

Technical Meeting on Loss Factor Activities

November 20, 2020 — Calgary, Alberta

AESO Engineering, Project
Management & Technology

- All attendees will join the meeting in listen-only mode, with attendee cameras disabled and microphones muted.
- When asking or typing in a question, **please state your first and last name and the organization you represent.**
- Two ways to ask questions during the presentation if you are accessing the meeting using your computer or smartphone:
 - You can 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 a 2-in-1/PC/Mac computer:
 - Hover your cursor over the bottom area of the Zoom window 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 the Zoom app on 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.

- If you are accessing the webinar via conference call:
 - If you would like to ask a question, 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.

The background of the slide is a blue-tinted photograph of two hands shaking in a firm grip. The hands are positioned in the center-left of the frame. The background also features a faint, white, geometric network pattern of lines and dots, and a blurred cityscape at the bottom.

OUR ENGAGEMENT PRINCIPLES

Inclusive and Accessible

Strategic and Coordinated

Transparent and Timely

Customized and Meaningful

- 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

The information contained in this presentation is for information purposes only. While the AESO strives to make the information contained in this presentation as timely and accurate as possible, the AESO makes no claims, promises, or guarantees about the accuracy, completeness, or adequacy of the information contained in this presentation, and expressly disclaims liability for errors or omissions. As such, any reliance placed on the information contained herein is at the reader's sole risk.

- Introduction
- Overview of 2013 to 2010 loss factor recalculation results
- Overview of 2013 to 2010 Module C adjustments
- Status update on settlement of Module C adjustments
- Status update for remaining Module C loss factor calculations
- Status update for 2021 loss factor calculations
- Investigation of volume discrepancies in loss factor calculations
- Review of questions from stakeholders
- Review of remaining schedule for loss factor activities
- Questions and discussion

Ask questions to clarify information during presentation

- The purpose of the meeting is to provide information on the recalculated loss factors recently published by the AESO for 2013, 2012, 2011, and 2010 and the resulting adjustments that will be charged or refunded, as determined in accordance with Decision 790-D07-2019 of the Alberta Utilities Commission in Module C of Proceeding 790
- Some information on other loss factor activities will also be provided

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- Ping-Kwan Keung, Manager, Standards & Modeling
- John Martin, Senior Special Projects Advisor
- Milton Castro-Núñez, Senior Engineer
- Ena Gibbons, Senior Credit & Settlement Analyst
- Trushal Umrana, Project Manager
- Andrea Lamy, Legal Counsel, Legal & Regulatory Affairs
- Keith Miller, Stikeman Elliott, external legal counsel
- Christine Waiand, Communications Advisor (Zoom support)

- Ashikur Bhuiya, Senior Supervising Engineer
- Ashraf Haque, Supervising Engineer
- Charley Rooney, Project Controller

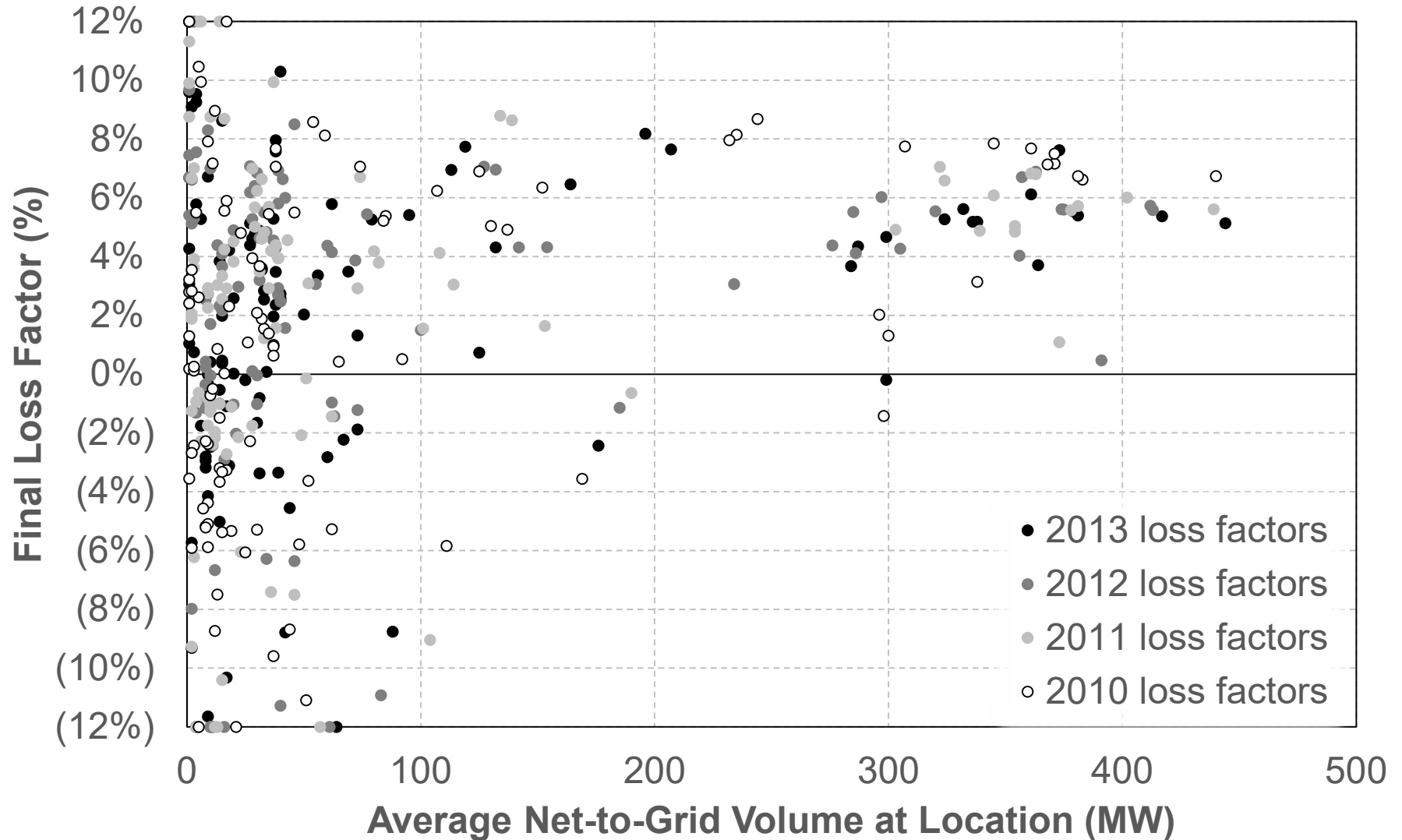
Note: On October 1, 2020 Stantec Consulting Ltd. purchased all of the assets of Teshmont Consultants LP

- Balancing Pool
- Capital Power
- City of Medicine Hat
- CNOOC Limited
- DePal Consulting Limited
- ENMAX Corporation
- Heartland Generation Ltd.
- Lionstooth Energy
- MEG Energy
- Milner Power Inc.
- MNP
- PGSC
- Powerex Corp.
- Suncor Energy Inc.
- TransAlta Corporation
- TransCanada (TC) Energy Ltd.

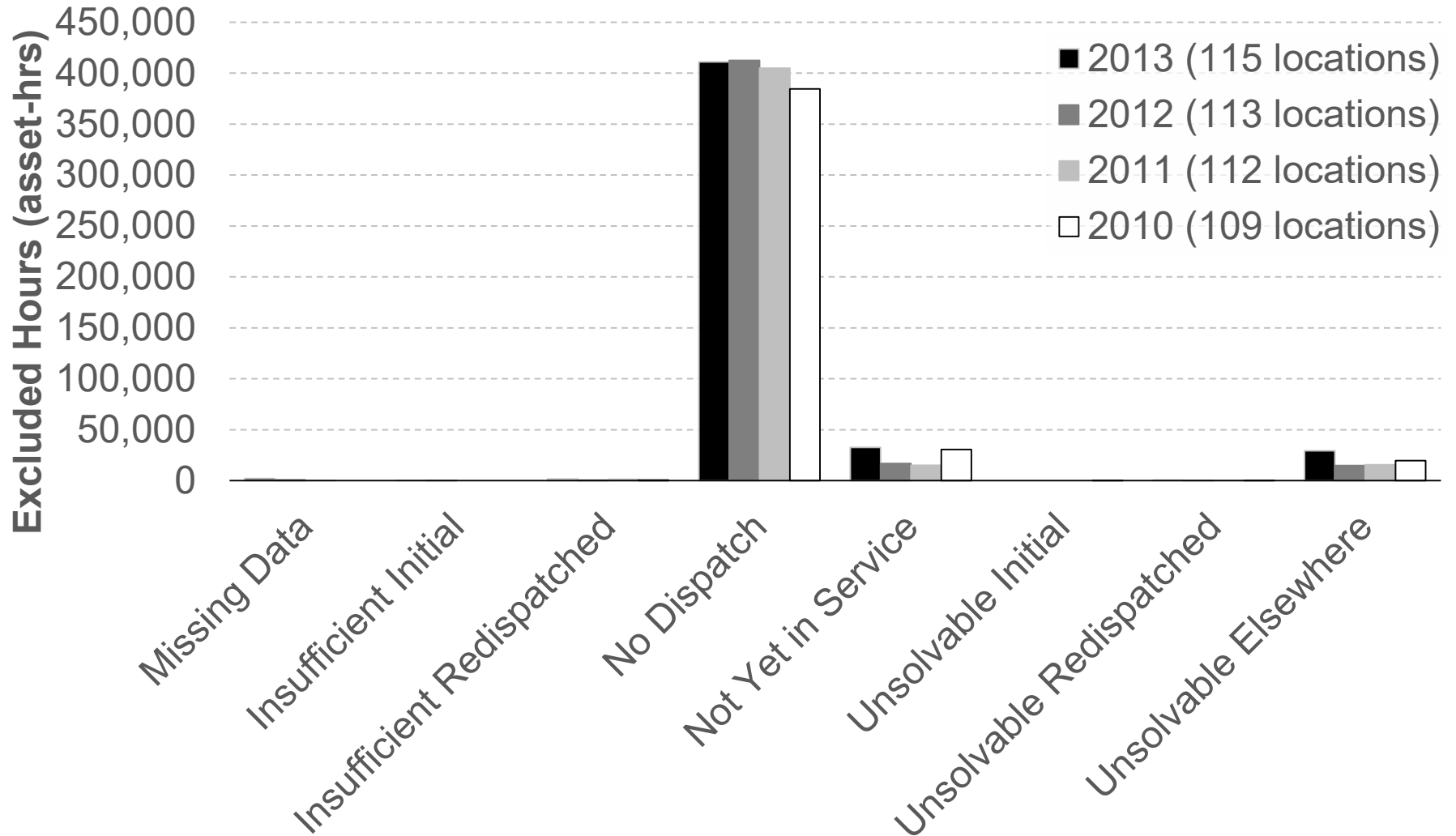
AESO published 2013, 2012, 2011, and 2010 loss factors on Oct 28 – Nov 3, 2020

- Loss factors were calculated in accordance with Modified Module B methodology approved in Decision 790-D07-2019 on the AESO Module C methodology compliance filing
- Related information was posted with loss factors
 - Hourly merit order data
 - Sample of hourly load data
 - 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 loss factors
- Base case suites are also available with solved initial state base cases for 144-hour sample of hourly load data

Annual loss factors show greater dispersion for smaller volumes

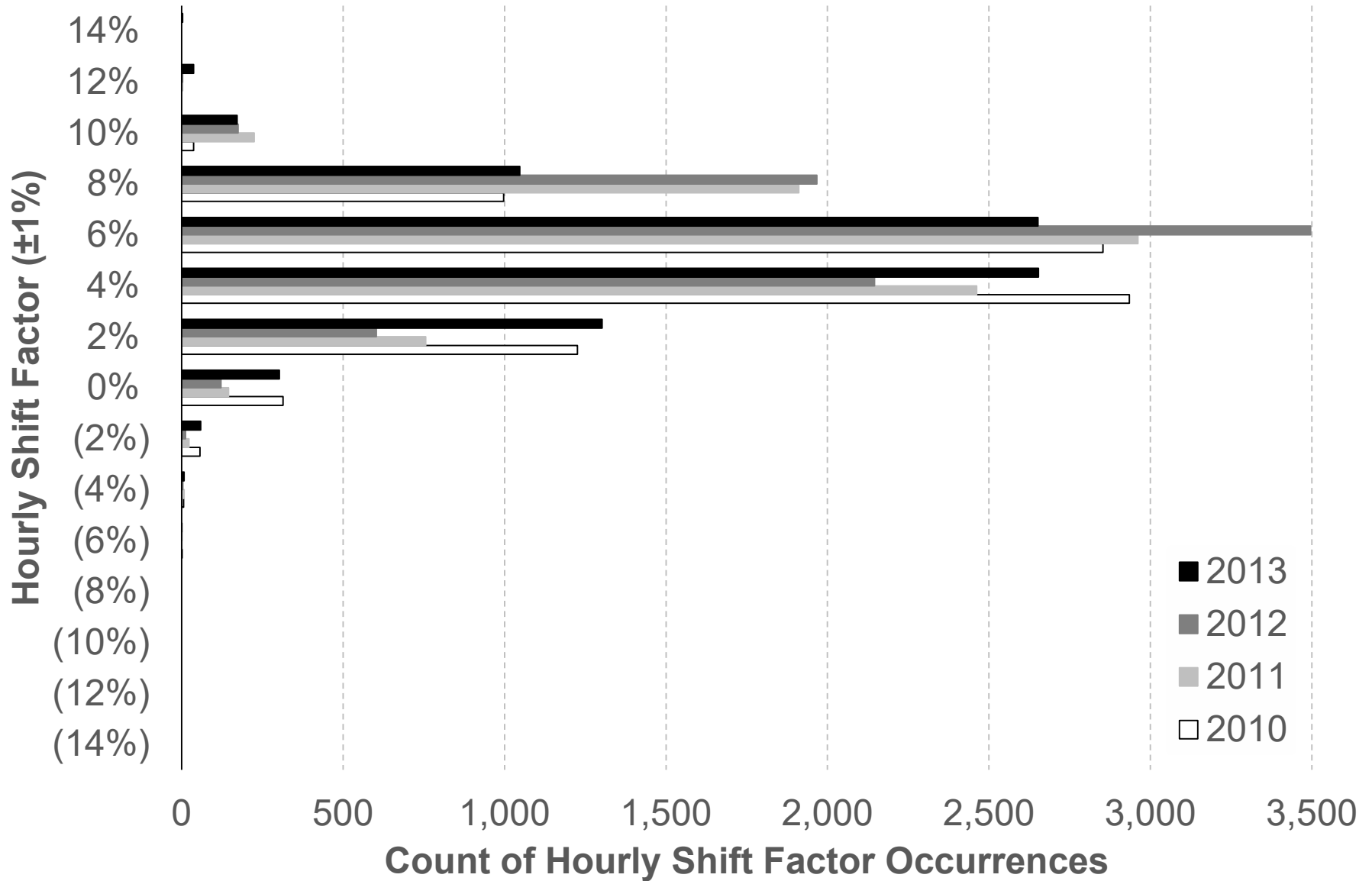


From 1% to 4% of hours were unsolvable in each year from 2013 to 2010

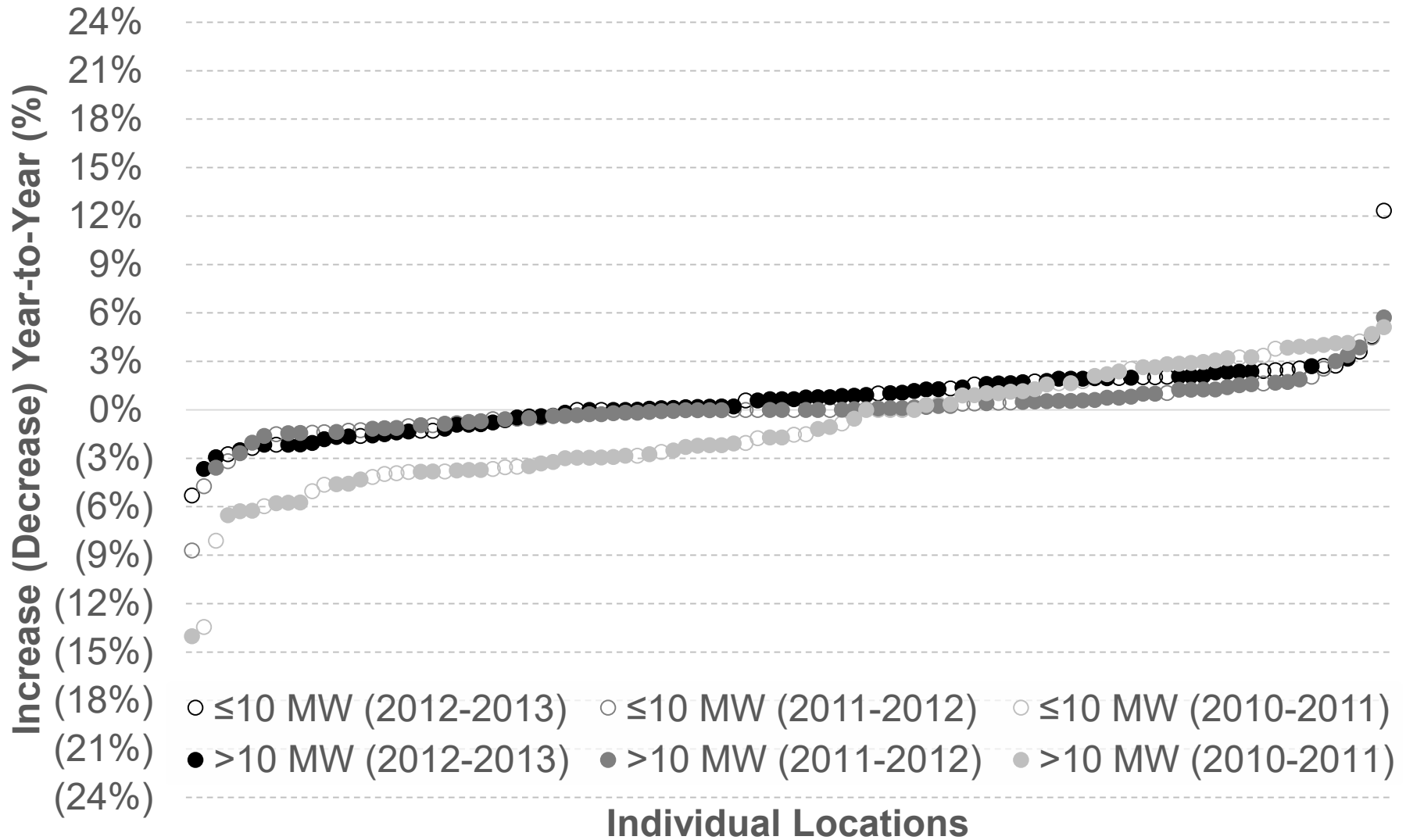


Note: 1% to 4% unsolvable hours were calculated excluding “no dispatch” and “not yet in service” hours

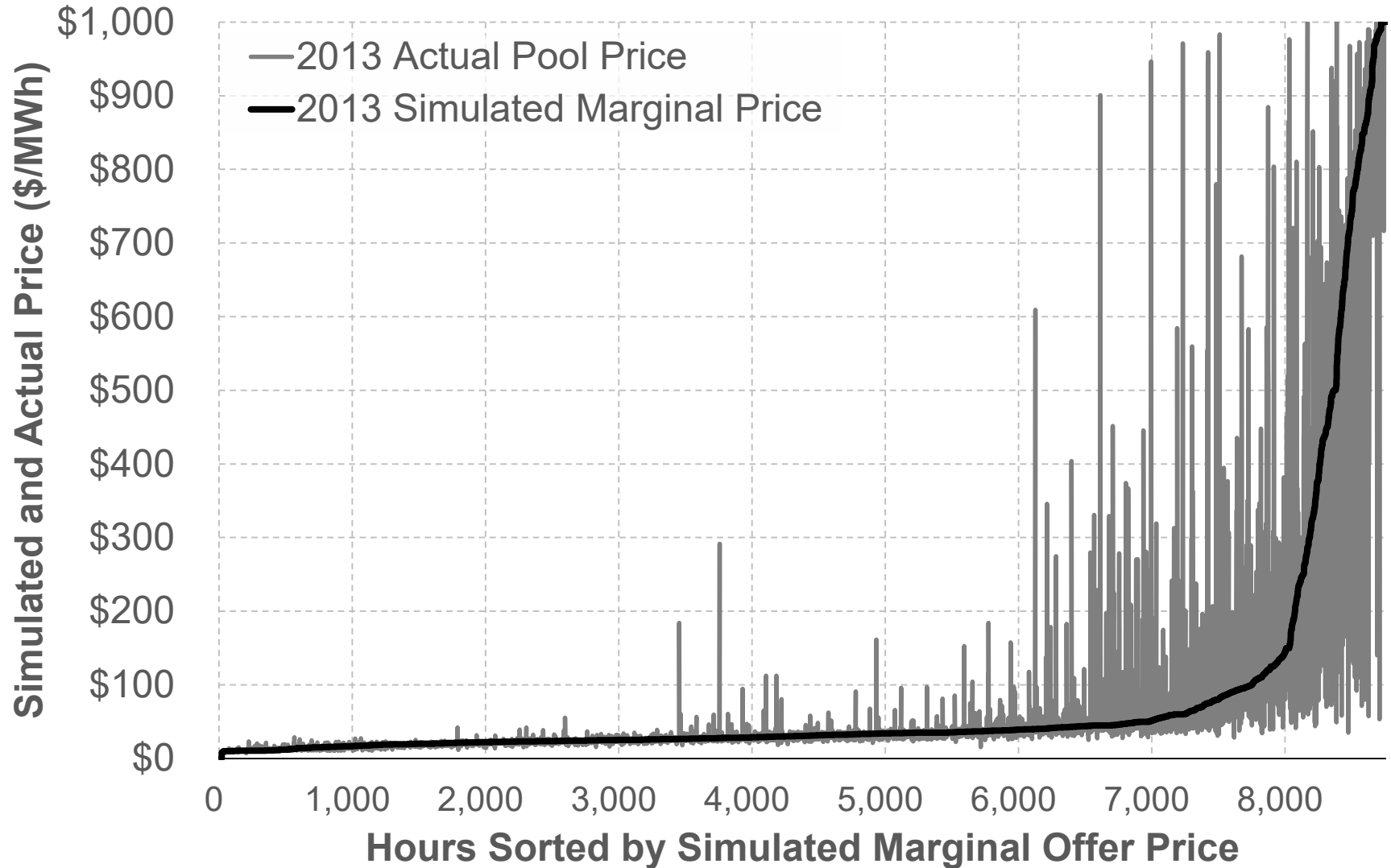
From 93% to 96% of hourly shift factors are between 1% and 9% in each year



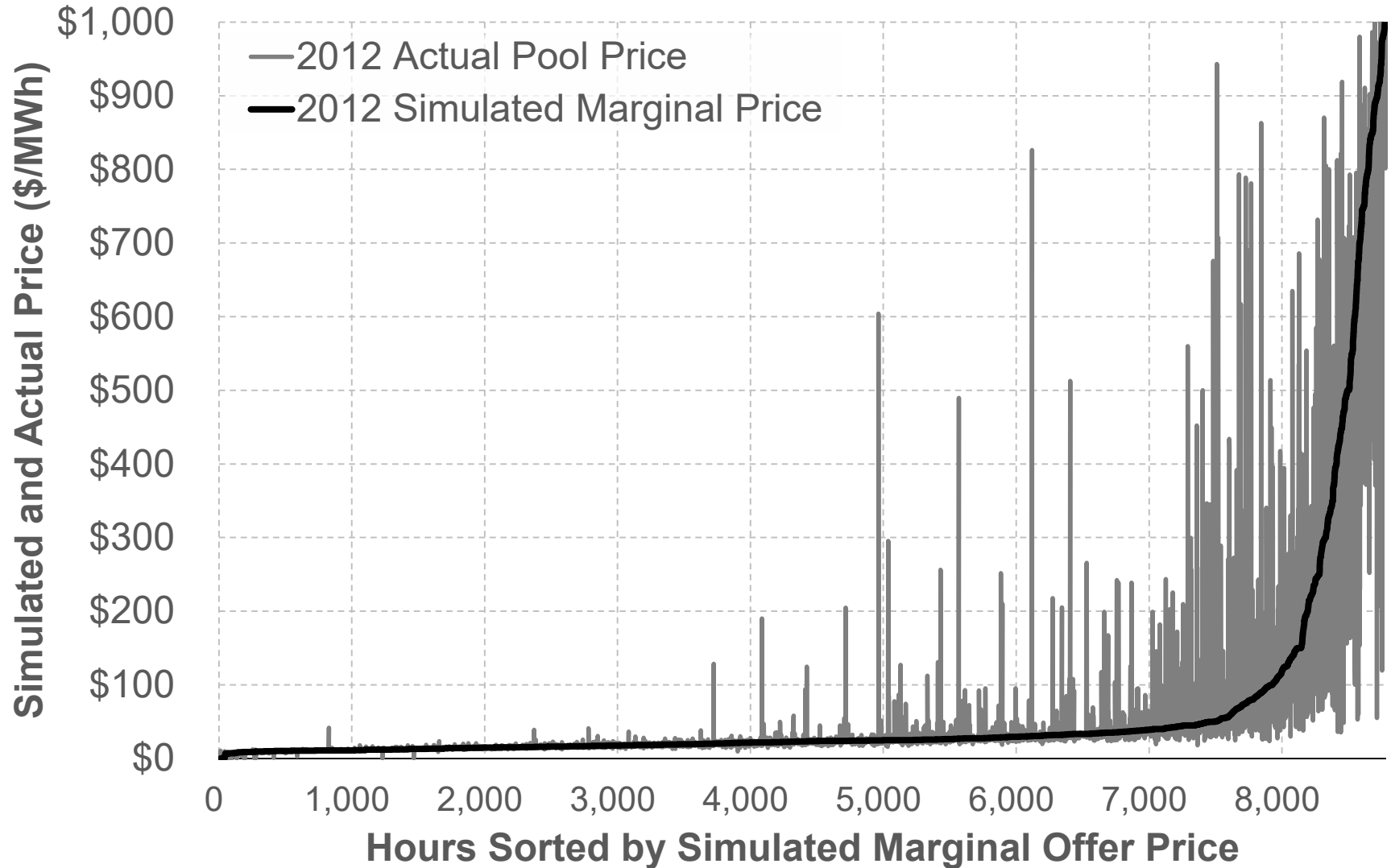
Most year-to-year loss factor changes are within $\pm 3\%$



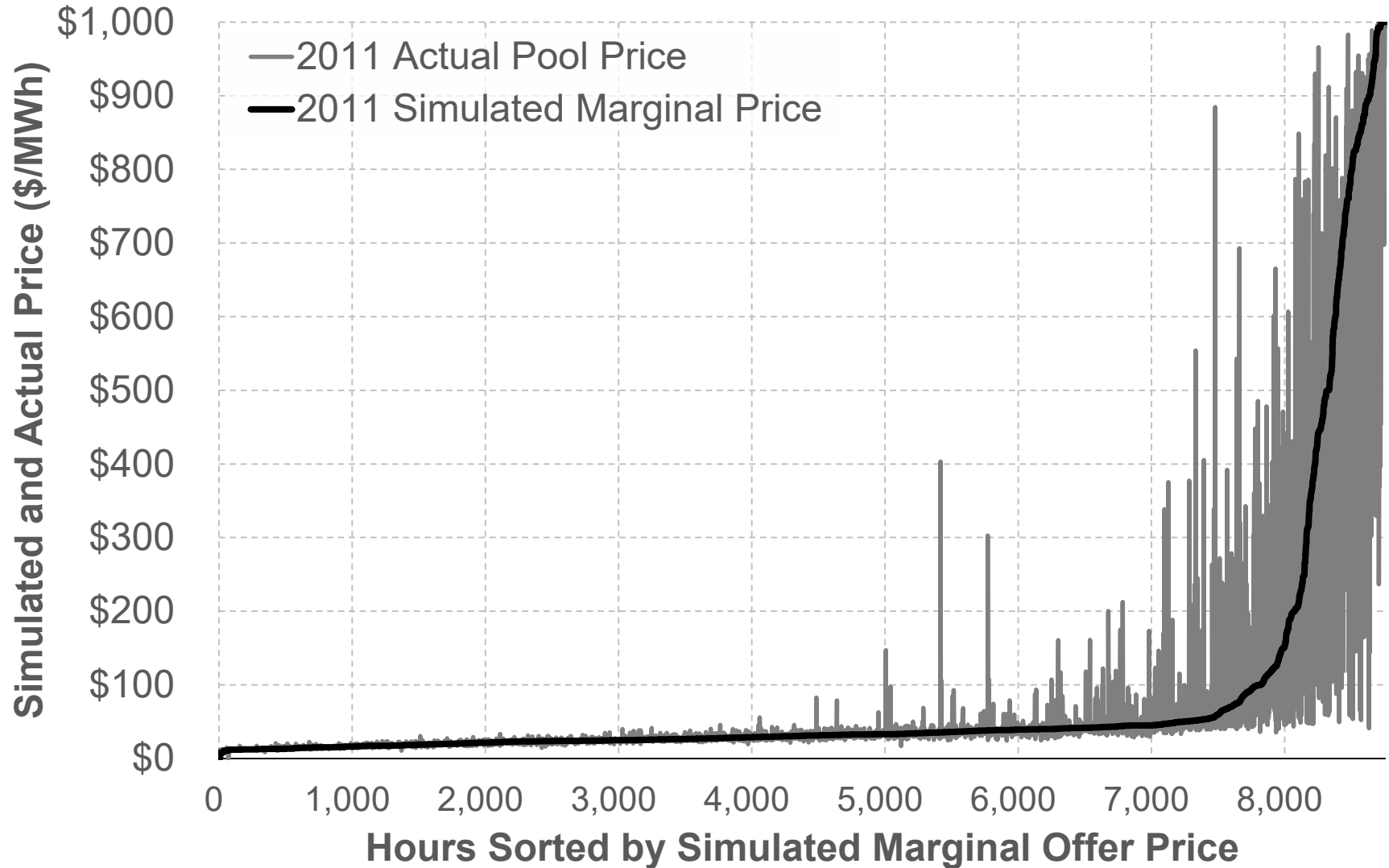
Simulated marginal offer price varied from actual pool price in 10% of 2013



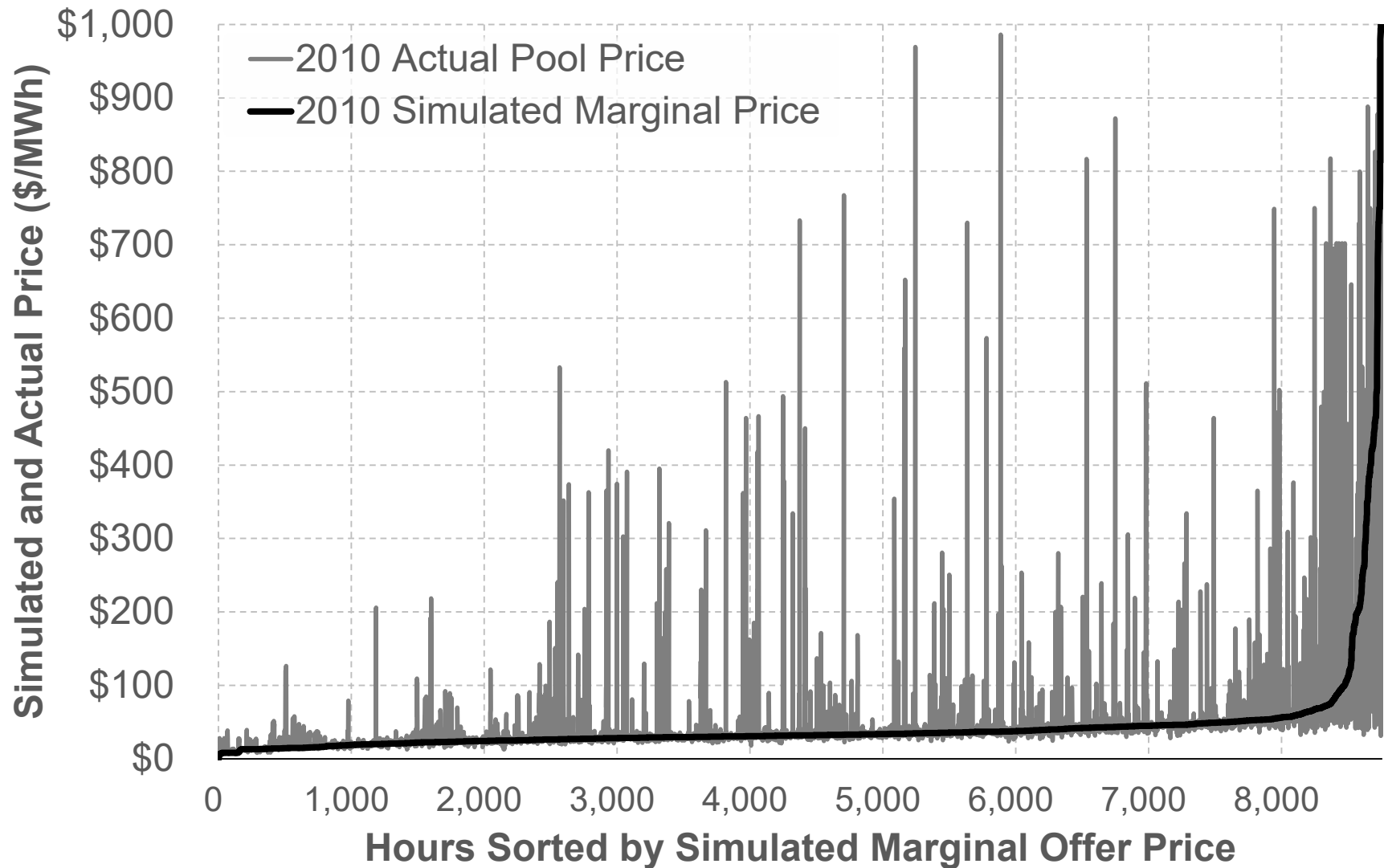
Simulated marginal offer price varied from actual pool price in 10% of 2012



Simulated marginal offer price varied from actual pool price in 10% of 2011



Simulated price differed from actual in 8% of 2010, but with different distribution



Simulated marginal price varies from pool price due to changes during hour

- Simulated marginal offer price assumes steady-state conditions during an hour
- Actual pool price is affected by price changes within an hour arising from a variety of factors
 - Market participant restatements within the hour
 - Price responsive load dropping off or picking up
 - Wind generation increasing or decreasing
 - Intertie dispatch changes
 - High offer price differences for smaller dispatch volumes (as much as \$500/MWh over 50 MW of dispatch)
 - Generation dispatch changes during sharp ramp up and ramp down events due to net demand variability
 - In-merit available power changes resulting from derates

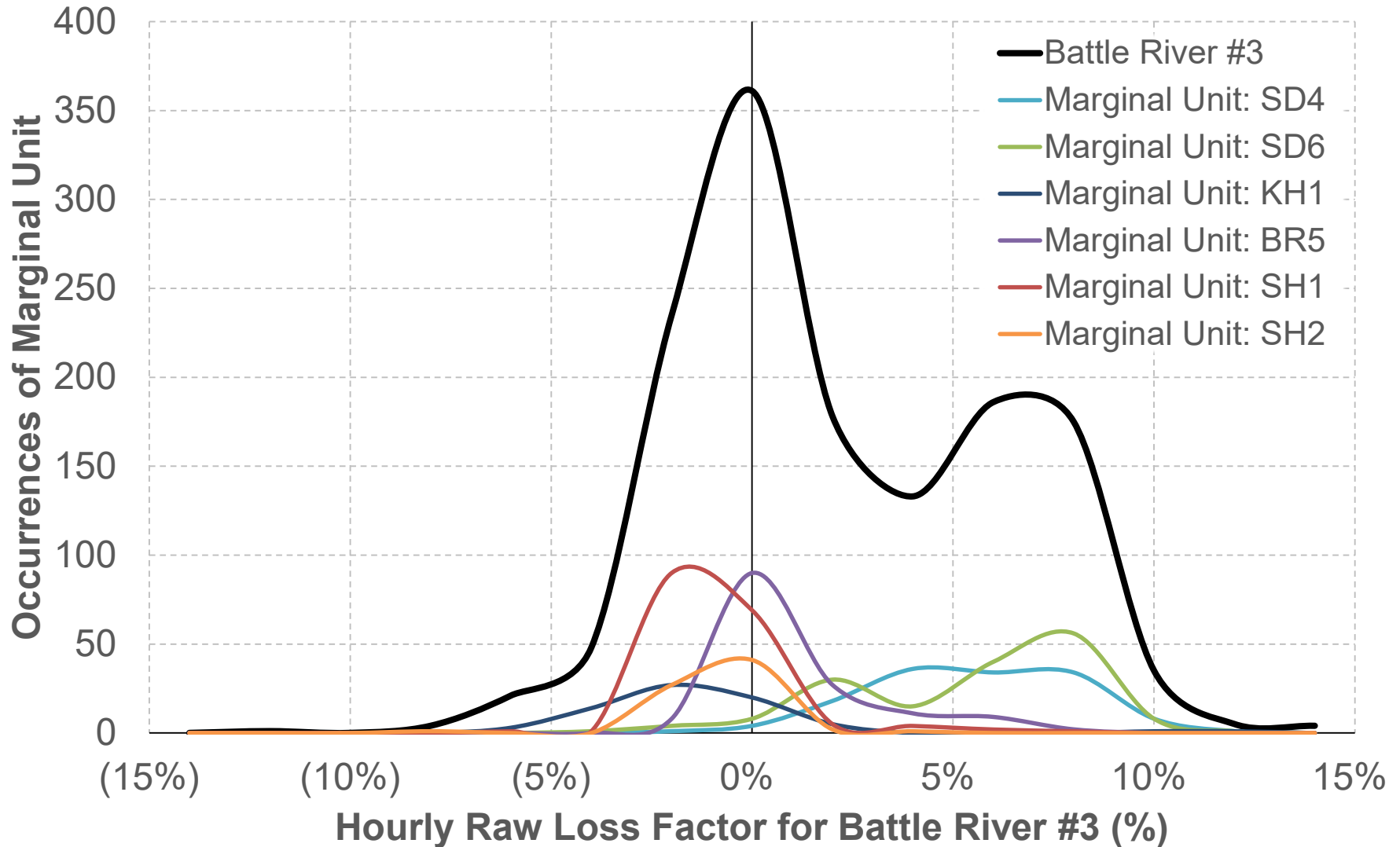
Most-frequent marginal units can be in different areas in different years

2013 Marginal Units			2012 Marginal Units		
Location	Hours	Area	Location	Hours	Area
Sheerness #1	950	Sheerness	Sheerness #2	992	Sheerness
Joffre	858	Red Deer	Sheerness #1	797	Sheerness
Battle River #5	846	Alliance	Sundance #4	512	Lake Wabamun
Sheerness #2	837	Sheerness	Joffre	501	Red Deer
Calgary Energy Centre	379	Calgary	Sundance #5	479	Lake Wabamun
Nexen Inc. #1	364	Calgary	Sundance #3	367	Lake Wabamun
Dow Complex	358	Fort Saskatchewan	City of Medicine Hat	358	Medicine Hat
H. R. Milner	328	Grande Cache	Calgary Energy Centre	353	Calgary
City of Medicine Hat	326	Medicine Hat	H. R. Milner	350	Grande Cache
Battle River #3	266	Alliance	Dow Complex	298	Fort Saskatchewan
Battle River #4	248	Alliance	Nexen Inc. #1	293	Calgary
Rainbow #5	215	Rainbow Lake	Battle River #5	290	Alliance
Scotford	210	Fort Saskatchewan	Clover Bar #2	261	Edmonton
Genesee #3	204	Lake Wabamun	Genesee #1	233	Lake Wabamun
Genesee #2	184	Lake Wabamun	Clover Bar #3	215	Edmonton
Cavalier	178	Strathmore	Battle River #4	212	Alliance
Sundance #5	177	Lake Wabamun	Genesee #3	210	Lake Wabamun
Sundance #4	162	Lake Wabamun	Genesee #2	198	Lake Wabamun
Northern Prairie Power	159	Grande Prairie	Keephills #3	172	Lake Wabamun
Genesee #1	128	Lake Wabamun	Battle River #3	155	Alliance

Most-frequent marginal units can be in different areas in different years (cont'd)

2011 Marginal Units			2010 Marginal Units		
Location	Hours	Area	Location	Hours	Area
Sheerness #1	943	Sheerness	Sheerness #2	1,118	Sheerness
Sheerness #2	837	Sheerness	Sheerness #1	1,032	Sheerness
Calgary Energy Centre	699	Calgary	Dow Complex	460	Fort Saskatchewan
Joffre	580	Red Deer	Cavalier	418	Strathmore
Sundance #5	419	Lake Wabamun	Calgary Energy Centre	407	Calgary
Sundance #4	408	Lake Wabamun	Sundance #2	392	Lake Wabamun
Sundance #3	368	Lake Wabamun	Joffre	365	Red Deer
Battle River #5	362	Alliance	Clover Bar #3	347	Edmonton
City of Medicine Hat	343	Medicine Hat	Battle River #5	329	Alliance
H. R. Milner	312	Grande Cache	Sundance #4	316	Lake Wabamun
Clover Bar #2	298	Edmonton	City of Medicine Hat	306	Medicine Hat
Sundance #6	288	Lake Wabamun	Sundance #1	294	Lake Wabamun
Cavalier	272	Strathmore	Nexen Inc. #1	289	Calgary
Dow Complex	239	Fort Saskatchewan	Battle River #4	193	Alliance
Nexen Inc. #1	217	Calgary	Battle River #3	164	Alliance
Battle River #4	178	Alliance	Sundance #5	164	Lake Wabamun
Scotford	178	Fort Saskatchewan	Muskeg River	159	Fort McMurray
Genesee #2	175	Lake Wabamun	Clover Bar #2	156	Edmonton
Northern Prairie Power	169	Grande Prairie	Crossfield #1	152	Airdrie
Suncor	153	Fort McMurray	Sundance #6	149	Lake Wabamun

Different marginal units contribute to a generating unit's annual loss factor



AESO is preparing 2013-2010 Module C adjustments for publication

- AESO published 2013 Module C adjustments workbook on November 19, 2020
 - Financial settlement expected to occur on March 1, 2021
- Workbooks for 2012-2010 are being finalized and will be published in the near future
 - Summary workbook will be published when annual workbooks are all finalized

Commission approved Module C payment plan in Decision 790-D08-2020

- Commission approved updated Module C payment plan compliance filing in Decision 790-D08-2020, issued on September 23, 2020
- AESO posted payment plan application instructions and forms on its website on September 25, 2020
 - No party has applied to participate in payment plan for first settlement period

AESO requested Commission guidance on Module C interest calculation

- AESO letter to Commission registered in Proceeding 26084 on November 13, 2020
- AESO requested guidance on whether interest attributable to monthly Module C amounts should be determined using compound interest or simple interest
 - AESO initially included compound interest on Module C amounts
 - AESO issued letter on October 15, 2020, and updated Module C adjustments workbooks that included simple interest
- Several participants expressed concern about the change while others expressed support for simple interest
- AESO conducted comment process on question to be asked to Commission
 - Stakeholder feedback is posted on AESO website

AESO is proceeding with settlement process while seeking guidance

- Commission has not yet established process for request
- AESO will proceed with remaining Module C settlement process while concurrently seeking Commission guidance
 - Final statements for first settlement period (2016-2014) included simple interest and will be cash settled as issued
 - Simple interest will continue to be included on any statements issued for second and third settlement periods, unless otherwise directed by Commission
- If Commission issues guidance to use compound interest:
 - (a) Final statements issued using simple interest will be cash settled as issued, and interest adjustments will be included in the next Module C settlement
 - (b) Final statements not yet issued will use compound interest

Remaining Module C settlement is progressing on schedule

Description	First Period 2016-2014	Second Period 2013-2010	Third Period 2009-2006
Publishing loss factors	May 2020	Oct 2020	Dec 2020 – Jan 2021
Publishing Module C adjustments	Sep 2020	Nov 2020	Dec 2020 – Jan 2021
Technical meeting	Jul 2020	Nov 2020	Jan 2021
Issuing statements	Oct 2020	Dec 2020	Feb 2021
Cash settlement	Dec 30, 2020	Mar 1, 2021	Apr 29, 2021

- Settlement schedule for Module C adjustments is included in *Module C Settlement Procedure* document posted on AESO website

Remaining loss factor calculations are progressing on schedule

- Data validation processes continue to be refined and improved
- Additional resources continue to be utilized within AESO and at Stantec
- Data preparation and validation for all years has been completed
- Loss factors for 2009 and 2008 have been recalculated and are being validated
 - 2009 and 2008 loss factors expected to be published in December 2020
- Loss factors for 2007 and 2006 are in calculation workflow
 - 2007 and 2006 loss factors may be delayed to early January 2021

2021 loss factors are on track for publishing by December 1

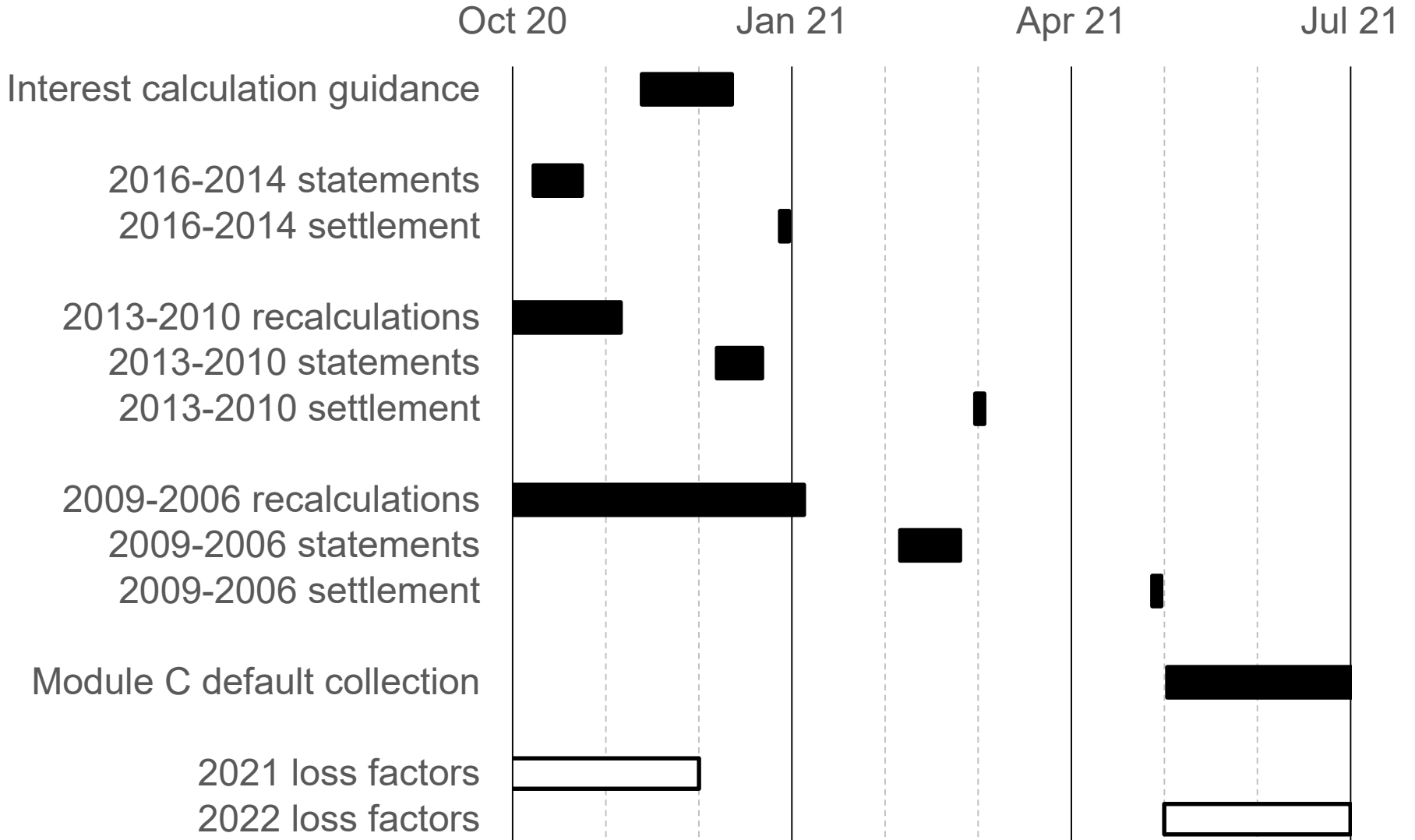
- AESO was unable to publish 2021 loss factors by “best efforts” deadline of October 1
- Loss factors are currently in calculation workflow
- Validation is scheduled for last week of November

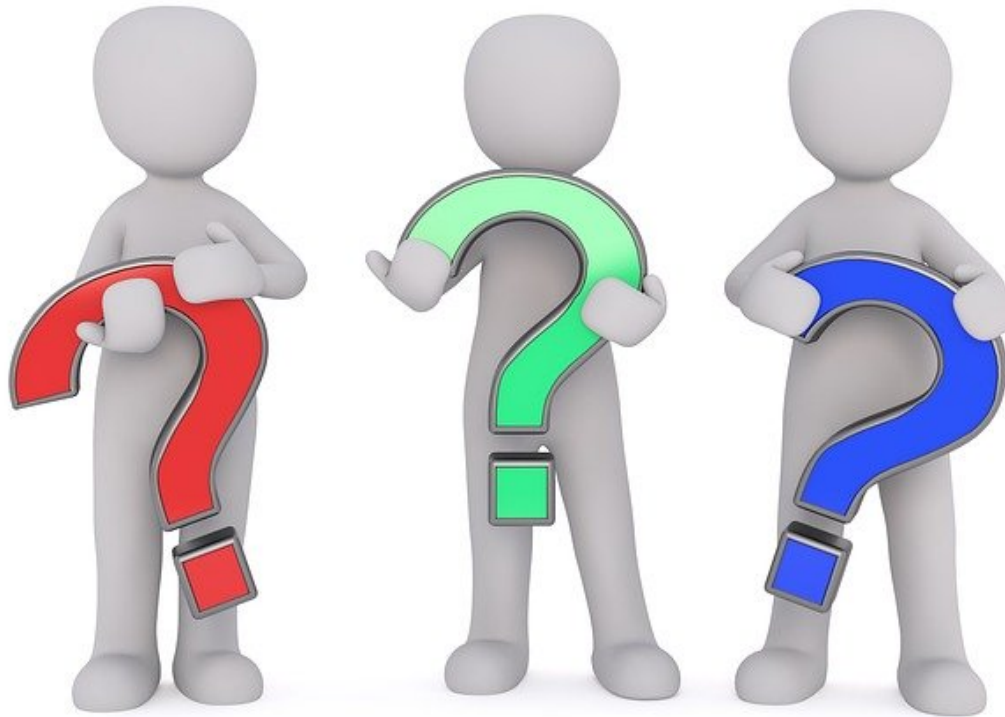
- Finalization of loss factor validation report was deferred due to resources being focused on 2021 loss factor development and Module C loss factor work
- Report will be posted as soon as possible
- Stakeholder questions and responses list will also be published on AESO website as soon as possible

- Energy market settlement used as offset to transmission settlement
 - *Offsets are not permitted between energy market settlement and transmission settlement*
- Explanation of differences between simulated marginal offer price and actual pool price
 - *Included in this presentation*
- Inability to calculate loss factors for sample hours
 - *Resolved with August 14 update to sample hour data*
- Interest calculated on GST in preliminary Module C adjustments workbooks
 - *GST excluded from interest calculation in September 23 updates to workbooks*

- Compound interest calculation in preliminary Module C adjustments workbooks
 - *Simple interest calculation in September 23 updates to workbooks; guidance requested from Commission*
- Impact on financial security requirements resulting from Module C adjustments
 - *The MSA recently granted the AESO's request for forbearance regarding the enforcement of section 103.3 of the ISO rules, Financial Security Requirements, as it relates to any adjustments arising from Module C*
 - *Accordingly, the AESO will not be requesting additional financial security from market participants relating to adjustments arising from Module C*

Module C settlements are planned for Dec 2020, Feb 2021, and Apr 2021





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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



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Thank you