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Market Renewal – Energy Project Implementation Market Power Mitigation

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Agenda

1. Update on reference level consultations
2. Updates on the Independent Review Process procurement
3. Updates to market power mitigation documents
 - Market Rules
 - Market Manual 14.1 & 14.2
 - Worksheets
4. Next steps

Reference Level Consultations: December 2023

- Nuclear, solar, wind effectively completed; have also completed a portion of thermal, dispatchable load, and electricity storage resource (ESR) consultations
- Significant progress on hydro and thermal: Contributions from market participants have been crucial in both identifying incremental enhancements and also in carrying out the data preparation for the workbooks

Updates on the Independent Review Process (IRP) Procurement

- The IESO is posting a Request for Vendors of Record (“RVOR”) to create a list of qualified experts for the IRP in December 2023 with the intent to close in early 2024
- The posting can be found: <https://www.merx.com/ieso> (reference RVOR 514)
- Any questions about the RVOR should be sent to nathan.king@ieso.ca and RFPinfo@ieso.ca

Updates to Market Power Mitigation Documents

Recap:

- In May 2022, the Technical Panel voted to provisionally approve the draft market rules for Market Power Mitigation (MPM)
- In July 2022, the IESO introduced incremental updates to the MPM market manuals and reference level workbooks and example workbooks. These updates were based on feedback from the Technical Panel and from market participants, received during the ongoing reference level consultations

Updates to Market Power Mitigation Documents

Recap *(continued)*:

- In September 2022, the IESO published the interim alignment batch, which included minor editorial changes to the MPM market manuals
- In March 2023, the IESO introduced incremental updates to the MPM market rules, market manuals, reference level workbooks and example workbooks. These updates were based on feedback received during the process of technical panel review and also from market participants during reference level consultations

Updates to Market Power Mitigation Documents

Newly Introduced Updates:

- The IESO is now introducing incremental refinements to the market rules, market manuals, reference level workbooks, and blank and example workbooks
- These refinements are based on significant input from market participants through both reference level consultations and public comments, as well as internal feedback received in response to solution development and process design



Market Rules

Reorganization and Corrections

Certain market rule changes were made to reorganize existing content, for example:

- Chapter 7, s. 22.5.2 was updated to incorporate content that was previously found in section 3.4.1.1 of Market Manual 14.2

Certain market rule changes were made to correct errors, for example:

- Chapter 7, s. 22.5.10.3 was updated to correct an erroneous reference to “EDT”

Clarifications

Certain market rule changes were made to clarify content. These include the following:

- Chapter 7, s. 22.1.1 was updated to specify the trigger for the IESO determining reference levels and also that the determination of reference levels is in accordance with the applicable market manual
- Chapter 7, s. 22.2.1.4 was updated to specify that an operating reserve offer reference level is required for each class of operating reserve that a resource is registered to provide. The updated language more explicitly a resource to the classes of operating reserve it is registered to provide

Clarifications (cont'd)

- Chapter 7, s. 22.5.1.1 was updated to specify that one of the triggers for the IESO to change reference levels is changes to the market rules. The previous version only contemplated changes to market manuals
- Chapter 7, s. 22.5.1.5 was updated to specify that market participants may request the IESO review a reference level. The updated language removes any need for the market participant to notify the IESO of a change to costs or operational characteristics to trigger such a review

Clarifications (cont'd)

- Chapter 7, s. 22.6.1 was updated to specify the trigger for the IESO determining reference quantities and also that the determination of reference quantities is in accordance with the applicable market manual
- Chapter 7, s. 22.7.1.1 was updated to specify that one of the triggers for the IESO to change reference quantities is changes to the market rules. The previous version only contemplated changes to market manuals
- Chapter 7, s. 22.9.1 and s. 22.9.1.1.3 were updated to clarify that "price responsive load" is a participation type, not a resource type

Clarifications (cont'd)

- Chapter 7, s. 22.10.1.2 was updated to specify that potential constrained area designations shall be assessed by the IESO. The previous language did not specify that the IESO would be the party that assessed these designations
- Chapter 7, s. 22.15.4.2 and s. 22.15.11.2 were updated to replace the phrase “one-hour ahead run of the pre-dispatch calculation engine” with “hour-ahead run of the pre-dispatch calculation engine” to align with terminology in other market rule sections

Solution Development

One market rule change was made in response to information that became known as a result of solution development:

- Chapter 7, s. 22.16.1.2 was updated so that the period of time between a dispatch day and when the IESO determines intertie reference levels for that dispatch day is 14 days. Previously, this period was six business days. The increased time between the dispatch day and this calculation is required in order to ensure that all data is correct and final

March 2023 Feedback

Certain market rule changes were made in response to external feedback received following the March 2023 update, for example:

- Chapter 7, s. 22.4.5 was updated to use the term “electricity storage resource” in place of the term “energy storage resource” in response to external feedback (OPG 1) submitted following the March 2023 stakeholder session
- Chapter 7, s. 22.17.1.1 was added in response to external feedback (HQEM 3) submitted following the March 2023 stakeholder session. This new section clarifies a specific scenario in which the IESO will not assess inertia economic withholding

Definitions

Six definitions in Chapter 11 were updated in response to internal feedback. These changes include:

1. Economic withholding: removed “exercising market power” from the definition
2. Intertie economic withholding: removed “exercising market power” from the definition
3. Instance of intertie economic withholding was updated to replace the phrase “dispatch day on which” with “dispatch day for which”

Definitions (cont'd)

4. Instance of physical withholding was updated to replace the phrase “dispatch day on which” with “dispatch day for which”
5. Physical withholding: removed “exercising market power” from the definition
6. Short-run marginal benefit: replaced “offtakes energy” with “exports energy”



Market Manual 14.1

Editorial, Grammatical and Addressing Redundancy

Various editorial updates were made. These include updating and supplementing market rule references, grammatical changes and removal of redundant content. For example:

- Section 2.1: Updated content to specify the relevant section of the market rules regarding identifying and revising potential constrained area definitions
- Section 2.3: Updated this section to remove narrative content that was redundant of the information in the following Market Manual sections and in the Market Rule sections identified

Clarifications

Certain sections of the Market Manual were updated to clarify content. These include the following:

- Section 5.3: Updated content in this section as there are not multiple runs of the day-ahead calculation engine. Also specified that the section referred to the “day-ahead market calculation engine” rather than the previous language that referred to the “day-ahead market”
- Section 5.6.1: Added language to the beginning of this section to provide the relevant market rule reference in the context of applying an impact test for physical withholding

Clarifications (cont'd)

- Section 5.7.1: Removed the word “additional” to align the content with the design, ensuring that each second notice issued results in incrementing the physical withholding multiplier correctly
- Section 5.7.1: Added language in this section to clarify that the exclusion of a physical withholding settlement charges that has been reversed as a result of a notice of disagreement is based on the information that is available at the time that the persistence multiplier is calculated

Alignment

- Alignment updates in various sections to account for the other materials (market manuals, market rules, etc.) that have been published, for example:
- Section 6.3: Added content that describes how the IESO determines a settlement amount for ex-post mitigation for economic withholding on an uncompetitive intertie. The new content includes a reference to the relevant Market Rule (Chapter 9, s. 5.5) that describes that settlement charge

March 2023 Feedback

Two changes were made to Market Manual 14.1 in response to external feedback received following the March 2023 update:

- Section 5.6.3: This section was updated so that the sub-bullets regarding offers for operating reserve correctly showed the numeral “ii” in the second sub-bullet in response to OPG 22
- List of Acronyms: Added the acronyms “DAM”, RTM, and “OR” and removed “SD” from the list in response to OPG 25

Report Development

Certain sections of the Market Manual were updated to clarify content. These include the following:

- Section 2.2.2: Updated content regarding publication as the IESO will publish a daily report that communicates annual NCA designations
- There are no changes to the restrictions around when the IESO may designate NCAs; this modification only updates the frequency of the reporting cadence to align with the IESO reporting solution

Report Development (cont'd)

- Section 5.6.3: Updated content to specify the report and variable that will inform the selection of a dispatch hour for the electricity storage resource impact test for physical withholding
- The use of "Ontario demand" was replaced with "market demand" from the "Day-Ahead Totals Report" and "Pre-Dispatch Totals Report". This update was made to avoid confusion with other uses of Ontario demand (such as in reference to the determination of global adjustment and in the context of the capacity auction). Use of "market demand" avoids this confusion while accomplishing the goal of providing tie-breaking logic for physical withholding

Alternate Reference Quantity Value Requests

More information was provided regarding supporting documents for alternate reference quantity value requests:

- Section 5.8: Language in this section that stated “reliability and safety operations of the facility” was updated to “actions taken to ensure the safety of any person, prevent the damage of equipment, prevent the violation of any applicable law, or to maintain the reliability of the IESO-controlled grid”
- Section 5.8: Added language that addresses IESO staff requests to reduce offer quantities or remove offers



Market Manual 14.2

Editorial Changes, Grammar and Removing Redundancy

Various editorial updates were made. These include updating and supplementing market rule references, grammatical changes and removal of redundant content. For example:

- Section 5.2: Removed language stating that supporting documentation is required to be provided for reference level changes as it was redundant of content in the sections below
- Section 6.3: Existing content in this section was moved to improve clarity and flow

Alignment Updates

Alignment updates in various sections to account for the other materials (market manuals, market rules, etc.) that have been published and solutions that have been completed, for example:

- Section 2.1.2: Updated the phrasing in the language leading to Table 2-1 to align with the relevant market rules, replacing “applicable to” with “determine” in the sentence

March 2023 Feedback

Certain changes were made to Market Manual 14.2 in response to external feedback received following the March 2023 update, for example:

- Section 2.1.2: Added the acronym “MLP” in parentheses in Table 2-1 as this was the first time that the term minimum loading point occurred in the manual. As a result of this change, the IESO also removed “(MLP)” in section 3.2.1. This change was made in response to OPG 29
- Section 3.2: Inserted the equation in this section (previously missing) that describes how inflation adjustments are made in response to OPG 30

Reference Level Value Reporting

Section 4.1.2:

- The timing of the Real-Time Financial Reference Level Report was updated to be 17:00 EPT for the next dispatch day. Previously, this timing was 14:00 EPT for the next dispatch day, however this approach would not have been feasible given the timing of execution of related solutions and creation of the necessary inputs
- This timing was updated in response to information stemming from solution development of upstream solutions required to provide inputs into calculation of real-time market reference level values

Reference Quantity Value Reporting

Section 4.2:

- The timing of the reference quantity value reports was updated so that Version 2 of the day-ahead report and Version 1 of the real-time report are published 14 days following the dispatch day. Previously, this timing was the day following the dispatch day, however this approach would not have allowed the IESO time to account for any required changes in ex-post
- Under the updated approach, data being used to create the relevant reports will be final. This timing was updated in response to information stemming from report development

Tax-Related Costs in Reference Levels

Section 6.3:

- Content was added to this section explaining that non-HST tax-related costs can be submitted to the IESO for financial reference levels, but that HST-related costs are not eligible
- Prior to this clarification, Market Manual 14.2 did not provide specific guidance on whether tax-related costs were eligible to be submitted for reference levels

Thermal: Total Cost Calculation for PSU

Section 2.1.3:

- Clarity was added on the total cost calculation used to determine the set of reference levels that will be used for a dispatch day by default for a PSU
- PSU resources do not have a MGBRT reference level, so the updated content specifies that this input is the relevant combustion turbine resource's MGBRT reference level
- This change is intended to provide clarity and was made in response to input received during development of the software that will calculate reference level values

Thermal: Operating Reserve Fuel Efficiency Cost

Section 7.1.10.1:

- A new section was added detailing a new cost that is eligible to contribute to operating reserve offer reference levels for thermal resources
- This new cost accounts for extra fuel associated with inefficient energy production for thermal resources that are providing operating reserve beyond a certain level. It can be used where the incremental heat rate at the baseload production level is lower than at MLP for a thermal resource
- This new cost was added in response to external stakeholder feedback received during reference level consultations

ESR: Supporting Materials for Fuel-Cost Change Requests

Section 5.2.1:

- A new bullet was added specifying the supporting information that can be provided by a market participant submitting a fuel-cost change for an electricity storage resource
- This documentation is required to demonstrate the average \$/MWh charging cost for the last charging cycle, accounting for round trip efficiency
- This content was added in response to external feedback received during reference level consultations

ESR: Assumed Charging Hours

Section 7.6.1.1:

- Updated the hours that are used to determine charging costs for electricity storage resources that do not have one year of historical charging data. Under the updated approach, the hours 23:00-06:00 EST are used (rather than 23:00-07:00 used previously)
- The change to exclude HE 7 was made in response to external feedback received during reference level consultations

Hydro: IOC Eligibility with Shared Forebays

Section 6.4.3.1:

- Added content that outlines that hydroelectric resources that share a forebay are eligible for the intraday opportunity cost (IOC) based on their maximum daily energy limit for the forebay
- This change was necessary as resources that share a forebay do not submit individual maximum daily energy limits, and absent this change, would not have ever been eligible to have the intraday opportunity cost included in their real-time reference level values
- This change was made in response to solution development

Hydro: SHOC Value Based on Max of Approach 1 and 2

Section 6.4.4:

- Updated the approach for the storage horizon opportunity cost (SHOC) so that the IESO calculates the value according to each approach and then takes the maximum of these two values rather than market participants selecting a single approach per resource. This change ensures that identical resources will receive identical reference level values
- This change was made in response to external stakeholder feedback received during reference level consultations

Hydro: Determining Reference Levels for Downstream Resources

Section 7.2.5, 7.2.5.1:

- The updates in these sections enable all resources on a cascade to register energy offer reference levels instead of only the resources at the top forebay
- The updated approach also enables downstream resources to submit temporary reference level change requests based on conditions at their resource, rather than relying on upstream conditions and resources
- These changes were made in response to external stakeholder feedback from reference level consultations

Hydro: FROC and SHOC for Downstream Resources

Section 6.4.4.2, 6.4.5, 6.4.5.2, 6.4.5.3:

- Updated the approach for the forebay refill opportunity cost and the storage horizon opportunity cost so that hydroelectric resources at downstream forebays of cascade groups can register and request use of these opportunity costs as part of their reference levels. Changes were made to the various methodologies and examples in these sections to enable downstream resources to use these reference level components
- These changes were made in response to external stakeholder feedback from reference level consultations

Hydro: Supporting Information for Alternate Cost Profile Requests for Downstream Resources

Section 6.4.5

- Added content providing further information regarding information that can be submitted to support a request to use an alternate cost profile that includes the forebay refill opportunity cost for hydroelectric resources
- Market participants can submit maximum daily energy limit data, along with the efficiency rating of the relevant resource for an alternate cost profile request
- These changes were made in response to external stakeholder feedback from reference level consultations

Hydro: Multiple Load Resources for Pumping Power Cost at Pumped Storage Facilities

Section 7.2.1.2:

- Updated the approach to determine pumping power cost for pumped storage hydroelectric resources so that multiple modeled load resources can contribute to the reference level of a modeled generation resource at the facility
- This change was made in response to external stakeholder feedback received during reference level consultations

Hydro: Operating Reserve Fuel Efficiency Cost

Section 7.2.4.4:

- A new section was added detailing a new cost that is eligible to contribute to operating reserve offer reference levels for hydroelectric resources
- This new cost accounts for extra fuel associated with inefficient energy production for hydroelectric resources that are providing operating reserve beyond a certain level. This new cost is only incurred for a portion of the operating reserve reference level
- This new cost was added in response to external stakeholder feedback received during reference level consultations

Hydro: Cost of Speed-No-Load Operations to Provide OR

Section 7.2.4.1:

- A new section was added detailing a new eligible cost that is eligible to contribute to operating reserve offer reference levels for hydroelectric resources
- This new cost accounts for extra fuel associated with speed-no-load operation for hydroelectric resources providing 10-S operating reserve
- This new cost was added in response to external stakeholder feedback received during reference level consultations

Hydro: Cost of Condense Mode Operations to Provide OR

Section 7.2.4.1:

- A new section was added detailing a new eligible cost that is eligible to contribute to 10S operating reserve offer reference levels for hydroelectric resources that can operate in condense mode
- This new cost accounts for the costs of power consumption to support condense mode operation for hydroelectric resources providing 10S operating reserve
- This new cost was added in response to external stakeholder feedback received during reference level consultations

Hydro: Reference Level Value Calculation for Downstream Resources

Section 7.2.5.2:

- Updated content regarding how energy offer reference levels are calculated for downstream resources to conform with their newly introduced ability to determine reference levels
- This change was made in response to external stakeholder feedback received during reference level consultations

Hydro: Cascade Adder for Downstream Resources

Section 7.2.5.2:

- Introduced a fixed value cascade adder of \$20/MWh for reference level values for downstream resources. The IESO reviewed historical offer data to calibrate the value of this adder
- This adder ensures that reference level values are higher for downstream resources than for upstream resources
- Dynamic loss factors render it infeasible to determine the cascade adder dynamically
- This change was made in response to solution development

Hydro: Reference Period Selection for SHOC

Section 6.4.4.3:

- Updated the approach for selecting the reference period dates for the storage horizon opportunity cost. The need to shift the dates for day-of-week alignment was removed in response to feasibility issues during solution development and the example was removed due to this simplifying change
- A statement was added to provide clarity regarding choice of the study period relative to the dispatch day.
- This content was added in response to internal feedback received during solution development

Hydro: Net Inflow Calculation for FROC

Section 6.4.5.3:

- Updated the approach for calculating the net inflow when determining the forebay refill opportunity cost so that when net inflows are negative for the relevant month they are instead set to a value of 31 days.
- The fill time calculation was already limited to a value no larger than 31 days. This change leverages the pre-existing 31 day limit to address the edge case where fill time would otherwise solve to a negative value
- This content was added in response to external feedback received during reference level consultations



Workbooks

Workbooks

- Example Variant C and Variant D Thermal Workbooks:
 - Updated two values: Maximum MWs in the energy offer emissions cost curve and a maintenance cost in the energy offer simplified formula to improve alignment between the data in the various worksheets
- Blank workbooks:
 - Added content in the introduction sheet specifying that a MLP NFRL is required for the steam turbine for each configuration
- Market Participants are encouraged to use the most recent workbooks available when preparing reference level submissions

Workbooks

- The updated blank and example workbooks have replaced the out-of-date versions of these workbooks on the IESO site
- Both sets of workbooks can be found on the [IESO's Implementation Phase Documents page](#)



Next Steps

Next Steps

- Clean and redline versions of the relevant Market Rules, Market Manuals 14.1 and 14.2 and clean versions of the FAQ document and workbooks have been published on the IESO website: [Implementation Phase Documents \(ieso.ca\)](https://ieso.ca/implementation-phase-documents)
- Stakeholders are invited to review the updates to these documents and provide any written comments related to the incremental changes to engagement@ieso.ca prior to **January 24, 2024**