

Technical Meeting on Loss Factor Activities

December 13, 2019 — Calgary, Alberta

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- Introductions
- Overview of 2020 loss factor calculation results
- Status update on investigation of volume discrepancies in loss factor calculations
- Status update on recalculation of 2017 and 2018 loss factor recalculations
- Status update for Module C loss factor calculations
- Overview of “pay-as-you-go” review and variance application
- Overview of Module C payment plan compliance filing
- Review of schedule for loss factor activities

Please ask questions during presentation

AESO published 2020 loss factors on November 21, 2019

- Updates to load and merit order data to reflect new projects delayed completion of 2020 loss factors beyond “best efforts” deadline of first business day of October
 - Loss factors were published prior to “final” deadline of first business day of December
- Two “reversing POD” sites were added using average annual loss factor for the transmission system without hourly calculations in the workbook
 - Sites did not satisfy project inclusion criteria of Loss Factor Rule when loss factors were being determined
 - Sites have since progressed and will be in service in Q1 2020

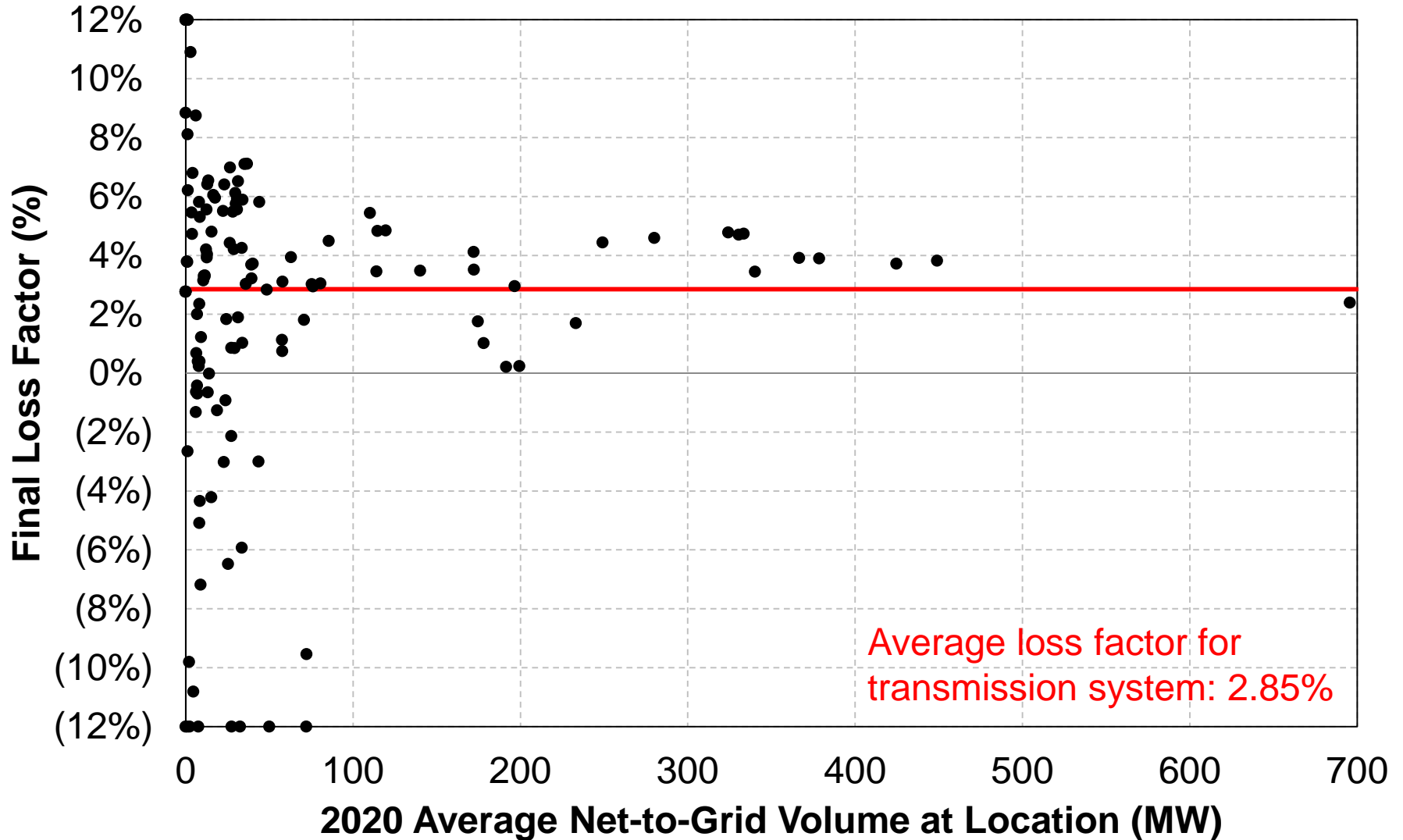
AESO published 2020 loss factors on November 21, 2019 (cont'd)

- 2020 loss factors will be effective January 1, 2020
 - Will be implemented in February 2020 billing cycle for January 2020 initial settlement
- Related information was posted with loss factors
 - Hourly merit order data for 2020 loss factors
 - Sample of hourly load data for 2020 loss factors
 - Process for requesting access to system topologies
 - Updated procedure to determine transmission system losses for loss factor calculations
 - Software and scripts used to calculate hourly raw loss factors
 - Workbook showing calculations for 2020 loss factors
- 2020 average loss factor for transmission system is 2.85%
 - 2019 average loss factor was 2.75%

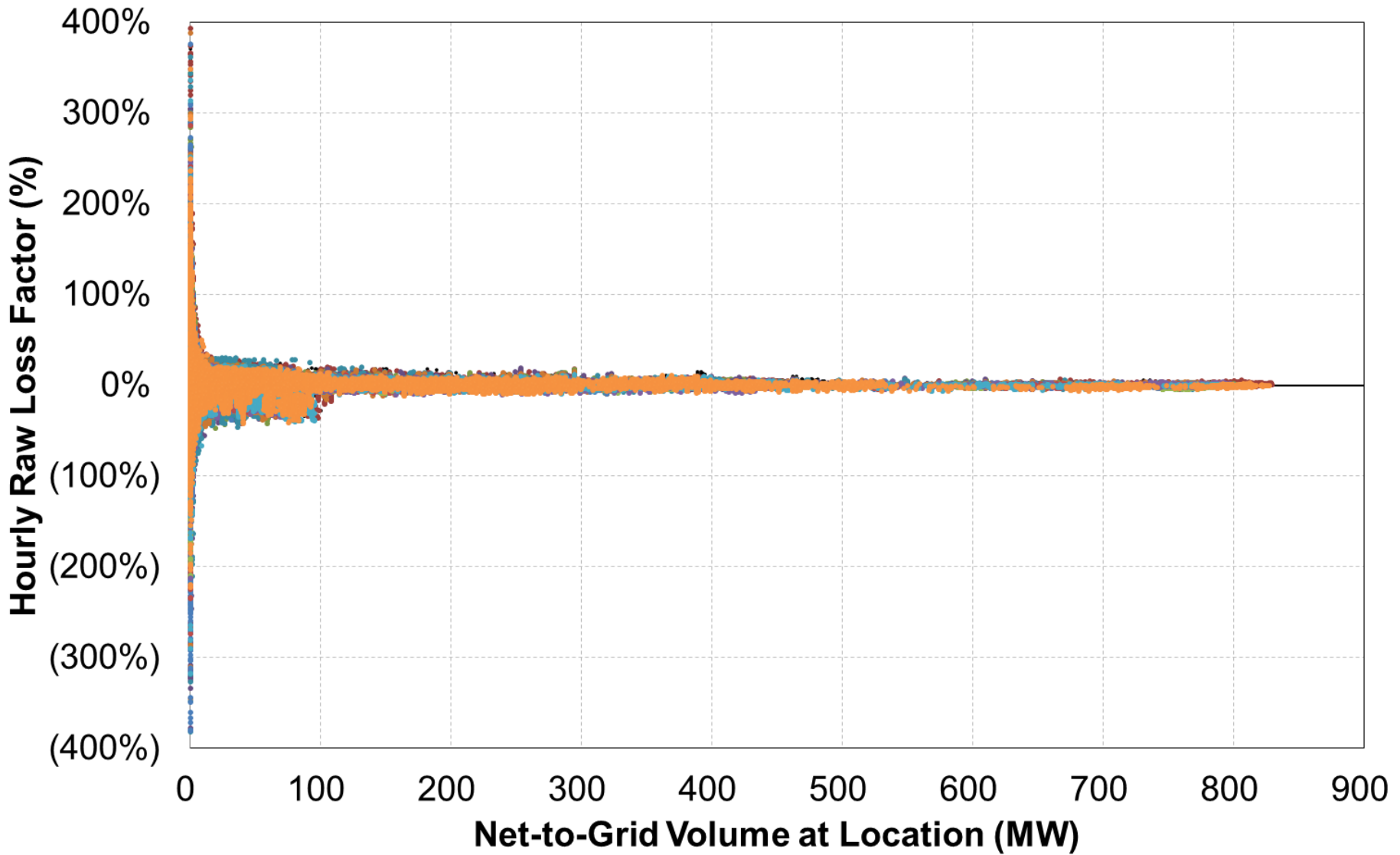
2020 loss factors were calculated using amended Loss Factor Rule

- Commission approved rule amendments in Decision 24637-D01-2019, issued on September 17, 2019
 - Historical volumes were increased or decreased in proportion to change in maximum capability or contract capacity, as appropriate, of source asset and to change in contract capacity of sink asset
 - Net demand was reduced before net supply offer block was dispatched to balance system when calculating hourly loss factors
 - All locations were excluded in an hour in which losses could not be calculated for a single location
- 2019 loss factors were calculated on the same basis

Annual loss factors continue to show greater dispersion for smaller volumes



Hourly raw loss factors continue to show high dispersion for small volumes



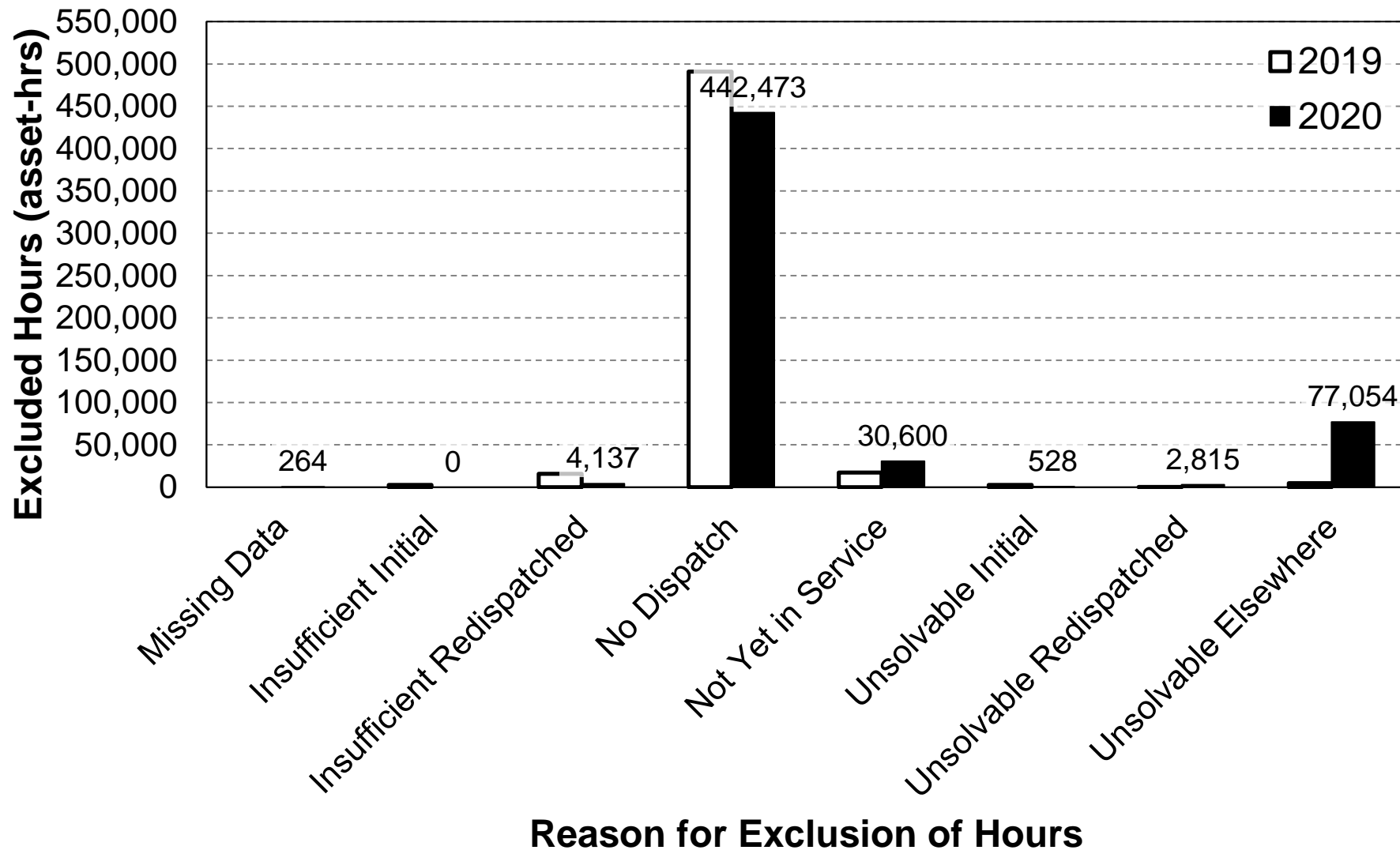
0.6% of hours were excluded due to insufficient source assets

- 8,760 simulations were attempted for calculation of losses in initial state
- Two hours (0.02%) were excluded due to missing data
- No hours could not solve due to insufficient source assets to balance load in initial state
- 54 hours (0.6%) could not solve due to insufficient source assets to balance load in redispatched state
- Hour is excluded for all assets if any simulation in hour fails to solve due to insufficient source assets
- Total of 54 hours (0.6%) were excluded due to insufficient source assets to balance load

Exclusions due to insufficient assets are attributed to retirements and outages

- Sundance Unit 2 (280 MW) retired as of August 2018
- Sundance Unit 3 (368 MW) and Unit 5 (406 MW) began mothball outages as of April 2018
- H. R. Milner (144 MW) expected to begin extended outage as of April 2020

11.8% of hours were unsolvable in 2020



About 59% of all hours and locations had dispatch and sufficient assets to solve



Hours (x132)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Total hours	98,208	88,704	98,076	95,040	98,208	95,040	98,208	98,208	95,040	98,208	95,172	98,208	1,156,320
Missing data	0	0	0	0	0	0	0	(264)	0	0	0	0	(264)
Insufficient redispached	(1,207)	(1,014)	0	0	(780)	(534)	(84)	(362)	(80)	(76)	0	0	(4,137)
No dispatch	(38,528)	(34,914)	(40,362)	(36,395)	(36,543)	(33,979)	(36,680)	(36,636)	(37,110)	(37,979)	(37,636)	(35,711)	(442,473)
Not yet in service	(2,972)	(2,688)	(2,972)	(2,880)	(2,972)	(2,880)	(2,976)	(2,968)	(2,872)	(2,976)	(1,444)	0	(30,600)
Potential hours	55,501	50,088	54,742	55,765	57,913	57,647	58,468	57,978	54,978	57,177	56,092	62,497	678,846

Percentages	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Total hours	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Missing data	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	(0.3%)	0.0%	0.0%	0.0%	0.0%	(0.02%)
Insufficient redispached	(1.2%)	(1.1%)	0.0%	0.0%	(0.8%)	(0.6%)	(0.1%)	(0.4%)	(0.1%)	(0.1%)	0.0%	0.0%	(0.4%)
No dispatch	(39.2%)	(39.4%)	(41.2%)	(38.3%)	(37.2%)	(35.8%)	(37.3%)	(37.3%)	(39.0%)	(38.7%)	(39.5%)	(36.4%)	(38.3%)
Not yet in service	(3.0%)	(3.0%)	(3.0%)	(3.0%)	(3.0%)	(3.0%)	(3.0%)	(3.0%)	(3.0%)	(3.0%)	(1.5%)	0.0%	(2.6%)
Potential hours	56.5%	56.5%	55.8%	58.7%	59.0%	60.7%	59.5%	59.0%	57.8%	58.2%	58.9%	63.6%	58.7%

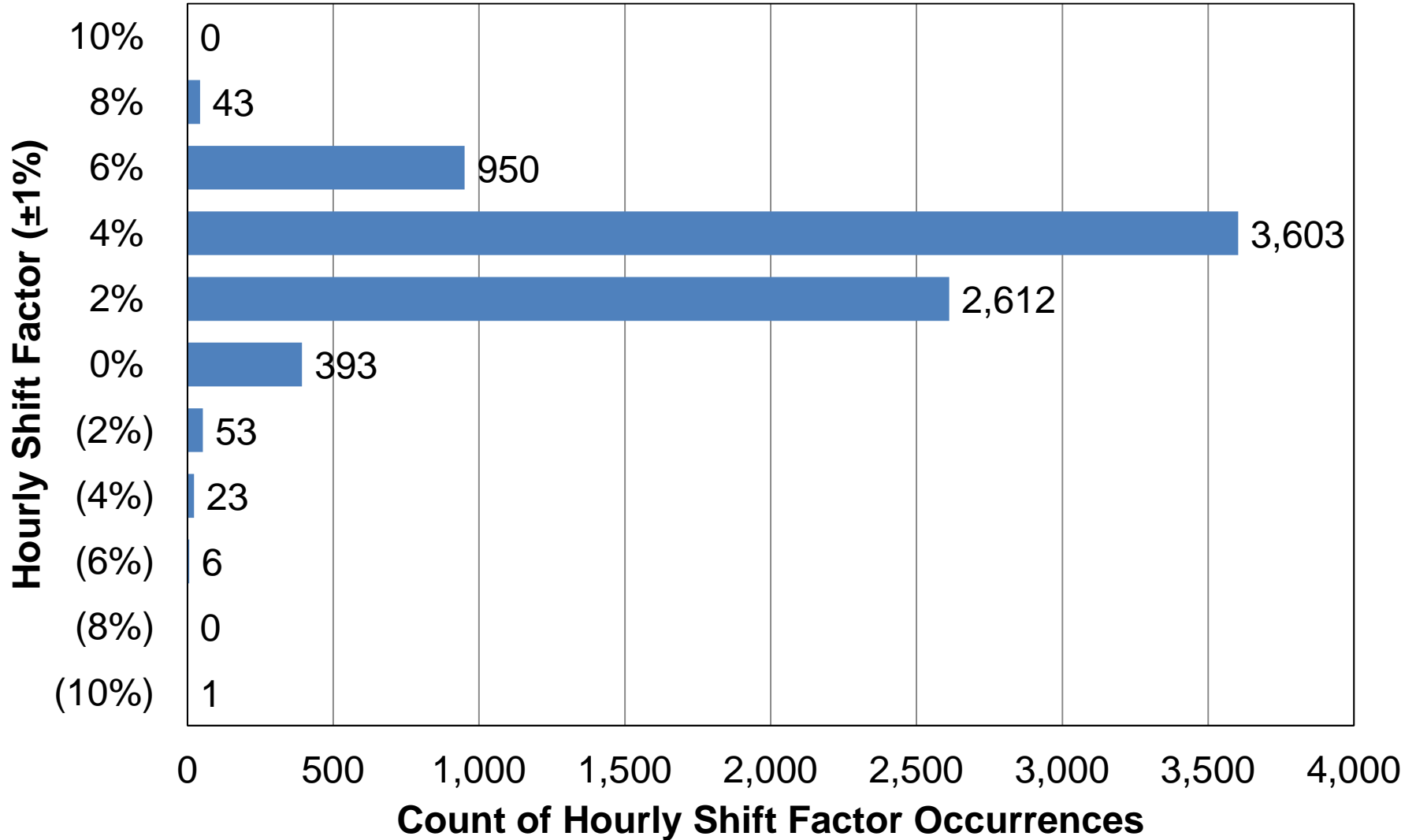
Over 99% of potential hours solved, with about 11% more excluded in same hours



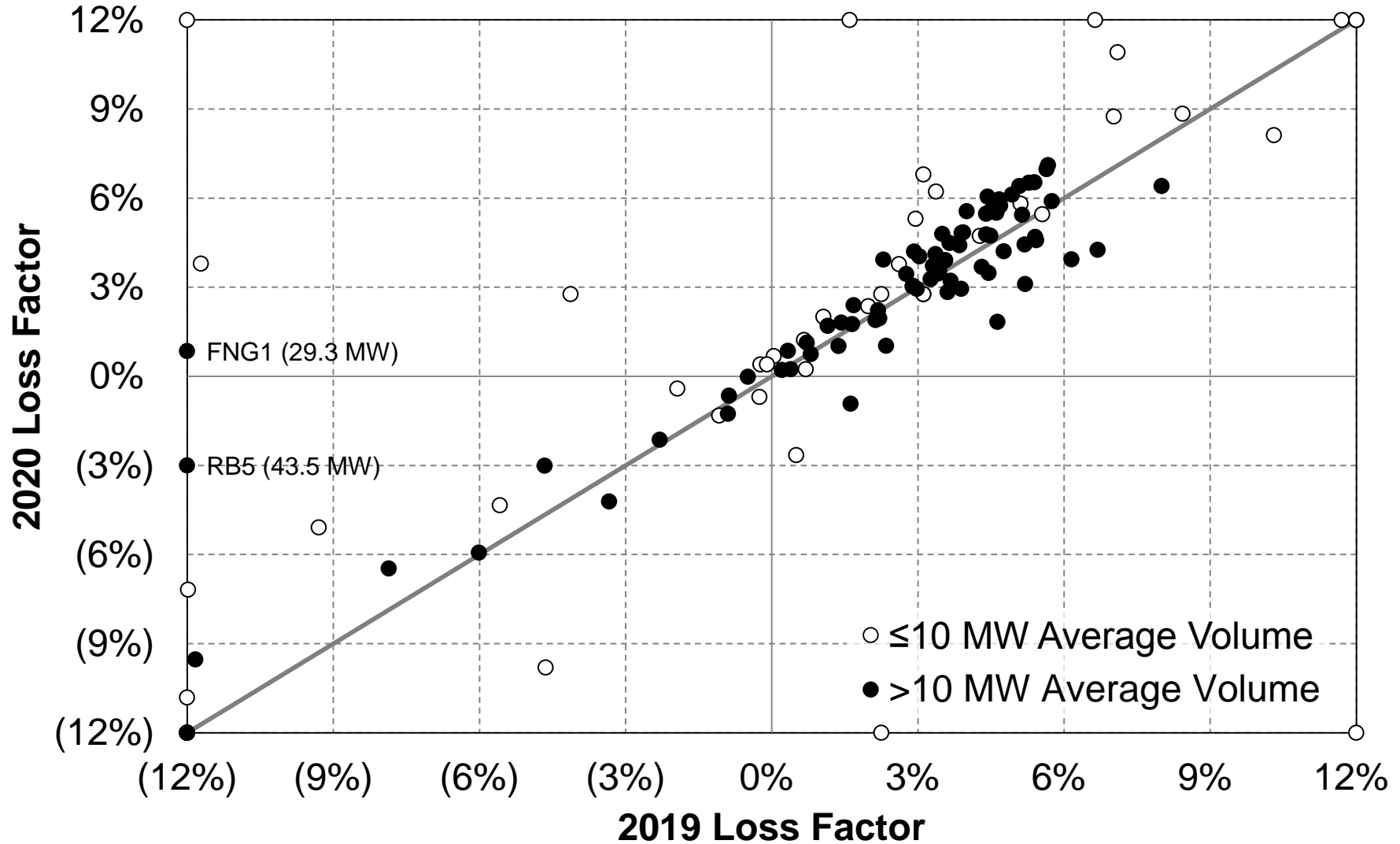
Hours (x132)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Potential hours	55,501	50,088	54,742	55,765	57,913	57,647	58,468	57,978	54,978	57,177	56,092	62,497	678,846
Unsolved initial	(132)	0	0	0	(132)	0	0	0	(264)	0	0	0	(528)
Unsolved redispached	(245)	(116)	(497)	(361)	(258)	(166)	(167)	(343)	(165)	(218)	(150)	(129)	(2,815)
Unsolved elsewhere	(7,159)	(3,654)	(6,793)	(10,105)	(7,787)	(6,535)	(6,800)	(5,406)	(5,730)	(7,085)	(4,937)	(5,063)	(77,054)
Solved hours	47,965	46,318	47,452	45,299	49,736	50,946	51,501	52,229	48,819	49,874	51,005	57,305	598,449

Percentages	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Potential hours	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Unsolved initial	(0.2%)	0.0%	0.0%	0.0%	(0.2%)	0.0%	0.0%	0.0%	(0.5%)	0.0%	0.0%	0.0%	(0.1%)
Unsolved redispached	(0.4%)	(0.2%)	(0.9%)	(0.6%)	(0.4%)	(0.3%)	(0.3%)	(0.6%)	(0.3%)	(0.4%)	(0.3%)	(0.2%)	(0.4%)
Unsolved elsewhere	(12.9%)	(7.3%)	(12.4%)	(18.1%)	(13.4%)	(11.3%)	(11.6%)	(9.3%)	(10.4%)	(12.4%)	(8.8%)	(8.1%)	(11.4%)
Solved hours	86.4%	92.5%	86.7%	81.2%	85.9%	88.4%	88.1%	90.1%	88.8%	87.2%	90.9%	91.7%	88.2%

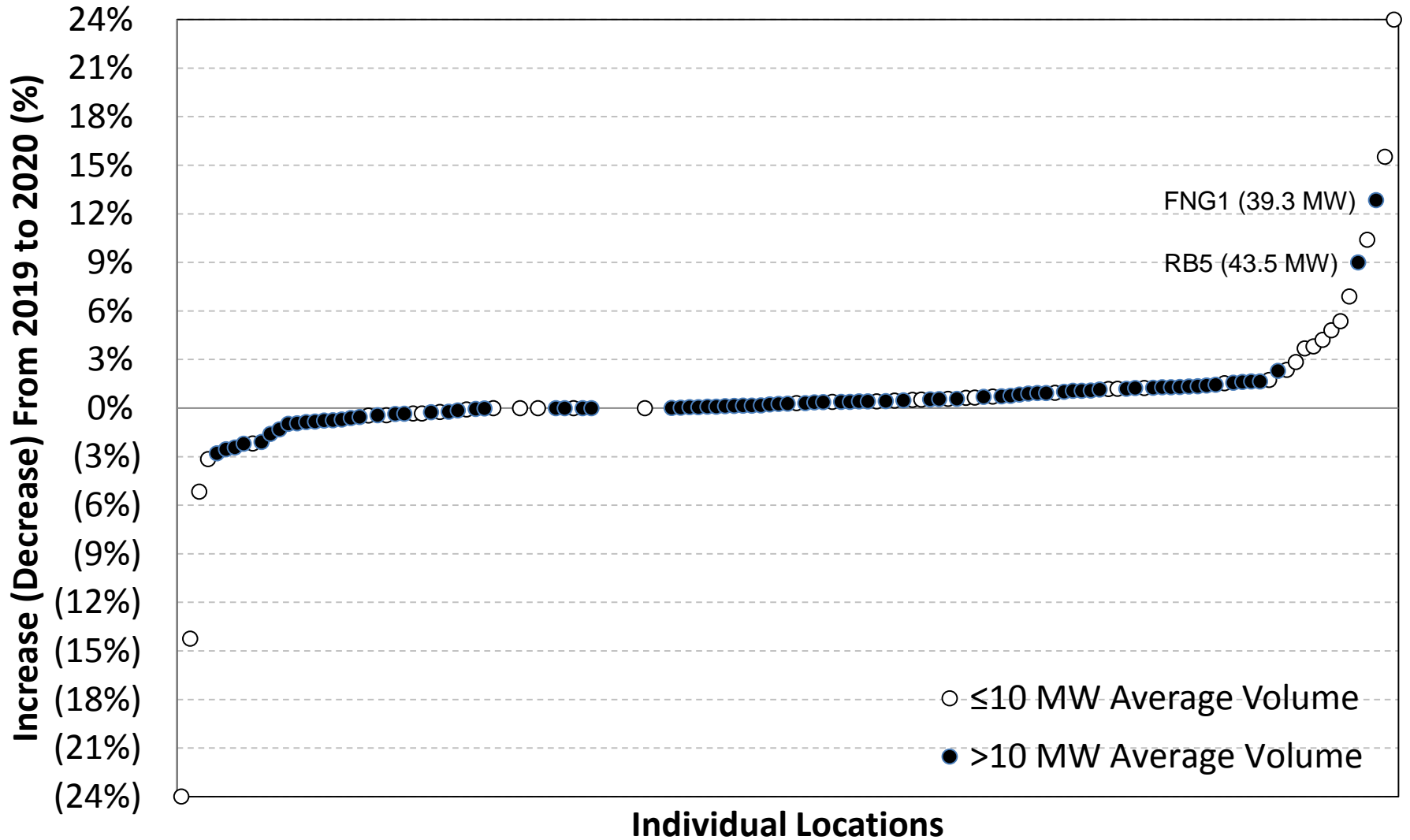
About 93% of hourly shift factors were between 1% and 7%



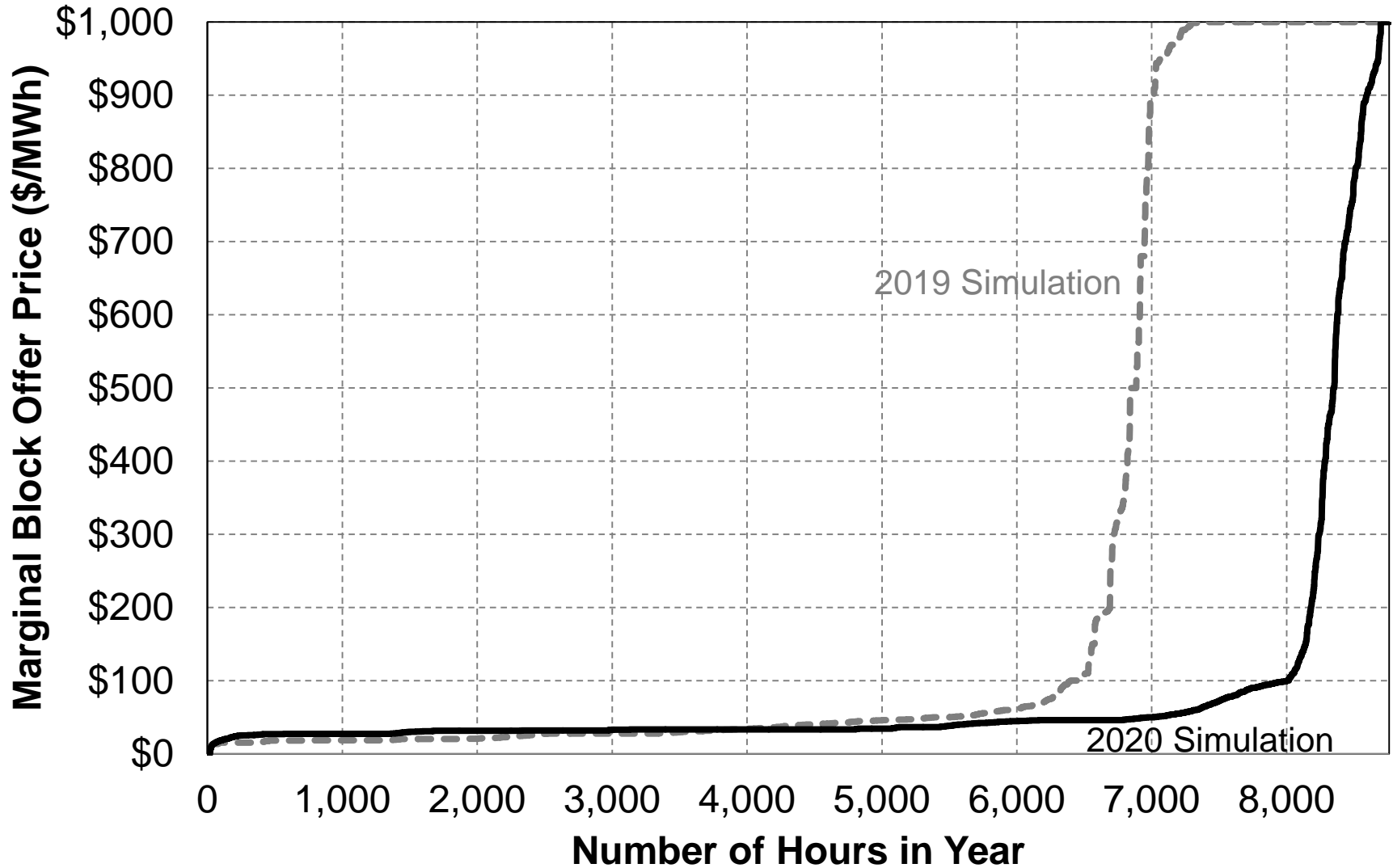
Most 2020 loss factors are similar to 2019 loss factors



Almost all loss factor changes are within $\pm 3\%$ between 2020 and 2019



Marginal block offer price reached \$999 in only 1% of hours in 2020 simulation



Marginal units are materially different between 2020 and 2019 simulations

Location (MPID)	2020 Marginal Units		2019 Marginal Units	
	Frequency	Average (MW)	Frequency	Average (MW)
Sheerness #1	1,071	229	400	235
Sundance #4	755	124	595	165
Battle River #5	737	175	704	228
Keephills #1	678	168	111	153
Sundance #6	667	133	321	171
Keephills #2	633	169	106	172
Sheerness #2	546	190	129	114
Keephills #3	490	90	13	53
Genesee #2	409	171	41	92
Genesee #1	325	167	26	92
Battle River #4	306	27	50	29
Shepard	289	82	404	73
City of Medicine Hat	250	28	350	29
Genesee #3	217	78	20	76
Brazeau Hydro	159	60	805	78
Calgary Energy Centre	149	44	172	41
Alberta Newsprint	113	30	217	51
Joffre Industrial System	112	44	397	42

Validation report based on 2016 simulation is being completed

- As previously discussed, seven implementation issues have been resolved through software revision
- AESO is completing a report describing implementation issues and their resolution
- AESO will also provide validation information based on 2016 loss factor calculations
- Report is expected to be posted in January 2020

2018 loss factor recalculations are underway

- Input data has been prepared for revised software and initial state calculations are being completed
- Current recalculation is using same input data as used for April 2018 calculation
 - One anomaly was discovered and corrected in merit order data, where import volumes were positioned too high in merit order
- Some historic data (used by revised software for specific location configurations) requires updates to accommodate revised software methodology
- AESO expects to publish recalculated 2018 loss factors by end of year

2017 loss factors will be recalculated in first quarter of 2020

- Recalculation will use same input data as used for October 2017 calculation
- AESO expects to publish recalculated 2017 loss factors in March 2020
- Is technical meeting required on 2018 and 2017 loss factor recalculations?

Billing of adjustments from 2018 and 2017 loss factors will occur in 2020

- AESO is investigating options for billing of adjustments resulting from implementation of 2018 and 2017 loss factors
- AESO is currently considering spreading the billing of adjustments over two billing cycles for each year

Loss Charge Adjustments	Billing Cycle	Concurrent Initial Settlement
January – June 2018	March 2020	February 2020
July – December 2018	April 2020	March 2020
January – June 2017	May 2020	April 2020
July – December 2017	June 2020	May 2020

- Would allow all 2018 and 2017 adjustment to be billed before any Module C adjustments are billed
- AESO interested in stakeholder feedback on options for billing of adjustments

Module C recalculation is complete for 2016 and in progress for 2015

- Processing of Module C loss factor recalculations for 2016 and 2015 concurrent with 2018 and 2017 loss factor recalculations
- Preparation of additional input data has been restarted following completion of software revisions
 - System topologies are expected to be complete back to 2006 in first quarter of 2020
 - Merit order data is complete back to 2006
 - Load data is complete back to 2006
 - Additional support data is complete back to 2006, including actual system losses and actual metered energy data
- Payment plan compliance filing was submitted to Commission on December 6, 2019

AESO applied for review of Module C “single settlement” on December 3, 2019

- In Decision 790-D06-2017, Commission approved the use of single settlement approach, with one net charge collected or reimbursed to a market participant only after all loss factors have been calculated for the Module C historical period of 2006-2016
- AESO applied for review of that decision and approval to use pay-as-you-go settlement, with charges or reimbursements made to market participants once loss factors have been calculated for one or more years and repeated sequentially until all historical years have been settled
 - Reflected the time needed to complete calculations of Module C Loss Factors and conduct single settlement being materially longer than expected when Decision 790-D06-2017 was issued

Commission will establish process in Proceedings 25150 and 790

- Commission issued filing announcement on December 4, 2019, in Proceeding 25150
- Commission issued letter on December 11 saying process would be established shortly in each of Proceeding 25150 and 790

AESO also requested interim order and reversed sequence of recalculation

- In its application, AESO requested that Commission grant leave for AESO to make application more than 60 days after Decision 790-D06-2017 was issued
- AESO also requested interim order to implement pay-as-you-go settlement
- Under pay-as-you-go settlement, AESO considers loss factors should be recalculated starting with 2006 and working forward to later years
 - Under single settlement, AESO planned to recalculate loss factors starting with 2016 and working backward to 2006
- Earlier years in the historical period experienced higher costs of losses than later years, and more interest has accumulated on earlier-year amounts

AESO submitted Module C payment plan compliance filing on December 6, 2019

- In Decision 790-D07-2019, Commission approved the AESO's Module C methodology compliance filing and ordered the AESO to file a payment plan compliance filing
- AESO submitted its payment plan compliance filing on December 6, 2019
 - AESO included two versions of the Module C payment plan application and agreement to accommodate alternative outcomes of its application for review of Module C “single settlement” approach
- Commission has not yet established a process for review of the payment plan compliance filing

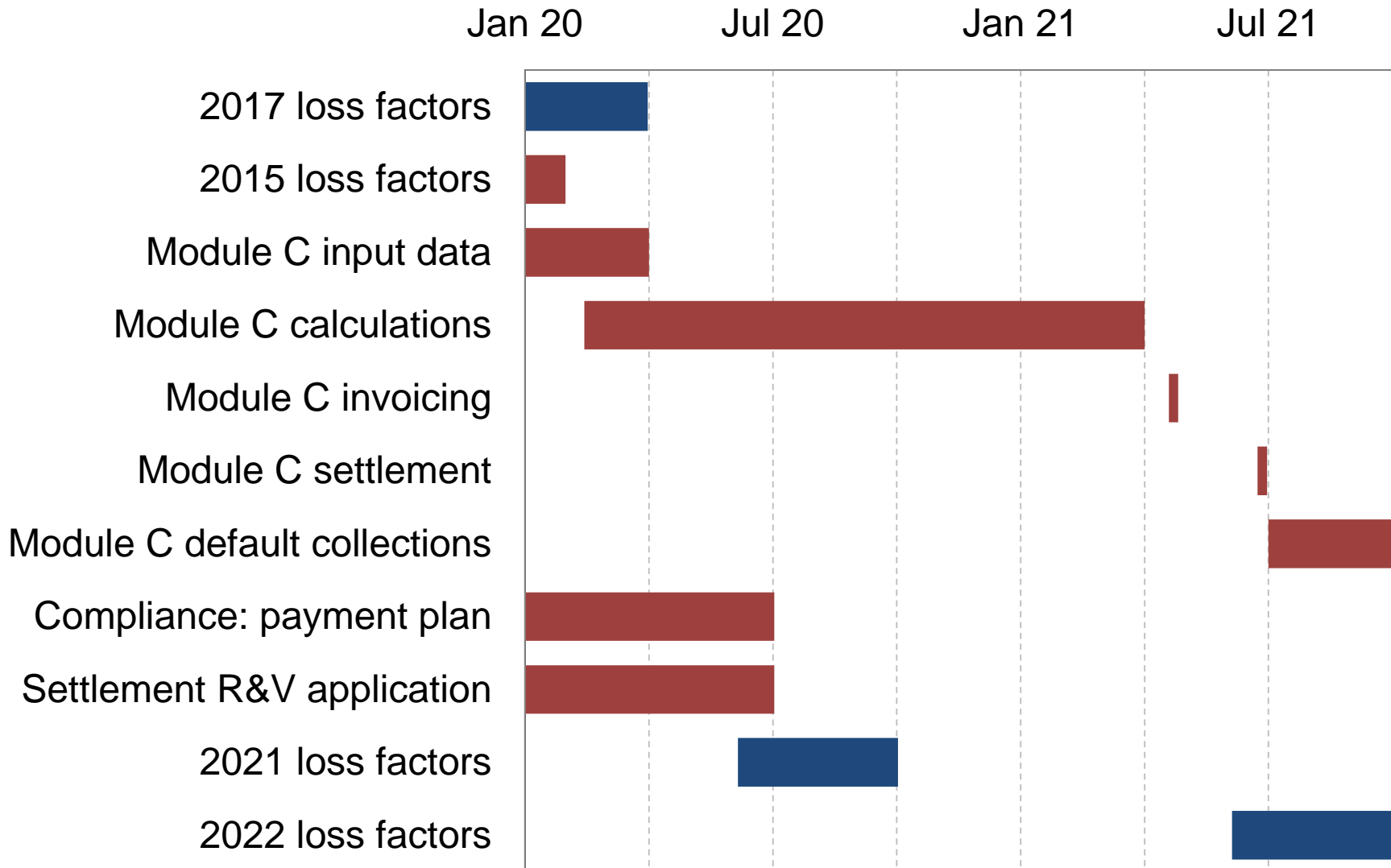
Compliance filing describes process for participation in payment plan

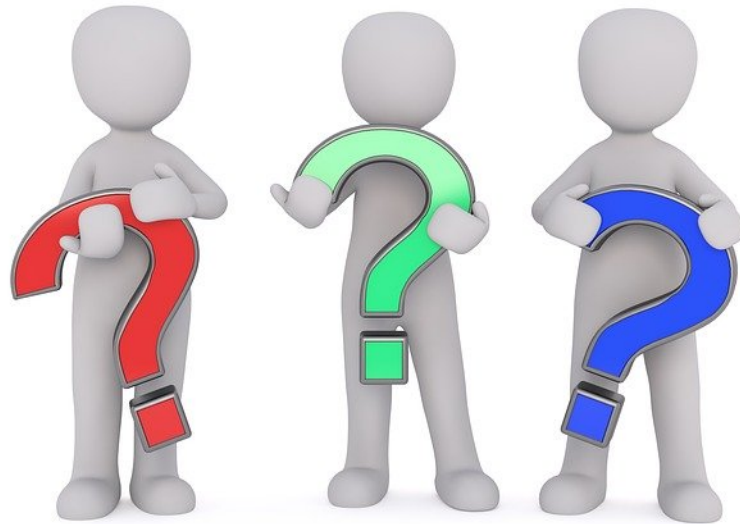
- Participation in payment plan will occur through an application process
- Market participant must meet specific criteria to establish financial hardship
 - insufficient liquidity
 - lack of available financing
 - inability to obtain financing
- Market participant must provide specified financial information and calculations to allow AESO to assess eligibility to participate in payment plan
- If eligible to participate in payment plan, market participant must accept form of credit agreement

Form of credit agreement establishes key terms of payment plan

- Form of credit agreement establishes key terms
 - Indicative interest rate consisting of 30-day bankers' acceptance rate plus 80 basis points
 - Commitment fee equal to 8 basis points on loan amount
 - Term of 2 years
 - Repayments in equal consecutive monthly payments
- AESO proposes that settlement will occur monthly throughout the term of the credit agreement on the 20th business day of a month, to align with AESO's regular tariff billing cycle
- AESO proposes that settlement implementation details be addressed in procedure document to be provided for settlement activities

AESO is updating schedule of loss factor activities for posting in January





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- Loss factors, stakeholder consultation information, and related documents are posted on AESO website
 - Grid ▶ Loss factors ▶ 2020 loss factors
 - Grid ▶ Loss factors ▶ Stakeholder engagement
 - Grid ▶ Loss factors ▶ Loss factors recalculation for 2006-2016

Thank you