020	1085.820137	884.392	1364.674	1574.164	1331.337
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17Nov2020 1:00:00	2020	908.2666391	810.6707	1265.527	1379.962	1324.352
17Nov2020 2:00:00	2020	890.8827493	801.6277	1234.007	1337.464	1319.375
17Nov2020 3:00:00	2020	885.8172357	800.4459	1229.684	1342.985	1327.45
17Nov2020 4:00:00	2020	908.2400773	806.5129	1243.56	1363.989	1317.759
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17Nov2020 6:00:00	2020	1106.354641	863.1129	1295.052	1559.905	1337.522
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17Nov2020 8:00:00	2020	1296.689532	913.6035	1340.35	1807.601	1332.378
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17Nov2020 10:00:00	2020	1344.907254	898.8713	1337.404	1845.457	1331.511
17Nov2020 11:00:00	2020	1363.396491	884.9697	1361.769	1844.23	1333.431
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17Nov2020 13:00:00	2020	1342.051379	879.6386	1354.638	1834.211	1315.533
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17Nov2020 18:00:00	2020	1393.235178	894.2489	1403.321	1889.149	1333.36
17Nov2020 19:00:00	2020	1323.383011	897.6756	1412.369	1837.035	1319.992
17Nov2020 20:00:00	2020	1251.671768	902.7673	1411.1	1777.06	1316.033
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18Nov2020 2:00:00	2020	867.1904537	781.2363	1265.024	1339.698	1260.14
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18Nov2020 15:00:00	2020	1360.365619	899.9184	1431.821	1793.033	1221.846
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18Nov2020 18:00:00	2020	1439.343273	940.0938	1445.393	1868.206	1248.108
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19Nov2020 0:00:00	2020	967.249544	850.2698	1332.315	1412.449	1204.688
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19Nov2020 4:00:00	2020	938.1329319	842.6727	1324.414	1380.75	1241.888

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21Nov2020 4:00:00	2020	883.789595	813.6359	1292.205	1388.727	1177.987
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21Nov2020 8:00:00	2020	1081.705385	885.3992	1376.179	1603.297	1216.008
21Nov2020 9:00:00	2020	1127.609409	896.3863	1413.613	1665.715	1226.241
21Nov2020 10:00:00	2020	1161.258058	894.8073	1394.056	1676.838	1232.821
21Nov2020 11:00:00	2020	1182.850353	883.5927	1391.615	1703.287	1226.651
21Nov2020 12:00:00	2020	1185.104537	872.3869	1403.789	1695.908	1225.671
21Nov2020 13:00:00	2020	1172.509477	866.8026	1391.315	1679.443	1221.478
21Nov2020 14:00:00	2020	1161.347769	859.8271	1380.702	1651.886	1233.945
21Nov2020 15:00:00	2020	1167.750657	877.7156	1387.865	1659.978	1232.35
21Nov2020 16:00:00	2020	1233.319004	926.5716	1429.126	1753.604	1249.378
21Nov2020 17:00:00	2020	1338.922354	970.6654	1458.727	1854.86	1250.314
21Nov2020 18:00:00	2020	1308.367325	961.0642	1465.166	1799.961	1231.117
21Nov2020 19:00:00	2020	1257.388705	947.153	1455.842	1734.537	1213.373
21Nov2020 20:00:00	2020	1211.459158	934.6473	1430.557	1667.645	1210.13
21Nov2020 21:00:00	2020	1154.034063	913.7472	1386.751	1628.648	1205.109
21Nov2020 22:00:00	2020	1080.904985	884.1779	1357.128	1554.273	1195.89
21Nov2020 23:00:00	2020	1005.335379	857.9739	1328.174	1481.108	1184.679
22Nov2020 0:00:00	2020	944.9689493	835.7279	1312.969	1431.399	1178.926
22Nov2020 1:00:00	2020	904.7838368	823.5302	1316.296	1421.017	1179.312
22Nov2020 2:00:00	2020	880.8179491	814.8305	1309.502	1379.741	1179.721
22Nov2020 3:00:00	2020	873.173808	811.4753	1309.772	1381.612	1180.666
22Nov2020 4:00:00	2020	877.7127442	815.6212	1323.265	1403.296	1190.689
22Nov2020 5:00:00	2020	901.1768449	824.2909	1332.842	1420.911	1188.46
22Nov2020 6:00:00	2020	944.5876419	839.2932	1338.103	1454.593	1212.456
22Nov2020 7:00:00	2020	1001.966232	862.9342	1350.412	1523.249	1245.896
22Nov2020 8:00:00	2020	1057.534522	875.9178	1358.047	1571.963	1245.308
22Nov2020 9:00:00	2020	1123.002399	881.7549	1401.841	1608.756	1246.222
22Nov2020 10:00:00	2020	1182.845584	887.663	1411.129	1655.194	1256.985
22Nov2020 11:00:00	2020	1221.029753	891.0612	1391.746	1679.46	1259.021
22Nov2020 12:00:00	2020	1235.756474	886.5444	1407.521	1708.217	1264.614
22Nov2020 13:00:00	2020	1226.949383	877.9098	1397.367	1686.847	1261.761
22Nov2020 14:00:00	2020	1214.08208	879.7496	1375.737	1712.083	1259.225
22Nov2020 15:00:00	2020	1211.368214	899.0655	1388.635	1728.947	1244.353
22Nov2020 16:00:00	2020	1284.936974	936.1533	1444.58	1831.148	1252.094
22Nov2020 17:00:00	2020	1399.081113	972.3023	1449.883	1901.318	1258.308
22Nov2020 18:00:00	2020	1356.375525	956.0932	1440.697	1840.756	1261.432
22Nov2020 19:00:00	2020	1301.440836	938.7782	1436.659	1804.043	1248.068
22Nov2020 20:00:00	2020	1246.787007	919.8295	1414.153	1759.2	1226.842
22Nov2020 21:00:00	2020	1171.051492	893.1411	1362.257	1665.334	1226.019
22Nov2020 22:00:00	2020	1075.475981	857.3521	1331.228	1577.342	1216.515
22Nov2020 23:00:00	2020	985.1050437	823.7864	1309.188	1481.746	1201.907
23Nov2020 0:00:00	2020	925.9234597	802.8197	1259.34	1399.916	1189.716
23Nov2020 1:00:00	2020	892.2861979	793.014	1248.928	1390.026	1180.946
23Nov2020 2:00:00	2020	875.6016619	791.8995	1254.734	1382.64	1173.866

23Nov2020 3:00:00	2020	873.7896469	792.9647	1285.258	1367.979	1175.726
23Nov2020 4:00:00	2020	896.7289645	807.3085	1303.568	1387.657	1173.923
23Nov2020 5:00:00	2020	963.6546111	827.6333	1336.415	1446.441	1190.947
23Nov2020 6:00:00	2020	1097.314236	855.633	1385.722	1565.234	1196.405
23Nov2020 7:00:00	2020	1244.592177	872.9668	1455.599	1709.16	1222.488
23Nov2020 8:00:00	2020	1290.650987	884.6189	1484.291	1781.149	1236.504
23Nov2020 9:00:00	2020	1306.13601	891.7266	1474.07	1768.376	1231.564
23Nov2020 10:00:00	2020	1312.111168	884.4126	1446.773	1773.643	1232.041
23Nov2020 11:00:00	2020	1324.393329	877.0222	1437.864	1788.611	1215.035
23Nov2020 12:00:00	2020	1325.474045	871.6063	1459.957	1794.716	1212.572
23Nov2020 13:00:00	2020	1318.266497	876.3886	1468.516	1787.245	1234.702
23Nov2020 14:00:00	2020	1308.368706	875.5212	1473.232	1769.829	1237.154
23Nov2020 15:00:00	2020	1316.809553	874.5942	1461.812	1786.38	1226.358
23Nov2020 16:00:00	2020	1382.035411	906.3171	1469.057	1863.367	1218.48
23Nov2020 17:00:00	2020	1483.322391	939.66	1472.39	1911.236	1225.244
23Nov2020 18:00:00	2020	1419.804212	926.6289	1456.553	1832.222	1213.71
23Nov2020 19:00:00	2020	1357.965852	951.1248	1441.981	1764.055	1195.822
23Nov2020 20:00:00	2020	1294.344561	942.644	1428.198	1695.876	1191.964
23Nov2020 21:00:00	2020	1213.682692	933.3659	1407.598	1620.917	1187.936
23Nov2020 22:00:00	2020	1111.824753	895.0504	1369.869	1511.177	1187.616
23Nov2020 23:00:00	2020	1017.263414	860.9439	1336.065	1407.91	1183.538
24Nov2020 0:00:00	2020	957.7813412	842.7392	1316.456	1347.315	1170.186
24Nov2020 1:00:00	2020	924.0883944	833.7641	1318.77	1344.06	1168.33
24Nov2020 2:00:00	2020	908.626549	831.9603	1304.708	1323.715	1191.92
24Nov2020 3:00:00	2020	906.4967648	829.0903	1303.872	1321.955	1196.424
24Nov2020 4:00:00	2020	927.2228692	834.1402	1303.489	1339.229	1198.167
24Nov2020 5:00:00	2020	993.3551835	852.7032	1320.793	1397.61	1199.603
24Nov2020 6:00:00	2020	1123.963933	890.5525	1363.58	1548.522	1210.123
24Nov2020 7:00:00	2020	1265.373824	931.4708	1426.962	1695.811	1225.96
24Nov2020 8:00:00	2020	1300.797904	946.6411	1449.737	1751.884	1230.005
24Nov2020 9:00:00	2020	1319.449309	927.282	1456.971	1802.519	1221.755
24Nov2020 10:00:00	2020	1341.638032	922.8488	1441.554	1815.117	1236.652
24Nov2020 11:00:00	2020	1360.018427	922.3329	1441.789	1821.617	1227.662
24Nov2020 12:00:00	2020	1365.593511	915.0279	1420.504	1822.492	1224.767
24Nov2020 13:00:00	2020	1356.463974	918.7883	1419.143	1817.916	1209.524
24Nov2020 14:00:00	2020	1327.770006	920.5124	1407.621	1806.528	1207.261
24Nov2020 15:00:00	2020	1316.088933	927.4773	1425.464	1807.478	1211.614
24Nov2020 16:00:00	2020	1372.284013	935.5968	1465.251	1881.872	1228.389
24Nov2020 17:00:00	2020	1450.760692	936.9202	1470.479	1913.091	1234.206
24Nov2020 18:00:00	2020	1404.58679	921.0024	1451.2	1863.754	1235.174
24Nov2020 19:00:00	2020	1340.162735	911.5957	1407.388	1777.47	1219.975
24Nov2020 20:00:00	2020	1279.051678	912.5309	1388.456	1727.775	1215.484
24Nov2020 21:00:00	2020	1195.346075	905.1748	1385.563	1667.177	1175.185
24Nov2020 22:00:00	2020	1091.550032	869.897	1336.38	1543.687	1154.959
24Nov2020 23:00:00	2020	998.0464368	834.1874	1294.002	1442.011	1131.272
25Nov2020 0:00:00	2020	937.6616766	810.676	1275.236	1396.154	1126.372
25Nov2020 1:00:00	2020	902.6119676	801.1735	1274.478	1362.763	1108.395

25Nov2020 2:00:00	2020	883.6621706	802.0816	1276.009	1326.627	1113.449
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25Nov2020 4:00:00	2020	903.3179774	814.7593	1278.378	1324.718	1120.517
25Nov2020 5:00:00	2020	968.6361907	834.0754	1293.052	1392.031	1120.404
25Nov2020 6:00:00	2020	1103.987106	877.1235	1329.122	1512.012	1132.79
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25Nov2020 8:00:00	2020	1292.456304	926.3559	1397.334	1709.475	1155.08
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25Nov2020 10:00:00	2020	1341.191213	909.7801	1393.639	1717.134	1171.617
25Nov2020 11:00:00	2020	1350.81848	926.3153	1387.542	1727.277	1183.37
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25Nov2020 16:00:00	2020	1387.176122	960.2033	1457.192	1838.464	1195.425
25Nov2020 17:00:00	2020	1483.020485	966.0145	1447.325	1897.279	1218.678
25Nov2020 18:00:00	2020	1420.20908	947.145	1419.261	1819.299	1189.117
25Nov2020 19:00:00	2020	1356.829737	947.186	1418.799	1750.065	1212.348
25Nov2020 20:00:00	2020	1286.709671	943.8622	1408.888	1689.099	1198.389
25Nov2020 21:00:00	2020	1207.206427	932.114	1408.698	1654.779	1188.316
25Nov2020 22:00:00	2020	1109.029063	893.7645	1367.987	1559.093	1154.702
25Nov2020 23:00:00	2020	1012.102505	856.3354	1331.245	1454.709	1140.059
26Nov2020 0:00:00	2020	949.2012811	833.9363	1304.899	1377.135	1142.691
26Nov2020 1:00:00	2020	908.7620759	824.9455	1292.028	1335.118	1146.345
26Nov2020 2:00:00	2020	889.7535145	818.9404	1289.475	1335.351	1152.34
26Nov2020 3:00:00	2020	886.1868762	819.1008	1294.697	1338.215	1169.713
26Nov2020 4:00:00	2020	911.1449829	824.5968	1314.882	1340.596	1175.051
26Nov2020 5:00:00	2020	974.5332957	843.4331	1326.244	1404.885	1180.963
26Nov2020 6:00:00	2020	1105.812832	876.5688	1358.671	1538.61	1199.918
26Nov2020 7:00:00	2020	1250.972047	923.194	1417.254	1699.644	1216.749
26Nov2020 8:00:00	2020	1296.718518	943.1541	1426.481	1756.544	1236.093
26Nov2020 9:00:00	2020	1308.501729	937.1242	1439.344	1743.423	1226.849
26Nov2020 10:00:00	2020	1316.975777	927.8722	1430.747	1758.722	1212.328
26Nov2020 11:00:00	2020	1328.535971	924.0573	1414.555	1736.417	1199.49
26Nov2020 12:00:00	2020	1331.915453	911.5112	1402.721	1744.351	1204.649
26Nov2020 13:00:00	2020	1322.906549	903.4746	1392.488	1724.786	1230.06
26Nov2020 14:00:00	2020	1312.932739	906.5781	1381.775	1744.477	1254.493
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26Nov2020 17:00:00	2020	1471.299974	949.7484	1440.593	1859.425	1250.905
26Nov2020 18:00:00	2020	1405.495061	936.0721	1411.194	1799.197	1222.047
26Nov2020 19:00:00	2020	1339.42176	935.1504	1399.467	1739.867	1206.786
26Nov2020 20:00:00	2020	1270.708857	929.9953	1374.685	1665.184	1186.141
26Nov2020 21:00:00	2020	1185.253884	919.6943	1355.985	1601.353	1179.341
26Nov2020 22:00:00	2020	1081.827864	887.6894	1318.947	1505.001	1164.399
26Nov2020 23:00:00	2020	990.0280205	852.8539	1286.795	1399.535	1150.155
27Nov2020 0:00:00	2020	928.7309386	832.167	1269.977	1318.798	1105.607

27Nov2020 1:00:00	2020	891.7495863	816.211	1257.16	1288.876	1101.38
27Nov2020 2:00:00	2020	869.0580525	812.2192	1252.421	1224.475	1105.33
27Nov2020 3:00:00	2020	865.1292347	808.8413	1256.425	1252.082	1104.899
27Nov2020 4:00:00	2020	884.7387789	815.4586	1303.535	1256.594	1109.455
27Nov2020 5:00:00	2020	948.3816756	831.7144	1317.664	1351.268	1129.172
27Nov2020 6:00:00	2020	1077.511236	867.4488	1356.26	1467.749	1163.367
27Nov2020 7:00:00	2020	1220.363537	912.3822	1411.937	1633.238	1174.262
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27Nov2020 16:00:00	2020	1348.991585	919.8267	1461.41	1791.051	1185.219
27Nov2020 17:00:00	2020	1413.838374	951.8839	1489.497	1851.939	1210.227
27Nov2020 18:00:00	2020	1355.192972	933.1193	1463.989	1788.932	1186.132
27Nov2020 19:00:00	2020	1293.971171	933.2555	1450.186	1723.532	1176.877
27Nov2020 20:00:00	2020	1235.973476	916.9559	1411.226	1652.16	1165.824
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27Nov2020 22:00:00	2020	1077.762419	862.1183	1346.706	1504.958	1141.516
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28Nov2020 0:00:00	2020	926.6404744	806.1707	1304.883	1384.584	1126.65
28Nov2020 1:00:00	2020	885.029225	795.1857	1262.124	1303.718	1130.494
28Nov2020 2:00:00	2020	864.9422066	792.2672	1264.768	1292.52	1130.022
28Nov2020 3:00:00	2020	854.3295187	788.687	1283.803	1305.742	1136.524
28Nov2020 4:00:00	2020	858.2619126	789.0677	1284.681	1313.519	1146.945
28Nov2020 5:00:00	2020	884.6751439	796.8137	1288.802	1335.317	1147.731
28Nov2020 6:00:00	2020	933.4153387	810.6337	1305.5	1373.284	1145.385
28Nov2020 7:00:00	2020	1007.868869	839.4408	1332.574	1466.243	1158.988
28Nov2020 8:00:00	2020	1070.238924	865.7783	1373.618	1532.982	1151.115
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28Nov2020 17:00:00	2020	1373.83422	964.0811	1425.976	1803.882	1205.783
28Nov2020 18:00:00	2020	1343.103286	954.4218	1415.032	1748.748	1198.268
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28Nov2020 20:00:00	2020	1241.783605	951.5154	1416.673	1664.881	1191.223
28Nov2020 21:00:00	2020	1178.532871	929.439	1377.843	1602.065	1215.08
28Nov2020 22:00:00	2020	1099.093695	900.9278	1371.37	1537.104	1223.495
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29Nov2020 1:00:00	2020	913.857962	819.2057	1326.718	1355.59	1192.072
29Nov2020 2:00:00	2020	889.7339146	814.6743	1320.541	1326.719	1184.286
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29Nov2020 19:00:00	2020	1294.279145	931.8176	1421.775	1733.705	1219.183
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29Nov2020 23:00:00	2020	968.3261102	813.3582	1299.338	1425.437	1167.266
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08Dec2020 16:00:00	2020	1369.854994	925.0892	1439.71	1832.973	1243.131
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17Dec2020 7:00:00	2020	1226.286053	917.336	1394.903	1673.647	1204.643
17Dec2020 8:00:00	2020	1291.873891	944.0792	1429.377	1809.271	1221.771
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17Dec2020 10:00:00	2020	1321.436744	923.2542	1431.365	1852.811	1210.602
17Dec2020 11:00:00	2020	1339.492302	916.082	1430.361	1873.867	1220.478
17Dec2020 12:00:00	2020	1343.925295	915.7653	1426.263	1875.887	1233.825
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17Dec2020 14:00:00	2020	1326.377457	912.456	1456.806	1890.78	1250.327
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17Dec2020 16:00:00	2020	1394.075734	935.2441	1492.607	2009.109	1292.265
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17Dec2020 19:00:00	2020	1377.408231	953.4588	1501.877	1919.558	1297.448
17Dec2020 20:00:00	2020	1311.574187	955.3272	1474.415	1846.26	1283.375
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868.4233
864.5623
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912.1972
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953.3467
954.4302
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893.0569
876.1479
887.0889
885.3491
953.1047
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926.129
912.1172
887.6368
882.385
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887.884
901.6426
920.9628
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853.0259
891.4056
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878.3139
869.3814
858.9359
850.3416
899.4904
900.2131
890.5784
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864.344
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873.0169
872.3164
850.7587
819.5548
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881.7049
873.4355
882.3138
884.4035
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840.6985
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810.0244
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874.1943
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853.2088
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823.5086
811.6181
814.9924
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836.7362
844.5227
861.5091
866.3864
880.2254
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899.8563
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916.634
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870.1293
886.9553
903.304
906.4604
902.9855
929.3473
951.2151
974.9913
973.6265
963.9051
934.4869
929.7761
921.871
910.1884
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919.3702
905.6813
902.2337
898.4312
892.8524
878.1365
868.1858
929.0245
947.9986
936.1927
925.9546
905.8346
903.3171
903.7483
902.0532
885.5644

875.1391
867.8109
869.4724
869.9385
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853.3027
871.2665
886.6096
904.4887
900.7953
912.2109
905.7472
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858.8778
846.0988
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836.7073
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817.8932
831.0384
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861.3527
849.4136
866.4099
925.8966
901.011
877.7909
882.3025
879.6402
893.8384
917.7621
895.5571
915.5307
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925.9883
929.5651

Notice

To: AESO Stakeholders

Date: Thursday, August 12, 2021

Subject: **Additional Information on Impacts to Rates, Calculation of XOS/XOM Rates, and Release of DTS, FTS, Peak Load and Peak Generation Data**

The AESO values stakeholder feedback and we thank those who shared their perspectives with us on the updated rate estimates on July 16, 2021. An update to the Estimating Rate Calculations tool (v0.3) to address an identified issue was released on July 15, 2021.

In response to feedback received, the AESO is releasing additional information on the following:

Impacts to Rates

Changes to the Bulk and Regional (B&R) Rate design will impact the following rates: DTS, FTS, DOS, XOS, and XOM. In all cases, the forthcoming B&R application will include placeholders in the charge column of the rate sheets, while approval of any actual charges will be included in a compliance filing or rates update application once the AESO has received the Alberta Utilities Commission (AUC) decision on the Preferred Rate Design using applicable revenue requirement and forecast bill determinants.

Calculation of XOS/XOM Rates

In response to multiple requests for details on how the XOS/XOM rate is calculated, summary information is provided below in a format similar to that provided for the DOS rate at Session 5 on March 25, 2021 (slide 73). Please refer to the AESO's 2010 ISO tariff application , the approval in Decision 2010-606 or the 2021 Rate Calculations workbook (Tab B – 11 Other Rates) for the current 2021 ISO Tariff Update at www.aeso.ca > Rules, Standards and Tariff > Current applications > 2021 ISO Tariff Update > Appendix B – 2021 Rate Calculations, or directly here for further information regarding the XOS rate.

Rate Type	Cost Allocation	Opportunity Service Obligations
XOS & XOM	Costs converted to $/MWh amounts Variable components of the bulk and regional system (i.e., energy charge) + 20% of the non-energy bulk and regional system charges + 32% of operating reserve charges	Recalled before Rates DTS, FTS and DOS (any type)

Similar to the Demand Opportunity Service (DOS) rate, the AESO is neither reviewing nor conducting additional consultation on the XOS/XOM rate methodology as part of the B&R rate design consultation.

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Instead, any changes to the rate components that make up the XOS/XOM rate will flow through in the previous approved methodology.

Data Release

The AESO is releasing the following information:

- 2016-2020 Hourly Regional Rate DTS and FTS data; and
- 2015-2020 Peak Load, Peak Generation and highest load during the 12 hours of system CP by Area data.

The AESO considers that this data may be relevant to the matters at issue in the B&R rate design application. The release of this additional data is consistent with the AESO's Transparent and Timely Stakeholder Engagement Principle to assist stakeholders in understanding and evaluating the AESO's Preferred Bulk and Regional Tariff Rate Design.

Please direct any further questions to tariffdesign@aeso.ca.

Public

Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021 to Sept. 21, 2021**	Contact:	Company Representative
Comments from:	Company Name	Phone:	Contact Phone Number
Date:	[yyyy/mm/dd]	Email:	

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeos.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Appendix A. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO Tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
2.	**Tariff Terms & Conditions**	

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	Questions	Stakeholder Comments
	(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
3.	**DOS Rate Sheet** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
4.	**DOS Appendix A** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document, once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	

	Questions	Stakeholder Comments
6.	Additional comments	

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca

Blackline ISO Tariff Terms and Conditions

Terms and Conditions

Section 3	System Access Service Requests
Section 5	Costs Changes to System Access Service
Section 9	Demand Opportunity Service
Section12	Miscellaneous

Appendices

Appendix A	System Access Service Agreement Proformas

Public

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Applicability

3.1(1) This section applies to a **market participant** who has requested a new **system access service** or changes to an existing **system access service** under:

(a) Rate DTS, *Demand Transmission Service*;

(b) Rate DOS, *Demand Opportunity Service*;

(b) Rate FTS, *Fort Nelson Demand Transmission Service*;

(c) Rate PSC, *Primary Service Credit*; or

(d) Rate STS, *Supply Transmission Service*.

Applying for System Access Service or Change to an Existing System Access Service

3.2(1) A **market participant** wishing to receive a new **system access service** or change an existing **system access service** must submit a request for **system access service** to the **ISO**, in the form specified by the **ISO** on the AESO website.

3.2(2) A **market participant** must provide the following critical information, as part of its request under subsection 3.2(1) above:

(a) the requested Rate STS **contract capacity** or requested change in Rate STS **contract capacity**, including **contract capacity** by stage, if applicable;

(b) the **maximum capability** of each **generating unit** or **aggregated generating facility**;

(c) the requested Rate DTS **contract capacity** or requested change in Rate DTS **contract capacity**, including **contract capacity** by stage, if applicable;

(d) generation type(s) in the case of a **generating unit** or **aggregated generating facility**;

(e) in-service date, including the dates relating to any staged **contract capacity** request;

(f) location of the load or generation related to the request of the **market participant**; and

(g) if load or generation related to the request of the **market participant** are or will be part of a **Commission**-designated industrial system, or if the **market participant** has otherwise obtained an approval from the **Commission** that permits the export to the **interconnected electric system** of electric energy in excess of the **market participant**'s own self-supply requirements, whether the load and generation will be metered on a gross or net basis.

3.2(3) In addition to the critical information set out in subsection 3.2(2) above, the **ISO** may establish additional critical information as part of the **ISO**'s connection process and a **market participant** must provide any additional critical information that exists at the time the **market participant** makes a **system access service** request.

3.2(4) If a **market participant** requesting **system access service** is the **legal owner** of an **electric distribution system** and its **system access service** request contemplates a load transfer from one **point of delivery** to another **point of delivery**, or is related to another **system access service**, then the **market participant** must include the following additional critical information as part of its **system access service** request:

(a) a list of the related **system access service** request(s);

(b) the amount of any load transfer from one **point of delivery** to another **point of delivery**;

(c) all distribution and transmission connection alternatives, or combinations of both, that have been considered by the **legal owner** of the **electric distribution system**;

(d) the larger geographical area considered, including any **point of delivery** or **point of supply** in the area;

(e) a complete description of why the **system access service** request is necessary; and

(f) any other information that the **ISO** determines to be relevant.

3.2(5) A **market participant** must make separate requests for changes to existing **system access services** at each **point of delivery** and **point of supply** at a single point of connection, unless the **market participant** is requesting or currently receiving **system access service** under both Rate DTS, *Demand Transmission Service*, and under Rate STS, *Supply Transmission Service*, at a single **point of connection**.

Review of System Access Service Request

3.3(1) The **ISO** may, at any point in the **ISO**'s connection process, reject a **system access service** request submitted to the **ISO** under subsection 3.2 above if the **ISO** determines the request to be incomplete.

3.3(2) If the **ISO** determines a **system access service** request under subsection 3.2 above to be complete, then the **ISO** must determine whether the construction of **transmission facilities** is required to respond to the request, except in the case of a **system access service** request under Rate DOS.

3.3(3) If the construction of **transmission facilities** is required under subsection 3.3(2) above, then the **market participant** must follow the connection process described on the AESO's website and pay a **construction contribution** in accordance with section 4, of the **ISO tariff**, *Classification and Allocation of Connection Projects Costs.*

3.3(4) If the construction of **transmission facilities** is not required under subsection 3.3(2) above, then the **market participant** must follow the **ISO**'s behind the fence or contract change process. The **ISO** must prepare an amendment to the **market participant**'s *System Access Service Agreement* substantially in the form included in Appendix A of the **ISO tariff**, *System Access Service Agreement Proformas*, and may require an adjustment to the **construction contribution** in accordance with section 5 of the **ISO tariff**, *Changes to System Access Service*.

ISO Preferred Alternative

3.4(1) If the construction of **transmission facilities** is required for a connection project, the **ISO** must determine how to respond to the **system access service** request, and select the **ISO**'s preferred connection alternative taking into account relevant factors including the following:

(a) the overall long-term cost of a connection alternative, including, as applicable:

(i) if the **system access service** request was submitted by the **legal owner** of an **electric distribution system**, all distribution costs;

(ii) costs classified as participant-related in accordance with subsection 4.2(2) of the **ISO tariff**, *Classification and Allocation of Connection Projects Costs*;

(iii) costs associated with system **transmission facilities**, being **transmission facilities** that the **ISO** determines will benefit many **market participants**, identified in subsections 3.4(1)(b) and (c) below; and

(iv) all other transmission costs (including the costs of any non-wires solutions) not included in subsections 3.4(1)(a)(i), (ii) and (iii) above required for the connection;

(b) if the **system access service** request is for Rate DTS, the effect of a connection alternative on the **transmission system**, including all transmission constraints, under Category A and Category B conditions as described in **reliability standards**, as a result of the connection alternative, and the system **transmission facilities** required to resolve the transmission constraints; and

(c) if the **system access service** request is for Rate STS, the effect of a connection alternative on the **transmission system**, including:

(i) all transmission constraints under Category A conditions as described in **reliability standards**, that are a result of the connection alternative, and the system **transmission facilities** required to resolve the transmission constraints;

(ii) all transmission constraints under Category B conditions as described in **reliability standards**, that are a result of the connection alternative, the system **transmission facilities** required to operationally manage the transmission constraints, and the operating procedures required to manage the Category B transmission constraints; and

(iii) all transmission constraints under Category B conditions as described in **reliability standards**, that are a result of the connection alternative and cannot be managed operationally, then the system **transmission facilities** required to resolve the transmission constraints.

and;

(d) if the **system access service** request is for both Rate DTS and Rate STS, the **ISO** must consider the effect on the **transmission system** separately for Rate DTS and Rate STS.

3.4(2) For a **system access service** request for Rate DTS under subsections 3.4(1)(b) or (d) above, if the **ISO**'s preferred alternative includes system **transmission facilities**, then the **market participant** must:

(a) accept the preferred alternative and pay any applicable advancement costs determined by the **ISO** in accordance with subsection 4.2(3)(a) of the **ISO tariff**, *Classification and Allocation of Connection Projects Costs*;

(b) amend the **market participant**'s **system access service** request to connect at a reduced **contract capacity** that:

(i) can be accommodated by the existing **transmission system**; and

(ii) as determined by the **ISO**, allows for a minimum of 5 years of area growth following the **market participant**'s projected in-service date, or such other reduced **contract capacity** or period of time that the **ISO** determines to be consistent with the **ISO**'s **transmission system** planning obligations and the safe, reliable and economic operation of the **interconnected electric system**;

(c) amend the **market participant**'s **system access service** request to connect at an in-service date that is a minimum of 5 years following the execution of an agreement for **system**

access service for Rate DTS substantially in the form included in Appendix A of the **ISO tariff**, *System Access Service Agreement Proformas*; or

(d) withdraw the **system access service** request.

3.4(3) For a **system access service** request for Rate STS under subsections 3.4(1)(c) or (d) above, if the **ISO**'s preferred alternative includes system **transmission facilities**, then the **market participant** must:

(a) accept the **ISO**'s preferred alternative;

(b) amend the **market participant**'s **system access service** request to connect at a reduced **contract capacity** that the **ISO** determines to be consistent with the **ISO**'s **transmission system** planning obligations and the safe, reliable and economic operation of the **interconnected electric system**; or

(c) withdraw the **system access service** request.

3.4(4) If the construction of **transmission facilities** is required for a connection project, the **ISO** must examine a connection alternative that does not give rise to any transmission constraints as described in subsection 3.4(1)(b) or (c) above.

3.4(5) Estimates required by the **ISO** to compare connection alternatives must be prepared with the same accuracy range, completed, at a minimum, to the level required for **need identification documents** and include all costs that have identified in subsection 3.4(1)(a) above.

3.4(6) The **ISO** must calculate a **construction contribution** for a connection project and must classify all transmission costs of the connection project as either participant-related or system-related in accordance with section 4 of the **ISO tariff**, *Classification and Allocation of Connection Projects Costs*.

Construction Commitment Agreement

3.5(1) The **market participant** providing **financial security**, **construction contribution** or both for a connection project must enter into a *Construction Commitment Agreement* with the **legal owner** of the **transmission facility**, substantially in the form included in Appendix A of the **ISO tariff**, *System Access Service Agreement Proformas* with the **legal owner** of a **transmission facility**, unless:

(a) the **market participant** is a **legal owner** of an **electric distribution system**; or

(b) the **market participant** and the **legal owner** of the **transmission facility** are **affiliates**.

3.5(2) The **market participant** providing **financial security**, **construction contribution** or both for a connection project must provide the **ISO** with an executed copy of a *Construction Commitment Agreement* referred to in subsection 3.5(1), as well as a record of the **financial security** and **construction contribution** unless the **legal owner** of the **transmission facility** provides a copy of the same to the **ISO**.

Execution of Agreement for System Access Service

3.6(1) A **market participant** must execute a *System Access Service Agreement* for Rate DTS or for Rate STS substantially in the form included in Appendix A of the **ISO tariff**, *System Access Service Agreement Proformas*, as applicable:

(a) if the construction of **transmission facilities** is required for a connection project, before the **ISO** submits a **needs identification document** to the **Commission** or, before the **ISO**

approves the connection project under the abbreviated needs approval process provided for under the *Transmission Deficiency Regulation*; or

(b) if the construction of **transmission facilities** is not required for a connection project, within 30 days of the issuance of a letter by the **ISO** acknowledging completion of an engineering connection assessment for the project, or within such later time period that the **ISO** determines to be reasonable in the circumstances.

3.6(2) A **market participant** must execute a *System Access Service Agreement* for Rate DTS for a **contract capacity** that, in the **ISO's** determination approximates the expected maximum coincident sum of the flows from the **transmission system**, excluding any **contract capacity** under a *System Access Service Agreement* for Rate DOS.

3.6(3) A **market participant** must execute a *System Access Service Agreement* for Rate DOS for a **contract capacity** that, in the **ISO**'s determination approximates the expected maximum coincident sum of the flows from the **transmission system**, excluding any **contract capacity** under a *System Access Service Agreement* for Rate DTS.

3.6(4~~3~~) A **market participant** must execute a *System Access Service Agreement* for Rate STS for a **contract capacity** that, in the **ISO**'s determination approximates the expected maximum coincident sum of the flows to the **transmission system.**

3.6(5~~4~~) Prior to executing a *System Access Service Agreement* for Rate DTS or Rate STS for a connection project when the construction of **transmission facilities** is required, a **market participant** must inform the **ISO** of any regulatory approvals and non-financial matters that the **market participant** expects could cause a delay or prevent the achievement of the in-service date that has been requested by the **market participant**, together with the expected dates for the receipt of the regulatory approvals and successful resolution of the non-financial matters.

3.6(6~~5~~) The **ISO** must include as a condition precedent in Section 2 of the *System Access Service Agreement*, the receipt of any regulatory approvals identified by the **market participant** pursuant to subsection 3.6(5~~4~~) above that the **ISO** determines could cause a delay or prevent the achievement of the in-service date that has been requested by the **market participant**.

3.6(7~~6~~) The **ISO** may, in its discretion, include as a condition precedent in Section 2 of the *System Access Service Agreement*, the successful resolution of any non-financial matters identified by the **market participant** pursuant to subsection 3.6(5~~4~~) above.

3.6(8~~7~~) If the construction of **transmission facilities** is not required for a connection project, the **ISO** may reject a system access service request if a **market participant** does not execute a *System Access Service Agreement* for Rate DTS or Rate STS by the date required pursuant to subsection 3.6(1)(b) above.

3.6(9~~8~~) At the time of executing a *System Access Service Agreement* for Rate STS, the **market participant** must provide the **ISO** with evidence satisfactory to the **ISO** that the owner of the generating facility (as that term is used in section 7 of **ISO tariff**, *Generating Unit Owner's Contribution*) has sufficient funds available to pay any contribution for a generating facility calculated in accordance with section 7 of the **ISO tariff**, *Generating Unit Owner's Contribution*. For purposes of the foregoing, such evidence may include a fully executed, enforceable and irrevocable assignment of funds, satisfactory to the **ISO**, that unconditionally directs the payment when due of any contribution for a generating facility calculated in accordance with section 7 of the **ISO tariff**, *Generating Unit Owner's Contribution*.

3.6(10~~9~~) For a connection project that requires a *System Access Service Agreement* for Rate STS, the contribution for a generating facility calculated in accordance with section 7 of the **ISO tariff**, *Generating Unit Owner's Contribution* must be paid by the owner of the generating facility in full to the **ISO**:

(a) if the construction of **transmission facilities** is required for the connection project, within 30 days of the *System Access Service Agreement* for Rate STS becoming effective pursuant to subsection 3.7(1) below; or

(b) if the construction of **transmission facilities** is not required for the connection project, within 30 days of the *System Access Service Agreement* for Rate STS becoming effective pursuant to subsection 3.7(4) of the **ISO tariff** below.

Effective Date of Agreement for System Access Service

3.7(1) If the construction of **transmission facilities** is required for a connection project, a *System Access Service Agreement* for Rate DTS or Rate STS becomes effective immediately following the later of:

(a) the issuance by the **Commission** of the permit(s) and licence(s) required to construct and operate the **transmission facilities**;

(b) the receipt by the **market participant** of any regulatory approvals included as a condition precedent in Section 2 of the *System Access Service Agreement*; and

(c) the successful resolution of any non-financial matters included as a condition precedent in Section 2 of the *System Access Service Agreement*.

3.7(2) Until such time as conditions precedent related to any regulatory approvals or non-financial matters included in Section 2 of a *System Access Service Agreement* have been satisfied, the **market participant** must provide the **ISO** with quarterly updates or as otherwise specified by the **ISO** regarding the status of the regulatory approvals or non-financial matters, including updates to the expected dates for the receipt of any regulatory approvals and the successful resolution of non-financial matters.

3.7(3) A **market participant** must promptly inform the **ISO** when any regulatory approvals that are the subject of conditions precedent have been received or non-financial matters that are the subject of conditions precedent have been successfully resolved.

3.7(4) If the construction of **transmission facilities** is not required for a connection project, a *System Access Service Agreement* for Rate DTS or Rate STS becomes effective the day it is executed.

3.7(5) If the construction of **transmission facilities** is required for a connection project, the **ISO** may cancel a **system access service** request and terminate the related *System Access Service Agreement* for Rate DTS or Rate STS if the *System Access Service Agreement* for Rate DTS or Rate STS does not become effective within 1 year of issuance by the **Commission** of the permit(s) and licence(s) required to construct and operate the **transmission facilities**.

3.7(6) The **ISO** must include the critical information of a specific connection project in the **ISO**'s forecast, **transmission system** plans and engineering connection assessments when the related *System Access Service Agreement* for Rate DTS or Rate STS becomes effective in accordance with subsection 3.7(1) or (4) above.

3.7(7) A *System Access Service Agreement* for Rate DOS is conditional upon the **market participant** having an effective *System Access Service Agreement* for Rate DTS, and shall become effective upon the later of:

(a) the effective date of the *System Access Service Agreement* for Rate DTS; or

(b) the execution date of the *System Access Service Agreement* for Rate DOS.

Transitional Election of GUOC and System Access Service Agreement Provisions

3.8(1) If, prior to the effective date of this **ISO tariff**, a connection project that requires the construction of **transmission facilities** is in Stage 4 or 5 of the **ISO's** connection process or if a connection project that does not require the construction of **transmission facilities** is in Stage 5 of the AESO's behind the fence process and a power plant approval has been issued by the **Commission** for any associated generating facility, then the **market participant** may elect, by no later than 11:59 pm Mountain Time of the 14th day following the effective date of this **ISO tariff** to pay the contribution for a generating facility according to either:

(a) the **ISO tariff** that was in effect immediately prior to this **ISO tariff**, in which case;

(i) a *System Access Service Agreement* for Rate STS must be executed at the time and in the form specified in the prior **ISO tariff**;

(ii) the contribution for a generating facility must be calculated and paid in accordance with the prior **ISO tariff**; and

(iii) subsection 3.6(8) above does not apply; or

(b) this **ISO tariff**, in which case:

(i) if the permit(s) and licence(s) required to construct and operate the **transmission facilities** have been issued by the Commission prior to the effective date of this **ISO tariff**:

(A) a *System Access Service Agreement* for Rate STS must be executed within 90 days from the effective date of this **ISO tariff**;

(B) the *System Access Service Agreement* for Rate STS becomes effective either immediately upon execution of the *System Access Service Agreement* for Rate STS if it does not include conditions precedent referred to in subsections 3.6(5) and 3.6(6) above or in accordance with subsection 3.7(1) above if the *System Access Service Agreement* for Rate STS includes an unsatisfied condition precedent referred to in one or both of subsections 3.6(5) and 3.6(6) above;

(C) the evidence required to be provided in accordance with subsection 3.6(8) above must be provided to the **ISO** within the 14-day election period; and

(D) the contribution for a generating facility must be calculated in accordance with section 7 of this **ISO tariff**, *Generating Unit Owner's Contribution,* and paid either within 30 days from the execution of the *System Access Service Agreement* for Rate STS if it becomes effective upon execution, or in accordance with subsection 3.6(9)(a) above if the *System Access Service Agreement* for Rate STS includes an unsatisfied condition precedent referred to in one or both of subsections 3.6(5) and 3.6(6) above; or

(ii) if the permit(s) and licence(s) required to construct and operate the **transmission facilities** have not been issued by the Commission prior to the effective date of this **ISO tariff**:

(A) a *System Access Service Agreement* for Rate STS must be executed within 90 days from the effective date of this **ISO tariff** and becomes effective in accordance with subsection 3.7(1) above;

(B) the evidence required to be provided in accordance with subsection 3.6(8) above must be provided to the **ISO** within the 14-day election period; and

(C) the contribution for a generating facility must be calculated in accordance with section 7 of this **ISO tariff**, *Generating Unit Owner's Contribution,* and it must be paid within 30 days of the *System Access Service Agreement* for Rate STS becoming effective; or

(iii) if the construction of **transmission facilities** is not required:

(A) a *System Access Service Agreement* for Rate STS must be executed within 90 days from the effective date of this **ISO tariff** and becomes effective immediately upon execution;

(B) the evidence required to be provided in accordance with subsection 3.6(8) above must be provided to the **ISO** within the 14-day election period; and

(C) the contribution for a generating facility must be calculated in accordance with section 7 of this **ISO tariff**, *Generating Unit Owner's Contribution,* and must be paid within 30 days of the *System Access Service Agreement* for Rate STS becoming effective.

3.8(2) The ISO may deny the election of a **market participant** to pay the contribution for a generating facility according to this **ISO tariff** if the **ISO** determines such denial would be consistent with the **ISO**'s **transmission system** planning obligations and the safe, reliable and economic operation of the **interconnected electric system.**

3.8(3) If a **market participant** that is eligible to make an election in accordance with subsection 3.8(1):

(a) does not make the election within 14 days from the effective date of this **ISO tariff**, or

(b) elects to pay the contribution for a generating facility according to subsection 3.8(1)(b) but fails to provide the evidence required in accordance with subsections 3.6(8) and 3.8(1)(b) above, or fails to execute a *System Access Service Agreement* for Rate STS within 90 days from the effective date of this **ISO tariff**,

then subsection 3.8(1)(a) above shall be deemed to apply to the **market participant**.

3.8(4) If prior to the effective date of this **ISO tariff**, a connection project that requires the construction of **transmission facilities** is in Stage 4 or Stage 5 of the **ISO's** connection process, or Stage 5 of the **ISO's** "Behind the Fence" process, for **system access service** under Rate DTS, *Demand Transmission Service*, then a *System Access Service Agreement* for Rate DTS must be executed at the time and in the form specified in the prior **ISO tariff.**

Amending a System Access Service Request

3.9(1) A **market participant** must, in a timely manner, amend or withdraw a **system access service** request if the information provided in, or in connection with, a **system access service** request ceases to be accurate and, in the case of an amended **system access service** request, the **market participant** must clearly identify the change and reasons for the change.

3.9(2) The **ISO**, upon receipt of an amended **system access service** request that includes changes to critical information, may:

(a) accept the amendment, subject to such requirements or further amendments as the **ISO** determines to be necessary that may include:

(i) revised or new connection studies; and

(ii) revised or new connection alternatives;

or

(b) reject the amended **system access service** request.

3.9(3) The **ISO** may, at any point in the **ISO**'s connection process, cancel a **system access service** request if a **market participant** fails to notify the **ISO** of a change to the critical information required under subsections 3.2(2), 3.2(3) and 3.2(4) above in a timely manner.

3.9(4) A **market participant** may reapply for **system access service** under subsection 3.2(1) above, if the **ISO** rejects or cancels the **system access service** request.

Alternative Processes

3.10 The **ISO** may satisfy the provisions of this section through processes other than those described above and, in particular, alternative processes may be utilized if the **ISO** anticipates the impact on the **transmission system** may be significant.

Revision History

Effective	Description
2021-01-01	Revised and reformatted all subsections, as approved in **Commission** Decision 25175-D02-2020 issued on November 30, 2020.
2015-07-01	Updated subsections, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.

Applicability

5.1 This section applies to a **market participant** who has requested or is receiving **system access service** under:

(a) Rate DTS, *Demand Transmission Service*;

~~(a)~~(b) Rate DOS, *Demand Opportunity Service;*

~~(b)~~(c) Rate PSC, *Primary Service Credit*; or

~~(c)~~(d) Rate STS, *Supply Transmission Service*.

Events Resulting in Adjustments to Construction Contributions and Contract Capacity

5.2(1) A **market participant**, the **ISO** or the **legal owner** of a **transmission facility** may initiate a review of the **construction contribution** that the **ISO** had previously determined for a connection project.

5.2(2) If the **ISO** determines that the contract capacity amount in a *System Access Service Agreement* for Rate DTS or Rate STS previously determined by the **ISO** in respect of subsections 3.6(2) and (3) of the **ISO tariff**, *System Access Service Request,* does not reflect the actual flows, the **ISO** may adjust the contract capacity to reflect such actual flows and the **market participant** must pay any recalculated amounts for any **construction contribution** in accordance with this section 5 of the **ISO tariff**, *Changes to System Access Service*, and any contribution for a **generating unit** or **aggregated generating facility** calculated in accordance with section 7 of the **ISO tariff**, *Generating Unit Owner's Contribution*, as applicable, provided that:

(a) prior to determining whether to adjust any contract capacity amount, the **ISO** must discuss the potential adjustment with the **market participant**; and

(b) the **ISO** must not adjust contract capacity unless the deviation from actual flows is 10 per cent or greater than the contract capacity amount.

5.2(3) A **market participant** may dispute a decision made by the **ISO** under subsection 5.2(2) in accordance with Section 103.2 of the ISO rules, *Dispute Resolution*.

5.2(4) The **ISO** must review a **construction contribution** determination and may determine a **construction contribution** adjustment is required when:

(a) a **market participant** materially increases or decreases **contract capacity** or investment term or terminates **system access service**, prior to the expiry of the investment term for a connection project;

(b) one or more additional **market participants** use facilities originally installed for an existing **market participant**, resulting in sharing of facilities as provided for in subsection 5.5 below;

(c) connection project costs previously classified as system-related are reclassified as participant-related to meet changes in **market participant** requirements;

(d) connection project costs previously classified as participant-related are reclassified as system-related;

(e) a material error in the original **construction contribution** is identified; or

(f) the estimated or actual cost of the connection project materially varies from the original estimate.

5.2(5) The **ISO** must determine a **construction contribution** under the provisions of section 4 of the **ISO tariff**, *Classification and Allocation of Connection Projects Costs*, rather than this section 5, if an increase in **contract capacity** requires the construction of **transmission facilities** at an existing **point of delivery** or **point of supply**.

5.2(6) The **ISO** must not make an adjustment to a **construction contribution** more than 20 years after **commercial operation** of a connection project.

Reductions or Terminations of Contract Capacity

5.3(1) The **ISO** must make a reduction or termination of **contract capacity** effective 5 years after the date of notice of the request for reduction or termination, subject to subsection 5.3(2) below.

5.3(2) A **market participant** may make a lump sum payment determined by the **ISO** in lieu of all or a portion of the 5-year notice period in subsection 5.3(1) above.

5.3(3) The **ISO** must calculate the payment in lieu of notice (also known as a "PILON") as a share of the costs of system **transmission facilities**, being **transmission facilities** that the **ISO** determines exist for the benefit of **market participants**, incurred to reasonably accommodate a **market participant**'s **contract capacity** over the 5-year planning horizon of the **transmission system**, and must calculate the payment for a **market participant** reducing, terminating or changing the start date or end date for **contract capacity** under Rate DTS, after executing a *System Access Service Agreement*, as the present value of the difference in bulk system and regional system charges that would be attributed to the service:

(a) with the reduction or termination of or change of date for **contract capacity** during the notice period; and

(b) with the contract capacity or start date or end date for contract capacity indicated in the System Access Service Agreement last executed by the **market participant**.

5.3(4) The **ISO** must use the discount rate provided in subsection 4.9 of the **ISO tariff**, *Classification and Allocation for Connection Projects Costs*, in the present value calculation in subsection 5.3(3)(a) and (b) above.

5.3(5) A **market participant** may make a payment in lieu of notice at any time prior to or during the 5 year notice period, for the remainder of the notice period and the **ISO** must receive such payment at least 30 **days** before the reduction or termination of **contract capacity** is effective.

5.3(6) The **ISO** may waive or reduce the requirement for payment in lieu of notice if, as determined by the **ISO**:

(a) **contract capacity** is transferred to a **system access service** of the same **market participant** at a nearby transmission substation;

(b) **transmission system** benefits arise from the reduction or termination of **contract capacity**, which may include relief of regional transmission constraints, removal of capacity limitations which would restrict **system access service** to other **market participants** or avoidance of future upgrades to the **transmission system**; or

~~(c) a **market participant** who has taken service for at least 20 years:~~

~~(i) demonstrates to the **ISO** that a reduction of **contract capacity** results from the **market participant**'s energy or **demand** reduction initiative; and~~

~~(ii)~~(i) (c) during the ~~10~~ 5 years prior to the reduction in **contract capacity** becoming effective, the **market participant** has not increased **contract capacity** at the **point of delivery** at which the reduction in **contract capacity** occurs.

5.3(7) The **ISO** must waive any requirement for payment in lieu of notice if a Rate DTS contract reduction request is received within the [contract adjustment period approved in this proceeding].

5.3(~~8~~7) The **ISO** may, at any time during the remainder of a notice period for which a payment in lieu of notice was made:

(a) re-assess the payment in lieu of notice if material differences arise between the requested and actual **contract capacities** or between expected and actual load; and

(b) require additional payment from the **market participant**.

5.3(9) Notwithstanding subsection 5.3(1)-8 above, the **ISO** must make a reduction or termination of Rate DOS, *Demand Opportunity Service*, **contract capacity** effective [●] after the date of notice of the request for reduction or termination.

Metered Demand Above Pre-Notice Contract Capacity

5.4(1) The **ISO** must determine the **contract capacity** immediately following the 5-year notice period required by subsection 5.3(1) above to be the maximum of:

(a) the pre-notice **contract capacity** less the reduction of **contract capacity** the **market participant** requested; or

(b) the highest **metered demand** during the 5-year notice period less the reduction of **contract capacity** the **market participant** requested.

5.4(2) A **market participant** may provide an additional notice of reduction to request a subsequent reduction of **contract capacity** to the original notice level, if the highest **metered demand** affects the maximum determined under subsection 5.4(1) above.

Shared Facilities

5.5(1) The **ISO** must allocate the participant-related costs of shared **transmission facilities** to **market participants** if **transmission facilities** are constructed to serve a **market participant** and then used to serve other but not all **market participants** within 20 years after **commercial operation** of the original connection project.

5.5(2) The **ISO** must allocate the participant-related costs of shared **transmission facilities**:

(a) when a transmission line is shared by two or more substations, by allocating the costs of the shared line to those substations in accordance with subsection 5.5(3) below; and

(b) when a single substation is shared by 2 or more **market participants**, by allocating the shared costs associated with the substation to those **market participants** in accordance with subsection 5.5(4) below.

5.5(3) The **ISO** must allocate the participant-related costs of a transmission line shared by 2 or more substations by:

(a) determining the higher of the sum of all Rate DTS **contract capacities** or the sum of all Rate STS **contract capacities** for each substation in each of the 20 years following **commercial operation** of the original transmission line, and assigning a **contract capacity** of zero in a year in which a substation did not exist;

(b) calculating the percentage share of the transmission line attributable to each substation by dividing the **contract capacity** determined in subsection 5.5(3)(a) above for the substation in a year by the sum of **contract capacities** determined for all sharing substations in that year;

(c) calculating the average percentage share over the full 20-year period for each substation; and

(d) multiplying the cost of the shared transmission line by the average percentage share determined for each substation.

5.5(4) The **ISO** must allocate the participant-related costs of **transmission facilities** used to provide **system access services** to more than one **market participant** at a single substation to the **market participants** at the substation by:

(a) determining the **substation fraction** for each **market participant** in each of the 20 years following **commercial operation** of the original connection project, assigning a **contract capacity** of zero in any year in which a **market participant** did not receive **system access service**;

(b) calculating the average **substation fraction** over the full 20-year period for each **market participant**; and

(c) multiplying the cost of the shared **transmission facilities** by the average **substation fraction** determined for each **market participant**.

5.5(5) The **ISO**, as a result of the allocation of costs of shared **transmission facilities** under subsections 5.5(2), (3) and (4) above:

(a) must reduce the participant-related costs allocated to the original **market participant**; and

(b) may refund under subsection 5.6 below, where applicable, in part or in full, a **construction contribution** previously paid by that **market participant**.

5.5(6) The **ISO**, as a result of the allocation of costs of shared **transmission facilities** under subsections 5.5(2), (3) and (4) above:

(a) must include the allocated share of existing **transmission facilities** in the determination of participant-related costs for the additional **market participants** under subsection 4.2(2)(d) of the **ISO tariff**, *Classification and Allocation for Connection Projects Costs*; and

(b) may assess **construction contributions** to the additional **market participants** under section 4 of the **ISO tariff**, *Classification and Allocation for Connection Projects Costs*.

5.5(7) The **ISO** must reclassify the participant-related costs of a connection project as system-related costs if, within 20 years after **commercial operation** of the original connection project, **transmission facilities** are constructed to serve a **market participant** and are then, in the determination of the **ISO**, used for the benefit of many **market participants,** based on calculating the average percentage share over the full 20 year period for the original connection project and the time the **ISO** reclassified the costs as system-related.

Determination of Construction Contribution

5.6 The **ISO** must determine the amount of an adjustment to a **construction contribution** paid for a connection project in accordance with the **construction contribution** provisions described in the **ISO tariff** as applied to the **transmission facility** at the time construction is completed.

Payments and Refunds

5.7(1) A **market participant** must pay a **construction contribution** adjustment or a payment in lieu of notice:

(a) at least 30 **days** prior to the effective date of a change to a *System Access Service Agreement*, if the payment arises from changes to **contract capacity** or investment term that do not require construction of a **transmission facility**; and

(b) within 30 **days** of a request for payment, in all other circumstances.

5.7(2) A **legal owner** of a **transmission facility** must refund a **construction contribution** adjustment:

(a) within 30 **days** after the effective date of a change to a *System Access Service Agreement*, if the refund arises from changes to **contract capacity** or investment term that do not require construction of a **transmission facility**;

(b) within 90 **days** after the **Commission** issues permit and licence for a **transmission facility**, if the refund results from the construction of the **transmission facility**; and

(c) within 90 **days** of the **ISO** determining the amount of the adjustment, in all other circumstances.

5.7(3) The **market participant** must pay:

(a) an increase in **construction contribution** by way of electronic funds transfer or wire transfer to the bank account a **legal owner** of a **transmission facility** specifies; and

(b) a payment in lieu of notice by way of electronic funds transfer or wire transfer to a bank account the **ISO** specifies.

5.7(4) A **market participant** must pay and a **legal owner** of a **transmission facility** must refund all adjustments without interest.

5.7(5) A **market participant** is not required to pay and a **legal owner** of a **transmission facility** is not required to refund an adjustment amount less than $10 000.

Revision History

Effective	Description
2021-01-01	Updated to remove the subsection relating to Regulated Generating Unit Connection Costs, as approved in **Commission** Decision 26054-D01-2020 issued on December 18, 2020.
2021-01-01	Updated $0.00/MWh charge, as approved in **Commission** Decision 25175-D01-2020 issued on November 30, 2020.
2015-07-01	Updated subsections, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.
2011-07-01	Revised and reformatted all subsections, as approved in **Commission** Decision 2011-275 issued on June 24, 2011, and in **Commission** Decision 2011-333 issued on August 4, 2011 for subsection 5(6).

Applicability

9.1 This section applies to a **market participant** who has requested or is receiving **system access service** under Rate DOS, *Demand Opportunity Service*.

Eligibility and ~~Pre-~~Qualification

9.2(1) A **market participant** must ~~pre-~~qualify ~~on an annual basis~~ for demand opportunity service to receive **system access service** under Rate DOS.

9.2(2) A **market participant** wishing to receive a new **system access service** under Rate DOS or change an existing **system access service** under Rate DOS~~who wishes to pre-qualify for demand opportunity service or change an existing qualification for demand opportunity service~~:

must submit to the **ISO** a request for system access service to the ISO in accordance with section 3 of the **ISO tariff** and comply with the requirements set forth in section 3 of the **ISO tariff**.~~completed pre-qualification application, available on the AESO website or from the **ISO**, at least 45 **days** prior to submitting a transaction request for demand opportunity service; and~~

~~(a) pay a non-refundable fee of $5,000 to the **ISO** for evaluation of the **market participant**'s eligibility for demand opportunity service at the time the pre-qualification application is submitted.~~

9.2(3) The **ISO**~~-~~ may enter into a *system access service agreement* for Rate DOS only if:~~must approve a **market participant**'s pre-qualification for demand opportunity service only if~~:

(a) the **market participant** meets the commercial eligibility criteria for demand opportunity service provided in subsection 9.3 below;

(b) the **market participant**'s use of demand opportunity service would not occur under any other applicable rate; ~~and~~

(c) there is ~~sufficient transmission capacity and~~ suitable system operating conditions capable of accommodating the request; and

(d) the **market participant** has a current *system access service agreement* for Rate DTS.~~.~~

9.2(4) A **market participant** holding a *system access service agreement* for Rate DOS~~who pre-qualifies for demand opportunity service~~ must limit use of the service to:

(a) no more than the demand opportunity service **contract capacity**~~ which the **market participant** requested or a lower demand opportunity service **contract capacity** as the **ISO** determines is available~~;

(b) no more than the maximum annual load factor that the **ISO** determines in accordance with Rate DOS; and

(c) the specific type of demand opportunity service, as listed in Rate DOS, which the **market participant** requested and is eligible for~~; and~~.

~~(c) a maximum of 1 year from the date the **ISO** approves the **market participant**'s pre-qualification.~~

~~**9.2(5)** The **ISO** must notify a **market participant,** in writing, of approval or denial of pre-qualification for demand opportunity service, within 45 **days** of receiving a pre-qualification application.~~

Commercial Eligibility Criteria

9.3(1) A **market participant** must ~~satisfy~~ represent to the **ISO** in the *system access service agreement* for Rate DOS that the **market participant** would not increase **metered demand** under Rate DTS, *Demand Transmission Service*, if Rate DOS was not available.

9.3(2) A **market participant** must ~~satisfy~~ represent to the **ISO** in the *system access service agreement* for Rate DOS that ~~a commercial business opportunity exists for~~ the market participant's use of additional electric energy ~~on either a temporary or repeated short-term basis~~would not occur under any other applicable rate.

9.3(3) A **market participant** must utilize additional electric energy under the DOS ~~7 Minutes and DOS 1 Hour~~ Dispatchable type~~s~~ of Rate DOS ~~either:~~

~~(a) to replace an alternative source of energy where the **market participant**:~~

~~(i) has an available alternative source of energy, including means to employ it, that could rationally be used instead of electric energy from the **interconnected electric system**; and~~

~~(ii) the cost of utilizing the alternative source of energy is less than the cost of receiving additional electric energy under Rate DTS;~~

~~or~~

~~(b)~~ to take advantage of a market opportunity where the **market participant**:

(a~~i~~) has a market or business opportunity that requires additional electric energy;

(b~~ii~~) the cost of receiving additional electric energy under Rate DTS renders the opportunity uneconomic; and

(c~~iii~~) the **market participant**'s alternative is to forego the opportunity.

9.3(4) A **market participant** must utilize additional electric energy under the DOS Term type of Rate DOS ~~either:~~

~~(a) for the purposes listed in subsection 9.3(3) above; or~~

~~(b)~~ for ~~scheduled maintenance~~a **planned outage**, **unplanned outage**, **forced outage**, or derate of a **generating unit** or an **aggregated generating facility** where the **market participant**:

(a~~i~~) has a **planned outage**, **unplanned outage**, **forced outage**, or derate ~~planned maintenance~~ of an on-site **generating unit** or **aggregated generating facility** that normally supplies electric energy to an industrial complex; and

(b~~ii~~) would reduce the load at its industrial complex in these circumstances rather than pay the cost of receiving additional electric energy under Rate DTS.

9.3(5) A **market participant** must not utilize additional electric energy under any type of Rate DOS when~~:~~

~~(a)~~ the **market participant** has the opportunity to install facilities that will reduce the consumption of electric energy from the **interconnected electric system**.~~; or~~

~~(b) the requirement for additional electric energy is the result of a **forced outage**, **unplanned outage** or derate of an on-site **generating unit** or **aggregated generating facility** that normally supplies electric energy to an industrial complex or otherwise displaces consumption of electric energy from the **interconnected electric system**.~~

Requirement to Bid ~~Transaction Requests~~

9.4(1) A **market participant** ~~may~~ must submit a bid for additional electric energy under Rate DOS into the energy market in accordance with **ISO rules** and receive a dispatch to use Rate DOS from the **ISO** before the **market participant** utilizes such additional electric energy under any type of Rate DOS.~~ submit a transaction request for demand opportunity service after the **ISO** approves the **market participant**'s pre-qualification for demand opportunity service under subsection 9.2 above.~~

9.4(2) A **market participant** must not utilize Rate DOS if the **market participant** receives a **dispatch** or **directive** not to use Rate DOS from the **ISO**. ~~may submit a transaction request for demand opportunity service for a **point of delivery** only if the request has the following attributes:~~

~~(a) it is in accordance with the **market participant**'s confirmed pre-qualification under subsection 9.2(4) above, specifically:~~

~~(i) up to its pre-qualified capacity; and~~

~~(ii) for the pre-qualified type of demand opportunity service;~~

~~(b) it is for only one Rate DOS type in any single hour, even if the **market participant** is eligible for multiple Rate DOS types;~~

~~(c) it has a minimum continuous duration of 8 hours and a maximum continuous duration of 1 **month**; and~~

~~(d) it has a start date and end date in the same **month**.~~

~~**9.4(3)** A **market participant** must submit a completed transaction request form, available on the AESO website or from the **ISO**, at least 1 hour and no more than 10 **days** before the requested start time of a demand opportunity service transaction.~~

~~**9.4(4)** The **ISO** must approve a transaction request for demand opportunity service if it determines that:~~

~~(a) the request meets the requirements of subsections 9.4(2) and (3) above;~~

~~(b) the request form has been fully and correctly completed; and~~

~~(c) sufficient surplus capacity exists on the **transmission system** to accommodate the requested capacity for the duration of the Rate DOS transaction.~~

~~**9.4(5)** The **ISO** must notify a **market participant** when a transaction request has been approved or has been denied approval.~~

~~**9.4(6)** A **market participant** may not cancel or revise a Rate DOS transaction request after it is approved by the **ISO**.~~

Recallable Service

9.5(1) The **ISO** must recall demand opportunity service in advance of recalling **system access service** provided to **market participants** under Rate DTS and Rate FTS, *Fort Nelson Demand Transmission Service*, to the extent practicable in an **emergency**.

9.5(2) The **ISO** must recall demand opportunity service:

(a) in accordance with the provisions of Rate DOS;

(b) whenever **transmission system** capacity becomes insufficient to sustain demand opportunity service, either temporarily or permanently;

(c) when the Alberta **balancing authority area** lacks sufficient **ancillary services**; and

(d) in accordance with the provisions of section 2 of the **ISO tariff**, *Provision of System Access Service*.

9.5(3) A **market participant** must curtail capacity provided under Rate DOS if the **ISO** issues a **dispatch** or **directive** to do so, in accordance with the ~~the~~ **ISO rules** ~~response time and recall priority set out in Rate DOS for the Rate DOS type approved for the transaction~~.

Effect of Disqualification

9.6(1) A **market participant** will be deemed to have misrepresented its use of Rate DOS under the **ISO tariff** and the *system access service agreement* for Rate DOS if:

(a) the **market participant** fails to respond to a **dispatch** or **directive** from the **ISO**;

(b) the **market participant's** use of the demand opportunity service exceeds the demand opportunity service **contract capacity**;

(c) the **market participant's** use of the demand opportunity service exceeds the maximum annual load factor that the **ISO** determines in accordance with Rate DOS; or

(d) the **market participant** no longer has a *system access service agreement* for Rate DTS.

unless the **market participant** can demonstrate to the **ISO's** satisfaction that it is, and continues to be, eligible for the demand opportunity service, and, if requested by the **ISO**, submits a **system access service request** to revise its demand opportunity service **contract capacity** or take such other action that the **ISO** determines necessary for it to be compliant with and eligible for the demand opportunity service.

9.6(2) The **ISO** may audit a **market participant**'s eligibility for and use of demand opportunity service from time to time to verify compliance with the eligibility requirements in subsection 9.2 above and the commercial eligibility criteria in subsection 9.3 above.

9.6(32) The **ISO** may charge a **market participant** the cost of an audit conducted in accordance with subsection 9.6(21) above.

9.6(43) The *system access service agreement* for Rate DOS shall terminate and t~~T~~he **ISO** must terminate billing under Rate DOS and bill all **metered energy** delivered to the **market participant** under Rate DTS starting on the date of termination of billing under Rate DOS, if the **market participant** has misrepresented its use of Rate DOS or the **ISO** otherwise determines that the **market participant** is no longer eligible for demand opportunity service.

9.6(54) The **ISO** may recover retroactive amounts for the period during which a **market participant** misrepresented its use of Rate DOS or was otherwise determined by the **ISO** not to be eligible ~~did not qualify~~ for, but was billed under, Rate DOS together with interest and any other costs incurred by the **ISO**.

9.6(6) Notwithstanding anything to the contrary, if a **market participant** has misrepresented its use of Rate DOS or the **ISO** otherwise determines that the **market participant** is no longer eligible for demand opportunity service, neither the **market participant** nor any of its **affiliates** shall re-apply for any demand opportunity service for such period of time as the **ISO** determines in its sole discretion, and the **ISO** shall have no obligation to provide any demand opportunity service to such **market participant** or its **affiliates** during such period of time.

Revision History

Effective	Description
2021-01-01	Revised and reformatted all subsections, as approved in **Commission** Decision 25175-D02-2020 issued on November 30, 2020.

2015-07-01	Updated subsections, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.
2011-07-01	Revised and reformatted all subsections, as approved in **Commission** Decision 2011-275 issued on June 24, 2011.

Applicability

12.1 This section applies to a **market participant** who has requested or is receiving **system access service** under any rate in the **ISO tariff**.

Assignment

12.2(1) A **market participant** may assign its agreement for **system access service** or any rights under it to another **market participant** who is eligible for the **system access service** available under the agreement and the **ISO tariff**, but only with the **ISO**'s prior consent.

12.2(2) The **ISO**'s consent under subsection 12.2(1) above must not be unreasonably withheld.

12.2(3) The **ISO** must apply to the account of the assignee all rights and obligations associated with the **system access service** when a **system access service** agreement for Rate DTS, *Demand Transmission Service*, Rate DOS, *Demand Opportunity Service*, Rate FTS, *Fort Nelson Demand Transmission Service*, or Rate STS, *Supply Transmission Service*, has been assigned in accordance with subsection 12.2(1) above, including any and all retrospective adjustments due to deferral account reconciliation or any other adjustments.

Termination by Mutual Agreement

12.3(1) The **ISO** and a **market participant** may, by mutual written agreement, terminate any agreement entered into with respect to **system access service** under the **ISO tariff**, provided such termination does not relieve either the **ISO** or the **market participant** of any obligations accrued or accruing under the agreement prior to its termination.

12.3(2) Subsection 12.3(1) above does not limit the **ISO**'s ability under subsection 2.4(1) of the **ISO tariff**, *Provision of System Access Service*, to unilaterally limit, reduce, withhold or terminate **system access service** if a **market participant** fails to comply with a provision of the **ISO tariff**.

Notifications

12.4(1) A notice or other document that is required to be given or served by a **market participant** upon the **ISO** under the **ISO tariff**, must be provided as follows:

(a) in writing;

(b) by personal service, registered letter, or email; and

(c) addressed to:

AESO
2500, 330 – 5th Avenue SW
Calgary, Alberta T2P 0L4
Attention: ISO Tariff
ISOtariffnotice@aeso.ca

12.4(2) A notice or other document that is required to be given or served by the **ISO** upon a **market participant** under the **ISO tariff**, must be provided as follows:

(a) in writing;

(b) by personal service, registered letter, or email; and

(c) sent to the address(es) shown for the **market participant** in the relevant agreement for **system access service**.

12.4(3) A **market participant** and the **ISO** must deem all notices to be duly given:

(a) upon delivery if personally delivered;

(b) 5 **business days** after posting if sent by registered mail during normal postal service conditions; or

(c) on the same **day**, if emailed.

12.4(4) In the event of disruption of normal postal service, a **market participant** and the **ISO** must provide notice by personal service or email.

Revision History

Effective	Description
2021-01-01	Revised and reformatted all subsections, as approved in **Commission** Decision 25175-D02-2020 issued on November 30, 2020.
2015-07-01	Updated subsections, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.
2011-07-01	Revised and reformatted all subsections, as approved in **Commission** Decision 2011-275 issued on June 24, 2011.

Applicability

1(1) The attached **system access service** agreement proformas are used for **system access services** provided under:

(a) Rate DTS, *Demand Transmission Service*;

(b) Rate STS. *Supply Transmission Service*;

(c) Rate DOS, *Demand Opportunity Service*;

(d) Rate XOS and Rate XOM, Export Service; and

(a) Rate IOS, *Import Opportunity Service*.

(2) The attached construction commitment agreement proforma is used for requests for **system access service** under section 6 of the **ISO tariff**, *Financial Obligations for Connection Projects*.

Revision History

Effective	Description
2021-01-01	Revised, as approved in **Commission** Decision 25175-D02-2020 issued on November 30, 2020, revised Appendix naming as approved in **Commission** Decision 26054-D01-2020 issued on December 18, 2020.
2015-07-01	Updated subsections, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.
2011-07-01	Revised and reformatted all subsections, as approved in **Commission** Decision 2011-275 issued on June 24, 2011.

[insert Substation Name and No – DTS - Date – Project No]

SYSTEM ACCESS SERVICE AGREEMENT
FOR DEMAND TRANSMISSION SERVICE RATE
("DTS Agreement")

This DTS Agreement is made effective as of the Effective Date.

Between:

Independent System Operator, operating as AESO,
a statutory corporation established pursuant to the
Electric Utilities Act (Alberta)
with offices in the City of Calgary, in the Province of Alberta
(the "**ISO**")

and

[insert legal name of corporation or partnership],
a **[corporation, incorporated] [partnership organized]** pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]
(the "**market participant**")

RECITALS:

A. This DTS Agreement sets out the particular details of the **system access service** that the **ISO** will provide to the **market participant** under Rate DTS of the **ISO tariff**.

B. The **ISO tariff** contains additional terms and conditions of **system access service**. This DTS Agreement is comprised of both this document and the **ISO tariff**, and accordingly, both this document and the **ISO tariff** must be referred to and administered by the parties, even though the **ISO tariff** is not attached but incorporated into this DTS Agreement by reference.

In consideration of the premises to this DTS Agreement, the mutual covenants and agreements set forth in this DTS Agreement and other good and valuable consideration (the receipt and sufficiency of which is acknowledged by each of the parties), the parties agree as follows:

1. DEFINITIONS AND INTERPRETATION

(a) Unless otherwise defined in this DTS Agreement, bolded terms, not including headings, used in this DTS Agreement have the meanings given to them in the *Consolidated Authoritative Document Glossary*. Capitalized terms have the meanings given to them in the preamble or body of this DTS Agreement, including:

i. "DTS Agreement" means this System Access Service Agreement for Demand Transmission Service Rate; and

ii. "Effective Date" means the date that is this DTS Agreement comes into effect, in accordance with Section 2 below.

(b) Should the **ISO tariff**, **ISO rules** or *Consolidated Authoritative Document Glossary* be amended from time to time during the term of this DTS Agreement by approval of the **Commission,** then such amended **ISO tariff**, **ISO Rules or** *Consolidated Authoritative Document Glossary* will apply to this DTS Agreement and this DTS Agreement shall be deemed amended upon each such approval.

(c) In the event of any conflict or inconsistency between this document and the **ISO tariff**, the latter shall prevail.

2. EFFECTIVE DATE

(a) If the construction of **transmission facilities** is required for a connection project, this **DTS Agreement** becomes effective immediately following the later of:

(i) the issuance by the **Commission** of the permit(s) and licence(s) required to construct and operate the **transmission facilities**;

(ii) if applicable, the receipt by the **market participant** of the following regulatory approvals;

[list approvals, if applicable];

and

(iii) if applicable, the successful resolution of the following non-financial matters:

[list non-financial matters].

(b) If the construction of transmission facilities is not required for a connection project, this **DTS Agreement** becomes effective on the day it is executed.,

3. POINT OF DELIVERY

Point of delivery is located at and described as follows:

Substation name and #:	[Name of Substation (123S)]
Legal Subdivisions (LSD):	[insert WxM]
Measurement Point Identification (MPID):	[insert assigned number]

4. CONTRACT CAPACITY

Contract capacity is the following amounts for and during the following periods:

MW [insert date] up to and including [insert date];

MW [insert date] up to and including [insert date]; and

MW [insert date] for the balance of the term of this DTS Agreement.

5. COMMERCIAL OPERATION

Upon completion of **commissioning** and provided that the **ISO** is satisfied with the same, the **ISO** must provide notice to the **market participant** confirming that the facility may begin **commercial operation**.

6. SETTLEMENT

The **ISO** must charge, and the **market participant** must pay, amounts in accordance with Rate DTS commencing in the **settlement period** in which the **ISO** commences the provision of **system access service** to the **market participant**.

7. ISO OBLIGATION TO PROVIDE SERVICE

Subject to Section 8 and 9 of this DTS Agreement, the **ISO** must provide **system access service** under Rate DTS to the **market participant** at the **point of delivery** at the **contract capacity** pursuant to Sections 2 and 3 of this DTS Agreement.

8. MARKET PARTICIPANT'S OBLIGATION IN RELATION TO SERVICE

If the **market participant** takes **system access service** under Rate DTS, the **market participant** must take such **system access service** at the **point of delivery** at the **contract capacity** pursuant to Sections 2 and 3 of this DTS Agreement.

9. MARKET PARTICIPANT'S PAYMENT OBLIGATION

The **market participant** must pay to the **ISO** for **system access service** under Rate DTS during the term of this DTS Agreement the amount required pursuant to Rate DTS.

10. OTHER RATES AND CONDITIONS

(a) The primary service credit is applicable under this DTS Agreement.

Yes ☐ No ☐

(b) This **point of delivery** is designated to provide **underfrequency load shedding**.

Yes ☐ No ☐

(c) The **market participant** is required to comply with a connection **remedial action scheme** for this **point of delivery**.

Yes ☐ No ☐

11. TERM

This DTS Agreement commences on the Effective Date and continues unless it is terminated in accordance with the **ISO tariff**.

12. PRIOR AGREEMENTS

This DTS Agreement supersedes and replaces, as of the Effective Date, any other agreement for **system access service** under Rate DTS between the parties at the **point of delivery**.

13. MARKET PARTICIPANT'S REPRESENTATIONS AND WARRANTIES

The **market participant** represents and warrants to the **ISO** as follows:

(a) the **market participant** is duly incorporated or organized, validly existing and in good standing under the laws of its jurisdiction of incorporation or organization, and duly registered and authorized to carry on business in the Province of Alberta;

(b) this DTS Agreement has been duly authorized, executed and delivered by the **market participant** and constitutes a legal, valid and binding obligation of the **market participant**, enforceable against it in accordance with its terms, except to the extent that such enforceability may be limited by bankruptcy, insolvency, winding-up, reorganization, and similar laws affecting the enforceability of creditors' rights generally and the availability of equitable remedies such as specific performance or injunction; and

(c) the authorization, execution and performance by the **market participant** of this DTS Agreement:

(i) does not and will not violate any laws applicable to the **market participant**; and

(ii) is not in contravention of its constating documents or its by-laws or the provisions of any loan agreement or other agreement to which it is a party or by which it is bound.

14. NOTICES

(a) A notice must be provided in accordance with subsection 12.4 of the **ISO tariff**, *Miscellaneous*. The **market participant**'s address for notices is:

_____
_____
_____

Attention: _____
Telephone: _____
Fax: _____
Email: _____

(b) The **market participant**'s address for invoices, if different from the address for notices, is:

_____
_____
_____

Attention: _____
Telephone: _____
Fax: _____
Email: _____

(c) The **market participant** must provide any changes to its address(es) to the **ISO** using the method posted on the AESO website as updated from time to time.

15. AMENDMENTS

(a) The parties acknowledge that either may request an amendment to this DTS Agreement. The **market participant** must request such an amendment by complying with the procedure for amending DTS Agreements posted by the **ISO** on its website or, if such procedure is not posted, by providing notice to the **ISO**.

(b) Notwithstanding the foregoing, the parties acknowledge that the **ISO tariff**, **ISO rules** and *Consolidated Authoritative Document Glossary* may be amended from time to time during the term of this DTS Agreement by approval of the **Commission** and that this DTS Agreement is deemed amended upon each such approval.

(c) Subject to subsection 15(b) of this DTS Agreement, this DTS Agreement may only be amended by written instrument executed by the **ISO** and the **market participant**.

16. MISCELLANEOUS

(a) Section 9 will survive the termination of this DTS Agreement for either the time provided for in such section or the longest period provided by law.

(b) This DTS Agreement will enure to the benefit and be binding upon the parties to this DTS Agreement and their respective successors and permitted assigns.

(c) No waiver by any party of any breach (whether actual or anticipated) of any of the terms, conditions, representations or warranties contained in this DTS Agreement will take effect or be binding upon that party unless the waiver is expressed in writing under the authority of that party. Any waiver so given must extend only to the particular breach so waived and must not limit or affect any rights with respect to any other or future breach.

(d) Time is of the essence.

(e) This DTS Agreement is governed by and interpreted in accordance with the laws of the Province of Alberta and the federal laws of Canada applicable therein, excluding any conflict of laws principles that may apply therein.

(f) Whenever possible, each provision of this DTS Agreement must be interpreted in such a manner as to be effective and valid under applicable law, however, each provision of this DTS Agreement is intended to be severable and if a provision is determined by a court of competent jurisdiction to be illegal, invalid or unenforceable for any reason whatsoever, such provision will be severed from this DTS Agreement and will not affect the legality, validity or enforceability of the remainder of this DTS Agreement or any other provision of this DTS Agreement.

(g) Each party will, from time to time, without further consideration, do such further acts and deliver all such further assurances, deeds and documents as is reasonably required in order to fully perform and carry out the terms of this DTS Agreement.

(h) The parties may execute this DTS Agreement by fax, e-mail or other electronic means capable of producing a paper copy, and in separate counterparts, each of which when so executed and delivered, and all such counterparts taken together will constitute one instrument.

By signing this DTS Agreement, the **market participant** acknowledges that it has reviewed the **ISO tariff** and fully understands all rights and obligations contained in it.

IN WITNESS WHEREOF the **ISO** and the **market participant** have executed this DTS Agreement.

ISO, operating as AESO

Per: _____ Date: _____

Name:

Title:

[insert legal name of corporation or partnership]

Per: _____ Date: _____

Name:

Title:

[Insert Substation Name and No – STS – Date – Project No]

SYSTEM ACCESS SERVICE AGREEMENT
FOR SUPPLY TRANSMISSION SERVICE RATE
("**STS Agreement**")

This STS Agreement is made effective as of the Effective Date.

Between:

Independent System Operator, operating as AESO,
a statutory corporation established pursuant to the
Electric Utilities Act (Alberta)
with offices in the City of Calgary, in the Province of Alberta
(the "**ISO**")

and

[insert legal name of corporation or partnership],
a **[corporation, incorporated] [partnership organized]**, pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]
(the "**market participant**")

RECITALS:

A. This STS Agreement sets out the particular details of the **system access service** that the **ISO** will provide to the **market participant** under Rate STS of the **ISO tariff**.

B. The **ISO tariff** contains additional terms and conditions of **system access service**. This STS Agreement is comprised of both this document and the **ISO tariff**, and accordingly, both this document and the **ISO tariff** must be referred to and administered by the parties, even though the **ISO tariff** is not attached but incorporated into this STS Agreement by reference.

In consideration of the premises to this STS Agreement, the mutual covenants and agreements set forth in this STS Agreement and other good and valuable consideration (the receipt and sufficiency of which is acknowledged by each of the parties), the parties agree as follows:

1. DEFINITIONS AND INTERPRETATION

(a) Unless otherwise defined in this STS Agreement, bolded terms, not including headings, used in this STS Agreement have the meanings given to them in the *Consolidated Authoritative Document Glossary*. Capitalized terms have the meanings given to them in the preamble or body of this STS Agreement, including:

i. "STS Agreement" means this System Access Service Agreement for Supply Transmission Service Rate; and

ii. "Effective Date" means the date that this STS Agreement comes into effect in accordance with Section 2 below.

(b) Should the **ISO tariff**, **ISO rules** or *Consolidated Authoritative Document Glossary* be amended from time to time during the term of this STS Agreement by approval of the **Commission,** then such amended **ISO tariff**, **ISO Rules** or *Consolidated Authoritative Document Glossary* will apply to this STS Agreement and this STS Agreement shall be deemed amended upon each such approval.

(c) In the event of any conflict or inconsistency between this document and the **ISO tariff**, the latter shall prevail.

2. EFFECTIVE DATE

(a) If the construction of **transmission facilities** is required for a connection project, this **STS Agreement** becomes effective immediately following the later of:

(i) the issuance by the **Commission** of the permit(s) and licence(s) required to construct and operate the **transmission facilities**;

(ii) if applicable, the receipt by the **market participant** of the following regulatory approvals;

[list approvals, if applicable];

and

(iii) if applicable, the successful resolution of the following non-financial matters:

[list non-financial matters].

(b) If the construction of transmission facilities is not required for a connection project, this **STS Agreement** becomes effective on the day it is executed.

3. POINT OF SUPPLY

Point of supply is located at and described as follows:

Substation name and #:	[Name of Substation (123S)]
Legal Subdivisions (LSD):	[insert WxM]
Measurement Point Identification (MPID):	[insert assigned number]

4. CONTRACT CAPACITY

Contract capacity is the following amounts for and during the following periods:

MW [insert date] up to and including [insert date];

MW [insert date] up to and including [insert date]; and

MW [insert date] for the balance of the term of this STS Agreement.

5. COMMERCIAL OPERATION

Upon completion of **commissioning** and provided that the **ISO** is satisfied with the same, the **ISO** must provide notice to the **market participant** confirming that the facility may begin **commercial operation**.

6. SETTLEMENT

The **ISO** must charge, and the **market participant** must pay, amounts in accordance with Rate STS commencing in the **settlement period** in which the **ISO** commences the provision of **system access service** to the **market participant**.

7. ISO OBLIGATION TO PROVIDE SERVICE

Subject to Section 8 and 9 of this STS Agreement, the **ISO** must provide **system access service** under Rate STS to the **market participant** at the **point of supply** at the **contract capacity** pursuant to sections 2 and 3 of this STS Agreement.

8. MARKET PARTICIPANT'S OBLIGATION IN RELATION TO SERVICE

If the **market participant** takes **system access service** under Rate STS, the **market participant** must take such service at the **point of supply** at the **contract capacity** pursuant to sections 2 and 3 of this STS Agreement.

9. MARKET PARTICIPANT'S PAYMENT OBLIGATION

The **market participant** must pay to the **ISO** for **system access service** under Rate STS during the term of this **STS Agreement** the amount required pursuant to Rate STS.

10. OTHER CONDITIONS

The **market participant** is required to comply with a connection **remedial action scheme** for this **point of supply**.

Yes ☐ No ☐

11. TERM

This STS Agreement commences on the Effective Date and continues unless it is terminated in accordance with the **ISO tariff**.

12. PRIOR AGREEMENTS

This STS Agreement supersedes and replaces, as of the Effective Date, any other agreement for **system access service** under Rate STS between the parties at the **point of supply**.

13. MARKET PARTICIPANT'S REPRESENTATIONS AND WARRANTIES

The **market participant** represents and warrants to the **ISO** as follows:

(a) the **market participant** is duly incorporated or organized, validly existing and in good standing under the laws of its jurisdiction of incorporation or organization, and duly registered and authorized to carry on business in the Province of Alberta;

(b) this STS Agreement has been duly authorized, executed and delivered by the **market**

participant and constitutes a legal, valid and binding obligation of the **market participant**, enforceable against it in accordance with its terms, except to the extent that such enforceability may be limited by bankruptcy, insolvency, winding-up, reorganization, and similar laws affecting the enforceability of creditors' rights generally and the availability of equitable remedies such as specific performance or injunction; and

(c) the authorization, execution and performance by the **market participant** of this STS Agreement:

(i) does not and will not violate any laws applicable to the **market participant**; and

(ii) is not in contravention of its constating documents or its by-laws or the provisions of any loan agreement or other agreement to which it is a party or by which it is bound.

14. NOTICES

(d) A notice must be provided in accordance with subsection 12.4 of the **ISO tariff**, *Miscellaneous*. The **market participant**'s address for notices is:

_____
_____

Attention: _____
Telephone: _____
Fax: _____
Email: _____

(e) The **market participant**'s address for invoices, if different from the address for notices, is:

_____
_____
_____

Attention: _____
Telephone: _____
Fax: _____
Email: _____

(f) The **market participant** must provide any changes to its address(es) to the **ISO** using the method posted on the AESO website as updated from time to time.

15. AMENDMENTS

(a) The parties acknowledge that either may request an amendment to this STS Agreement. The **market participant** must request such an amendment by complying with the procedure for amending STS Agreements posted by the **ISO** on its website or, if such procedure is not posted, by requesting providing notice to the **ISO**.

(b) Notwithstanding the foregoing, the parties acknowledge that the **ISO tariff**, **ISO rules**, and *Consolidated Authoritative Document Glossary* may be amended from time to time during the term of this STS Agreement by approval of the **Commission** and that this STS Agreement is deemed amended upon each such approval.

(c) Subject to Section 15(b) of this STS Agreement, this STS Agreement may only be amended by written instrument executed by the **ISO** and the **market participant**.

16. MISCELLANEOUS

(a) Section 9 will survive the termination of this STS Agreement for either the time provided for in such section or the longest period provided by law.

(b) This STS Agreement will enure to the benefit and be binding upon the parties to this STS Agreement and their respective successors and permitted assigns.

(c) No waiver by any party of any breach (whether actual or anticipated) of any of the terms, conditions, representations or warranties contained in this STS Agreement will take effect or be binding upon that party unless the waiver is expressed in writing under the authority of that party. Any waiver so given must extend only to the particular breach so waived and must not limit or affect any rights with respect to any other or future breach.

(d) Time is of the essence.

(e) This STS Agreement shall be governed by and interpreted in accordance with the laws of the Province of Alberta and the federal laws of Canada applicable therein, excluding any conflict of laws principles that may apply therein.

(f) Whenever possible, each provision of this STS Agreement must be interpreted in such a manner as to be effective and valid under applicable law, however, each provision of this STS Agreement is intended to be severable and if a provision is determined by a court of competent jurisdiction to be illegal, invalid or unenforceable for any reason whatsoever, such provision will be severed from this STS Agreement and will not affect the legality, validity or enforceability of the remainder of this STS Agreement or any other provision of this STS Agreement.

(g) Each party will, from time to time, without further consideration, do such further acts and deliver all such further assurances, deeds and documents as is reasonably required in order to fully perform and carry out the terms of this STS Agreement.

(h) The parties may execute this STS Agreement by fax, e-mail or other electronic means capable of producing a paper copy, and in separate counterparts, each of which when so executed and delivered, and all such counterparts taken together will constitute one instrument.

[Remainder of page intentionally left blank. Signature page to follow.]

By signing this STS Agreement, the **market participant** acknowledges that it has reviewed the **ISO tariff** and fully understands all rights and obligations contained in it.

IN WITNESS WHEREOF the **ISO** and the **market participant** have executed this STS Agreement.

ISO, operating as AESO

Per: _____ Date: _____

Name:

Title:

[insert legal name of corporation or partnership]

Per: _____ Date: _____

Name:

Title:

System Access Service Agreement Proforma for Rate DOS, Demand Opportunity Service

A **market participant** applying for pre-qualification for demand opportunity service should review the terms and conditions of such service contained in the **ISO tariff** and any other related information documents that appear on the **ISO**'s website from time to time.

This application, if approved by the **ISO**, sets the parameters for a **market participant**'s demand opportunity service transaction requests throughout the 12 months following such approval. Pre-qualification does not obligate the **ISO** to approve, or the **market participant** to request, any demand opportunity service. A non-refundable fee of $5000.00 is payable with this application.

Unless otherwise defined in this application, bolded terms, not including headings, used in this application have the meanings given to them in the *Consolidated Authoritative Document Glossary*. Capitalized terms have the meanings given to them in the preamble or body of this application.

Application Details

Market participant: _____

Party administering demand opportunity service on behalf of the **market participant**:

Market participant ☐ or ☐ company name: _____

Name of primary contact of administrator: _____

Phone: _____ Fax: _____ Email: _____

Facility name: _____

Facility location: LSD_____ SEC_____ TWP_____ RGE_____ MER_____

Connected substation (name and number): _____

Point of delivery: _____

Current demand transmission service **contract capacity** at the **point of delivery**: _____

Is this an application to renew a current pre-qualification? Yes ☐ No ☐

Technical and Commercial Information

The following information is required in order for the **ISO** to determine whether the proposed use of demand opportunity service complies with the criteria set out in the **ISO tariff**.

- Requested start date: _____
- End date: Twelve (12) months from requested start date
- Requested demand opportunity service capacity: _____ MW
- Anticipated frequency of use: _____
- Total MWhs per month: _____

- Type of demand opportunity service expected to be used:

DOS 7 minute ☐ DOS 1 hour ☐ DOS Term ☐

Technical Information**:** Please provide the following in an attachment labeled "Schedule A".

1. Load characteristic (static, synchronous machine or induction machine);
2. Approximate load factor (demand opportunity service specific load only); and
3. Expected **power factor.**

Schedule A: ☐ Attached

Commercial Information: Please read the eligibility criteria in the **ISO tariff** and provide a comprehensive business case in an attachment labeled "Schedule B" demonstrating that the proposed use of demand opportunity service complies with those criteria. The business case must provide enough information to satisfy the **ISO** that that the proposed use of electricity under demand opportunity service would not occur at the standard Rate DTS. The business case normally pertains to the end-user's commercial circumstances and the end-user must be prepared to provide any additional information that the **ISO** reasonably requests.

Schedule B: ☐ Attached

Undertaking

The **market participant** undertakes to notify the **ISO** upon the occurrence of a financial, operational, and/or technical change, where such changes materially impacts the assumptions contained within the attached business case ("Schedule B"). Failure to provide such information to the **ISO** in a timely and comprehensive manner may result in the **ISO** auditing and/or reassessing the eligibility of the **market participant** to be pre-qualified for the use of demand opportunity service. Further, the **market participant** undertakes that the use of demand opportunity service contemplated in the business case will not be modified.

The **market participant** confirms that the contents of this application are true.

Market participant:

Name: (Print name)	Title: (Print title)
Signature:	Date:

~~Please complete and send to the Alberta Electric System Operator.~~

~~Mail: 2500, 330 – 5th Avenue SW~~
~~Calgary, Alberta T2P 0L4~~

~~Attention: Commercial Services~~

~~Email: dos.applications@aeso.ca~~

ii. "Effective Date" means date that the Export Agreement comes into effect, as stated in the preamble of this Export Agreement; and

iii. "Point of Interconnection" means the British Columbia **Intertie**, Saskatchewan **Intertie** or Montana **Intertie**, as indicated in section 2 of this Export Agreement.

(b) Should the **ISO tariff**, **ISO rules** or *Consolidated Authoritative Document Glossary* be amended from time to time during the term of this Export Agreement by approval of the **Commission,** then such amended **ISO tariff**, **ISO Rules** or *Consolidated Authoritative Document Glossary* will apply to this Export Agreement and this Export Agreement shall be deemed amended upon each such approval.

(c) In the event of any conflict or inconsistency between this document and the **ISO tariff**, the latter shall prevail.

2. POINT OF INTERCONNECTION

☐ British Columbia **Intertie** ☐ Saskatchewan **Intertie** ☐ Montana **Intertie**

3. SETTLEMENT

The **ISO** must charge, and the **market participant** must pay, amounts in accordance with Rate XOS or Rate XOM, as applicable, commencing on [insert date].

4. ISO OBLIGATION TO PROVIDE SERVICE

Subject to Section 5 and 6 of this Export Agreement, the **ISO** must provide **system access service** under Rate XOS or Rate XOM, as applicable, to the **market participant** at the Point of Interconnection pursuant to Section 2 of this Export Agreement.

5. MARKET PARTICIPANT'S OBLIGATION IN RELATION TO SERVICE

If the **market participant** takes **system access service** under Rate XOS or Rate XOM, as applicable, the **market participant** must take such **system access service** at the Point of Interconnection pursuant to Section 2 of this Export Agreement.

6. MARKET PARTICIPANT'S PAYMENT OBLIGATION

The **market participant** must pay to the **ISO** for **system access service** under Rate XOS or Rate XOM, as applicable, during the term of this Export Agreement the amount required pursuant to Rate XOS or Rate XOM, as applicable.

7. TERM

This Export Agreement commences on the Effective Date and continues for a term of one (1) year, expiring on , 202 .

8. PRIOR AGREEMENTS

This Export Agreement supersedes and replaces, as of the Effective Date, any other agreement for **system access service** under Rate XOS or Rate XOM, as applicable, between the parties at the Point of Interconnection pursuant to Section 2 of this Export Agreement.

9. MARKET PARTICIPANT'S REPRESENTATIONS AND WARRANTIES

The **market participant** represents and warrants to the **ISO** as follows:

(a) the **market participant** is duly incorporated or organized, validly existing and in good standing under the laws of its jurisdiction of incorporation or organization, and duly registered and authorized to carry on business in the Province of Alberta;

(b) this Export Agreement has been duly authorized, executed and delivered by the **market participant** and constitutes a legal, valid and binding obligation of the **market participant**, enforceable against it in accordance with its terms, except to the extent that such enforceability may be limited by bankruptcy, insolvency, winding-up, reorganization, and similar laws affecting the enforceability of creditors' rights generally and the availability of equitable remedies such as specific performance or injunction; and

(c) the authorization, execution and performance by the **market participant** of this Export Agreement:

(i) does not and will not violate any laws applicable to the **market participant**; and

(ii) is not in contravention of its constating documents or its by-laws or the provisions of any loan agreement or other agreement to which it is a party or by which it is bound.

10. NOTICES

(a) A notice must be provided in accordance with subsection 12.4 of the **ISO tariff**, *Miscellaneous*. The **market participant**'s address for notices is:

_____
_____
_____

Attention: _____

Telephone: _____

Fax: _____

Email: _____

(b) The **market participant**'s address for invoices, if different from the address for notices, is:

_____
_____
_____

Attention: _____

Telephone: _____

Fax: _____

Email: _____

(d) The **market participant** must provide any changes to its address(es) to the **ISO** using the method posted on the AESO website as updated from time to time.

11. AMENDMENTS

(a) The parties acknowledge that either may request an amendment to this Export Agreement. The **market participant** must request such an amendment by complying with the procedure for amending Export Agreements posted by the **ISO** on its website or, if such procedure is not posted, by providing notice to the **ISO**.

(b) Notwithstanding the foregoing, the parties acknowledge that the **ISO tariff**, **ISO rules** and *Consolidated Authoritative Document Glossary* may be amended from time to time during the term of this Export Agreement by approval of the **Commission** and that this Export Agreement is deemed amended upon each such approval.

(c) Subject to subsection 11(b) of this this Export Agreement, this Export Agreement may only be amended by written instrument executed by the **ISO** and the **market participant**.

12. MISCELLANEOUS

(a) Section 6 will survive the termination of this Export Agreement for either the time provided for in such section or the longest period provided by law.

(b) This Export Agreement will enure to the benefit and be binding upon the parties to this Export Agreement and their respective successors and permitted assigns.

(c) No waiver by any party of any breach (whether actual or anticipated) of any of the terms, conditions, representations or warranties contained in this Export Agreement will take effect or be binding upon that party unless the waiver is expressed in writing under the authority of that party. Any waiver so given must extend only to the particular breach so waived and must not limit or affect any rights with respect to any other or future breach.

(d) Time is of the essence.

(e) This Export Agreement is governed by and interpreted in accordance with the laws of the Province of Alberta and the federal laws of Canada applicable therein, excluding any conflict of laws principles that may apply therein.

(f) Whenever possible, each provision of this Export Agreement must be interpreted in such a manner as to be effective and valid under applicable law, however, each provision of this Export Agreement is intended to be severable and if a provision is determined by a court of competent jurisdiction to be illegal, invalid or unenforceable for any reason whatsoever, such provision will be severed from this Export Agreement and will not affect the legality, validity or enforceability of the remainder of this Export Agreement or any other provision of this Export Agreement.

(g) Each party will, from time to time, without further consideration, do such further acts and deliver all such further assurances, deeds and documents as shall be reasonably required in order to fully perform and carry out the terms of this Export Agreement.

(h) The parties may execute this Export Agreement by fax, e-mail or other electronic means capable of producing a paper copy, and in separate counterparts, each of which when so executed and delivered, and all such counterparts taken together will constitute one instrument.

By signing this Export Agreement, the **market participant** acknowledges that it has reviewed the **ISO tariff** and fully understands all rights and obligations contained in it.

IN WITNESS WHEREOF the **ISO** and the **market participant** have executed this Export Agreement as of the Effective Date.

ISO, operating as AESO

Per: _____ Date:

Name:
Title:

[insert legal name of corporation or partnership]

Per: _____ Date:

Name:
Title:

SYSTEM ACCESS SERVICE AGREEMENT
FOR IMPORT OPPORTUNITY SERVICE RATE
("Import Agreement")

This Import Agreement effective the 1st day of , 202 (the "Effective Date").

Between:

Independent System Operator, operating as AESO
a statutory corporation established pursuant to the
Electric Utilities Act (Alberta)
with offices in the City of Calgary, in the Province of Alberta
(the "**ISO**")

and

[insert legal name of corporation or partnership],
a **[corporation, incorporated] [partnership organized]**, pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]
(the "**market participant**")

RECITALS:

A. This Import Agreement sets out the particular details of the **system access service** that the **ISO** will provide to the **market participant** under Rate IOS of the **ISO tariff**, *Import Opportunity Service*.

B. The **ISO tariff** contains additional terms and conditions of **system access service**. This Import Agreement is comprised of both this document and the **ISO tariff**, and accordingly, both this document and the **ISO tariff** must be referred to and administered by the parties, even though the **ISO tariff** is not attached but incorporated into this Import Agreement by reference.

In consideration of the premises to this Import Agreement, the mutual covenants and agreements set forth in this Import Agreement and other good and valuable consideration (the receipt and sufficiency of which is acknowledged by each of the parties), the parties agree as follows:

1. DEFINITIONS AND INTERPRETATION

(a) Unless otherwise defined in this Import Agreement, bolded terms, not including headings, used in this Import Agreement have the meanings given to them in the *Consolidated Authoritative Document Glossary*. Capitalized terms have the meanings given to them in the preamble or body of this Import Agreement, including:

i. "Import Agreement" means this System Access Service Agreement for Import Opportunity Service Rate;

ii. "Effective Date" means date that the Import Agreement comes into effect, as stated in the preamble of this Import Agreement; and

iii. "Point of Interconnection" means the British Columbia **Intertie**, Saskatchewan **Intertie** or Montana **Intertie**, as indicated in section 2 of this Import Agreement.

(b) Should the **ISO tariff**, **ISO rules** or *Consolidated Authoritative Document Glossary* be amended from time to time during the term of this Import Agreement by approval of the **Commission,** then such amended **ISO tariff**, **ISO Rules** or *Consolidated Authoritative Document Glossary* will apply to this Import Agreement and this Import Agreement shall be deemed amended upon each such approval.

(c) In the event of any conflict or inconsistency between this document and the **ISO tariff**, the latter shall prevail.

2. POINT OF INTERCONNECTION

☐ British Columbia **Intertie** ☐ Saskatchewan **Intertie** ☐ Montana **Intertie**

3. SETTLEMENT

The **ISO** must charge, and the **market participant** must pay, amounts in accordance with Rate IOS commencing on [insert date].

4. ISO OBLIGATION TO PROVIDE SERVICE

Subject to Section 5 and 6 of this Import Agreement, the **ISO** must provide **system access service** under Rate IOS to the **market participant** at the Point of Interconnection pursuant to Section 2 of this Import Agreement.

5. MARKET PARTICIPANT'S OBLIGATION IN RELATION TO SERVICE

If the **market participant** takes **system access service** under Rate IOS, the **market participant** must take such **system access service** at the Point of Interconnection pursuant to Section 2 of this Import Agreement.

6. MARKET PARTICIPANT'S PAYMENT OBLIGATION

The **market participant** must pay to the **ISO** for **system access service** under Rate IOS during the term of this Import Agreement the amount required pursuant to Rate IOS.

7. TERM

This Import Agreement commences on the Effective Date and continues for a term of 1 year, expiring on , 202 .

8. PRIOR AGREEMENTS

This Import Agreement supersedes and replaces, as of the Effective Date, any other agreement for **system access service** under Rate IOS between the parties at the Point of Interconnection pursuant to Section 2 of this Import Agreement.

9. MARKET PARTICIPANT'S REPRESENTATIONS AND WARRANTIES

The **market participant** represents and warrants to the **ISO** as follows:

(a) the **market participant** is duly incorporated or organized, validly existing and in good standing under the laws of its jurisdiction of incorporation or organization, and duly registered and authorized to carry on business in the Province of Alberta;

(b) this Import Agreement has been duly authorized, executed and delivered by the **market participant** and constitutes a legal, valid and binding obligation of the **market participant**, enforceable against it in accordance with its terms, except to the extent that such enforceability may be limited by bankruptcy, insolvency, winding-up, reorganization, and similar laws affecting the enforceability of creditors' rights generally and the availability of equitable remedies such as specific performance or injunction; and

(c) the authorization, execution and performance by the **market participant** of this Import Agreement:

(i) does not and will not violate any laws applicable to the **market participant**; and

(ii) is not in contravention of its constating documents or its by-laws or the provisions of any loan agreement or other agreement to which it is a party or by which it is bound.

10. NOTICES

(a) A notice must be provided in accordance with subsection 12.4 of the **ISO tariff**, *Miscellaneous*. The **market participant**'s address for notices is:

_____
_____
_____

Attention: _____

Telephone: _____

Fax: _____

Email: _____

(b) The **market participant**'s address for invoices, if different from the address for notices, is:

_____
_____
_____

Attention: _____

Telephone: _____

Fax: _____

Email: _____

(c) The **market participant** must provide any changes to its address(es) to the **ISO** using the method posted on the AESO website as updated from time to time.

11. AMENDMENTS

(a) The parties acknowledge that either may request an amendment to this Import Agreement. The **market participant** must request such an amendment by complying with the procedure for amending Import Agreements posted by the **ISO** on its website or, if such procedure is not posted, by providing notice to the **ISO**.

(b) Notwithstanding the foregoing, the parties acknowledge that the **ISO tariff**, **ISO rules**, and *Consolidated Authoritative Document Glossary* may be amended from time to time during the term of this Import Agreement by approval of the **Commission** and that this Import Agreement is deemed amended upon each such approval.

(c) Subject to subsection 11(b) of this Import Agreement, this Import Agreement may only be amended by written instrument executed by the **ISO** and the **market participant**.

12. MISCELLANEOUS

(a) Section 6 will survive the termination of this Import Agreement for either the time provided for in such section or the longest period provided by law.

(b) This Import Agreement will enure to the benefit and be binding upon the parties to this Import Agreement and their respective successors and permitted assigns.

(c) No waiver by any party of any breach (whether actual or anticipated) of any of the terms, conditions, representations or warranties contained in this Import Agreement will take effect or be binding upon that party unless the waiver is expressed in writing under the authority of that party. Any waiver so given must extend only to the particular breach so waived and must not limit or affect any rights with respect to any other or future breach.

(d) Time is of the essence.

(e) This Import Agreement is governed by and interpreted in accordance with the laws of the Province of Alberta and the federal laws of Canada applicable therein, excluding any conflict of laws principles that may apply therein.

(f) Whenever possible, each provision of this Import Agreement must be interpreted in such a manner as to be effective and valid under applicable law, however, each provision of this Import Agreement is intended to be severable and if a provision is determined by a court of competent jurisdiction to be illegal, invalid or unenforceable for any reason whatsoever, such provision will be severed from this Import Agreement and will not affect the legality, validity or enforceability of the remainder of this Import Agreement or any other provision of this Import Agreement.

(g) Each party will, from time to time, without further consideration, do such further acts and deliver all such further assurances, deeds and documents as is reasonably required in order to fully perform and carry out the terms of this Import Agreement.

(h) The parties may execute this Import Agreement by fax, e-mail or other electronic means capable of producing a paper copy, and in separate counterparts, each of which when so executed and delivered, and all such counterparts taken together will constitute one instrument.

[Remainder of page intentionally left blank. Signature page to follow.]

By signing this Import Agreement, the **market participant** acknowledges that it has reviewed the **ISO tariff** and fully understands all rights and obligations contained in it.

IN WITNESS WHEREOF the **ISO** and the **market participant** have executed this Import Agreement as of the Effective Date.

ISO, operating as AESO

Per: _____ Date:

Name:
Title:

[insert legal name of corporation or partnership]

Per: _____ Date:

Name:
Title:

ISO Tariff – Appendix A
Construction Commitment Agreement Proforma

This Construction Commitment Agreement effective as of the day of , 202 (the "Effective Date")

BETWEEN:

[Insert Name of Legal Owner of the Transmission Facility],
a corporation, incorporated pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]

(the "TFO")

– and –

[Insert Name of Market Participant],
a **[corporation, incorporated] [partnership organized]**, pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]
(the "**market participant**")

RECITALS

A. The **market participant** has requested **system access service** from the **ISO**, operating as the Alberta Electric System Operator, and intends to enter into, or amend, a **system access service** agreement with the **ISO** in relation to [Insert Connection Project Name and Number as provided by the ISO];

B. The provision or amendment of **system access service** will require the construction of a new **transmission facility** and a commitment by the **market participant** in relation to the expenditure of capital for such construction;

C. The **ISO tariff** requires the **market participant** to provide **financial security** or a **construction contribution**, or both, to the TFO, in the amounts determined pursuant to the **ISO tariff**;

D. Prior to commencing the Project Work, as set out in the attached Schedule "A", the **ISO tariff** requires the **market participant** to enter into an agreement substantially in the form of this Construction Commitment Agreement with the TFO and to hold the TFO harmless from any negative financial consequences related to the cancellation of the Connection Project; and

E. The **ISO tariff** contains additional terms and conditions of **system access service**. This Construction Commitment Agreement is comprised of both this document and the **ISO tariff**, and accordingly, both this document and the **ISO tariff** must be referred to and administered by the parties, even though the **ISO tariff** is not attached but incorporated into this Construction Commitment Agreement by reference.

In consideration of the mutual covenants and agreements set forth in this Construction Contribution Agreement and other good and valuable consideration, the receipt and sufficiency of which is acknowledged by each of the parties, the parties agree as follows:

Interpretation and Definitions

1.

(a) Unless otherwise defined in this Construction Commitment Agreement, bolded terms, not including headings, used in this Construction Commitment Agreement have the meanings

given to them in the *Consolidated Authoritative Document Glossary*. Capitalized terms have the meanings given to them in the preamble or body of this Construction Commitment Agreement, including:

(i) "Cancellation Costs" means all Connection Project costs actually incurred by the TFO prior to cancellation of a Connection Project, or reasonably required to be incurred by the TFO after cancellation of a Connection Project, including costs arising from preparation of a connection proposal, preparation of a facility application and construction of a Connection Project, as documented in the construction commitment agreement required by section 5 of the **ISO tariff**; third-party cancellation costs and penalties; costs for material salvage; and reclamation of any related construction;

(ii) "Cancellation Event" means an event described in paragraph 10 or 11 of this Construction Commitment Agreement which leads to or may lead to the cancellation of the Connection Project;

(iii) "Connection Project" means a new **transmission facility** constructed by the TFO at the request of the **market participant** for **system access service**;

(iv) "Construction Commitment Agreement" means this Construction Commitment Agreement;

(v) "Effective Date" means date that this Construction Commitment Agreement comes into effect, as stated in the preamble of this Construction Commitment Agreement;

(vi) "Guarantor" means an entity that provides a guarantee on behalf of the **market participant**;

(vii) "Project Work" means the work for the Connection Project as set out in Schedule "A" to this Agreement.

(viii) "Schedules" means the following Schedules attached to this Agreement, and all amendments to such Schedules:

Schedule "A" – Project Work and Financial Obligation

Schedule "B" – Construction Contribution and Financial Security; and

(b) Should the **ISO tariff, ISO rules,** or *Consolidated Authoritative Document Glossary* be amended from time to time during the term of this Construction Commitment Agreement by approval of the **Commission,** then such amended **ISO tariff**, **ISO Rules**, or *Consolidated Authoritative Document Glossary* will apply to this Construction Commitment Agreement and this Construction Commitment Agreement shall be deemed amended upon each such approval.

(c) In the event of any conflict or inconsistency between this document and the **ISO tariff**, the latter shall prevail.

Term of Agreement

2. This Construction Commitment Agreement takes effect on the Effective Date and remains in full force and effect until:

(a) the Connection Project begins **commercial operation**; or

(b) upon the occurrence of a Cancellation Event, the Connection Project is cancelled and all amounts owing to the TFO hereunder have been paid in full.

Construction Contribution and Financial Security

4. The **market participant** must pay to the TFO a **construction contribution** required in respect of its **financial obligation** for the Connection Project in accordance with section 6 of the **ISO tariff**. The **market participant** will pay the **construction contribution** in the amounts and at the times set out and described in the Schedules, each such payment being an absolute transfer of ownership in the funds to the TFO as a payment for the Project Work.

5. For a Connection Project that is eligible for local investment, the **market participant** will also provide or cause to be provided to the TFO the **financial security** required in accordance with section 6 of the **ISO Tariff** as security for the payment and performance of all present and future debts, costs and **financial obligations** of the **market participant** to the TFO arising pursuant to this Construction Commitment Agreement other than those for which the **construction contribution** is paid. The **market participant** will provide or cause to be provided the **financial security** in the amounts and at the times set out and described in the Schedules.

6. The **construction contribution** and **financial security** must in aggregate be in an amount adequate to fund the **financial obligation** arising from the Project Work, as determined pursuant to section 6 of the **ISO tariff**.

7. All changes to the **construction contribution** and **financial security** must be documented in duly executed amended Schedules by the parties reflecting the change.

8. If all or part of the **financial obligation** of the **market participant** is unsecured, or if its Guarantor has provided a guarantee as **financial security**, and the **market participant** becomes aware of a **material adverse change** in respect of the **market participant** or Guarantor, the **market participant** must provide written notice thereof to the TFO and to the **ISO** within 2 **business days** of becoming aware of the occurrence of such **material adverse change**. Upon the occurrence of a **material adverse change**, the TFO may require the **market participant** to provide additional or replacement **financial security**.

9. In determining whether a **material adverse change** has occurred, consideration must be given to an event, circumstance or change which affects or is reasonably expected to affect:

   (a) the financial condition of the **market participant** or its Guarantor;

   (b) the ability of the **market participant** or its Guarantor to perform its obligations under a Financial Security; or

   (c) the assets or business of the **market participant** or its Guarantor.

Cancellation of Connection Project

10. The Connection Project must be cancelled if:

    (a) the **market participant** informs the **ISO** or the TFO of the cancellation of the Connection Project;

    (b) the **ISO** cancels the Connection Project due to the **market participant**'s failure to meet a critical information under subsection 3.2 of the **ISO tariff**; or

    (c) the **ISO** cancels the Connection Project after reasonably concluding, based on the action or inaction of the **market participant**, that the **market participant** is not proceeding with the Connection Project.

11. The Connection Project may be cancelled by the TFO upon the occurrence of any of the following events:

    (a) the **market participant** fails to provide or cause to be provided the **financial security** in the form and amount set out in Schedule "B" concurrently with the execution and delivery of this Construction Commitment Agreement, or subsequently in forms and amounts set out in any amended Schedule "B", or fails to provide or cause to be provided such additional guarantee(s), security or other documents as it may be required to deliver to the TFO pursuant to the terms and conditions of this Construction Commitment Agreement;

    (b) the **Commission** rejects or fails to approve the relevant application for the Connection Project;

    (c) the **market participant** fails to:

        (i) execute a **system access service** agreement as set out in Appendix A of the **ISO tariff**; or

        (ii) enter into an amendment of its existing **system access service** agreement with respect to the Connection Project as set out in Appendix A of the **ISO tariff**,

    in accordance with the **ISO tariff**;

    (d) the **market participant** or its Guarantor breaches a term, condition, agreement or covenant under this Construction Commitment Agreement or the **financial security** and fails to remedy the breach within 5 **business days** of receipt of written notice of the breach by the TFO to the **market participant**;

    (e) a representation or warranty made or given by the **market participant** in connection with this Construction Commitment Agreement is shown to be untrue or incorrect when it was made or given at the Effective Date or ceases to be true and correct during the term of this Construction Commitment Agreement;

    (f) the **market participant** or its Guarantor is found to be insolvent or bankrupt by a court of competent jurisdiction or makes an authorized assignment of its assets or a compromise or arrangement for the benefit of its creditors, makes a proposal to its creditors under the *Bankruptcy and Insolvency Act* (Canada), seeks relief under the *Companies' Creditors Arrangement Act* (Canada), the *Winding Up Act* (Canada) or any other bankruptcy, insolvency or analogous law in Canada or the United States, files a petition or proposal to take advantage of any act of insolvency, consents to or acquiesces in the appointment of a trustee, receiver, receiver and manager, interim receiver, custodian or other person with similar powers over all or any substantial portion of its assets, files a petition or

otherwise commences a proceeding seeking a reorganization, arrangement, composition or readjustment under a applicable bankruptcy, insolvency, moratorium, reorganization or other similar law affecting creditor's rights or consents to, or acquiesces in, the filing of such a petition; or if a petition in bankruptcy is filed or presented against the **market participant** or its Guarantor;

(g) a formal or informal proceeding is instituted by or against the **market participant** or its Guarantor for the dissolution or liquidation of, settlement of claims against, or winding up of the affairs of, the **market participant** or its Guarantor, or a resolution is passed for dissolution, liquidation or winding up the **market participant** or its Guarantor;

(h) the **market participant** or its Guarantor ceases or threatens to cease to carry on business or makes or agrees to make a bulk sale of assets or commits or threatens to commit an act of bankruptcy;

(i) a receiver, receiver and manager or interim receiver is appointed for all or any part of the property, assets or undertaking of the **market participant** or its Guarantor;

(j) the **market participant** creates or permits to exist a charge, security interest, lien, encumbrance or claim against any of the collateral charged under the **financial security** which ranks or could in any event rank in priority to or equally with the **financial security**;

(k) the holder of a charge, security interest, lien, encumbrance or claim against a collateral charged under the **financial security** does anything to enforce or realize on the charge, security interest, lien, encumbrance or claim; or

(l) with respect to a letter of credit provided to the TFO, if replacement **financial security** is requested and not provided by the **market participant** within 2 **business days** of the request due to any of the following events:

(i) the issuer of the letter of credit is no longer acceptable to the TFO, at its sole discretion;

(ii) the issuer of the letter of credit fails to comply with or perform its obligations under such letter of credit if such failure continues after the lapse of an applicable grace period;

(iii) the issuer of the letter of credit disaffirms, disclaims, repudiates or rejects, in whole or in part, or challenges the validity of, such letter of credit;

(iv) the letter of credit expires or terminates, or ceases to be in full force and effect for the purposes of this Construction Commitment Agreement (in either case other than in accordance with its terms) prior to the satisfaction of all obligations of the **market participant** under this Construction Commitment Agreement without the written consent of the TFO;

(v) there are less than 20 **business days** remaining until expiry of the letter of credit; or

(vi) an event analogous to a **material adverse change** occurs with respect to the issuer of the letter of credit.

12. If, the Connection Project is cancelled due to the occurrence of a Cancellation Event, the TFO, without limiting or restricting other rights or remedies under contract, at law or in equity:

(a) must:

(i) cease to perform any Project Work;

(ii) demand immediate payment of all Cancellation Costs; and

(iii) if applicable, demand immediate payment under any guarantee granted to the TFO;

and

(b) may do one or both of the following:

(iv) exercise its rights under all or any part of the **financial security**, and any other security in respect of the Connection Project provided by the **market participant** to the TFO under separate construction commitment agreements; and

(v) commence a legal action or proceeding against the **market participant** or its Guarantor.

13. Upon the occurrence of a Cancellation Event, the TFO must use, and must cause its contractors to use, reasonable commercial efforts to minimize the amount of the Cancellation Costs to the extent within their control.

14. The TFO must at all times maintain accurate accounts, records, invoices and third-party invoices for all Connection Project costs, including all Cancellation Costs, which are prima facie evidence of the amounts owing to the TFO by the **market participant**.

15. The **market participant** must, upon demand having been made by the TFO following the occurrence of a Cancellation Event, pay the Cancellation Costs to the TFO without delay. If the **market participant** fails to pay to the TFO the Cancellation Costs upon demand, the TFO has all remedies available pursuant to the **ISO tariff** and may charge the **market participant** interest calculated at the TFO's bank prime rate plus 6% on all amounts outstanding from the date of demand to the date of payment to the TFO.

Representations and Warranties

15. The **market participant** represents and warrants to the TFO as follows:

(a) the **market participant** is duly incorporated or organized, validly existing and in good standing under the laws of its jurisdiction of incorporation or organization;

(b) the **construction contribution** and **financial security** are provided to the TFO free and clear of any and all security interests, mortgages, liens, charges, and encumbrance of any nature;

(c) this Construction Commitment Agreement has been duly authorized, executed and delivered by the **market participant** and constitutes a legal, valid and binding obligation of the **market participant**, enforceable against it in accordance with its terms, except to the extent that such enforceability may be limited by bankruptcy, insolvency, winding-up, reorganization, and similar laws affecting the enforceability of creditors' rights generally and the availability of equitable remedies such as specific performance or injunction; and

(d) the authorization, execution and performance by the **market participant** of this Construction Commitment Agreement:

(i) does not and will not violate any laws applicable to the **market participant**; and

(ii) is not in contravention of its constating documents or its by-laws or the provisions of any loan agreement or other agreement to which it is a party or by which it is bound.

16. The TFO represents and warrants to the **market participant** as follows:

(a) the TFO is duly incorporated or organized, validly existing and in good standing under the laws of its jurisdiction of incorporation or organization;

(b) this Construction Commitment Agreement has been duly authorized, executed and delivered by the TFO and constitutes a legal, valid and binding obligation of the TFO, enforceable against it in accordance with its terms, except to the extent that such enforceability may be limited by bankruptcy, insolvency, winding-up, reorganization, and similar laws affecting the enforceability of creditors' rights generally and the availability of equitable remedies such as specific performance or injunction; and

(c) the authorization, execution and performance by the TFO of this Construction Commitment Agreement:

(i) does not and will not violate any laws applicable to the TFO; and

(ii) is not in contravention of its constating documents or its by-laws or the provisions of any loan agreement or other agreement to which it is a party or by which it is bound.

General

17. The **market participant** must pay for the TFO's legal fees (on a solicitor and client basis) and other costs, charges and expenses in respect of the enforcement of this Construction Commitment Agreement and the **financial security** by the TFO.

18. In this Construction Commitment Agreement:

(a) a notice or communication required or permitted to be given under this Construction Commitment Agreement must be in writing and is considered to have been duly given if delivered by hand or courier, transmitted by fax, or delivered by e-mail, to each party set out below:

(i) if to the **market participant**:

•
Attention: •
Fax No: •
E-mail: •

(ii) if to the TFO:

•
Attention: •
Fax No: •
E-mail: •

(iii) if to the ISO:

Alberta Electric System Operator
2500, 330 – 5th Ave SW

Calgary, Alberta T2P 0L4
E-mail: ISOtariffnotice@aeso.ca

(iv) to another address, fax or email as a party may designate by providing notice of the same to all parties.

(b) notice or communication is considered to have been received if delivered by hand or courier during business hours on a **business day**, upon receipt by a responsible representative of the receiver, and if not delivered during business hours, upon the commencement of business hours on the next **business day**, and if sent by fax or e-mail during business hours on a **business day**, upon the sender receiving confirmation of the fax or e-mail delivery, and if not sent during business hours, upon the commencement of business hours on the next **business day**.

19. The **market participant** must not assign this Construction Commitment Agreement without the prior written consent of the TFO.

20. The TFO must not assign this Construction Commitment Agreement without the prior written consent of the **market participant**, except that the TFO may assign its interest in this Construction Commitment Agreement to the **ISO** without the consent of the **market participant**.

21. Without prejudice to the **market participant**'s obligation to pay Cancellation Costs, nothing in this Construction Commitment Agreement is to be construed as an obligation on the part of the **market participant** to proceed with the Connection Project.

22. This Construction Commitment Agreement enures to the benefit of and will be binding upon the parties and their respective successors and permitted assigns.

23. No failure or delay on the TFO's part in exercising a power or right as provided in this Construction Commitment Agreement operates as a waiver of this Construction Commitment Agreement.

24. The TFO's rights and remedies as provided in this Construction Commitment Agreement are cumulative and not exclusive of a right or remedy at law or in equity.

25. Time is of the essence.

26. Whenever possible, each provision of this Construction Commitment Agreement must be interpreted in such a manner as to be effective and valid under applicable law, however, each provision of this Construction Commitment Agreement is intended to be severable and if a provision is determined by a court of competent jurisdiction to be illegal, invalid or unenforceable for any reason whatsoever, such provision will be severed from this Construction Commitment Agreement and will not affect the legality, validity or enforceability of the remainder of this Construction Commitment Agreement or any other provision of this Construction Commitment Agreement.

27. This Agreement is be governed by and interpreted in accordance with the laws of the Province of Alberta and the laws of Canada. The **market participant** and the TFO submit to the nonexclusive jurisdiction of the Courts of the Province of Alberta and agree to be bound by a suit, action or proceeding commenced in such Courts and by an order or judgment resulting from such suit, action or proceeding, but the foregoing in no way limits the right of the TFO to commence suits, actions or proceedings based on this Construction Commitment Agreement in any jurisdiction it may deem appropriate.

28. This Construction Commitment Agreement may be varied or amended only by or pursuant to an agreement in writing signed by the parties.

29. All Schedules are deemed fully to be a part of this Agreement. The Schedules may be varied or amended provided such amendments are signed by the parties, as provided in the Schedules.

30. This Agreement may be signed in one or more counterparts, originally or by fax, e-mail or other electronic means capable of producing a paper copy, and each such counterpart taken together will form one and the same agreement.

IN WITNESS WHEREOF the TFO and the **market participant** have executed this Construction Commitment Agreement:

[INSERT FULL NAME OF TFO]	**[INSERT FULL NAME OF MARKET PARTICIPANT]**
By: _____	By: _____
Name (print): _____	Name (print): _____
Title (print): _____	Title (print): _____

SCHEDULE "A"

To the Construction Commitment Agreement

Between

[Insert Name of Legal Owner of the Transmission Facility],
a **[corporation, incorporated] [partnership organized]**, pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]
(the "TFO")

– and –

[Insert name of Market Participant],
a **[corporation, incorporated] [partnership organized]**, pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]
(the "**market participant**")

PROJECT WORK AND FINANCIAL OBLIGATION

For Connection Project **[insert project name]**

[Author: If this is an amended Schedule "A", keep the language in the following first three paragraphs and the word "amended" in the fourth paragraph and in the "IN WITNESS WHEREOF" paragraph:

The TFO and **market participant** have agreed to amend the Construction Commitment Agreement pursuant to the terms and conditions contained this amended Schedule "A".

In consideration of the premises in this amended Schedule "A", the mutual covenants and agreements set forth and for other good and valuable consideration (the receipt and sufficiency of which is acknowledged by each of the parties), the parties agree to amend this Schedule "A" as provided below.

Effective upon execution of this amended Schedule "A", being the latest date of signature stated below, the Schedule "A" effective on **[insert date]** is deleted in its entirety and replaced with this amended Schedule "A".**]**

This **[amended]** Schedule "A" describes the Project Work to be performed by the TFO for the Connection Project. The Project Work as referenced in the Construction Commitment Agreement includes the following:

[Author: The table below should be revised to reflect the agreed upon Project Work and payment schedule, including any agreed upon changes to the description of work, number of stages or number of steps.]

Project Work	Estimated Costs	Date of Issue
[add description of work. For example: Stages 1 and 2 Activities: preparation and support for connection proposal, including connection study scope, technical studies, order-of-magnitude cost estimates, and project management]	Amount in words Canadian dollars plus GST (CND $ Amount in numbers + GST).	
Stages 3 and 4 Activities: preparation and support for submission and approval of a proposal to provide service (PPS), participant involvement program (PIP) and facilities application (FA) **[add description of any additional work]**	Amount in words Canadian dollars plus GST (CND $ Amount in numbers + GST).	
Stages 5 and 6 Costs: Construction Costs – Step 1 **[add description of any additional work]**	Amount in words Canadian dollars plus GST (CND $ Amount in numbers + GST).	
Stages 5 and 6 Costs: Construction Costs – Step 2 **[add description of any additional work]**	Amount in words Canadian dollars plus GST (CND $ Amount in numbers + GST).	
Stages 5 and 6 Costs: Construction Costs – Step 3 **[add description of any additional work]**	Amount in words Canadian dollars plus GST (CND $ Amount in numbers + GST).	
[Additional construction steps as required]	Amount in words Canadian dollars plus GST (CND $ Amount in numbers + GST).	
[Additional detail for any stages as required]	Amount in words Canadian dollars plus GST (CND $ Amount in numbers + GST).	
Total Costs as of **[Insert Date]**		

Provided the TFO has confirmed to the ISO that the **market participant** has delivered the **financial obligation** for the Project Work to the TFO, and provided that the Cancellation Costs for the Project Work do not exceed Insert Connection Project total in words Canadian dollars plus GST (CDN $ Connection Project total in numbers + GST), the **ISO** will direct the TFO to proceed with Project Work issued prior to permit and licence being granted by the **Commission**.

The required **construction contribution**, if any, is set out in Schedule “B”.

[Remainder of page intentionally left blank. Signature page to follow.]

IN WITNESS WHEREOF, the parties acknowledge that they have read this **[amended]** Schedule "A", understand it, and agree to be bound by it and have caused it to be executed by their duly authorized representatives effective as of the latest date of signature stated below.

[INSERT FULL NAME OF TFO]	**[INSERT FULL NAME OF MARKET PARTICIPANT]**
By: _____	By: _____
Name (print): _____	Name (print): _____
Title (print): _____	Title (print): _____
Date: _____	Date: _____

SCHEDULE "B"

To the Construction Commitment Agreement

Between

[Insert Name of Legal Owner of the Transmission Facility],
a **[corporation, incorporated] [partnership organized]**, pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]
(the "TFO")

– and –

[Insert name of Market Participant],
a **[corporation, incorporated] [partnership organized]**, pursuant to the laws of XXX,
with office[s] in the City of [insert city], in the Province of [insert province]
(the "**market participant**")

CONSTRUCTION CONTRIBUTION AND FINANCIAL SECURITY

For Connection Project **[insert project name]**

[Author: If this is an amended Schedule "B", keep the language in the following first three paragraphs and the word "amended" in the fourth paragraph and in the "IN WITNESS WHEREOF" paragraph:

The TFO and **market participant** have agreed to amend the Construction Commitment Agreement pursuant to the terms and conditions contained this amended Schedule "B".

In consideration of the premises in this amended Schedule "B", the mutual covenants and agreements set forth and for other good and valuable consideration (the receipt and sufficiency of which is acknowledged by each of the parties), the parties agree to amend this Schedule "B" as provided below.

Effective upon execution of this amended Schedule "B", being the latest date of signature stated below, the Schedule "B" effective on **[insert date]** is deleted in its entirety and replaced with this amended Schedule "B".**]**

This **[amended]** Schedule "B" describes the **construction contribution** and **financial security** to be provided to the TFO as of **[Insert Current Date]**. The **construction contribution** and **financial security** as referenced in the Construction Commitment Agreement includes the following:

1. Upon execution of the Construction Commitment Agreement, the **market participant** must provide to the TFO one or more of the following as determined in accordance with section 6 of the **ISO tariff**:

    (a) **Construction contribution** (cash payment) in the amount of Amount in words Canadian dollars plus GST (CDN $ Amount in numbers + GST); and

    (b) **Financial security** in one or more of the following forms:

        (i) an unconditional and irrevocable standby letter of credit payable on demand to the TFO and issued from a Canadian chartered bank or other comparable

financial institution acceptable to the TFO in the amount of Amount in words Canadian dollars plus GST (CDN $ Amount in numbers + GST);

(ii) a cash collateral deposit capable of being registered as a first security interest held by the TFO in the amount of Amount in words Canadian dollars plus GST (CDN $ Amount in numbers + GST); or

(iii) alternative **financial security** in a form, substance and amount determined at the sole discretion of the TFO.

2. The **market participant** must execute and if applicable, cause to have executed all security agreements and documentation in form and substance required from time to time by the TFO in its sole absolute discretion.

IN WITNESS WHEREOF, the parties acknowledge that they have read this **[amended]** Schedule "B", understand it, and agree to be bound by it and have caused it to be executed by their duly authorized representatives effective as of the latest date of signature stated below.

[INSERT FULL NAME OF TFO]	**[INSERT FULL NAME OF MARKET PARTICIPANT]**
By: _____	By: _____
Name (print): _____	Name (print): _____
Title (print): _____	Title (print): _____
Date: _____	Date: _____

ISO Tariff - Contents

July 2021 Tariff Rate Sheet Blacklines for Bulk and Regional Redesign

Rates

Rate DTS	Demand Transmission Service
Rate FTS	Fort Nelson Demand Transmission Service
Rate XOS	Export Opportunity Service
Rate XOM	Export Opportunity Merchant Service
Rate PSC	Primary Service Credit

Public

Alberta Electric System Operator

Calgary Place, 2500, 330-5th Avenue SW Calgary, AB T2P 0L4

Phone: 403-539-2450 | Fax: 403-539-2949

www.aeso.ca

@theaeso

ISO Tariff – Rate DTS
Demand Transmission Service

Applicability

1 Rate DTS of the **ISO tariff**, *Demand Transmission Service*, applies to **system access service** provided at a **point of delivery** to:

(a) the **legal owner** of an **electric distribution system**;

(b) a **person** who has entered into an arrangement directly with the **ISO** for the provision of **system access service** under subsection 101(2) of the **Act**;

(c) the **legal owner** of an industrial system that has been designated as such by the **Commission**; or

(d) the City of Medicine Hat.

Rate

2 The **ISO** must determine the charge under Rate DTS in a **settlement period** in accordance with subsections 3 through 7 below as the sum of the connection charge, the **operating reserve** charge, the **transmission constraint rebalancing** charge, the voltage control charge and the other system support services charge.

Connection Charge

3(1) The **ISO** must determine the connection charge as the sum, over all rows, of the products calculated by multiplying the volume and charge in each row (a) through (~~h~~i) of the following table.

Volume in **Settlement Period**	Charge
Energy Charge	
(~~c~~a) **Metered energy**	$X/MWh
Demand Charge	
(~~a~~b) Coincident **metered demand**	$X/MW/**month**
(~~b~~c) **Billing capacity**	$X/MW/**month**
~~Energy Charge~~	
~~(c) **Metered energy**~~	~~$X/MWh~~
Point of Delivery Charge	
(d) **Substation fraction**	$X/**month**
(e) First (7.5 × **substation fraction**) MW of **billing capacity**	$X/MW/**month**
(f) Next (9.5 × **substation fraction**) MW of **billing capacity**	$X/MW/**month**
(g) Next (23 × **substation fraction**) MW of **billing capacity**	$X/MW/**month**

Volume in **Settlement Period**	Charge
(h) All remaining MW of **billing capacity**	$X/MW/**month**

3(2) The **ISO** must determine the **settlement period** coincident **metered demand** as the **metered demand** at the **point of delivery** ~~averaged~~ in the ~~15-minute~~one hour interval in which the sum of the **metered demands** for all Rate DTS and Rate FTS of the **ISO tariff**, *Fort Nelson Demand Transmission Service*, **market participants** is greatest in the **settlement period**.

3(3) The **ISO** must obtain the coincident **metered demand** determined pursuant to subsection 3(2) for each prior **settlement period** that was:

(a) after January 1, 2024;

(b) for the same **month** as the **settlement period**; and

(c) within five years of the **settlement period**.

3(4) The **ISO** must calculate the coincident **metered demand** for use in subsection 3(1)(b) as the average of the **settlement period** coincident **metered demand** determined pursuant to subsection 3(2) and either:

(a) the four most recent coincident **metered demand** values obtained pursuant to subsection 3(3), if there were at least four values were obtained; or

(b) all coincident **metered demand** values obtained pursuant to subsection 3(3), if fewer than four values were obtained.

Operating Reserve Charge

4(1) The **ISO** must determine the **operating reserve** charge as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate DTS **market participant** in the hour; and

(b) the total cost of **operating reserves** in the hour divided by the total **metered energy** for all Rate DTS, Rate DOS of the **ISO tariff**, *Demand Opportunity Service*, Rate XOS of the **ISO tariff**, *Export Opportunity Service*, Rate XOM of the **ISO tariff**, *Export Opportunity Merchant Service*, and Rate FTS **market participants** in the hour.

4(2) The **ISO** must estimate the **operating reserve** charge, if unable to determine it for a **settlement period** in accordance with subsection 4(1) above, as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate DTS **market participant** in the hour; and

(b) **pool price** in the hour multiplied by X%.

Transmission Constraint Rebalancing Charge

5 The **ISO** must determine the **transmission constraint rebalancing** charge as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate DTS **market participant** in the hour; and

(b) the total cost of **transmission constraint rebalancing** payments in the hour divided by the total **metered energy** for all Rate DTS and Rate FTS **market participants** in the hour.

Voltage Control Charge

6 The **ISO** must determine the voltage control charge as the product of **metered energy** in the **settlement period** multiplied by $X/MWh.

Other System Support Services Charge

7 The **ISO** must determine the other system support services charge as the sum of:

(a) the highest **metered demand** in the **settlement period** multiplied by $X/MW/**month**; and

(b) when **power factor** is less than 90% during the interval of highest **metered demand** in the **settlement period**, $400.00/MVA multiplied by the **apparent power** difference calculated during the interval of highest **metered demand** in the **settlement period** as the difference between the metered **apparent power** and 111% of **metered demand**, unless the **ISO** waived the application of such a charge prior to December 31, 2016.

Terms

8(1) The **ISO** must apply Rate DTS separately at each **point of delivery**, except where Rate DTS applies to totalized **points of delivery** under subsection 10.3 of the **ISO tariff**, *Settlement and Payment Terms*.

8(2) The **ISO** must determine **metered energy** under Rate DTS, ~~in an hour for which a Rate DOS of the **ISO tariff**, *Demand Opportunity Service*, transaction has been approved by the **ISO**~~ at a **point of delivery** where Rate DOS applies, as the sum of:

(a) **metered energy** up to the Rate DTS **contract capacity**; plus

(b) any additional **metered energy** determined under subsection 2(2) of Rate DOS.

8(3) The **ISO** must apply Rider C of the **ISO tariff**, *Deferral Account Adjustment Rider*, to **system access service** provided under this rate.

8(4) The **ISO** must apply Rider F of the **ISO tariff**, *Balancing Pool Consumer Allocation Rider*, to **system access service** provided under this rate.

8(5) The terms and conditions of the **ISO tariff** form part of this rate.

Revision History

Effective	Description
2024-01-01	As filed in the bulk and regional tariff application on October 15, 2021.
2021-01-01	Updated charges as approved on a final basis in **Commission** Decision 26054-D01-2020 issued on December 18, 2020.
2020-04-01	Updated charges as approved on an interim refundable basis in **Commission** Decision 25175-D01-2020 issued February 28, 2020 and on a final basis approved in **Commission** Decision 25175-D02-2020.
2019-01-01	Updated charges, as approved in **Commission** Decision 24036-D01-2018 issued on December 18, 2018.
2018-01-01	Updated charges, as approved in **Commission** Decision 23065-D01-2017 issued on November 28, 2017.
2017-01-01	Updated charges, as approved on an interim refundable basis in **Commission** Decision 22093-D01-2016 issued on December 2, 2016 and on a final basis in **Commission** Decision 22093-D02-2017 on April 4, 2017.
2016-04-01	Updated charges, as approved in **Commission** Decision 21302-D01-2016 issued on March 31, 2016.
2016-01-01	Updated charges, as approved in **Commission** Decision 20753-D02-2015 issued on December 21, 2015.
2015-11-26	Updated subsections and charges, as approved in **Commission** Decision 20623-D01-2015 issued on November 5, 2015.
2015-07-01	Updated subsections and charges, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.
2013-10-01	Updated charges, as approved on an interim refundable basis in **Commission** Decision 2013-325 issued on August 28, 2013 and on a final basis in **Commission** Decision 2014-242 issued on August 21, 2014.
2011-07-01	Revised and reformatted all subsections, as approved in **Commission** Decision 2011-275 issued on June 24, 2011.

ISO Tariff – Rate FTS
Fort Nelson Demand Transmission Service

Applicability

1 Rate FTS of the **ISO tariff**, *Fort Nelson Demand Transmission Service*, applies to **system access service** provided at the **point of delivery** to BC Hydro at Fort Nelson, British Columbia.

Rate

2 The **ISO** must determine the charge under Rate FTS in a **settlement period** in accordance with subsections 3 through 7 below as the sum of the connection charge, the **operating reserve** charge, the **transmission constraint rebalancing** charge, the voltage control charge and the other system support services charge.

Connection Charge

3(1) The **ISO** must determine the connection charge as the sum, over all rows, of the products calculated by multiplying the volume and charge in each row (a) through (c) of the following table.

Volume in **Settlement Period**	Charge
Energy Charge	
(~~e~~a) **Metered energy**	$X/MWh
Demand Charge	
(~~a~~b) Coincident **metered demand**	$X/MW/**month**
(~~b~~c) **Billing capacity**	$X/MW/**month**

3(2) The **ISO** must determine the **settlement period** coincident **metered demand** as the **metered demand** at the **point of delivery** ~~averaged over the 15-minute~~ in the one hour interval in which the sum of the **metered demands** for all Rate DTS of the **ISO tariff**, *Demand Transmission Service*, and Rate FTS **market participants** is greatest in the **settlement period**.

3(3) The **ISO** must obtain the coincident **metered demand** determined pursuant to subsection 3(2) for each prior **settlement period** that was:

(a) after January 1, 2024;

(b) for the same **month** as the **settlement period**; and

(c) within five years of the **settlement period**.

3(4) The **ISO** must calculate the coincident **metered demand** for use in subsection 3(1)(b) as the average of the **settlement period** coincident **metered demand** determined pursuant to subsection 3(2) and either:

(a) the four most recent coincident **metered demand** values obtained pursuant to subsection 3(3), if there were at least four values were obtained; or

(b) all coincident **metered demand** values obtained pursuant to subsection 3(3), if fewer than four values were obtained.

3(~~3~~5) The **ISO** must determine the rate for the ~~regional system charge~~billing capacity charge in subsection~~s~~ 3(1)(~~bc~~c) ~~and (d)~~ above as the greater of:

(a) the rate for the ~~regional system~~ billing capacity charge in subsections 3(1)(c) ~~and (d)~~ of Rate DTS; or

(b) a specific Fort Nelson rate based on the levelized cost of the original ATCO Electric line providing service to Fort Nelson.

Operating Reserve Charge

4(1) The **ISO** must determine the **operating reserve** charge as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate FTS **market participant** in the hour; and

(b) the total cost of **operating reserves** in the hour divided by the total **metered energy** for all Rate DTS, Rate DOS of the **ISO tariff**, *Demand Opportunity Service*, Rate XOS of the **ISO tariff**, *Export Opportunity Service*, Rate XOM of the **ISO tariff**, *Export Opportunity Merchant Service*, and Rate FTS **market participants** in the hour.

4(2) The **ISO** must estimate the **operating reserve** charge, if unable to determine it for a **settlement period** in accordance with subsection 4(1) above, as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate FTS **market participant** in the hour; and

(b) **pool price** in the hour multiplied by 6.19%.

Transmission Constraint Rebalancing Charge

5 The **ISO** must determine the **transmission constraint rebalancing** charge as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate FTS **market participant** in the hour; and

(b) the total cost of **transmission constraint rebalancing** payments in the hour divided by the total **metered energy** for all Rate DTS and Rate FTS **market participants** in the hour.

Voltage Control Charge

6 The **ISO** must determine the voltage control charge as the sum of:

(a) the product of **metered energy** in the **settlement period** multiplied by $X/MWh; and

(b) the sum, over all hours in the **settlement period** in which Rainbow area load exceeds 145 MW and transmission must-run generation is required in the Rainbow area, of the cost associated with transmission must-run generation in the Rainbow area in an hour multiplied by the ratio in the hour of:

(i) Fort Nelson load in excess of 38.5 MW; to

(ii) the sum of Fort Nelson load in excess of 38.5 MW and Alberta Rainbow area load (excluding Fort Nelson load) in excess of 106.5 MW.

Other System Support Services Charge

7 The **ISO** must determine the other system support services charge as the sum of:

(a) the highest **metered demand** in the **settlement period** multiplied by $X/MW/**month**; and

(b) when **power factor** is less than 90% during the interval of highest **metered demand** in the **settlement period**, $400.00/MVA multiplied by the **apparent power** difference calculated during the interval of highest **metered demand** in the **settlement period** as the difference between the metered **apparent power** and 111% of **metered demand**, unless the **ISO** waived the application of such a charge prior to December 31, 2016.

Terms

8(1) BC Hydro must, if it terminates the **system access service** provided under this rate prior to the full payment of the levelized cost of the original ATCO Electric line providing service to Fort Nelson under subsection 3(3)(b) above, pay the amount the **ISO** determines as the remaining unpaid balance of those costs net of any residual value, in addition to any **financial obligations** under section 5 of the **ISO tariff**, *Changes to System Access Service*.

8(2) The **ISO** must apply Rider C of the **ISO tariff**, *Deferral Account Adjustment Rider*, to **system access service** provided under this rate.

8(3) The terms and conditions of the **ISO tariff** form part of this rate.

Revision History

Effective	Description
2024-01-01	As filed in the bulk and regional tariff application on October 15, 2021.
2021-01-01	Updated charges, as approved in **Commission** Decision 26054-D01-2020 issued on December 18, 2020.
2020-04-01	Updated charges as approved on an interim refundable basis in **Commission** Decision 25175-D01-2020 issued February 28, 2020 and revised Other System Support Services Charge waiver, as approved on a final basis in **Commission** Decision 25175-D02-2020 issued on November 30, 2020.
2019-01-01	Updated charges, as approved in **Commission** Decision 24036-D01-2018 issued on December 18, 2018.
2018-01-01	Updated charges, as approved in **Commission** Decision 23065-D01-2017 issued on November 28, 2017.
2017-01-01	Updated charges, as approved on an interim refundable basis in **Commission** Decision 22093-D01-2016 issued on December 2, 2016 and on a final basis in **Commission** Decision 22093-D02-2017 on April 4, 2017.

2016-04-01	Updated charges, as approved in **Commission** Decision 21302-D01-2016 issued on March 31, 2016.
2016-01-01	Updated charges, as approved in **Commission** Decision 20753-D02-2015 issued on December 21, 2015.
2015-11-26	Updated subsections and charges, as approved in **Commission** Decision 20623-D01-2015 issued on November 5, 2015.
2015-07-01	Updated subsections and charges, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.
2013-10-01	Updated charges, as approved on an interim refundable basis in **Commission** Decision 2013-325 issued on August 28, 2013 and on a final basis in **Commission** Decision 2014-242 issued on August 21, 2014
2011-07-01	Revised and reformatted all subsections, as approved in **Commission** Decision 2011-275 issued on June 24, 2011.

ISO Tariff – Rate XOS
Export Opportunity Service

Applicability

1 Rate XOS of the **ISO tariff**, *Export Opportunity Service*, applies to **system access service** provided to **market participants** who export electric energy from the **interconnected electric system** utilizing an **intertie** that existed on August 12, 2004, as referred to in section 16 of the *Transmission Regulation*.

Availability

2 The **ISO** must make export opportunity service available:

(a) only when sufficient capacity exists on the **transmission system** to accommodate the capacity scheduled for export; and

(b) a minimum of 24 hours following execution of an agreement for **system access service** for export opportunity service.

Rate

3(1) The **ISO** must provide export opportunity service in accordance with the charge, recall **directive** response time and recall priority in the following table.

Rate	Charge	Recall **Directive** Response Time	Recall Priority
XOS	$X/MWh	1 hour	Before Rates DTS, FTS and DOS (any type)

3(2) The **ISO** must determine the amount billed for export opportunity service in a **settlement period** as the greater of:

(a) (i) the Rate XOS charge from subsection 3(1) above multiplied by the **market participant**'s export **interchange transaction** during the **settlement period**; plus

(ii) an incremental losses charge or credit calculated as the sum, over all transaction hours in the **settlement period**, of the **market participant**'s export **interchange transaction** in the hour multiplied by **pool price** for the hour multiplied by a **loss factor** for the **intertie**, where the **loss factor** is determined in accordance with section 501.10 of the **ISO rules**, *Transmission Loss Factors*, which is available to **market participants** on the AESO website;

or

(b) a minimum amount calculated as the sum, over all transaction hours in the **settlement period**, of:

(i) the Rate XOS charge from subsection 3(1) above, as applicable, multiplied by the **market participant**'s hour-ahead scheduled capacity multiplied by 75%; plus

(ii) an incremental losses charge calculated as the **market participant**'s hour-ahead scheduled capacity multiplied by 75% multiplied by **pool price** for the hour multiplied by a **loss factor** for the **intertie**, where the **loss factor** is determined in accordance with section 501.10 of the **ISO rules**, *Transmission Loss Factors*, which is available to **market participants** on the AESO website.

3(3) The **ISO** must determine the **operating reserve** charge as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate XOS **market participant** in the hour; and

(b) the total cost of **operating reserves** in the hour divided by the total **metered energy** for all Rate DTS of the **ISO tariff**, *Demand Transmission Service*, Rate DOS of the **ISO tariff**, *Demand Opportunity Service*, Rate XOS, Rate XOM of the **ISO tariff**, *Export Opportunity Merchant Service*, and Rate FTS of the **ISO tariff**, *Fort Nelson Demand Transmission Service*, **market participants** in the hour~~The **ISO** must add an **operating reserve** charge, an other system support services charge or both to the amount billed for export opportunity service in a **settlement period** when the transaction requires the **ISO** to procure incremental **operating reserves**, incremental system support services or both.~~

3(4) The **ISO** must estimate the **operating reserve** charge, if unable to determine it for a **settlement period** in accordance with subsection 4(1) above, as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate XOS **market participant** in the hour; and

(b) **pool price** in the hour multiplied by X%.

3(5) The **ISO** must add a transaction fee of $500.00 to the amount billed for export opportunity service in a **settlement period** in which at least one Rate XOS transaction was approved for the **market participant**.

Terms

4(1) The **ISO** must apply Rate XOS separately at each **point of interconnection**.

4(2) A **market participant** must achieve curtailment of its export opportunity service within the response time specified in subsection 3(1) above in response to a **directive** from the **ISO**.

4(3) The **market participant** may contract for export opportunity service for a term within the minimum and maximum terms in the following table.

Rate	Minimum Term	Maximum Term
XOS	1 hour	1 **month**

4(4) The **ISO** must apply Rider E of the **ISO tariff**, *Losses Calibration Factor Rider*, to **system access service** provided under this rate.

4(5) The terms and conditions of the **ISO tariff** form part of this rate.

Revision History

Effective	Description
2024-01-01	As filed in the bulk and regional tariff application on October 15, 2021.
2021-01-01	Updated charges as approved in **Commission** Decision 26054-D01-2020 issued on December 18, 2020.
2020-04-01	Updated charges as approved on an interim refundable basis in **Commission** Decision 25175-D01-2020 issued February 28, 2020 and revised Other System Support Services Charge waiver, as approved on a final basis in **Commission** Decision 25175-D02-2020 issued on November 30, 2020.
2019-01-01	Updated charges, as approved in **Commission** Decision 24036-D01-2018 issued on December 18, 2018.
2018-01-01	Updated charges, as approved in **Commission** Decision 23065-D01-2017 issued on November 28, 2017.
2017-01-01	Updated charges, as approved on an interim refundable basis in **Commission** Decision 22093-D01-2016 issued on December 2, 2016 and on a final basis in **Commission** Decision 22093-D02-2017 on April 4, 2017.
2016-04-01	Updated charges, as approved in **Commission** Decision 21302-D01-2016 issued on March 31, 2016.
2016-01-01	Updated charges, as approved in **Commission** Decision 20753-D02-2015 issued on December 21, 2015.
2015-07-01	Updated subsections and charges, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015 except for the losses charge component in subsection 3(2) approved on an interim basis in **Commission** Decision 2014-242 issued on August 21, 2014.
2013-10-01	Updated charges, as approved on an interim refundable basis in **Commission** Decision 2013-325 issued on August 28, 2014 and on a final basis, in **Commission** Decision 2014-242 issued on August 21, 2014 except for the losses charge component in subsection 3(2) approved on an interim basis in **Commission** Decision 2014-242 issued on August 21, 2014.
2011-07-01	Revised and reformatted all subsections, as approved in **Commission** Decision 2011-275 issued on June 24, 2011.

ISO Tariff – Rate XOM
Export Opportunity Merchant Service

Applicability

1 Rate XOM of the **ISO tariff**, *Export Opportunity Merchant Service*, applies to **system access service** provided to **market participants** who export electric energy from the **interconnected electric system** utilizing a merchant **intertie**, defined in accordance with subsection 27(4) of the *Transmission Regulation* as an **intertie** for which the cost of planning, designing, constructing, operating and interconnecting is paid by the person who proposed the **intertie** and other persons that directly benefit from the **intertie**.

Availability

2 The **ISO** must make export opportunity merchant service available:

(a) only when sufficient capacity exists on the **transmission system** to accommodate the capacity scheduled for export; and

(b) a minimum of 24 hours following execution of an agreement for **system access service** for export opportunity merchant service.

Rate

3(1) The **ISO** must provide export opportunity merchant service in accordance with the charge, recall **directive** response time and recall priority in the following table.

Rate	Charge	Recall **Directive** Response Time	Recall Priority
XOM	$X/MWh	1 hour	Before Rates DTS, FTS and DOS (any type)

3(2) The **ISO** must determine the amount billed for export opportunity merchant service in a **settlement period** as the greater of:

(a) the Rate XOM charge from subsection 3(1) above multiplied by the **market participant**'s export **interchange transaction** during the **settlement period**; or

(b) a minimum amount calculated as the sum, over all transaction hours in the **settlement period**, of the Rate XOM charge from subsection 3(1) above multiplied by the **market participant**'s hour-ahead scheduled capacity multiplied by 75%.

3(3) The **ISO** must determine the **operating reserve** charge as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate XOM **market participant** in the hour; and

(b) the total cost of **operating reserves** in the hour divided by the total **metered energy** for all Rate DTS of the **ISO tariff**, *Demand Transmission Service*, Rate DOS of the **ISO tariff**, *Demand Opportunity Service*, Rate XOS of the **ISO tariff**, *Export Opportunity Service*, Rate XOM and Rate FTS of the **ISO tariff**, *Fort Nelson Demand Transmission Service*, **market participants** in the hour~~The **ISO** must add an **operating reserve** charge, an other system support services charge or both to the amount billed for export opportunity merchant~~

~~service in a **settlement period** when the transaction requires the **ISO** to procure incremental **operating reserves**, incremental system support services or both.~~

3(4) The **ISO** must estimate the **operating reserve** charge, if unable to determine it for a **settlement period** in accordance with subsection 4(1) above, as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate XOM **market participant** in the hour; and

(b) **pool price** in the hour multiplied by X%.

3(45) The **ISO** must add a transaction fee of $500.00 to the amount billed for export opportunity merchant service in a **settlement period** in which at least one Rate XOM transaction was approved for the **market participant**.

Terms

4(1) The **ISO** must apply Rate XOM separately at each **point of interconnection**.

4(2) A **market participant** must achieve curtailment of its export opportunity merchant service within the response time specified in subsection 3(1) above in response to a **directive** from the **ISO**.

4(3) The **market participant** may contract for export opportunity merchant service for a term within the minimum and maximum terms in the following table.

Rate	Minimum Term	Maximum Term
XOM	1 hour	1 **month**

4(4) The terms and conditions of the **ISO tariff** form part of this rate.

Revision History

Effective	Description
2024-01-01	As filed in the bulk and regional tariff application on October 15, 2021.
2021-01-01	Updated charges as approved in **Commission** Decision 26054-D01-2020 issued on December 18, 2020.
2021-04-01	Updated charges as approved on an interim refundable basis in **Commission** Decision 25175-D01-2020 issued February 28, 2020 and revised Other System Support Services Charge waiver, as approved on a final basis in **Commission** Decision 25175-D02-2020 issued on November 30, 2020.
2019-01-01	Updated charges, as approved in **Commission** Decision 24036-D01-2018 issued on December 18, 2018.
2018-01-01	Updated charges, as approved in **Commission** Decision 23065-D01-2017 issued on November 28, 2017.

2017-01-01	Updated charges, as approved on an interim refundable basis in **Commission** Decision 22093-D01-2016 issued on December 2, 2016 and on a final basis in **Commission** Decision 22093-D02-2017 on April 4, 2017.
2016-04-01	Updated charges, as approved in **Commission** Decision 21302-D01-2016 issued on March 31, 2016.
2016-01-01	Updated charges, as approved in **Commission** Decision 20753-D02-2015 issued on December 21, 2015.
2015-07-01	Updated subsections and charges, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.
2013-10-01	Introduced for export service over Alberta-Montana **intertie**, as approved on interim refundable basis in **Commission** Decision 2013-325 issued on August 28, 2013.

ISO Tariff – Rate PSC
Primary Service Credit

Applicability

1(1) Rate PSC of the **ISO tariff**, *Primary Service Credit*, applies to **system access service** provided at a **point of delivery** to a **market participant** who receives **system access service** under Rate DTS of the **ISO tariff**, *Demand Transmission Service*, and:

(a) does not utilize transformation facilities owned by a **legal owner** of **transmission facilities** to step transmission voltage down to 25 kV or less; or

(b) is served through an unconventional connection such as one using metering transformers.

1(2) Rate PSC does not apply to **system access service** to an isolated community as defined under the *Isolated Generating Units and Customer Choice Regulation*.

Rate

2(1) The **ISO** must determine the primary service credit to compensate a **market participant** whose connection does not include conventional transformation facilities owned by a **legal owner** of **transmission facilities**, including a connection for a **market participant** who has purchased, owns and operates its transformer.

2(2) The **ISO** must determine the primary service credit as the sum of the products calculated by multiplying the volume and credit in each row (a) through (e) of the following table.

Volume in **Settlement Period**	Credit
(a) **Substation fraction**	$X/**month**
(b) First (7.5 × **substation fraction**) MW of **billing capacity**	$X/MW/**month**
(c) Next (9.5 × **substation fraction**) MW of **billing capacity**	$X/MW/**month**
(d) Next (23 × **substation fraction**) MW of **billing capacity**	$X/MW/**month**
(e) All remaining MW of **billing capacity**	$X/MW/**month**

Terms

3(1) The **ISO** must apply Rate PSC separately at each **point of delivery**, except where Rate PSC applies to totalized **points of delivery** in accordance with subsection 10.3 of the **ISO tariff**, *Settlement and Payment Terms*.

3(2) The **ISO** must provide the primary service credit in conjunction with a reduced maximum local investment in accordance with subsection 4.7 of the **ISO tariff**, *Classification and Allocation of Connection Projects Costs*.

3(3) The **ISO** must apply Rider C of the **ISO tariff**, *Deferral Account Adjustment Rider*, to **system access service** provided under this rate.

3(4) The terms and conditions of the **ISO tariff** form part of this rate.

Revision History

Effective	Description
2021-01-01	Updated charges as approved in **Commission** Decision 26054-D01-2020 issued on December 18, 2020.
2020-04-01	Updated charges as approved on an interim refundable basis in **Commission** Decision 25175-D01-2020 issued February 28, 2020 and revised Other System Support Services Charge waiver, as approved on a final basis in **Commission** Decision 25175-D02-2020 issued on November 30, 2020.
2019-01-01	Updated credit levels, as approved in **Commission** Decision 24036-D01-2018 issued on December 18, 2018.
2018-01-01	Updated credit levels, as approved in **Commission** Decision 23065-D01-2017 issued on November 28, 2017.
2017-01-01	Updated credit levels, as approved on an interim refundable basis in **Commission** Decision 22093-D01-2016 issued on December 2, 2016 and on a final basis in **Commission** Decision 22093-D02-2017 on April 4, 2017.
2016-04-01	Updated credit levels, as approved in **Commission** Decision 21302-D01-2016 issued on March 31, 2016.
2016-01-01	Updated credit levels, as approved in **Commission** Decision 20753-D02-2015 issued on December 21, 2015.
2015-07-01	Updated subsections and credit levels, as approved in **Commission** Decision 3473-D01-2015 issued on June 17, 2015.
2011-07-01	Revised and reformatted all subsections, as approved in **Commission** Decision 2011-275 issued on June 24, 2011.

DOS Blackline Rate Sheet

Applicability

1 Rate DOS of the **ISO tariff**, *Demand Opportunity Service*, applies to **system access service** provided at a **point of delivery** to a **market participant** who:

(a) receives **system access service** under Rate DTS of the **ISO tariff**, *Demand Transmission Service*;

(b) is eligible for demand opportunity service under section 9 of the **ISO tariff**, *Demand Opportunity Service*; and

(c) is recallable in accordance with the provisions of this rate.

Metered Energy

2(1) The **ISO** must apply a Rate DOS charge to **metered energy** received at a **point of delivery** in every hour:

(a) for which a Rate DOS ~~transaction~~ has been ~~approved~~ dispatched by the **ISO**;

(b) above the Rate DTS **contract capacity** for the **system access service**; and

(c) up to the sum of the Rate DTS **contract capacity** and the ~~approved~~ dispatched Rate DOS ~~transaction~~ **contract capacity** for the **system access service** and equal to or below the **maximum annual load factor balance**.

2(2) The **ISO** must add to the **market participant**'s **metered energy** received at a **point of delivery** under:

(a) Rate DTS any **metered energy** received at the **point of delivery** in an hour that exceeds the sum of the Rate DTS **contract capacity** and the ~~approved~~ dispatched Rate DOS ~~transaction~~ **contract capacity** for the **system access service** and that is equal to or below the **maximum annual load factor balance**, in the same **settlement period**; and~~.~~

(b) Rate DOS DTS surcharge rate any **metered energy** received at the **point of delivery** in an hour that exceeds the Rate DTS **contract capacity** and the **maximum annual load factor balance**, in the same **settlement period**.

2(3) On an annual basis, the **ISO** must calculate the **market participant's** "**maximum annual load factor limit**" which shall be an amount equal to the Rate DOS **contract capacity** for the **system access service** multiplied by the number of hours in the following 12-month period multiplied by 0.2. For each **settlement period** in the following 12-month period, the **ISO** shall reduce the **maximum annual load factor limit** by the aggregate amount of **metered energy** that received a Rate DOS charge pursuant to subsection 2(1) to calculate the "**maximum annual load factor balance**".

2(4) The **ISO** must recalculate the maximum annual load factor limit on the anniversary date of the effective date of the **system access service** agreement for Rate DOS using the **contract capacity** in effect at the anniversary date.

Rate

3(1) The **ISO** must provide the three types of demand opportunity service in accordance with the charges, ~~recall directive response times~~ and recall priorities in the following table.

Rate DOS Type	Rate DOS Charge	~~Recall **Directive** Response Time~~	Recall Priority
(a) DOS ~~7 Minutes~~ Dispatchable	$X/MWh	~~7 minutes~~	Before Rates DTS, and ~~FTS, DOS Term and DOS 1 Hour~~
~~(b) DOS 1 Hour~~	~~$18.14/MWh~~	~~1 hour~~	~~Before Rates DTS, FTS and DOS Term~~
(b~~c~~)DOS Term	$X/MWh	~~7 minutes~~	Before Rates DTS and FTS
(c) DTS surcharge rate	$X/MWh		Before Rates DTS, and FTS

3(2) The **ISO** must determine the amount ~~billed~~ charged or credited for demand opportunity service in a **settlement period** as~~:~~ ~~the greater of:~~

(a) ~~(i)~~ the Rate DOS charge from subsection 3(1)(a), (b), or (c) above, as applicable, multiplied by the **metered energy** during the **settlement period**; plus

(b) ~~(ii)~~ an incremental losses charge or credit calculated as the sum, over all transaction hours in the **settlement period**, of **metered energy** in the hour multiplied by **pool price** in the hour multiplied by a **loss factor** for the facility, where the **loss factor** is determined in accordance with section 501.10 of the **ISO rules**, *Transmission Loss Factors*, which is available to **market participants** on the AESO website.~~;~~

~~or~~

~~(b) a minimum amount equal to the Rate DOS charge from subsection 3(1)(a), (b), or (c) above, as applicable, multiplied by the approved **Rate DOS transaction capacity** multiplied by the number of hours in total transactions in the **settlement period** multiplied by 75%.~~

~~**3(3)** The **ISO** must add a transaction fee of $500.00 to the amount billed for demand opportunity service in a **settlement period** in which the **ISO** approved at least one Rate DOS transaction at the **point of delivery**.~~

3(3) The **ISO** must determine the **operating reserve** charge as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate DOS **market participant** in the hour; and

(b) the total cost of **operating reserves** in the hour divided by the total **metered energy** for all Rate DTS, Rate DOS, Rate XOS of the **ISO tariff**, *Export Opportunity Service*, Rate XOM of the **ISO tariff**, *Export Opportunity Merchant Service*, and Rate FTS of the **ISO tariff**, *Fort Nelson Demand Transmission Service*, **market participants** in the hour.

3(4) The **ISO** must estimate the **operating reserve** charge, if unable to determine it for a **settlement period** in accordance with subsection 3(3) above, as the sum, over all hours in the **settlement period**, of the amount calculated in each hour as the product of:

(a) **metered energy** for the Rate DOS **market participant** in the hour; and

(b) **pool price** in the hour multiplied by X%.

Terms

4(1) The **ISO** must apply Rate DOS separately at each **point of delivery**.

4(2) The **market participant** must, if the **ISO** recalls a **market participant**'s demand opportunity service, curtail load by the amount directed by the **ISO** which:

(a) may be an amount up to the ~~approved~~ dispatched Rate DOS ~~transaction~~ **contract capacity**; and

(b) must not require curtailment below the **market participant**'s Rate DTS **contract capacity** for the **system access service**.

4(3) The **market participant** must, in response to a **directive** from the **ISO**, achieve curtailment of its demand opportunity service load within the response time specified in the **ISO rules**. ~~subsection 3(1)(a), or or (b), or (c) above, as applicable~~.

4(4) The **ISO** must apply Rider E of the **ISO tariff**, *Losses Calibration Factor Rider*, to **system access service** provided under this rate.

4(~~5~~4) The **ISO** must apply Rider F of the **ISO tariff**, *Balancing Pool Consumer Allocation Rider*, to **system access service** provided under this rate, with the exception of the City of Medicine Hat.

4(~~6~~5) The terms and conditions of the **ISO tariff** form part of this rate.

[insert Substation Name and No – DOS - Date – Project No]

SYSTEM ACCESS SERVICE AGREEMENT
FOR DEMAND OPPORTUNITY SERVICE RATE
("DOS Agreement")

This DOS Agreement is made effective as of the Effective Date.

Between:

Independent System Operator, operating as AESO,
a statutory corporation established pursuant to the
Electric Utilities Act (Alberta)
with offices in the City of Calgary, in the Province of Alberta
(the "**ISO**")

and

[insert legal name of corporation or partnership],
a **[corporation, incorporated] [partnership organized]** pursuant to the laws of [●],
with office[s] in the City of [insert city], in the Province of [insert province]
(the "**market participant**")

RECITALS:

A. This DOS Agreement sets out the particular details of the **system access service** that the **ISO** will provide to the **market participant** under Rate DOS of the **ISO tariff**.

B. The **ISO tariff** contains additional terms and conditions of **system access service**. This DOS Agreement is comprised of both this document and the **ISO tariff**, and accordingly, both this document and the **ISO tariff** must be referred to and administered by the parties, even though the **ISO tariff** is not attached but incorporated into this DOS Agreement by reference.

In consideration of the premises to this DOS Agreement, the mutual covenants and agreements set forth in this DOS Agreement and other good and valuable consideration (the receipt and sufficiency of which is acknowledged by each of the parties), the parties agree as follows:

1. DEFINITIONS AND INTERPRETATION

(a) Unless otherwise defined in this DOS Agreement, bolded terms, not including headings, used in this DOS Agreement have the meanings given to them in the *Consolidated Authoritative Document Glossary*. Capitalized terms have the meanings given to them in the preamble or body of this DOS Agreement, including:

i. "DOS Agreement" means this System Access Service Agreement for Demand Opportunity Service Rate; and

ii. "Effective Date" means the date that is this DOS Agreement comes into effect, in accordance with Section 2 below.

(b) Should the **ISO tariff**, **ISO rules** or *Consolidated Authoritative Document Glossary* be amended from time to time during the term of this DOS Agreement by approval of the

Commission, then such amended **ISO tariff**, **ISO Rules or** *Consolidated Authoritative Document Glossary* will apply to this DOS Agreement and this DOS Agreement shall be deemed amended upon each such approval.

(c) In the event of any conflict or inconsistency between this document and the **ISO tariff**, the latter shall prevail.

2. EFFECTIVE DATE

This DOS Agreement becomes effective immediately following the later of:

(a) the effective date of the **system access service** for Rate DTS; or

(b) the day this **DOS Agreement** is executed.

3. POINT OF DELIVERY

Point of delivery is located at and described as follows:

Substation name and #: [Name of Substation (123S)]

Measurement Point Identification (MPID): [insert assigned number]

4. DOS CONTRACT CAPACITY

Contract capacity is MW for the term of this DOS Agreement:

5. TECHNICAL AND COMMERCIAL INFORMATION

(a) The type of demand opportunity service expected to be used.

DOS Dispatchable ☐ DOS Term ☐

(b) The **market participant** shall provide the **ISO** with any technical information the **ISO** may request.

(c) The **market participant** has read and acknowledges the eligibility criteria in the **ISO tariff** for Rate DOS.

Yes ☐ No ☐

(d) The **market participant** has attached a brief description of the **market participant's** proposed use of Rate DOS in an attachment labeled "Schedule A".

(e) The **market participant** must notify the **ISO** with ten (10) **business days** upon the occurrence of any change that materially impacts the **market participant's** eligibility for Rate DOS under the **ISO tariff**. The **market participant** must provide such assurances and information as the **ISO** may reasonably request respecting any **system access service** to be provided pursuant to this **DOS Agreement** and the **market participant's** eligibility for such **system access service**.

6. SETTLEMENT

The **ISO** must charge, and the **market participant** must pay, amounts in accordance with Rate DOS commencing in the **settlement period** in which the **ISO** commences the provision of **system access service** to the **market participant**.

7. ISO OBLIGATION TO PROVIDE SERVICE

Subject to Section 8 and 9 of this **DOS Agreement**, the **ISO** must provide **system access service** under Rate DOS to the **market participant** at the **point of delivery** at the **contract capacity** pursuant to Sections 3 and 4 of this **DOS Agreement**.

8. MARKET PARTICIPANT'S OBLIGATION IN RELATION TO SERVICE

If the **market participant** takes **system access service** under Rate DOS, the **market participant** must take such **system access service** at the **point of delivery** at the **contract capacity**, but below the maximum annual load factor for the applicable year as determined by the **ISO** in accordance with Rate DOS, pursuant to Sections 3 and 4 of this **DOS Agreement**.

9. MARKET PARTICIPANT'S PAYMENT OBLIGATION

The **market participant** must pay to the **ISO** for **system access service** under Rate DOS during the term of this **DOS Agreement** the amount required pursuant to Rate DOS.

10. TERM

This **DOS Agreement** commences on the Effective Date and continues unless it is terminated in accordance with the **ISO tariff**.

11. PRIOR AGREEMENTS

This **DOS Agreement** supersedes and replaces, as of the Effective Date, any other agreement or application for **system access service** under Rate DOS between the parties at the **point of delivery**.

12. MARKET PARTICIPANT'S REPRESENTATIONS AND WARRANTIES

The **market participant** represents and warrants to the **ISO** as follows:

(a) the **market participant** is duly incorporated or organized, validly existing and in good standing under the laws of its jurisdiction of incorporation or organization, and duly registered and authorized to carry on business in the Province of Alberta;

(b) this **DOS Agreement** has been duly authorized, executed and delivered by the **market participant** and constitutes a legal, valid and binding obligation of the **market participant**, enforceable against it in accordance with its terms, except to the extent that such enforceability may be limited by bankruptcy, insolvency, winding-up, reorganization, and similar laws affecting the enforceability of creditors' rights generally and the availability of equitable remedies such as specific performance or injunction;

(c) the authorization, execution and performance by the **market participant** of this **DOS Agreement**:

(i) does not and will not violate any laws applicable to the **market participant**; and

(ii) is not in contravention of its constating documents or its by-laws or the provisions of any loan agreement or other agreement to which it is a party or by which it is bound;

(d) the **market participant** would not increase metered demand under Rate DTS, *Demand Transmission Service*, if Rate DOS was not available; and

(e) the **market participant's** use of additional electric energy under Rate DOS complies with the eligibility criteria in the **ISO tariff** for Rate DOS and the use of **system access service** by the **market participant** under Rate DOS would not otherwise occur under Rate DTS or any other applicable rate.

13. NOTICES

(a) A notice must be provided in accordance with subsection 12.4 of the **ISO tariff**, *Miscellaneous*. The **market participant**'s address for notices is:

_____
_____
_____

Attention: _____
Telephone: _____
Fax: _____
Email: _____

(b) The **market participant**'s address for invoices, if different from the address for notices, is:

_____
_____
_____

Attention: _____
Telephone: _____
Fax: _____
Email: _____

(c) The **market participant** must provide any changes to its address(es) to the **ISO** using the method posted on the AESO website as updated from time to time.

14. AMENDMENTS

(a) The parties acknowledge that either may request an amendment to this **DOS Agreement**. The **market participant** must request such an amendment by complying with the procedure for amending DOS Agreements posted by the **ISO** on its website or, if such procedure is not posted, by providing notice to the **ISO**.

(b) Notwithstanding the foregoing, the parties acknowledge that the **ISO tariff**, **ISO rules** and *Consolidated Authoritative Document Glossary* may be amended from time to time during the term of this **DOS Agreement** by approval of the **Commission** and that this DOS Agreement is deemed amended upon each such approval.

(c) Subject to subsection 15(b) of this **DOS Agreement**, this **DOS Agreement** may only be amended by written instrument executed by the **ISO** and the **market participant**.

15. MISCELLANEOUS

(a) Section 9 will survive the termination of this **DOS Agreement** for either the time provided for in such section or the longest period provided by law.

(b) This **DOS Agreement** will ensure to the benefit and be binding upon the parties to this **DOS Agreement** and their respective successors and permitted assigns.

(c) No waiver by any party of any breach (whether actual or anticipated) of any of the terms, conditions, representations or warranties contained in this **DOS Agreement** will take effect or be binding upon that party unless the waiver is expressed in writing under the authority of that party. Any waiver so given must extend only to the particular breach so waived and must not limit or affect any rights with respect to any other or future breach.

(d) Time is of the essence.

(e) This **DOS Agreement** is governed by and interpreted in accordance with the laws of the Province of Alberta and the federal laws of Canada applicable therein, excluding any conflict of laws principles that may apply therein.

(f) Whenever possible, each provision of this **DOS Agreement** must be interpreted in such a manner as to be effective and valid under applicable law, however, each provision of this **DOS Agreement** is intended to be severable and if a provision is determined by a court of competent jurisdiction to be illegal, invalid or unenforceable for any reason whatsoever, such provision will be severed from this **DOS Agreement** and will not affect the legality, validity or enforceability of the remainder of this **DOS Agreement** or any other provision of this **DOS Agreement**.

(g) Each party will, from time to time, without further consideration, do such further acts and deliver all such further assurances, deeds and documents as is reasonably required in order to fully perform and carry out the terms of this **DOS Agreement**.

(h) The parties may execute this **DOS Agreement** by fax, e-mail or other electronic means capable of producing a paper copy, and in separate counterparts, each of which when so executed and delivered, and all such counterparts taken together will constitute one instrument.

By signing this **DOS Agreement**, the **market participant** acknowledges that it has reviewed the **ISO tariff** and fully understands all rights and obligations contained in it.

IN WITNESS WHEREOF the **ISO** and the **market participant** have executed this **DOS Agreement**.

ISO, operating as AESO

Per: _____ Date: _____

Name:

Title:

[insert legal name of corporation or partnership]

Per: _____ Date: _____

Name:

Title:

Rate Sheets Consultation – September 7, 2021 Comments

Stakeholder comments on Rate Sheets [Posted September 22, 2021]

1. Alberta Direct Consumers Association (ADC)
2. Canadian Renewable Energy Association (CanREA)
3. Capital Power Corporation
4. Energy Storage Canada (ESC)
5. ENMAX Corporation
6. Greengate Power Corporation
7. Industrial Power Consumers Association of Alberta (IPCAA)
8. TransAlta Corporation (TAC)

Public

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Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021 to Sept. 21, 2021**	Contact:	Colette Chekerda
Comments from:	Alberta Direct Connect Consumer Association "ADC"	Phone:	780-920-9399
Date:	2021/09/21	Email:	colette@carmal.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Proforma Agreement. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	ADC has no comments on the tariff sheets until the AUC issues a decision on the tariff design.
2.	**Tariff Terms & Conditions**	

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Phone: 403-539-2450 | Fax: 403-539-2949
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@theaeso

	Questions	Stakeholder Comments
	(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	Question (i): For the most part, the AESO's revisions provide clarity; however, we offer the following comments: • In ISO Tariff – Section 5, paragraph 5.3(6c): Is the AESO suggesting that if there have been no changes to the DTS contract capacity in the prior 5 years that the AESO will waive the notice period and the PILON? If yes, this is a welcome change. Are there conditions where the AESO would not waive the notice period or PILON if the site met this criteria? • In ISO Tariff – Section 5, paragraph 5.3.7: The ADC supports the opportunity for all DTS contract holders to right size their contract capacity without penalty. The ADC submits that not all loads (especially those direct connect loads receiving DTS service through a Distribution company flow through rate) may be aware of the DTS contract capacity at the POD. The AESO should compile a list of POD's that would benefit from a DTS contract capacity adjustment. • In ISO Tariff – Section 9, paragraph 9.3(4): ADC agrees with the expansion of rate DOS to specifically include unplanned and forced outages as a reason to utilize Rate DOS.
3.	**DOS Rate Sheet** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	• ADC remains concerned with the 20% annual load factor.
4.	**DOS Proforma Agreement** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific.	No comments at this time.

	Questions	Stakeholder Comments
	(iii) Is anything missing? If yes, please be specific.	
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document, once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	No comments at this time.
6.	Additional comments	None at this time

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca

Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021 to Sept. 21, 2021**	Contact:	Leonard Olien
Comments from:	Canadian Renewable Energy Association	Phone:	587-971-0049
Date:	2021/09/21	Email:	lolien@renewablesassociation.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Proforma Agreement. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
2.	**Tariff Terms & Conditions**	The consequences described in Section 9.6(4) seems to be harsher than as described in the AESO stakeholder sessions. In the stakeholder sessions, it was communicated that non-compliance with one of factor (a), (b) or (c), in section 9.6(1)

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	Questions	Stakeholder Comments
	(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	would lead to some part of the metered energy being charged at rate DTS and could lead to a change in the volume of the DOS and DTS contracts. The current wording indicates a market participant would lose access to DOS and all energy would be charged at DTS, which represents a significant increase in consequences. Further, Sections 9.6(1) – (3) indicate that the burden of proof lies with the market participant to demonstrate eligibility for DOS. CanREA believes that the burden of proof lies with the AESO to demonstrate a loss of eligibility. To that end, CanREA suggests to following wording for sections 9.6(1) – (3); 9.6(1) If one or more of the following events has occurred: (a) the market participant fails to respond to a dispatch or directive from the ISO; (b) the market participant's use of the demand opportunity service exceeds the demand opportunity service contract capacity; (c) the market participant's use of the demand opportunity service exceeds the maximum annual load factor that the ISO determines in accordance with Rate DOS; or (d) The market participant no longer has a system access service agreement for Rate DTS, the ISO may investigate the market participant's reasons why the event in (i)-(iv) occurred. (2) The investigation in (1) shall include notice to the market participant and a reasonably opportunity for the market participant to explain the circumstances. (3) Following its investigation, the ISO may deem the market participant to have misrepresented its use of Rate DOS under the ISO tariff and the system access service agreement for Rate DOS if, following consideration of the market participant's reasons, the ISO

	Questions	Stakeholder Comments
		(a) confirms that one or more of the events in (1)(a)-(d) has occurred; and, (b) concludes that the market participant no longer meets the eligibility criteria in section 9.3.
3.	**DOS Rate Sheet** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	CanREA seeks clarity on the loss charge as indicated in section 3(2)(b). Does the does DOS facility received a credit for losses if located in areas where a generator would be charged for losses and vice versa? For example, for a storage facility at a location where the AESO determines the loss factor to be 5%, the facility would pay 5% on discharged energy (per STS), but would it the receive a 5% credit on charging energy?
4.	**DOS Proforma Agreement** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document, once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	It would be helpful for the AESO to include, in an information document, that energy storage resources will qualify for the DOS Dispatchable rate under sections 9.3(1), 9.3(2) and 9.3(3) because there are no reasonable market conditions under which an energy storage facility would participate in the market under DTS. Having the AESO recognize this fact will increase investor confidence in the ability of energy storage resources to participate in the Alberta electricity market.

	Questions	Stakeholder Comments
6.	Additional comments	

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca

Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021 to Sept. 21, 2021**	Contact:	Megan Gill
Comments from:	Capital Power	Phone:	403.827.3566
Date:	2021/09/21	Email:	mgill@capitalpower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeos.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Appendix A. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO Tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	Capital Power does not have any comments on the draft tariff rate sheets at this time.
2.	**Tariff Terms & Conditions**	Capital Power does not have any comments on the draft changes to the tariff terms and conditions at this time.

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	Questions	Stakeholder Comments
	(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
3.	**DOS Rate Sheet** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	Capital Power believes the following changes are required to the DOS Rate Sheet to provide more clarity. • Section 1 – More details are needed to clarify when DOS is applied. For example, does a Market Participant have to be on rate DTS prior to DOS being applied? Or does a Market Participant apply for service under both DOS and DTS simultaneously? • Section 2(1)(c) – The term "maximum annual load factor balance" should be defined. • Section 2(2)(b) –The term "Rate DOS DTS surcharge rate" is a new term and should be defined (or this section should be reworded to provide clarity). • Section 3 – The terms "DOS dispatchable", "DOS term", and "DTS surcharge rate" should be defined with a clear explanation for when each is applied. There should be more consistent use of this terminology throughout the DOS Rate Sheet.
4.	**DOS Appendix A** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	Capital Power does not have any comments at this time.

	Questions	Stakeholder Comments
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document, once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	It would be helpful for the AESO to develop an information document on DOS participation and obligations in the market. This information document should confirm energy storage eligibility for DOS and provide exemptions for energy storage market participants to prove eligibility under Sections 9.3(1), 9.3(2), and 9.3(3) of the DOS Terms and Conditions. This would not adversely affect the intent of DOS as there are only limited conditions in which an energy storage facility would require DTS. Furthermore, this would increase investor confidence and reduce red tape for energy storage resources to participate in the Alberta electricity market.
6.	Additional comments	

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca

Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021, to Sept. 21, 2021**	Contact:	Justin Rangooni
Comments from:	Energy Storage Canada	Phone:	647.627.1815
Date:	2021-09-21	Email:	jrangooni@energystoragecanada.org

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Proforma Agreement. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	The blackline amendments proposed by the AESO appears to align with the materials presented by the AESO through the Bulk & Regional tariff stakeholder consultation. Additional details on the frequency that the AESO will re-assess the energy rate portion of cost allocation for the preferred rate design would be helpful (i.e., will the energy portion be calculated on an annual basis or fixed for a certain term?).
2.	**Tariff Terms & Conditions**	The blackline amendments proposed by the AESO appears to align with the materials presented by the AESO through the Bulk & Regional tariff stakeholder consultation.

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	Questions	Stakeholder Comments
	(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	ESC has no further comments on the authoritative documents at this time.
3.	**DOS Rate Sheet** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	ESC requests AESO to clarify if there is any Recall Priority difference between DOS Dispatchable and DOS Term.
4.	**DOS Proforma Agreement** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	ESC has no comments on the DOS Proforma Agreement
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	Yes, additional guidance information would be beneficial including • Examples of real-time operation that lead to DOS dispatch instructions and what options proponents in responding/adjusting energy bids • Example calculations and explanation of settlement process on a monthly and annual basis

	Questions	Stakeholder Comments
6.	Additional comments	

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca

Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021 to Sept. 21, 2021**	Contact:	Mark McGillivray
Comments from:	ENMAX Corporation	Phone:	
Date:	2021/09/17	Email:	MMcGillivray@enmax.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeos.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Appendix A. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO Tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	No comment at this time. ENMAX will have more information once the AESO files its application for a new Tariff with the AUC.
2.	**Tariff Terms & Conditions**	No comment at this time. See response to Question #1.

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	Questions	Stakeholder Comments
	(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
3.	**DOS Rate Sheet** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	No comment at this time. See response to Question #1.
4.	**DOS Appendix A** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	No comment at this time. See response to Question #1.
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document, once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	Yes, it would be helpful for the AESO to develop additional guidance information in the form of an information document or similar format. For instance, additional clarity on how the demand opportunity service will work for energy storage facilities would be useful to market participants. Seeing as every customer in the province could potentially be impacted by this change in Tariff, we would also expect the AESO to take the lead in developing a

	Questions	Stakeholder Comments
		complete communications plan and effort to reach impacted customers so that retailer call centers do not get flooded with questions about changes to their bills.
6.	Additional comments	We recognize that these rate sheets are subject to review by the AUC as part of its upcoming ISO Tariff proceeding and may change depending on the outcomes of that process.

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca

Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021 to Sept. 21, 2021**	Contact:	Scott Perry
Comments from:	Greengate Power	Phone:	403.519.6194
Date:	2021/09/21	Email:	Scott@greengatepower.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Proforma Agreement. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	(i) Greengate finds the AESO's revisions provided more clarity. However, it is not clear how the ancillary services charge will be made separate from the DOS rate. Can the AESO please provide the associated rates for ancillary services charge and the updated DOS rate? (ii) N/A (iii) N/A
2.	**Tariff Terms & Conditions**	(i) Several areas require more clarity. Greengate's impression of DOS terms from the AESO stakeholder sessions did not clearly indicate that the consequence of being found to be DOS ineligible would lead to the Market Participant being charged

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Questions	Stakeholder Comments
(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	at rate DTS on past consumption under DOS. This could likely lead to a Market Participant being charged a significant penalty, long after consumption has occurred. The rules for eligibility and audit for DOS are unclear and mostly undefined. Furthermore, it is not clear how and to what level of stringency the AESO will evaluate the eligibility of participants before they are permitted to use DOS. It is highly recommended that the AESO clearly define pre-qualification and the AESO's policies and practices in monitoring pre-qualification. As it currently written, the lack of clarity will inhibit firms such as Greengate from using this rate for its storage projects. (ii) The section 9.6(1) appears to indicate that a non-compliant DOS participant would need to repay some metered energy at rate DTS, that the volume of the DOS and DTS contracts could change, and that the participant would lose access to DOS. Clarity on this approach is needed as it introduces substantial risk if the AESO does not evaluate the eligibility of a market participant before they begin using DOS. The test for determining that rate DTS is uneconomic needs clarity on how the estimate is required to be calculated. Greengate supports changes suggested by CanREA, that would put the burden of proof on the AESO to prove ineligibility and clarify the process: 9.6(1) If one or more of the following events has occurred: (a) the market participant fails to respond to a dispatch or directive from the ISO; (b) the market participant's use of the demand opportunity service exceeds the demand opportunity service contract capacity. (c) the market participant's use of the demand opportunity service exceeds the maximum annual load factor that the ISO determines in accordance with Rate DOS; or (d) The market participant no longer has a system access service agreement for Rate DTS, the ISO may investigate the market participant's reasons why the event in (i)-(iv) occurred.

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	Questions	Stakeholder Comments
		(2) The investigation in (1) shall include notice to the market participant and a reasonably opportunity for the market participant to explain the circumstances. (3) Following its investigation, the ISO may deem the market participant to have misrepresented its use of Rate DOS under the ISO tariff and the system access service agreement for Rate DOS if, following consideration of the market participant's reasons, the ISO (a) confirms that one or more of the events in (1)(a)-(d) has occurred; and, (b) concludes that the market participant no longer meets the eligibility criteria in section 9.3. Furthermore, missing a dispatch may be a relatively minor infraction as compared to not meeting the eligibility criteria. Greengate recommends that the AESO create standards and consequences that clearly reflect the severity of an infraction and not treat each infraction with a significant penalty. Potentially the AESO could use a stepped approach, with less severe consequences for less serious infractions.
3.	**DOS Rate Sheet** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	(i) More clarity is needed on the losses charge in 3(2)(b). In Greengate's view, it is only reasonable to charge losses in this way if the market participant would also receive credits if located in an area where a generator would be charged for losses, and vice versa. For storage this would mean that a storage facility using DOS in an area with a 5% loss factor would pay 5% losses on discharges, but receive a 5% credit, or another calculated amount, upon charging.
4.	**DOS Proforma Agreement**	

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	Questions	Stakeholder Comments
	(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document, once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	Greengate supports CanREA's suggestion that an information document should clarify that energy storage resources definitively will qualify for DOS in sections 9.3(1), 9.3(2), and 9.3(3). However, if the AESO intends to do this, it would be best if they indicated this at the earliest point in time, even if this means the AESO provides it in comments during the Tariff Application, to provide some certainty about this rate to investors and developers. This type of statement would help to alleviate Greengate's concerns on the AESO's DOS terms and conditions.
6.	Additional comments	

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca

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Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021 to Sept. 21, 2021**	Contact:	Richard Penn
Comments from:	Industrial Power Consumers Association of Alberta (IPCAA)	Phone:	403-903-7693
Date:	2021/09/20	Email:	Richard.Penn@IPCAA.ca

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Proforma Agreement. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	IPCAA thanks the AESO for providing draft Tariff Rate Sheets. The Tariff Rate Sheets, as drafted, follow the AESO's proposed tariff. IPCAA's concerns relate to the proposed tariff, not the rate sheets. IPCAA notes that the total cost of operating reserves will now also be allocated to Rate DOS, Rate XOS and Rate XOM. That point was not fully addressed during the tariff consultations to date. Question (i): No comment at this time.

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	Questions	Stakeholder Comments
		Question (ii): IPCAA notes that in Section 4(2) there is an X% set if the OR charge must be estimated. IPCAA would like to understand how the X% is determined. We assume that its derivation will be included in the upcoming AUC proceeding.
2.	**Tariff Terms & Conditions** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	IPCAA thanks the AESO for providing draft Tariff Terms & Conditions. Question (i): For the most part, the AESO's revisions provide clarity; however, we offer the following comments: • In ISO Tariff – Section 5, paragraph 5.3(7): IPCAA appreciates the opportunity for a load to reduce its Rate DTS contract within the contract adjustment period, which is to be determined in the proceeding. This change is long overdue and will help right-size load contracts and in aggregate right-size Alberta's new transmission requirements. • In ISO Tariff – Section 9, paragraph 9.2(4): It would be helpful to better understand the analysis that will go into establishing the maximum annual load factor. • In ISO Tariff – Section 9, paragraph 9.3(4): IPCAA appreciates the expansion of rate DOS to specifically include unplanned and forced outages as a reason to utilize Rate DOS. Question (ii): With regard to additional details that need to be included in this authoritative document, IPCAA provides the following comment: • In ISO Tariff – Section 9**:** paragraph 9.4(1) It is not clear how a participant must bid for additional energy for a forced outage under Rate DOS. The Tariff requirement should include an ability to submit a bid as soon as possible after a forced outage. Question (iii): IPCAA believes a mechanism is needed to bid for Rate DOS after a forced outage is required. A load cannot anticipate the need for Rate DOS ahead of time in the case of a forced outage.
3.	**DOS Rate Sheet**	Question (i): For the most part, the AESO's revisions provide clarity; however, we offer the following comments: • In the DOS Rate Sheet Section 2(3): the AESO has chosen 0.2 as the maximum annual load factor. IPCAA is concerned with the process used to establish this

	Questions	Stakeholder Comments
	(i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	value and submits that the value should be determined during the AUC Proceeding. • In the DOS Rate Sheet, the Rate DOS DTS surcharge rate referred to in Section 2(2) b is not clear. • In the DOS Rate Sheet: it is not clear why the AESO should be purchasing operating reserves for DOS Dispatchable. The AESO should consider removing it from the OR calculation if it is dispatched off prior to OR utilization. For questions (ii) and (iii), IPCAA has no comments at this time, other than what is listed in question (i) above.
4.	**DOS Proforma Agreement** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	No comment at this time.
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document, once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	IPCAA agrees that an information document would be helpful – and it would be more helpful if it is provided as a draft in advance of the AUC proceeding to ensure everyone fully understands the proposed rates and terms & conditions. A full and complete guidance document explaining DOS will be required.
6.	Additional comments	N/A

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca

Stakeholder Comment Matrix – Sept. 7, 2021

Bulk and Regional Tariff Design – Tariff and DOS Rate Sheets, Tariff Terms & Conditions, and DOS Appendix A

Comment period:	**Sept. 7, 2021 to Sept. 21, 2021**	Contact:	Luis Pando
Comments from:	TransAlta Corporation	Phone:	(403) 267-3627
Date:	2021/09/21	Email:	Luis_Pando@transalta.com

Instructions:

1. Please fill out the section above as indicated.
2. Please respond to the questions below and provide your specific comments.
3. **Please submit one completed comment matrix per organization.**
4. Email your completed comment matrix to tariffdesign@aeso.ca by **Sept. 21, 2021**.

The AESO values stakeholder feedback and invites all interested stakeholders to provide their comments on the proposed drafts of the Bulk and Regional Preferred Rate Design and Modernized Demand Opportunity Service (DOS) design: Tariff Rate Sheets, Tariff Terms & Conditions, DOS Rate Sheet, and DOS Proforma Agreement. Please be as specific as possible with your responses. Thank you.

Note that the AESO is seeking feedback as to whether the rate sheets and other revisions to the ISO tariff are clear and effectively reflect the AESO's Preferred Rate Design and the Modernized DOS design as presented during Stakeholder Sessions 5, 5B (DOS), 6A and 6B. The AESO appreciates all of the feedback it has previously received regarding the Preferred Rate Design and Modernized DOS and will not be considering additional comments on the rate design at this time.

	Questions	Stakeholder Comments
1.	**Tariff Rate Sheets** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	We appreciate the AESO providing blacklined versions of the drafts to aid market participants in identifying the proposed changes. The changes proposed by the AESO in the preferred rate design are reflected in most of the rate sheets including changes to the calculation of the connection charge. We note that most of the changes to the DTS rate sheet relate to the settlement period of coincident metered demand which includes the change from the average 15-minute interval to a one-hour interval. We wish to clarify the averaging approach proposed in subsection 3(4) for the DTS rate, which proposes four-year averaging versus the five-year average that the AESO discussed in its consultation. More specifically, we would like to understand why the AESO has changed the number of periods that it will use to determine the average. We also request the AESO contemplate the use of another approach such as the use of a class average coincident metered demand value in instances where the data set is less than 4 years of data. Furthermore, we propose the following grammatical

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	Questions	Stakeholder Comments
		correction to paragraph 3(4)(a): "the four most recent coincident metered demand values obtained pursuant to subsection 3(3), if there were at least four values ~~were~~ obtained" (strikethrough added). **Adding Rates DOS, XOS, and XOM to the operating reserves charge should be based upon cost causation.** Under the existing rates, the ISO adds an operating reserve charge "when the transaction requires the ISO to procure incremental operating reserves, incremental system support services or both". This requirement specifically identifies the need for a cost causation linkage before an operating reserve charge is included. Under the AESO's proposed language, an operating reserve charge is added even if the ISO has no incremental requirement to procure operating reserves or system support services. We disagree with this change and recommend that the operating reserve charge still be conditioned upon a requirement of the ISO to procure incremental operating reserves and/or system support services.
2.	**Tariff Terms & Conditions** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	**TransAlta disagrees with the additional requirements for market participants requesting DOS and the inclusion of unnecessary penalties and enforcement provisions in head of the ISO through the terms & conditions (T&Cs).** The requirement for a DOS holder to also hold a DTS contract is unnecessary and should be removed. A load customer should have the option to exclusively contract for DOS without holding a DTS contract. We believe that an appropriately designed DOS rate embeds the risk through priority of service and ensures fair cost allocation without the need for the customer to also contract for an unneeded amount of DTS. As stated during consultation, the AESO would permit a market participant to contract for a minimal amount <1 MW of DTS, which obviates any significant benefit towards addressing the AESO's expressed concerns about "DTS cannibalization". Furthermore, we see the AESO's concern as unfounded and misplaced in that if the DOS rates are truly reflective of cost causation there is no grounds to conflate a choice for DOS as cannibalization DTS. In fact, viewing prevention of "DTS cannibalization" as a legitimate outcome biases the AESO to not propose any real alternative to the DTS rate. Additionally, we view the AESO's proposed changes including a representation that it complies with Rate DOS eligibility, a maximum annual load factor, bidding and dispatching rules as addressing any real concerns about DOS misuse. We note that the consequence of misuse carries significant consequences including disqualification from future access to DOS and ex-post investigation of potential misuse or

Questions	Stakeholder Comments
	misrepresentation. All of these requirements more than covers of any risk without the need to impose an unnecessary requirement on the customers to hold a DTS contract. \We recommend eliminating this requirement (paragraph 9.2(3)(d) and 9.6(1)(d)) and simply leave market participants to bear the risk, which is consistent with a *Fair, Efficient and Open Competition Regulation* and the energy market design. Furthermore, we do not understand the need for the changes proposed in paragraph 9.3(4) which requires that all additional energy under DOS must be used for planned or unplanned outages or derates of generating units. These are restrictive and onerous requirements that limit the value and benefit of DOS for energy storage and could have the unintended consequence of sterilizing the efficient utilization of the transmission system. Customers should be able to freely determine when they utilize DOS subject to the constraint of interruptibility. We do not understand what is the authority that the AESO has under the current statutory framework to direct through changes to section 9.3(4) of the terms and conditions, that all additional energy under DOS dispatchable must be used for planned or unplanned outages or derates of generating units. These decisions should be only made by the market participant and the ISO should only intervene through an assessment of the representation of DOS use. We also question the need for adding in a requirement for annual determination of each market participant's maximum annual load factor limit. Notably, the regarding eligibility and qualification criteria for Rate DOS do not require market participants to qualify on an annual basis for DOS. We see no purpose in adding the annual determination requirement and view this as unnecessary red tape that should be removed. We ask the AESO to clarify the following: 1. Clarify the bidding, dispatching and settlement rules, particularly about the specific ISO Rules that apply to these transactions, and the requirement to bid in section 9.4. 2. What is the envisioned process for a market participant to demonstrate to the ISO that it is still eligible for rate DOS? 3. Please provide an indicative timeline for its intended practices with respect to terminating a DOS contracting and retroactively charging the customers under another rate.

	Questions	Stakeholder Comments
		4. Why is subsection 9.6(6) applied at the market participant or affiliate level rather than the facility level? The severity of the penalty, not permitting a market participant or any of its affiliates from accessing DOS even on another facility, if it was deemed to have misrepresented its use of DOS or becomes ineligible for DOS. We recommend that this subsection be redrafted to restrict the market participant or an affiliate from re-applying for DOS at that facility (not as a blanket prohibition).
3.	**DOS Rate Sheet** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific. (iii) Is anything missing? If yes, please be specific.	**The modernized DOS rate sheet is an improvement but falls short of being suitable to energy storage because it is inheriting the flaws of the old DOS design.** We recommend reviewing the following: 1. The DOS rate sheet in section 2(1) refers to the maximum annual load factor **balance**. Then in section 2(3) it requires the ISO to calculate each market participant's maximum annual load factor **limit**. There is no explanation about the difference between "balance" and "limit" and whether the AESO will do a calculation of both. With respect to the maximum annual load factor limit, it is unclear what calculation will be used by the ISO for the first year of the application. 2. The proposed draft of section 2(2)(b) is not clear, especially the use of the concept of Rate DOS DTS surcharge. Please explain what this charge is, how it is calculated and the rationale for applying this charge. 3. Section 3 reflect the changes to the Rate DOS types, but it is unclear why subsection (3) makes the operating reserve charge mandatory for DOS.
4.	**DOS Proforma Agreement** (i) Do you believe the AESO's revisions in the proposed draft provide clarity and are effective as written? Why or why not. (ii) Are there additional details that need to be included in this authoritative document? If yes, please be specific.	See our answer to 2 and 3 above.

	Questions	Stakeholder Comments
	(iii) Is anything missing? If yes, please be specific.	
5.	Would it be helpful for the AESO to develop additional guidance information, potentially in the form of an information document, once the Alberta Utilities Commission makes it decision on the Bulk and Regional Tariff Application? If yes, please specify what additional guidance would be helpful.	Yes, the AESO should develop information documents for the modernized DOS explaining how the new bidding, settlement and dispatching will work, the process to determine eligibility and qualification, the process, timelines, and evaluation/decision criteria that are considered/applied to determine DOS misuse or considering a market participant's dispute of an ISO's determination of DOS misuse (how is fairness ensured), the methodology for the calculation of the maximum annual load factor.
6.	Additional comments	Changes to regulation, particularly those that add requirements to market participants, seem counterintuitive in a time when the government is leading a Red Tape Reduction initiative. We consider that a truly modernized DOS should eliminate unnecessary requirements instead of creating new ones, otherwise it will fail to pass the test the government has established to measure red tape reductions.

Thank you for you input. Please email your completed matrix to: tariffdesign@aeso.ca