AESO 2018 ISO Tariff Consultation

April 10, 2017
AESO Office, Calgary

Agenda

- Introduction and objectives (slides 1-5)
- ISO Tariff Terms and Conditions Proposals (slides 6-29)
  - Certainty Charge Workshop (slides 30-36)
- POD Cost Function Database (slides 37-46)
- Transmission Cost Causation Study follow-up (slides 47-53)
- Critical Infrastructure Protection ("CIP") Alberta reliability standards cost responsibility (slides 54-56)
- Application process and next steps (slides 57-63)
- Discussion and wrap-up (slide 64)

Please feel free to ask questions during presentation

Stakeholder session objectives

- Enhance understanding of ISO tariff application
- Review technical results of a number of analytical exercises by the AESO
- Share information prior to filing of 2018 ISO tariff application
- Gather feedback to ensure tariff application provides all information stakeholders require
- Review application timeline and next steps

Applications currently in progress

- Directions 5-8 on advancement costs and related provisions
  - Decision 3473-D02-2015 issued on August 26, 2015
  - AUC letter issued March 29 “Issues list and closure of Proceeding 20922”
  - “…*the Commission has determined that matters anticipated to be addressed within proceeding 20922 should instead be considered as part of a comprehensive tariff application*”
- 2015 Deferral Account Reconciliation application
  - Hearing held on December 13 and 14, 2016
  - Decision 21735-D02-2017 issued on March 14, 2017, ordered that the application is approved as filed.
  - “ . . .*the Commission directs the AESO to address whether changes to the deferral account allocation methodology and to Rider C are warranted given the concerns raised by the PS Group, as part of its next ISO tariff application*”

Applications currently in progress

- 2017 ISO tariff update
  - Interim, refundable approval for January 1, 2017 issued by Commission on December 2, 2016
  - Commission final decision 22093-D02-2017 issued on April 4, 2017 approving 2017 rates and investment levels as filed
- Upcoming Rider C Amendment application
  - Amending Rider C to apply to Rate PSC, *Primary Service Credit*, change to percentage charge or credit and restore deferral account balance to zero at the end of the calendar year
  - AESO now planning to file Rider C Amendment application in April 2017
  - The AESO will request an effective date of July 1, 2017 but given the delay in filing, the AESO will be able to handle a mid-quarter change to Rider C methodology, i.e. August 1, 2017

ISO Tariff Terms and Conditions Proposals

Lee Ann Kerr

Proceeding 20922 Closure March 29, 2017 Commission “Issues List”

#	Issue
Issue 1	Legislative framework
Issue 2	Advanced system-related classification of radial transmission projects
Issue 3	Load forecasting

Commission “Issues List”
Issue 1 - Legislative framework

- The Commission suggests that one way to interpret the legislation is that there is a distinction between the construction of transmission to serve generation and to serve forecast load
- The planning restrictions affect the ability of the AESO to set and alter in-service dates, affecting the cost of achieving its congestion and planning mandates

Commission “Issues List” Issue 2 – advanced system-related classification of radial transmission projects

- The “in-advance system-related classification” can affect the magnitude and timing of entry into the transmission system by load customers
- A market participant may have an incentive to overstate its long-term requirements as it is not responsible for system-related costs
- The AESO should balance between the preferences for certainty among market participants and the desire to minimize the costs of transmission development

Commission “Issues List”
Issue 3 - Load forecasting

- “Because the information used by the AESO for transmission system planning and development decisions currently relies on information provided by the large industrial customer group, the forecast inaccuracy identified by interveners could be related to the incentives built-in to the provision of information to the AESO”
- There is no financial reason for the market participant to be accurate or conservative when providing forecast information
- Establish a target rate of load growth? Load connections who want to connect more quickly can do so only if there is no net cost to other market participants

Other Commission Decisions

Decision	Summary
2005-096	"The underlying purpose of the contribution policy is to send price signals (reflective of the AESO's economics) to market participants when they are considering siting alternatives for their facilities."
2005-096	"With respect to the request of AE that the Board should provide clear directions respecting the classification of system and customer costs, the Board considers that the AESO should approach any situation in which there may be "shades of grey" in this designation exercise, with the position that a debatable interconnection project cost should be presumed initially to be customer-related unless clearly demonstrated otherwise."
2005-096	"The Board, however, considers that a general stance that system enhancement costs are customer costs unless demonstrated otherwise is consistent with the expectation that the AESO adopt a more proactive stance in respect of its overall system planning and transmission system upgrade responsibilities, as detailed in the *Transmission Regulation*."

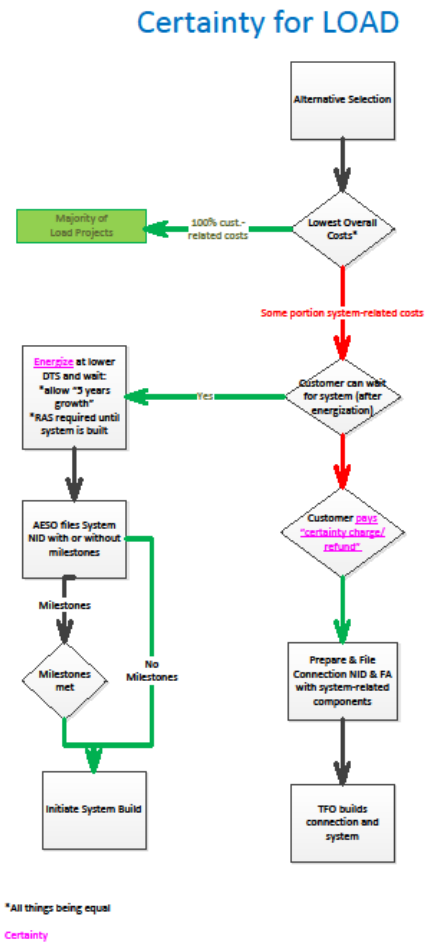
Other Commission Decisions(cont'd)

Decision	Summary
2010-606	"The Commission considers that Article 9.3(c)(ii) of the current T&Cs provides a reasonable balance between the attribution of incremental costs caused by a connecting customer and the designation of costs as system costs where the AESO was already contemplating a system planning driven expenditure prior to the connection request. Article 9.3(c)(iii) already provides broad discretion to designate costs that would otherwise be classified as customer costs to be classified as system costs."
3473-D02-2015	"…the Commission intended that the AESO would develop tariff provisions that would induce the market participant on the critical path to either consent to a shifting of the requested in-service date or absorb relevant incremental costs that would arise from a decision not to shift the requested in-service date."

Principles for Load Customers

- Provide a price signal
  - Unconstrained alternative selection
  - ISDs for system transmission projects should be moved if they can't be met without incurring significant increases to project costs (or the market participant can pay)
  - Where the construction of system transmission facilities are triggered, the market participant needs to provide some form of commitment
- System transmission facilities aren't built as the result of a connection(s) not proceeding
  - We need sufficient certainty that projects will "show up"
  - Don't construct system transmission facilities if market participants don't show up
- Alignment with Commission's issue list (Proceeding 20922)

System Transmission Facilities Required for a Load Connection



See pdf file “Certainty for Load” for larger image

Alternative Selection for Load Connections

Alternatives to connect to transmission system

a) most load connection projects will be radial facilities to existing transmission facilities with capacity

b) in some cases load connection projects may require an enhancement of existing system facilities or creation of looped facilities

- Load connection alternative must be unconstrained

and

- Alternative selected will be lowest overall costs

Market participant can wait for system or pay certainty charge/refund

If lowest overall costs alternative requires some portion system-related costs, customer has a choice

1. Energize at lower DTS and wait for system to be built
   - Will require market participant to lower DTS request and allow “5 years of growth” in the area (planning horizon), energize and upon energization AESO can plan system development
   - RAS will be required on the market participant until system is built

or

2. Customer pays a certainty charge/refund to ensure that at their energization, there are no constraints on the transmission system

“Refundable Deposit” – What does it provide for the AESO?

- Provides the AESO with sufficient certainty that the connection project will energize
- Not building system transmission assets that will not be used
  - If market participant does not show – no refund
  - If market participant only partially shows up (lower DTS), only partial refund
- Provides a price signal where there is limited capacity
- Only applies when the MP can’t “wait” for system transmission facilities

Pros and Cons – Refundable Deposit

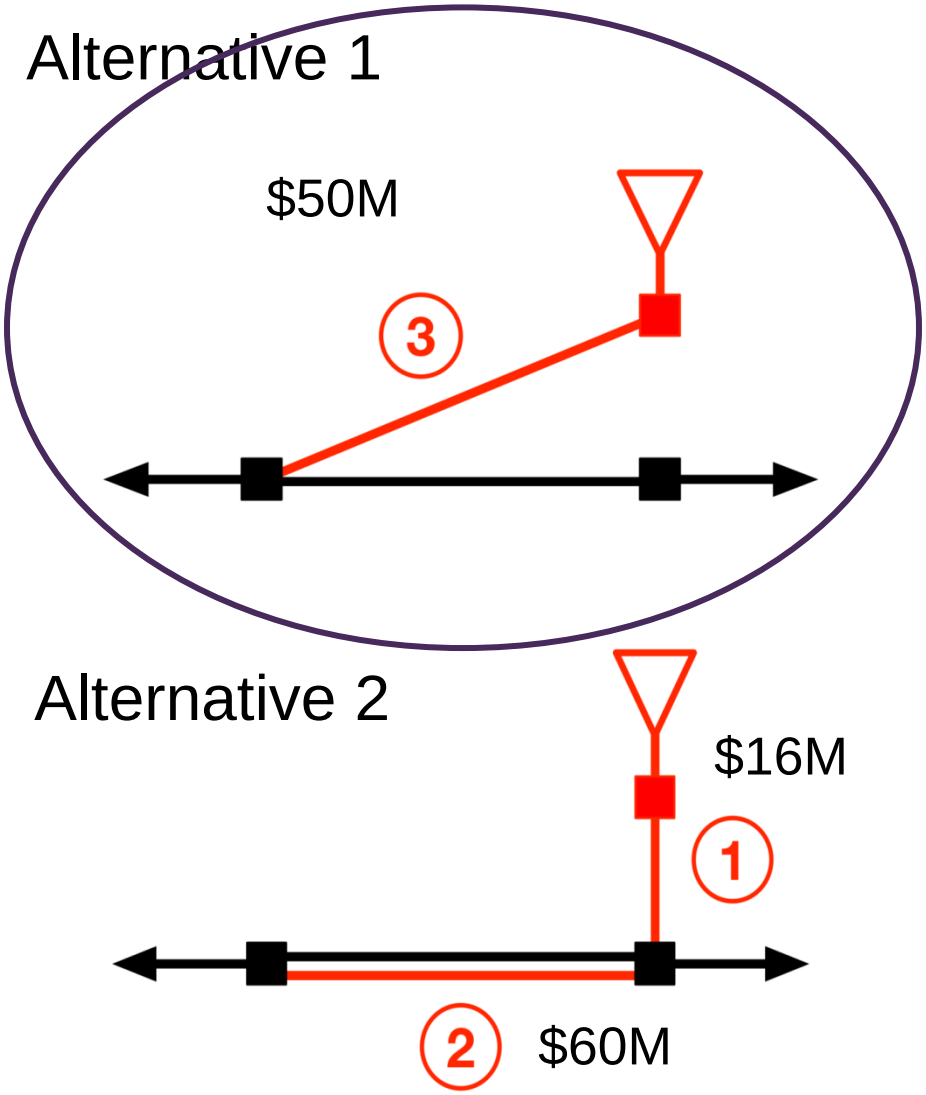
- Pros
  - Strong price signal (if you can't wait)
  - Aligns with GUOC incentives ("performance" = "energization")
  - Encourages timely energization (the AESO is holding a large deposit)
  - The MP can choose to "wait", stage their contract to accommodate current system capacity and construction will begin after energization
- Cons
  - System transmission facility costs might be prohibitively high
  - Delay in cost estimates (creation of system NID)

System Transmission Facilities Required for a Load Connection

Option	Pros	Cons	Overall Score
Charge $/MW	-Easy to understand -Avoids “true” advancement cost calculation	- Facilities may be built and not used - Cliff between waiting and not - MP “pay’s” for system facilities - Sunk costs, MP might “sit”	
Charge Adv. Cost	- Aligns with existing provision - 5 years aligns PILON/planning horizon - Very strong price locational signal (drives economic efficient outcome) - Difficult to determine “actual” adv. Costs - Perception that they are paying for system in advance	- Facilities may be built and no used - Cliff between waiting and not - MP “pays” for system facilities - Sunk costs, MP might “sit” - Based on O&M cost estimate (+50/-50)- consultant prepared?	
Refund Full System	- No system facilities build that won’t be used/paid for - somewhat strong locational price signal - Avoids MP contributions to system facilities cost - encourages timely energization - Avoids “true” adv. costs calculation	- Delay in cost estimates in order to determine refundable charge - Who holds the $	
Refund $/MW	-Like GUOC - Easy to understand - Avoids MP contributions to system facilities cost - Encourages timely energization - Avoids “true” advancement cost calculation	- Facilities may be built and not used	
Refund Adv. Cost	- Somewhat aligns with existing provision - 5 years aligns with PILON/planning horizon - Avoids MP contributions to system facilities cost - Encourages timely energization	- Facilities may be built and not used	

Increasing shade is higher score

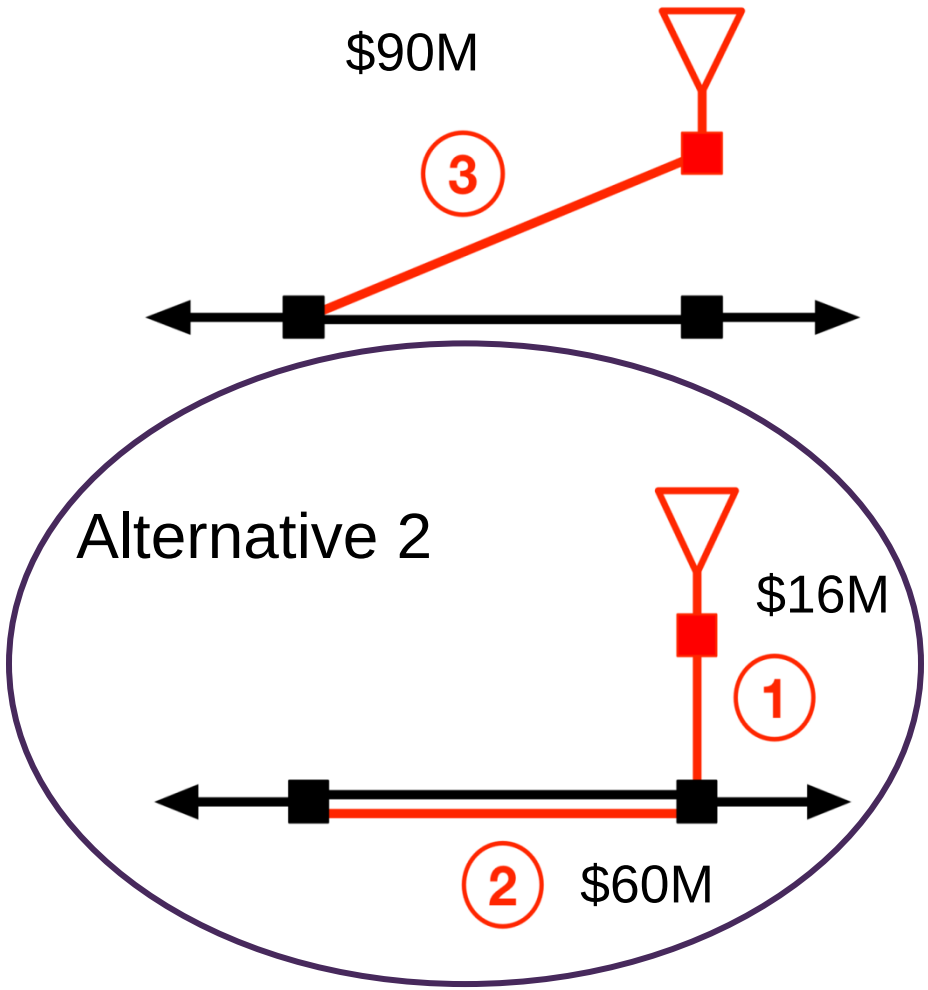
Alternative Selection - “Lowest Overall Costs”



- Both Alternative 1 and 2 are unconstrained
- Alternative 1 is a radial connection to a strong source
- Alternative 2 is a radial to a weaker source ① with a required system upgrade ②
- Alternative selection would result in Alternative 1 as it is the lowest overall costs (system upgrade required)

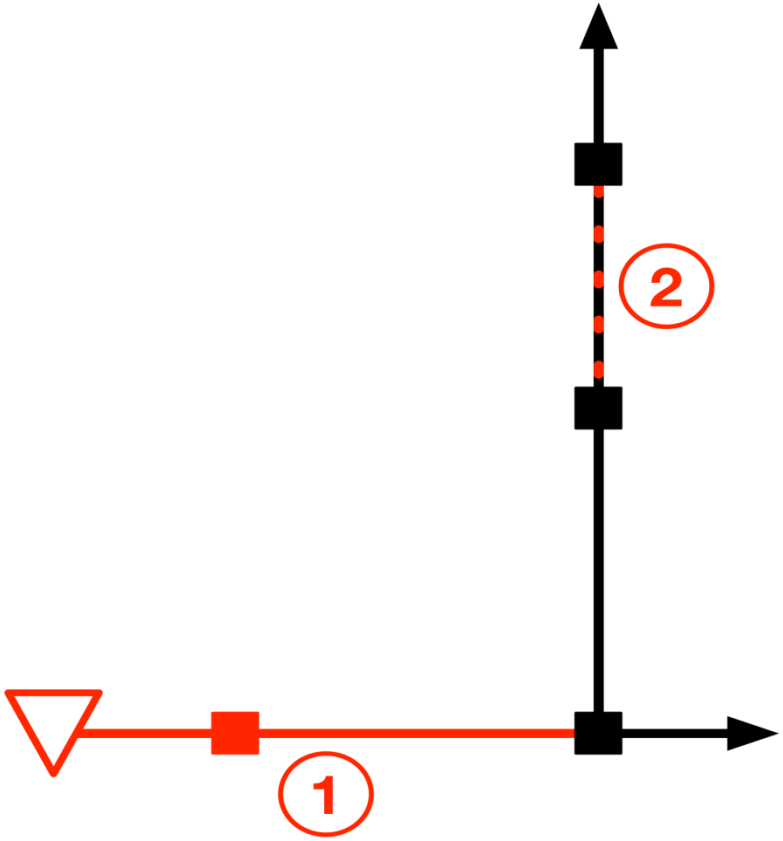
Alternative Selection - “Lowest Overall Costs”

Alternative 1

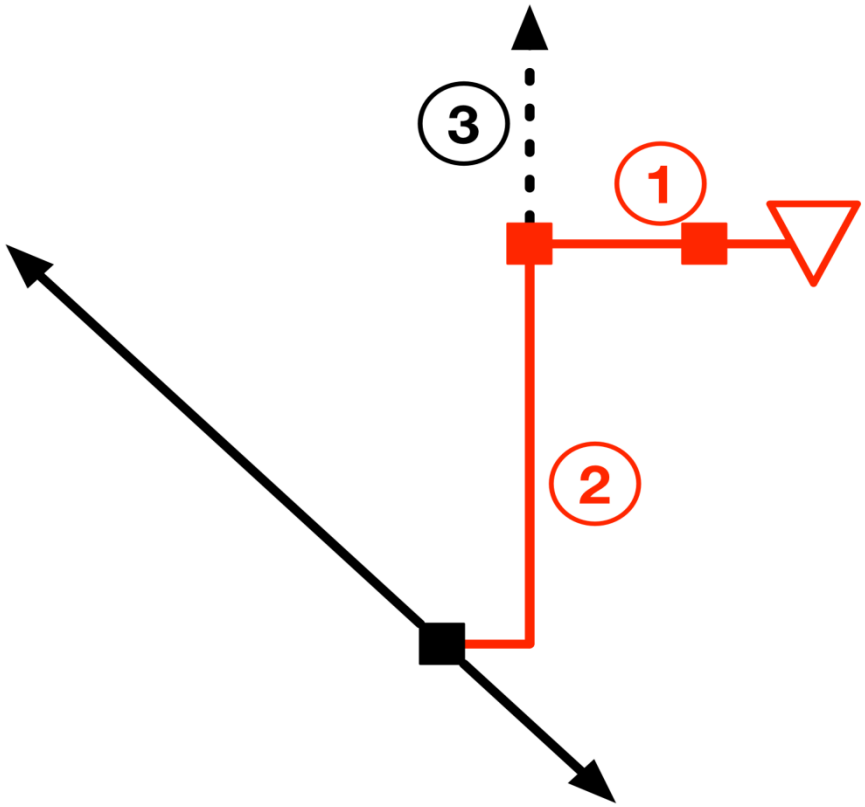


- Both Alternative 1 and 2 are unconstrained
- Alternative 1 is a radial connection to a strong source
- Alternative 2 is a radial to a weaker source ① with a required system upgrade ②
- Alternative selection would result in Alternative 2 as it is the lowest overall costs (with system upgrade required)

Example – Wait or Pay



Examples – Initially Radial then “Shared”



Changes to Sections 4, 5, 8 & 9: What are we proposing to add?

- New provisions that identify how the AESO will determine the preferred alternative
  - Constraint/congestion free
- Revised practices for system access (to replace the AESO's "Practices for System Access Service")
- Defining and enforcing critical requirements for a SASR
  - MWs, in-service date, location
- Identify when connection projects give us "sufficient certainty" that they will materialize
  - Example: GUOC payment, REP award, energization, "load certainty charge"
- New provisions around advancement costs and "accelerated construction" charges

Changes to Sections 4, 5, 8 & 9: What are we proposing to add? (cont'd)

- Differentiation between generation and load
  - New provisions for dual use customers?
- "Shared with system" cost provisions
- Connection that are initially radial are 100% participant-related costs, to be "shared" if loop is closed

Changes to Sections 4, 5, 8 & 9: What are we proposing to revise/remove?

- Remove any provisions that are duplicative of the legislation, Rules, Reliability Standards
- Language in Section 8 referring to a “contiguous” connection project
- Remove provision referring to “planned to be looped” as system-related cost
  - Advancement costs will apply to all system transmission facilities required for a load connection
- Remove connection process references
- Revisit the “Good Electric Industry Practice” to reflect the AESO’s minimum requirements

Other Terms and Conditions Proposals

- Section 1 - Applicability and Interpretation of ISO Tariff
  - Legal review
  - Ensure no duplication of legislation, rules, reliability standards
- Section 2 - Provision of and Limitations to System Access Service (may merge Sections 2 - 4)
  - Make distinction between load and generation
  - Add t-tap expectation of service
  - Remove outage provisions (covered in ISO Rules)
- Section 3 - System Access Service Connection Requirements (may merge Sections 2 - 4)
  - Remove technical requirements (covered in ISO Rules)
  - Move compliance requirements to section 2

Other Terms and Conditions Proposals (cont'd)

- Section 5 - Financial Obligations for Connection Projects
  - Legal Review
  - Ensure no duplication of other authoritative documents
- Section 6 - Metering
  - Remove altogether (covered in ISO Rules)
- Section 7 - Provision of Information by Market Participants
  - Review for duplication of ADs and legislation
- Section 10 - Generating Unit Owners Contribution
  - Add GUOC rates to the tariff

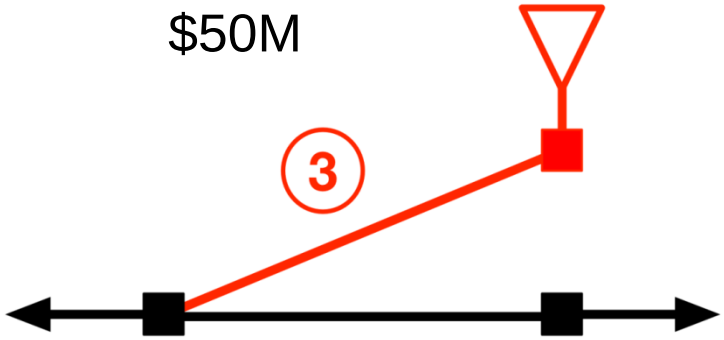
Other Terms and Conditions Proposals (cont'd)

- Section 11 - Ancillary Services
  - No changes proposed
- Section 12 - Demand Opportunity Service
  - No changes proposed
- Section 13 - Financial Security, Settlement and Payment Terms
  - Duplication with ISO Rules?
- Section 14 Peak Metered Demand Waivers
  - No changes proposed
- Section 15 Miscellaneous
  - Confirm with legal

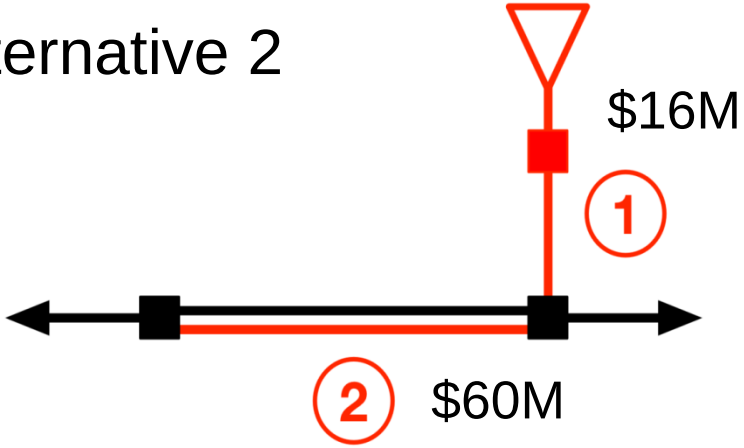
Workshop

Workshop – Example 1

Alternative 1

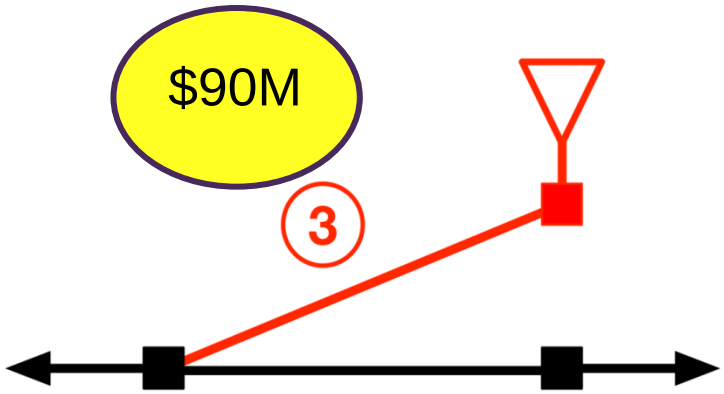


Alternative 2

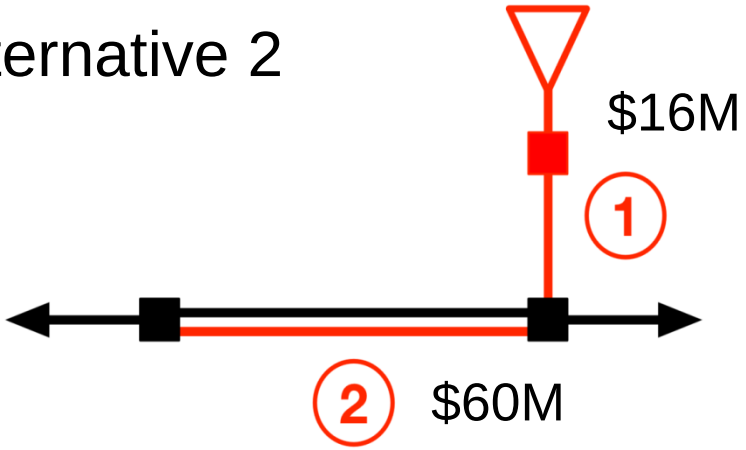


Workshop – Example 1a

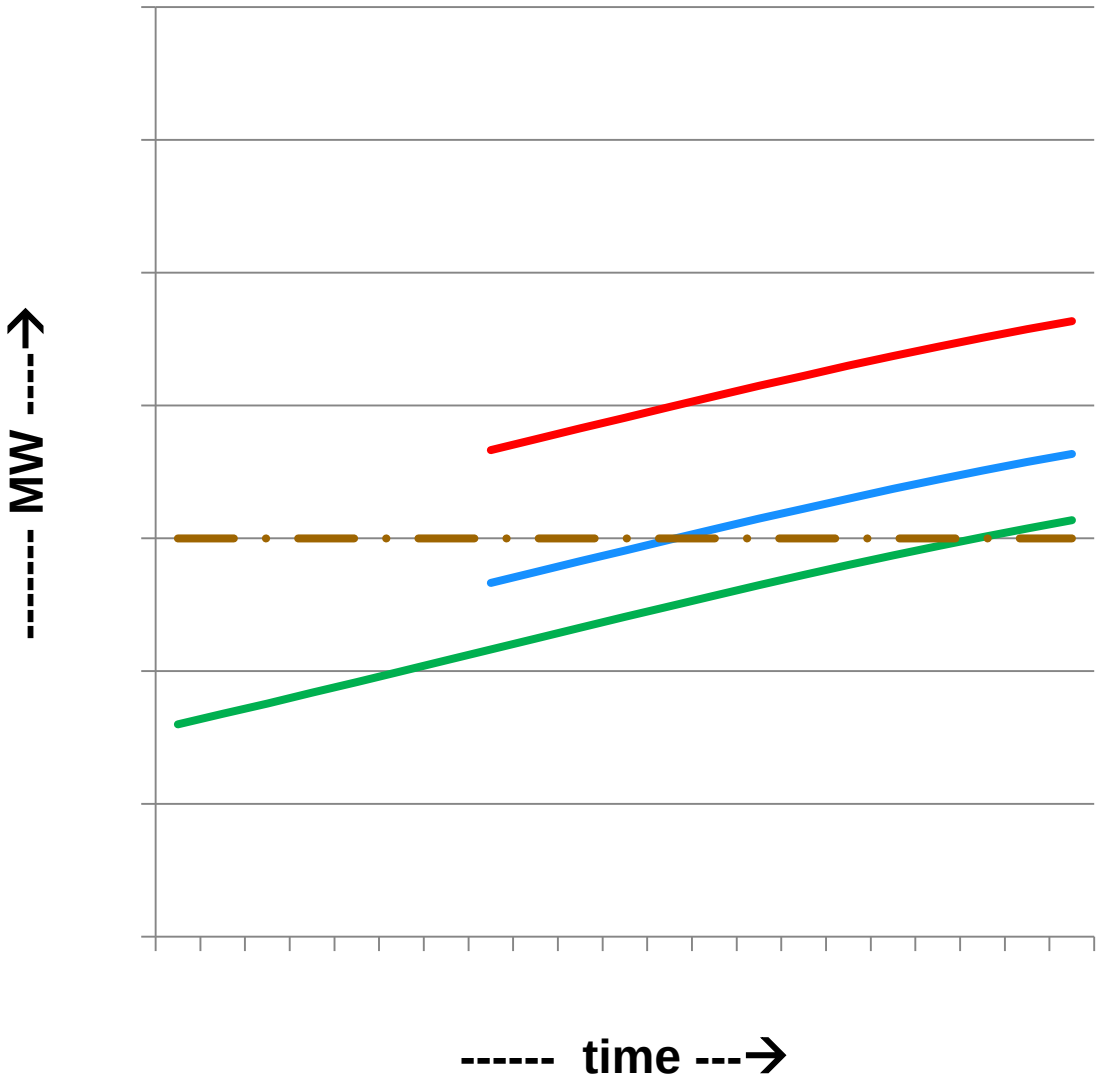
Alternative 1a



Alternative 2



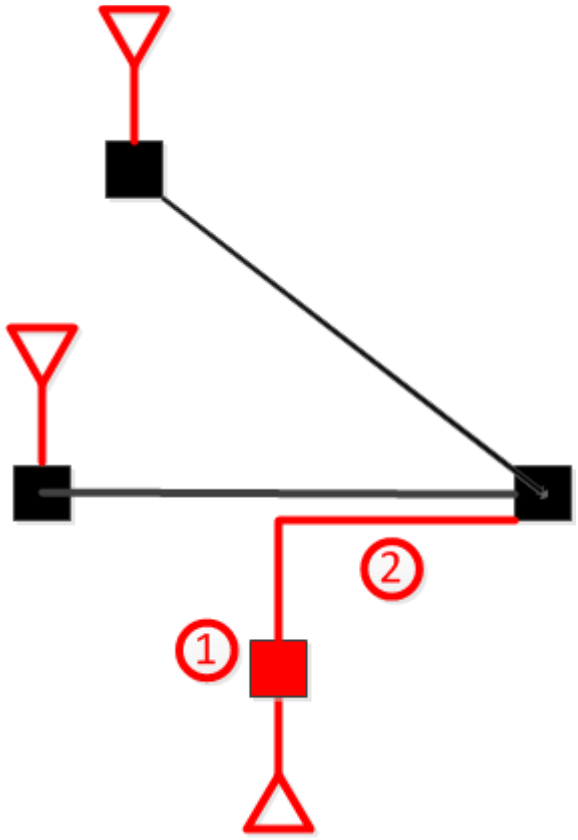
Example 1 (cont'd)



- Market Participant requests 90 MW DTS for 2019
- Available additional capacity by 2024 is 40 MW

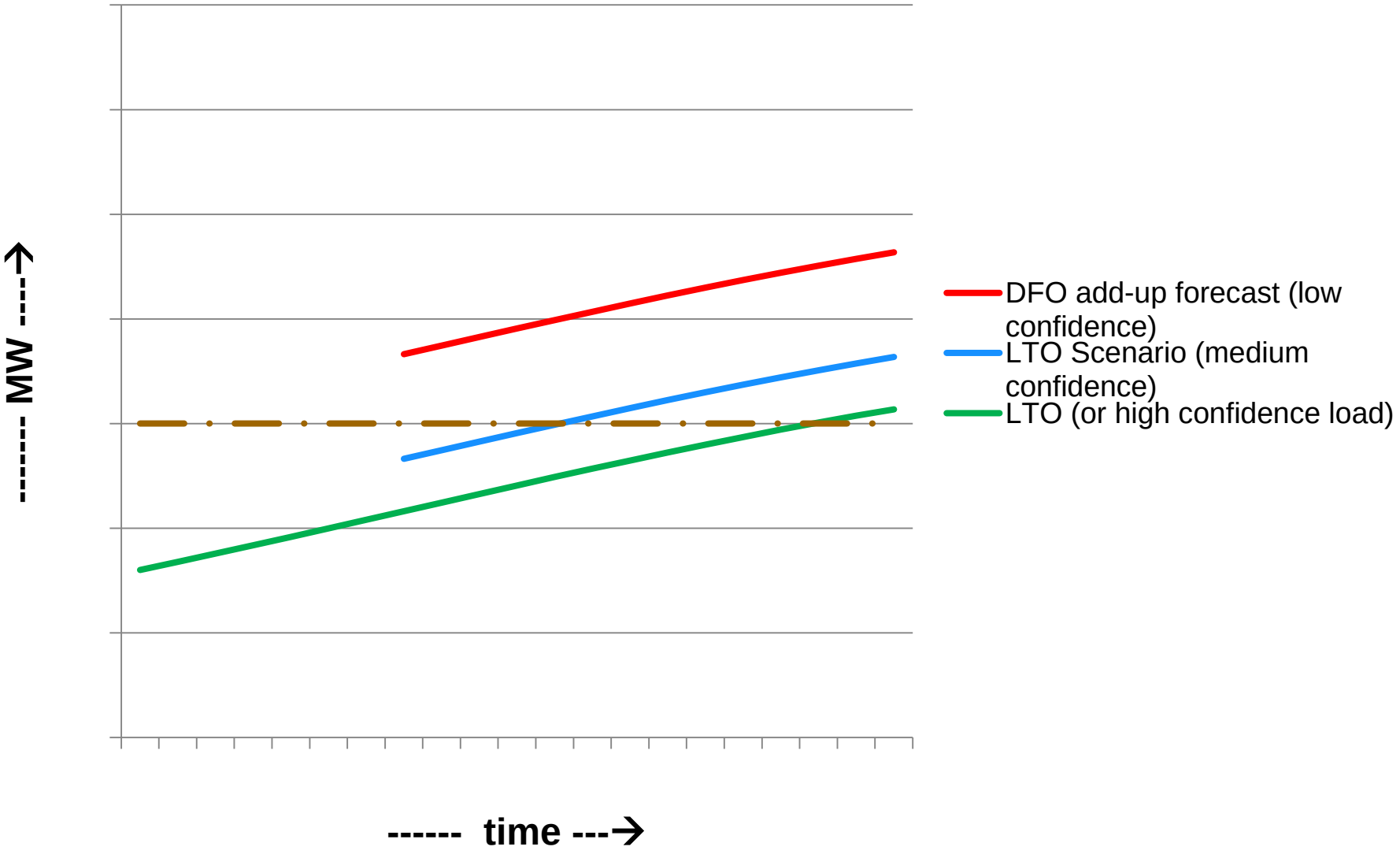
Original DTS Request
MP requests reduced DTS
LTO (or high confidence load)
Area Capacity

Workshop – Example 2



- If all 3 projects energize, system component ② is required.
- If only 2 projects energize and 1 project cancels, system component ② is <u>not</u> required.

Example 2 (cont'd)



Next Steps

- Allow stakeholders to review presentation and concepts and provide feedback
- Prepare application with revised terms and conditions

POD Cost Function Database

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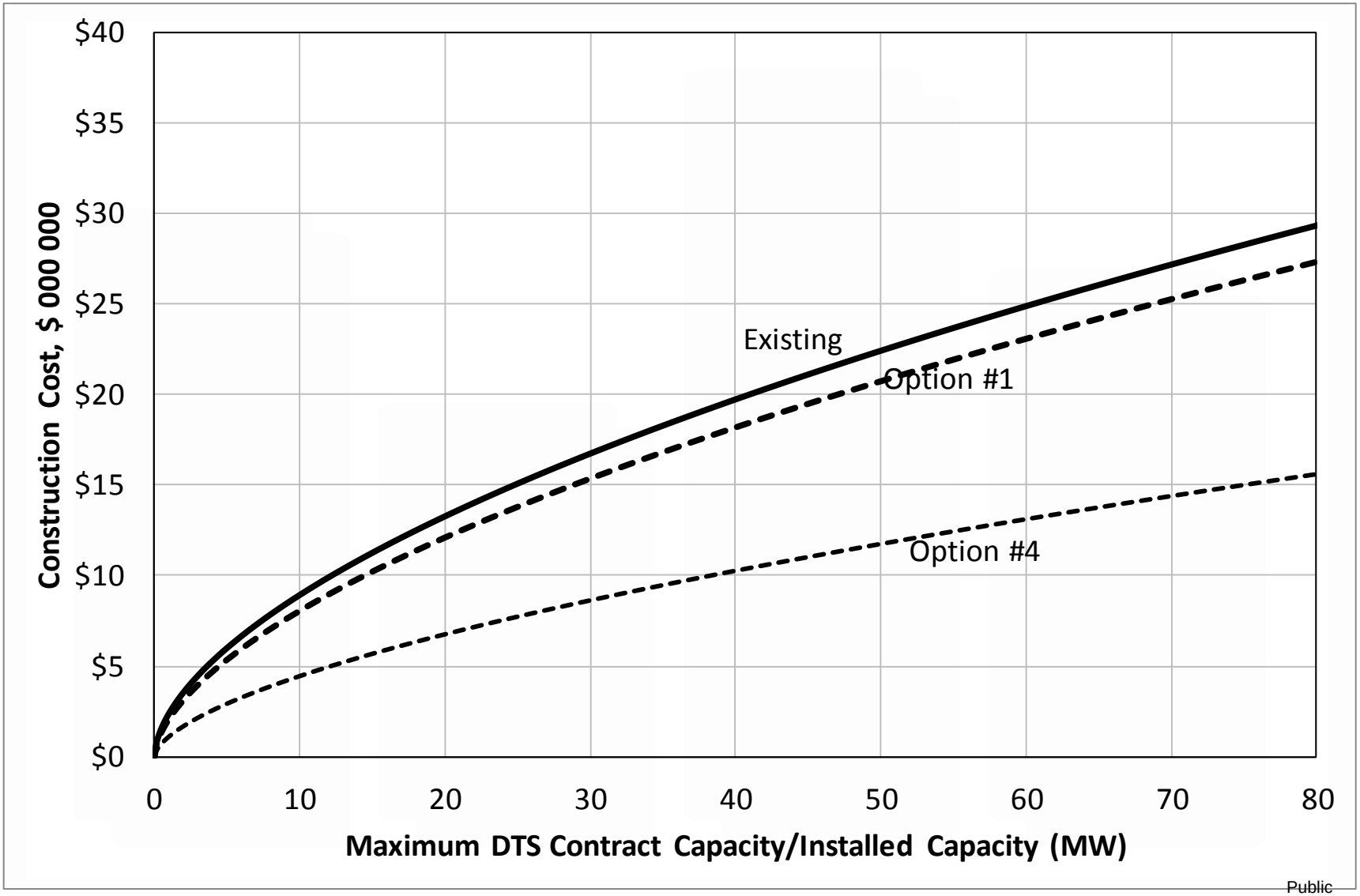
POD cost function database input into cost curves

- POD cost function database includes connection project (demand only) attributes: cost data, contract levels, installed capacity, connection type, location, substation number, project type, etc.
- For the 2018 tariff application, AESO will update POD cost function database with projects data since last update in 2014
- After Decision 2014-242 and Decision 3473-D01-2015 from the Commission in regards to project inclusion and criteria, the AESO was directed to "use 'Greenfield and Update Excluding 0 MW' until the matter can be thoroughly explored"
  - contract vs installed capacity
  - upgrade projects with 0 MW increase

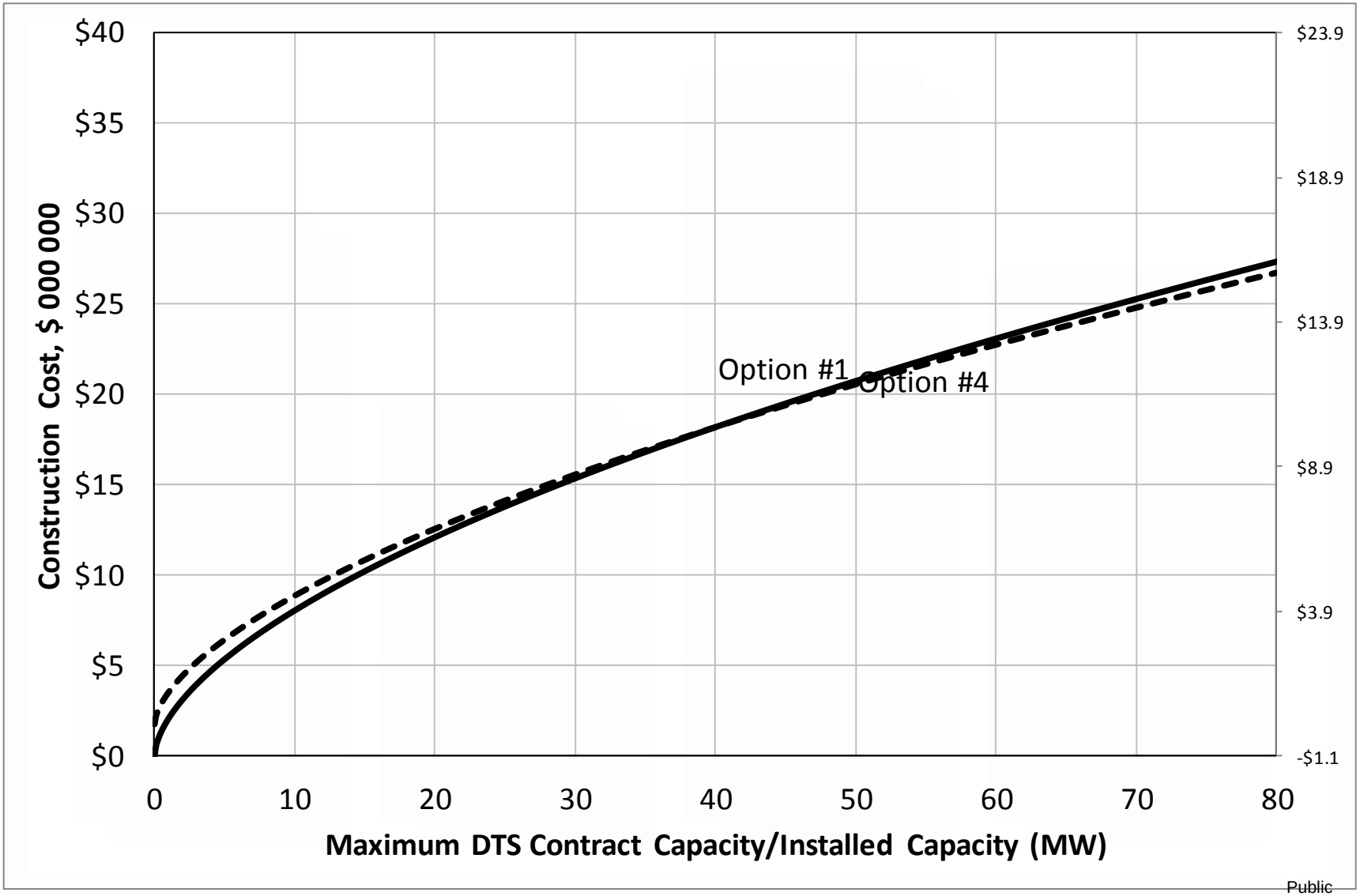
POD cost function database – cost curves

Cost Curve Options	Greenfield	Upgrade	0 MW Contracts
#1 Pre-2014 Practice	Contract	Contract	Include
#2 Current Practice (until thoroughly explored)	Contract	Contract	Remove
#3 As requested in Decision 2014-242	Contract	Installed	By using installed, 0 MW projects <u>are</u> included
#4 Not asked	Installed	Installed	
~~**#5 AESO not considering**~~ ~~(Not asked, not debated)~~	~~Installed~~	~~Contract~~	~~?~~

Comparison of Options to Existing (2014 ISO Tariff) Cost Function Curve



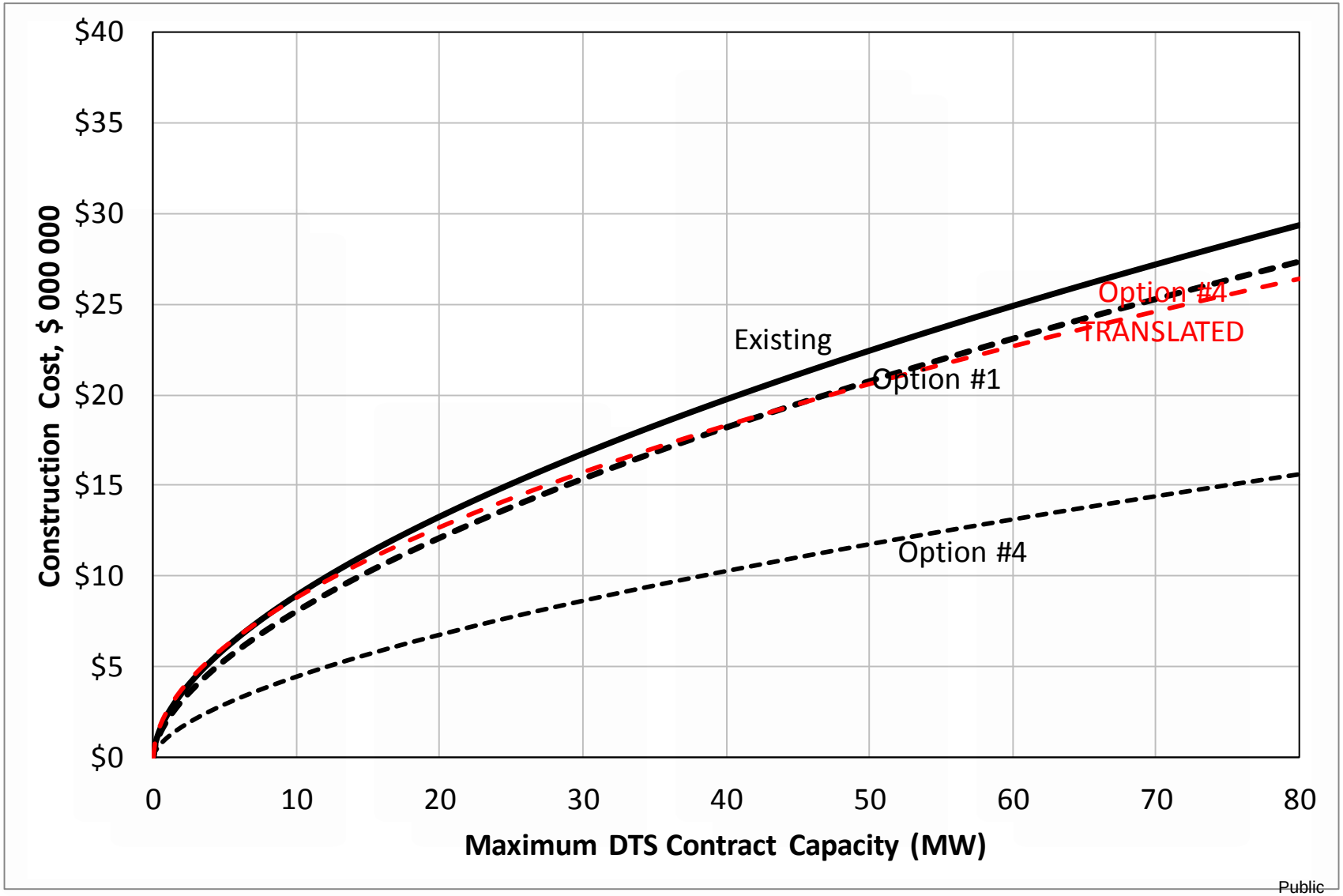
Comparison of Options - Shape



Translated Installed Capacity to Contract Capacity – X axis

- In order to continue to bill based on contract capacity, the cost curve x-axis for installed capacity must be “translated” to contract capacity
- In other words, create the exact same shape and dimensions as previous graph Option #4 which can be graphed against Option #1 without altering the secondary vertical axis

Comparison of Options to Existing (2014 ISO Tariff) Cost Function Curve



Criteria Summary

Criteria	Option #1	Option #4
Variability of relationship between installed capacity and contract capacity		
Number of assumptions and reasonableness of assumptions		
Fairness of treatment of customers with charges based on two different approaches (intergenerational equity)		
Reflect actual cost drivers of projects	R2 = 0.35	R2 = 0.37

Increasing shade is more positive

Impact on POD Rates

POD Charge	2017 ISO Tariff	Option #1 – est.*	Option #4 – est.*
Customer X SF	$8,789/month	$8,353/month	$10,986/month
<= 7.5 MW	$3,559/MW	$3,616/MW	$3,687/MW
>7.5 to <=17 MW	$2,229/MW	$2,306/MW	$2,196/MW
>17 to <=40 MW	$1,555/MW	$1,633/MW	$1,476/MW
>40 MW	$1,007/MW	$1,070/MW	$914/MW

* Estimated using proposed transmission cost study results for 2018 and 2017 wires costs and 2017 billing determinants

POD Cost Function
Next Steps

- Proceed with rates calculations based on Option #1
- Continue to work on translation of Installed Capacity cost curve to a Contract Capacity cost curve to provide analysis to Commission in application in order to thoroughly explore the matter
- Application will include analysis of all 4 options:
  - Option #1 – Contract capacity for both greenfield and upgrade projects, including 0 MW upgrade projects
  - Option #2 – Contract capacity for both greenfield and upgrade projects, excluding MW upgrade projects
  - Option #3 – Contract capacity for greenfield and installed capacity for upgrade projects
  - Option #4 – Installed capacity for both greenfield and installed capacity for upgrade projects

Transmission Cost Causation Study Follow-up

Raj Sharma

Preliminary 2018-2020 Functionalization

Year/Function	Bulk	Regional	POD
2016	59.2%	21.6%	19.2%
2018	53.4%	26.3%	20.3%
2019	55.0%	25.1%	19.9%
2020	53.7%	26.2%	20.1%

Regional System Additions in 2020

- Downtown Calgary (P1456) – about $145 million
- Grande Prairie (P1784, P1785) – about $75 million
- Central East (PENV, P1781) – about $280 million potentially moving to post 2020

Classification by Minimum System Approach

- Demand related cost as ratio of minimum system cost and optimal system cost
- 138kV: minimum system is 1x266 ACSR and optimal system is 1x477 ACSR
- 240kV: minimum system is 2x795 ACSR and optimal system is 2x1033 ACSR
- 500kV: minimum system is 2x2156 ACSR and optimal system is 3x1590 ACSR

Classification Calculations

- Normalize cost to single circuit for 138kV
- Normalize cost to double circuit for 240kV
- Escalate cost to common test year*

Regional System Classification

Conductor	1x266 ACSR	1x477 ACSR
2019 $ per kM	487,202	537,349

Class	Demand	Energy
2014-2016	87.4%	12.6%
2018-2020	93.3%	6.7%

Bulk System Classification

Conductor	2x795 ACSR	2x1033 ACSR
2019 $ per kM	1,764,083	2,306,910

Class	Demand	Energy
2014-2016	93.1%	6.9%
2018-2020	78.2%	21.8%

Critical Infrastructure Protections ("CIPs") Cost Recovery

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Background to CIPs Cost Recovery Issue

- Alberta reliability standard – *Cyber Security – BES Cyber System Categorization CIP-002-AB-5.1* is planned to be come effective on October 1, 2017
- TransAlta's Sundance Facility (units 1-6) would be the only aggregated generating facility classified with a Medium Impact Rating and would be then subject to additional expenditures
- In Proceeding 3443, the Commission directed the AESO to:

  "Address as part of its next general tariff application, the issue of cost responsibility for compliance with the CIP Alberta reliability standards. The AESO's application must either state that the AESO is including any such costs in its proposed tariff as recoverable under the AESO's tariff pursuant to section 30(2)(iv) of the *Electric Utilities Act*, or that the AESO does not propose that some or all of such costs are recoverable through its proposed tariff."

AESO's Proposed Position in Upcoming Application

- Not recoverable under tariff; generators should be individually responsible for the costs of complying with Alberta Reliability Standards, including CIPs
  - Based on AESO's internal FEOC assessment (costs that are directly assigned to the market participant are more efficient than if they are socialized)
  - Consistent with the treatment of other Alberta reliability standards that provide a benefit to the AIES and all market participants
- AESO's rationale included in application, may include evaluation of tariff, cost causation and FEOC principles

Application Process, Timeline and Next Steps

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Commission Letter from March 29, 2017

- “In order to present a manageable set of issues, the Commission considers it may be helpful to parties if certain scope issues are communicated to market participants in advance of the submission of the ISO’s tariff application. The scope issues include consideration of issues that arose out of Proceeding 20922 and also incorporate issues that were raised in subsequent proceedings, since Proceeding 20922 was initiated. However, parties are not limited or constrained in any way from submitting evidence on the issues identified below or on any other issues of significance to the operation and construction of the ISO tariff.”

Other issues raised by stakeholders

To be investigated after 2018 ISO Tariff Application

- Capacity market cost recovery
- Coincident metered demand as billing determinant for bulk recovery charges
- Export rates

Will be addressed in application but with no proposed changes in rates or terms and conditions in 2018 ISO Tariff Application

- Energy storage tariff
- Isolated generation connections

March 1, 2017 Session – Stakeholder Comments Review

- Rider A1 – Dow - General agreement to approach the AESO is proposing to include in application
  - Revise Rider A1 in ISO Tariff to add clarity regarding the life of the duplication avoidance tariff (DAT) and include a high-level assessment of the continued applicability of the DAT
  - Extend forecast benefit to reflect life of the assets so that O&M and losses payments (only) continue in an extended payment table
- Application preview session will be an opportunity for the AESO to share the complete scope of changes proposed to the ISO tariff
  - Due to the amount time required for legal and language review, the exact provisions will only be provided in the application to the Commission, not in the application preview

Checklist for 2018 ISO tariff application

Scope item	Status
Rider C / DAR / Tariff updates	100% complete
POD cost function work	100% complete
Transmission cost causation study	100% complete
Terms and conditions including Sections 4, 5, 8 and 9	80% complete
Clarify tariff for energy storage	100% complete
Updates to Proformas	100% complete
Clarify Rider A-1 – Dow duplication avoidance tariff	100% complete
Address direction from Commission regarding cost recovery from Critical Infrastructure Protection (CIP) work	100% complete
Long-term transmission rate projection model	75% complete

Tariff tentative timeline

Session	Date
Application Preview Session	June 2017
Application writing	Q2 2017
Application filing	Q2 2017
2016 DAR Filing	Q3 2017
2018 tariff update application	Q3 2017
Regulatory review process for 2018 tariff application	Q4 2017 – Q1 2018
Compliance filing	Q2 2018

Next steps

- The AESO will invite participants to respond to this presentation through a comment matrix in the next few weeks. To allow transparency, the AESO will post all comments on AESO's website following the receipt of participants' input
- For more information:

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  larhonda.papworth@aeso.ca
- All consultation documents can be found on AESO website at www.aeso.ca by following the path:
  Rules, Standards and Tariff ►Stakeholder engagement ►2018 ISO tariff application

Further Discussion? Questions?