JULY 16, 2024

Market Renewal – Market Power Mitigation Education Session – 1 of 2

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Purpose of MPM Learning Sessions

- Working group sessions on market power mitigation (MPM) are being provided to the Technical Panel to support their review of the Final Alignment batch of MRP market rules
- These sessions are intended to:
    - Summarize information regarding the various mitigation processes found in the MRP batches
    - Clarify key areas in which the IESO has built out the market power mitigation framework since the provisional approval of the MPM batch based on feedback from external stakeholders

Agenda - Session 1 (July 16)

1. Background
2. Preparing for Participation:
   - NCA Designation
   - Registering RLs and RQs*
3. Participating in the DAM and RTM:
   - DCA Designation
   - Temporary RL* Requests
   - Validation Mitigation
   - Ex-Ante Mitigation
   - Reports

*RL = "reference level" and RQ = "reference quantity"

Draft Agenda - Session 2 (July 23)

1. Settlement Mitigation
2. Ex-post mitigation of physical withholding
3. Ex-post mitigation of intertie economic withholding
4. Q&A

Background

What is market power and why mitigate it?

- In electricity markets, market power arises when grid conditions limit the possible sources of supply to serve load in a particular location. These physical restrictions allow the local suppliers to dictate the energy price without sufficient competition
- In markets with low barriers to entry, exercises of market power are limited in duration and impact because high prices will attract new competition
- In electricity markets, with high barriers to entry, market power mitigation frameworks are necessary to ensure market efficiency and minimize ratepayer costs

Exercise of Market Power

- Absent any mitigation measures, a market participant can exercise market power by withholding supply, thereby increasing market costs. Two primary forms of exercising market power are:

Economic Withholding

- Economic withholding occurs when suppliers offer at prices significantly higher than their short-run marginal costs, resulting in higher prices

Physical Withholding

- Physical withholding occurs when available supply is not offered into the market, resulting in prices higher than would have been the case had the supply been available at expected prices

Legacy vs MRP Mitigation Framework

Legacy Framework

- Exercise of market power has limited impact on uniform market clearing price and dispatch schedules
  - Primarily influences payments to the resource exerting market power, not market settlement prices as a whole
- After-the-fact (ex-post) investigation and enforcement

MRP Framework

- Exercise of market power can materially impact locational marginal prices and dispatch schedules
  - Influences prices for all resources within a constrained area
- Mitigation to prevent any impact where possible
- Mitigation to reduce the incentive to attempt to exercise market power where acting to prevent impact is infeasible (e.g. physical withholding)

Market Power Mitigation Processes

- The renewed market will have several types of market power mitigation

Renewed Market MPM Processes	
Validation of dispatch data submissions	Discussed on July 16
Ex-ante (before-the-fact) mitigation of offer prices	
Ex-post (after-the-fact) mitigation for physical withholding	Discussed on July 23
Mitigation of certain settlement payments	
Ex-post (after-the-fact) mitigation for economic withholding at uncompetitive interties	

Role of the MRP Mitigation Framework

- Applying mitigation under one of the new MPM processes is not an assessment of compliance with the Market Rules
- The market continues to be the mechanism that the IESO relies on to drive efficient outcomes
- The MRP mitigation framework is focused on identifying the scenarios when resources have market power and limiting its application to those scenarios

Reference Levels and Quantities

- Reference levels and quantities are used in market power mitigation processes
- Reference levels for non-financial dispatch data parameters are IESO-approved estimates for a resource's operational capabilities
- Reference levels for financial dispatch data parameters and reference quantities are IESO-approved estimates for what prices (reference levels) and quantities (reference quantities) market participants might have offered for a resource in the energy and operating reserve markets had they been subject to unrestricted competition

Reference Levels and Reference Quantities

- During High Level Design stakeholders requested, and the IESO agreed, that financial reference levels be based on actual costs incurred by a resource as opposed to being based on historical average offer prices or historical average resource LMPs
- **Financial reference levels** are cost benchmarks based on short-run marginal costs incurred by a resource to supply incremental energy or provide incremental operating reserve
- **Non-financial reference levels** and **reference quantities** are benchmarks of physical operating capabilities based on operational characteristics of a resource

Conduct and Impact Tests

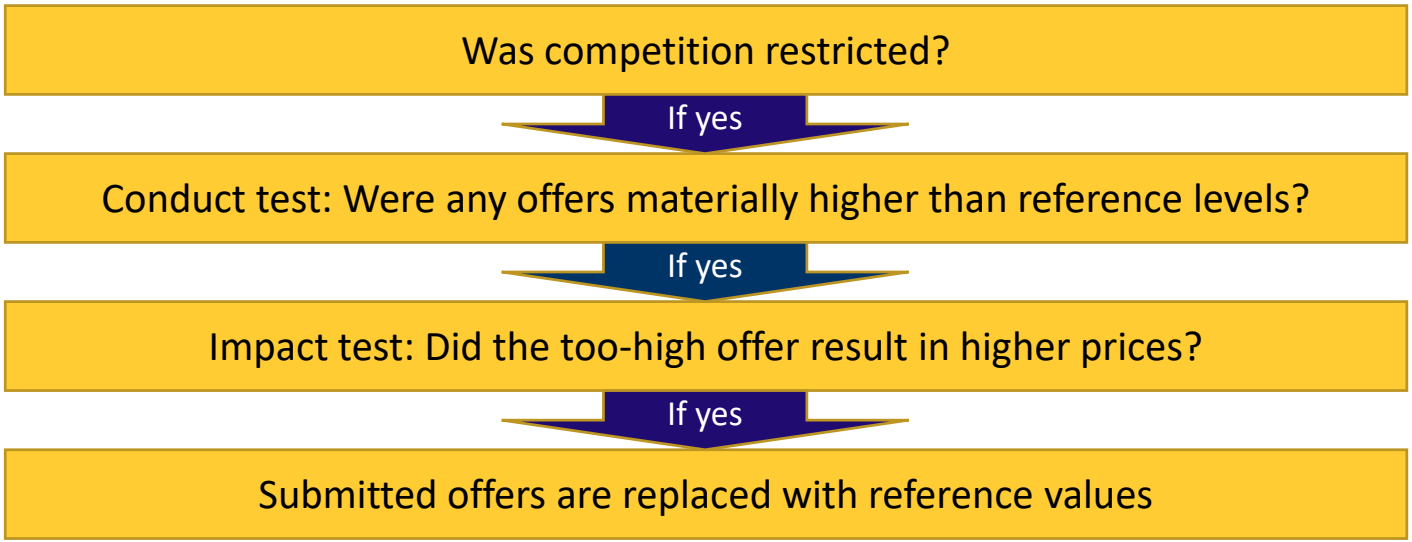
- The IESO will generally use **conduct tests** and **impact tests** to identify situations where MPs with market power are offering in a way that would result in higher market clearing prices or make-whole payments:
  - **Conduct test**: Did a market participant submit dispatch data that was significantly different than they would have under competitive conditions?
  - **Impact test**: Would prices or make-whole payments determined using the submitted dispatch data have been significantly higher than what they would have been under competitive conditions?

Conduct and Impact Tests

- The IESO will use reference levels in the conduct test and impact test:
  - Reference levels are compared to submitted dispatch data to assess if a resource fails the conduct test
  - If the impact test is **also** failed for a resource, reference levels are used to replace the submitted dispatch data when the IESO determines schedule, price and settlement

Ex-ante (Before-the-Fact) Mitigation

- Ex-ante market power mitigation involves four steps. The criteria for each of the first three must be met in turn before mitigation is applied



Market Power Mitigation - Engagement History

- The IESO has worked closely with stakeholders over the last three years to ensure that the MPM framework is implemented in a way that appropriately reflects the various operational considerations each technology type faces
- The IESO has made several incremental updates, reflected in the Summary of Changes document, to add additional detail to the MPM framework within the structure laid out in the detailed design
- The IESO has made many changes to the MPM framework in response to external stakeholder input

Market Power Mitigation - Engagement History

After the provisional approval of the MPM market rules by the IESO Board of Directors, the IESO:

- Worked with suppliers regarding determination of reference levels and reference quantities, in particular making significant modifications to the opportunity cost design for hydroelectric resources
- More narrowly scoped the reasons for IESO to reject an IRP review
- Sought stakeholder comments on the criteria used to procure IRP experts

Market Power Mitigation – Engagement Timeline

The processes that form the market power mitigation framework have been approved in stages with the MRP batches of market rules and market manuals:

1. March 2022: Ex-Post Mitigation for Physical Withholding
2. March 2022: Ex-Post Mitigation for Intertie Economic Withholding
3. March 2022: Validation Mitigation

MPM Batch

4. June 2023: Settlement Mitigation

Settlements Batch

5. May 2024: Ex-Ante Mitigation

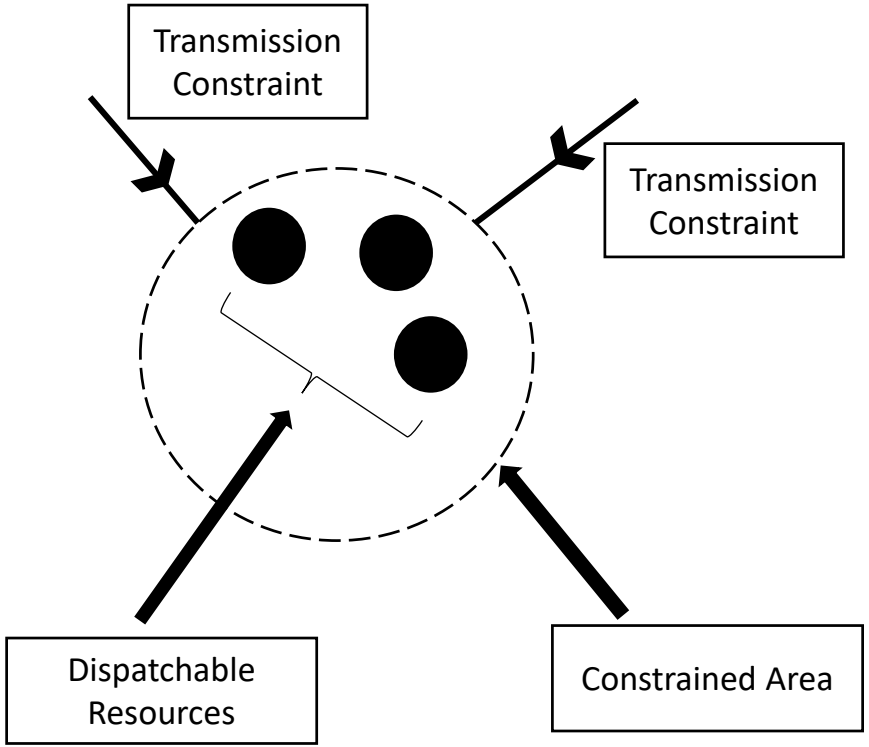
MSO Batch

Market Power Mitigation - Engagement Materials

1. SE session links: Aug 2020, Oct 2020, Oct 2020, Nov 2020, Nov 2020, Nov 2020, Nov 2020, Dec 2020, Feb 2021, Apr 2021, May 2021, Aug 2021, Sep 2021, Dec 2021, July 2022, Dec 2022, Jan 2023, Mar 2023, Jun 2023, Dec 2023
2. TP session links: Oct 2021, Nov 2021, Jan 2022, Feb 2022, Feb 2022, Feb 2022, Mar 2022, Jun 2022, Jul 2022, Feb 2024
3. Relevant Market Rules: Final Alignment version of Chapter 7
4. Relevant Market Manuals: Final Alignment version of 14.1 and 14.2

Preparing for Participation – Narrow Constrained Area (NCA) Designation

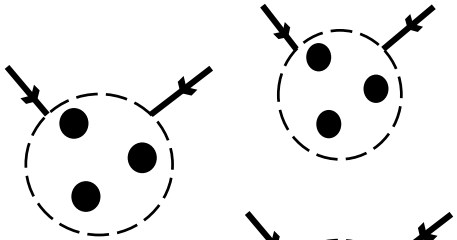
NCA Designation: Background



NCA Designation: Background

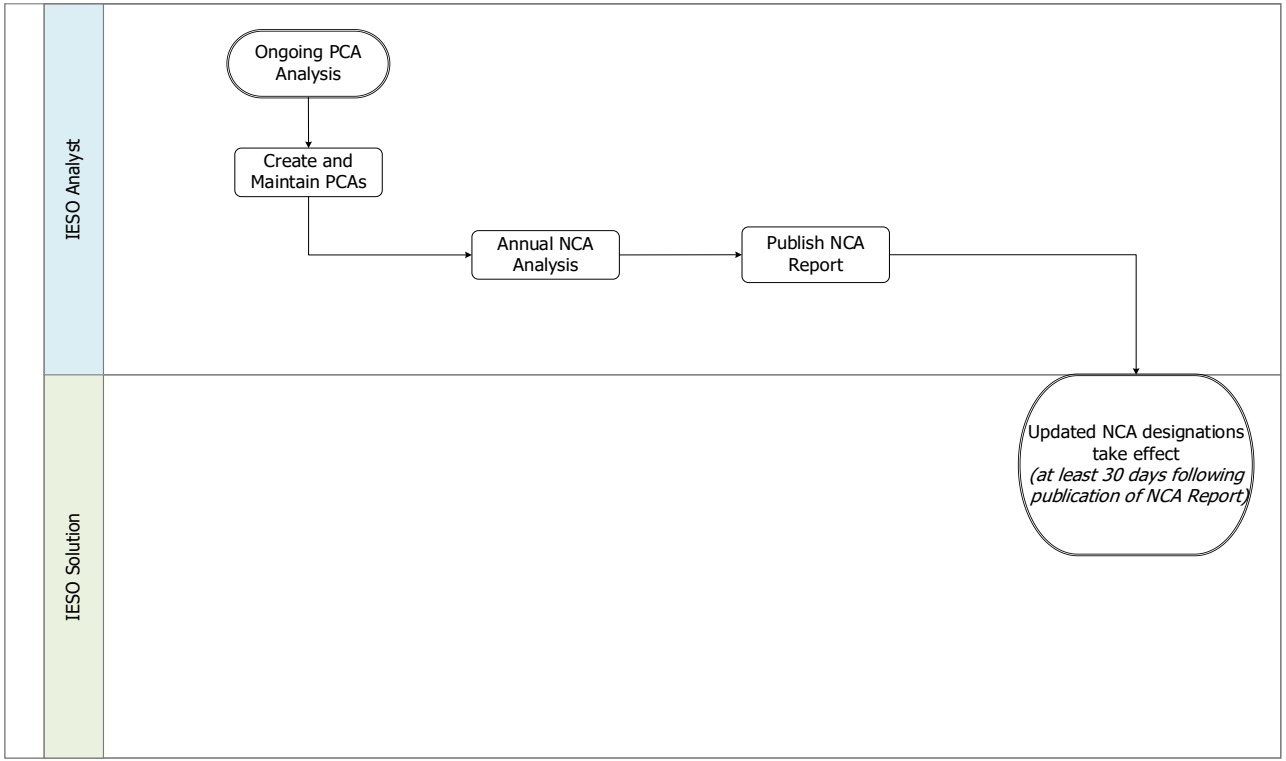
Potential Constrained Area (PCA)

Designated Narrow Constrained Area (NCA)



Could be Designated as Dynamic Constrained Areas (DCA)

NCA Designation: Process



NCA Designation: Criteria

- The IESO conducts analysis to determine potential constrained areas by studying congestion, binding constraints, shadow prices, correlation of congestion between resources, etc.
- The IESO designates NCAs if a potential constrained area was import constrained in more than 4% of the hours in the study period using data from both the DAM and the RTM
- The IESO conducts the NCA analysis on an annual basis, with updated NCA designations coming into effect no sooner than 30 days following the publication of the relevant report

NCA Designation: Reporting

1. The IESO will publish the Narrow Constrained Areas report daily
2. This report will contain the following data:
    - Version number and publication date of the report
    - Effective date of the relevant NCA designation
    - Dispatchable resources within each NCA
    - Transmission facilities and branch groups that make up the NCA
    - Congestion frequency data that resulted in an NCA designation

NCA Designation: MRP Timing

- The IESO will not designate the first NCAs or DCAs until *after* MRP Go Live.
- This delay will allow time for sufficient data from the renewed market to be available to enable the IESO to designate PCAs; and carry out the NCA designation analysis
- A period of at least 90 days following MRP Go Live is expected before the NCA report will be published or DCAs will appear in the DCA report

NCA Designation: MRP Timing

- NCAs come into effect no sooner than 30 days following their designation which is communicated via publication of the NCA report
- The result of this decision is that resources will not be tested for mitigation related to NCAs or DCAs until this period has elapsed post-MRP Go Live

NCA Designation: Prior Analysis

- The IESO previously published an analysis regarding potential NCA designations based on legacy market data from 2019-2020
- This analysis was based on legacy data that is different from the data that will be used to designate NCAs. It also required a significant amount of manual work that cannot be automated at this time. Updating that analysis of legacy market data using more recent data is not expected to provide any material increase in NCA forecast accuracy given the inherent limitations of the approach.
- Market participants can also review public reports from the legacy market to assess where positive congestion has occurred historically.

NCA Designation: Market Rules and Market Manuals

- Market Rule sections related to designation of NCAs:
  - Chapter 7, section 22.10.2
- Market Manual sections related to designation of NCAs:
  - Market Manual 14.1, section 2.2

Preparing for Participation – Registering Reference Levels (RLs) and Reference Quantities (RQs)

Registering RLs: Background

Reference Levels are:

- Estimates of dispatch data that would have been submitted under competitive pressures
  - financial dispatch data related to costs (e.g. energy offer reference level ($/MWh))
  - non-financial dispatch data related to operational capability (e.g. MLP reference level (MW))
- Approved by the IESO with input from market participants
- Used in validation, ex-ante and settlement mitigation

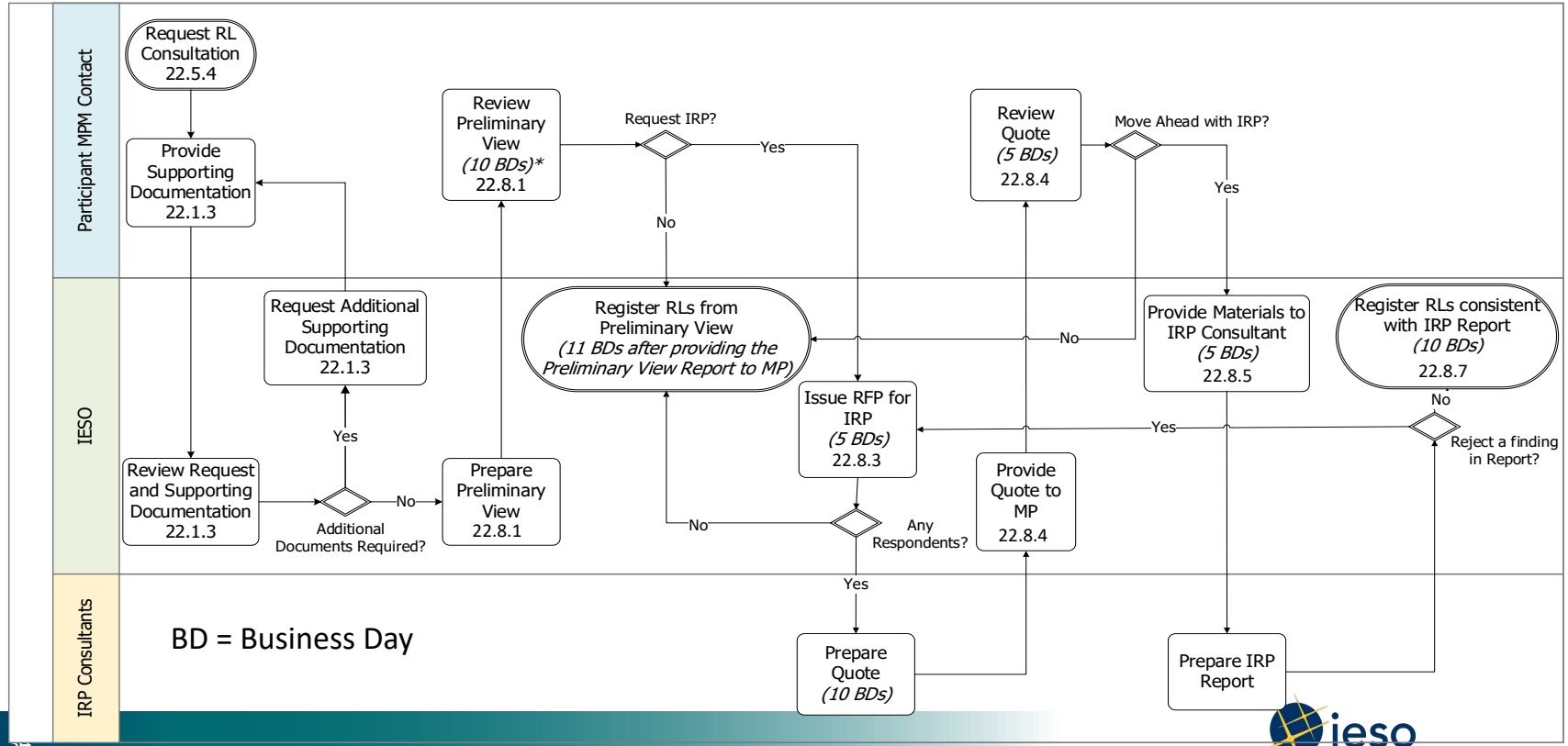
Registering RQs: Background

- Reference Quantities are:
  - Estimates of available supply of energy or operating reserve at the resource, accounting for outages and de-rates
  - Representative of the quantities that would have been offered under competitive pressures
  - Approved by the IESO with input from market participants
  - Used to assess mitigation for physical withholding after the fact

Registering RLs and RQs: Market Rules and Market Manuals

- Market Rule sections related to registering reference levels and reference quantities:
  - Chapter 7, section 22.1 - 22.8
- Market Manual sections related to registering reference levels and reference quantities:
  - Market Manual 14.2, section 2.2

Registering RLs and RQs: Process



Registering RLs and RQs: RQ Modifiers

- Market participants are able to request modifiers to reference quantities that vary on a monthly basis to better match the reference quantity to the capability of the resource
- Modifiers will reduce the reference quantity for the particular month based on operating characteristics that further limit the available supply at the facility during that month
- Operating restrictions that warrant reference quantity modifiers must be verified to the IESO via documentation at registration of reference levels and reference quantities

Registering RLs and RQs: Independent Review Process

- The Independent Review Process (IRP) is a step in the process of determining reference levels and reference quantities
- In the event that a market participant and the IESO's views on an eligible reference level or reference quantity modifier differ, market participants can request independent review of the relevant facts
- An independent expert provides a view on the appropriate value for a particular reference level or reference quantity modifier and the IESO will use that value absent material error

Registering RLs and RQs: Independent Review Process

- The market participant that requests use of the IRP pays for the process (the IESO pays the consultant and recoups the money from the market participant)
- In the event the IESO rejects an IRP report, the IESO re-procures and pays for the subsequent IRP report on the same matter (the IESO then recoups the money via an uplift to consumers)
- The IESO can only reject an IRP determination if adopting the determination would contravene the market rules or if the determination relied on a manifest error

Registering RLs and RQs: Independent Review Process

- The IRP was created in response to external stakeholder input during the detailed design phase of MRP
- Consistent with direction received from the IESO Board of Directors at the time of their provisional approval of the MPM batch, the IESO condensed the reasons for IESO rejection of an IRP report to be solely related to the existence of a material error on the part of the IRP consultant
- The IESO made this change and has made other incremental updates to the process to add more detail since publishing the MPM batch of market rules and market manuals

Registering RLs and RQs: Updates

- The IESO has updated Market Manual 14.2 significantly in response to external stakeholder input (both public and via 1-1 reference level consultations). Subject areas that have been updated include:
  - Opportunity costs
  - Supporting documents
  - Operating reserve costs
  - Operating and maintenance costs
  - Steam turbine resources
  - Cascade system reference levels
  - Station service costs
  - Transmission and distribution costs
  - Global adjustment costs

Registering RLs and RQs: Consultation Progress

- The current state of reference level consultations:
  - Wind, solar, nuclear: complete
  - Hydroelectric, DL, ESR: near complete
  - Gas: most facilities have completed the bulk of the work, recent engagement levels have increased markedly, with IESO moving quickly to support timely completion

Registering RLs and RQs: MRP Launch Scenarios

As we approach Registration Launch (Nov 11, 2024), facilities will fall into 1 of 3 categories in regards to their preliminary view (PV) reports:

1. **Complete**: MP has completed all work, IESO issues a draft PV report
2. **Partially complete**: MP has completed most work, IESO issues a draft PV report based on the supported and eligible costs at the time
3. **Incomplete**: MP did not engage with the IESO; IESO issues a draft PV report based on $0 FRLs and the NFRL values from Ch7, S 22.3.3

Registering RLs and RQs: MRP Launch Scenarios

1. **Complete**: MP has completed all work, IESO issues a draft PV report

- In this scenario, the IESO anticipates that reference levels in place will not require update for MRP Go Live absent any other changes
- No further work anticipated for facilities in scenario 1
- MPs are able to initiate the process to update reference levels following Reference Level Launch (Feb 1, 2025) via a request in Online IESO

Registering RLs and RQs: MRP Launch Scenarios

2. **Partially complete**: MP has completed most work, IESO issues a draft PV report based on the supported and eligible costs at the time (may be some items that were not supported)

- In this scenario, the IESO anticipates that MPs will request updates to the reference levels in place for Reference Level launch (Feb 1, 2025) to be updated prior to MRP Go Live
- IESO will endeavor to support MPs who request updates to reference levels following Reference Level Launch, such that updated values are ready prior to MRP Go-Live

Registering RLs and RQs: MRP Launch Scenarios

3. **Incomplete**: MP has not engaged with the IESO; IESO issues a draft PV report based on $0 FRLs and the NFRL values from Ch.7, S 22.3.3

- In this scenario, the IESO anticipates that reference levels for Reference Level launch (Feb 1, 2025) will require significant update for MRP Go Live
- IESO will initiate a workflow to update reference levels via Online IESO following Reference Level Launch
- IESO continues to attempt to contact a small number of gas facilities that may fall into this scenario

Participating in the DAM

Participating in the DAM: Ex-Ante Mitigation

- Ex-ante mitigation in the DAM assesses which relevant dispatch data should be replaced by a reference level for each dispatchable resource and dispatch hour(s)
- If required, the IESO uses the relevant reference level in place of the submitted dispatch data to determine DA schedules and LMPs
- The topics covered in this section are arranged in order roughly according to when a process would occur during market operation

Participating in the DAM: DCA Designations

- IESO evaluates DCA designation conditions and publishes the public Day-Ahead Market Dynamic Constrained Areas Report at 05:30AM EPT
- This report communicates:
  - Dynamic Constrained Areas
  - Resources within the DCA
  - Branch groups and constraints

Participating in the DAM: DCA Designations

- The IESO will not designate DCAs on day 1 of MRP Go-Live
- To ensure that sufficient data from the renewed market exists to create DCA designations correctly, the IESO will wait until some time after MRP Go Live before designating any DCAs
- The IESO currently anticipates a delay of at least 90 days following MRP Go Live prior to designating DCAs
- More information will be communicated as we get closer to MRP Go Live regarding when DCAs could start to be designated

Participating in the DAM: DA Reference Level Value Report

- IESO uses the resource specific registered reference level formulae to calculate the reference level values (actual numbers that are used for a particular dispatch day) and publishes the Day-Ahead Market Financial Reference Level Values Report at 05:45AM EPT and as needed
- This report communicates all financial reference level values that will be used by the DAM for the resource
- This report is confidential to a market participant

Participating in the DAM: Review DA Report Data

- Market participants review financial reference level value reports, DCA reports, NCA reports, other relevant data in the DA submission window (starting at 06:00EPT)
- During this time market participants assess all relevant data, including system conditions, forecasts, reference levels
- Market participants determine their optimal offer strategy given all the available information

Participating in the DAM: Submit Temporary DA Reference Level Change Requests

- Within the DAM submission window, market participants are also able to submit temporary reference level change requests, including fuel cost change requests and alternate cost profile change requests
- Fuel cost change requests are used to provide an updated fuel cost to the resource's reference level value calculation
- When a fuel cost change request is submitted, this results in an updated calculation of the reference level values and an updated version of the relevant financial reference level value report

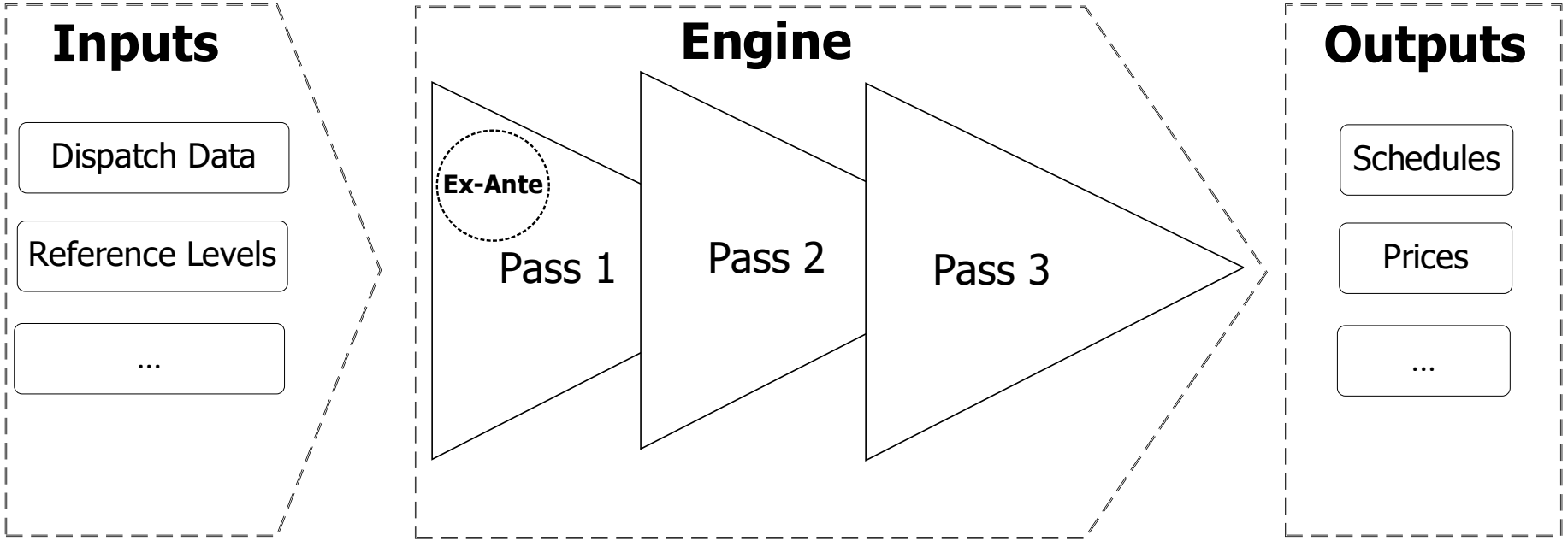
Participating in the DAM: Submit Temporary DA Reference Level Change Requests

- Resources that have registered more than one set of reference levels can request that the IESO use the higher cost profile in this window as well (referred to as 'alternate cost profile requests')
- The IESO defaults to using the lower cost profile by default, allowing market participants to request use of the higher cost profile when conditions are met
- The conditions to request use of the higher cost profile are either found in the market manual (e.g. forebay refill opportunity cost) or are determined for the resource as part of the process to register reference levels

Participating in the DAM: Validation Mitigation

- The IESO has introduced new validations related to market power mitigation into the Market Information Management system that market participants use to submit dispatch data
- When market participants submit certain non-financial dispatch data, the IESO compares the submitted dispatch data to the relevant non-financial reference level value. Submitted values that are outside the allowed thresholds are rejected, such as submitted Energy Ramp Rates that are much slower than the reference level
- Market participants are able to then resubmit this data, within regular market operation timelines

Participating in the DAM: Ex-Ante Mitigation



Participating in the DAM: Ex-Ante Mitigation

As Offered Run

- Uses submitted dispatch data
- Determine as-offered schedules and LMPs

Determine Constrained Area Conditions & Conduct Test

- Review as-offered run results
- Identify resources and dispatch data parameters that meet a constrained area condition for a particular dispatch hour and fail the conduct test

Reference Level Run

- Replace relevant dispatch data with reference level values for resources that fail the conduct test
- Determine schedules and LMPs

Impact Test

- Compare as offered LMPs to Reference Level LMPs for resources that failed the conduct test
- If the as-offered LMPs are too high, relative to the Reference Level LMPs, then the impact test is failed for a dispatch hour

Apply Mitigation

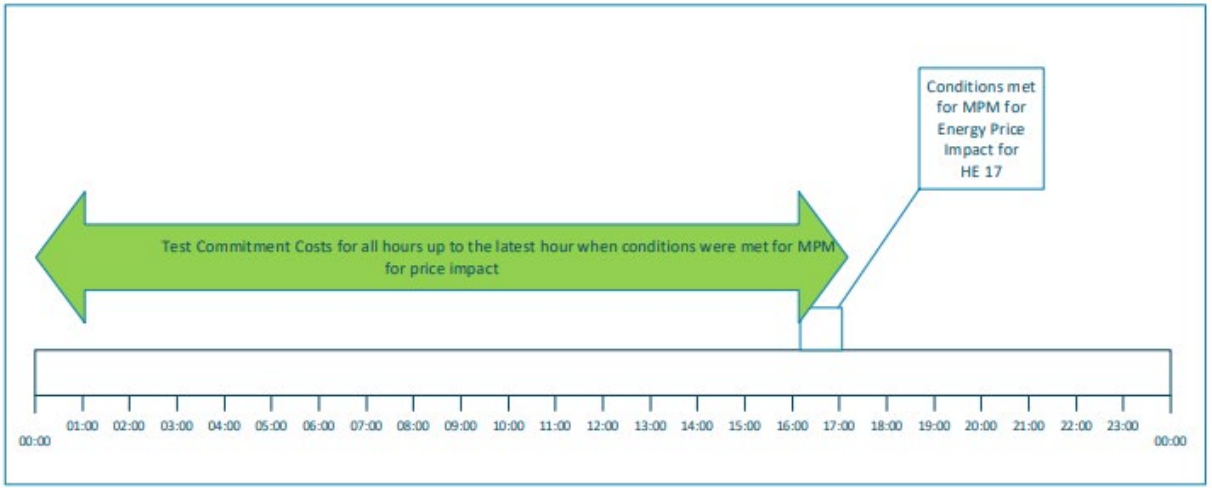
- Where the impact test was failed, use reference level values to determine outputs of Pass 2 and 3 of the DAM

Participating in the DAM: Constrained Area Conditions

- When the stated criteria (described in the following slides) are met for a resource for a particular dispatch hour then the relevant dispatch data will be tested:
  - Energy offers above MLP and/or operating reserve offers for that resource meet the relevant constrained area condition and will be tested for that condition for that dispatch hour
  - The commitment costs (energy offer up to MLP, speed no-load offers, start up offers) for that NQS resource meet the relevant constrained area condition and will be tested for all dispatch hours up to and including the relevant dispatch hour

Participating in the DAM: Constrained Area Conditions

- Determining constrained area conditions for commitment costs is illustrated in this diagram taken from section 3.7.1.1 of the final Market Power Mitigation Detailed Design document:



Participating in the DAM: NCA/DCA Conditions

- The NCA or DCA conditions are met if at least one transmission constraint for an NCA or a DCA is binding (non-zero shadow price on the constraint) in the as-offered pricing run. When this is true all resources within the relevant NCA or DCA meet the NCA or DCA condition to test for ex-ante mitigation
- This means that energy offers for the relevant resources will be tested for this dispatch hour and commitment costs will be tested for all hours up to and including this dispatch hour

Participating in the DAM: BCA Condition

- The broad constrained area (BCA) condition is met for a resource and a dispatch hour if the congestion component of the LMP for a resource is greater than $25/MWh in the as-offered run of the DAM for that resource and dispatch hour. When this is true, the relevant resource meets the BCA condition to test for ex-ante mitigation
- This means that energy offers for the relevant resource will be tested for this dispatch hour and commitment costs will be tested for all hours up to and including this dispatch hour

Participating in the DAM: EGMP Condition

- The Energy Global Market Power (EGMP) condition is met when the intertie border prices at designated global market power reference interties (NY and MI at MRP Go-Live) is greater than $100/MWh and it is not possible to schedule incremental imports at these interties. When this is true, all dispatchable resources that can provide incremental energy meet the EGMP condition to test for ex-ante mitigation
- This means that energy offers for the relevant resources will be tested for this dispatch hour and commitment costs will be tested for all hours up to and including this dispatch hour

Participating in the DAM: ORLOC Condition

- The OR local (ORLOC) conditions are met if an OR area constraint has a minimum value greater than 0 MW. When this is true all resources within the relevant OR area meet the ORLOC condition to test for ex-ante mitigation
- This means that operating reserve offers for the relevant resources will be tested for this dispatch hour and commitment costs for NQS resources will be tested for all hours up to and including this dispatch hour
- If a resource is inside an OR area with a maximum constraint that is binding, that resource is excluded from the ORLOC condition

Participating in the DAM: ORGMP Condition

- The OR global market power (ORGMP) conditions are met if an OR LMP is greater than $15/MW in the as-offered run of the DAM for a resource. When this is true this resource meets the ORGMP condition to test for ex-ante mitigation
- This means that operating reserve offers for the relevant resource will be tested for this dispatch hour and commitment costs for NQS resources will be tested for all hours up to and including this dispatch hour
- If a resource is inside an OR area with a maximum constraint that is binding, that resource is excluded from the ORLOC condition

Participating in the DAM: DA Schedule Reports

- The IESO publishes the Day-Ahead Schedule Reports daily following the successful completion and validation of the DAM
- This report communicates energy and operating reserve schedules for each hour of the next day as established by the DAM
- This report also communicates dispatch hours where mitigation was applied to a resource (if any) and the most restrictive constrained area condition that was applied to a resource for each dispatch hour
- This report is confidential to a market participant

Participating in the RTM

Participating in the RTM: Ex-Ante Mitigation

- Ex-ante mitigation in the RTM assesses which relevant dispatch data should be replaced by a reference level for each dispatchable resource and dispatch hour
- If required, the IESO uses the relevant reference level in place of the submitted dispatch data to determine RT schedules and LMPs
- Assessment of mitigation for the RTM is carried out by the Pre-Dispatch (PD) calculation engine; when mitigation is applied to a resource the real-time calculation engine maintains those decisions
- The topics covered in this section are arranged in order roughly according to when a process would occur during market operation

Participating in the RTM: DCA Designations

- IESO evaluates DCA designation conditions on a rolling basis and publishes the public Real-time Market Dynamic Constrained Areas Report hourly at 30 minutes past every hour
- This report communicates:
  - Dynamic Constrained Areas
  - Resources within the DCA
  - Branch groups and constraints

Participating in the RTM: RT Reference Level Value Report

- IESO uses the registered reference level formulae to calculate the reference level values (actual numbers that are used for a particular dispatch day) and publishes the Real-Time Market Financial Reference Level Values Report at 16:30 EPT the day prior to the dispatch day and as needed
- This report communicates all financial reference level values that will be used by the RTM for the resource
- This report is confidential to a market participant

Participating in the RTM: Review Report Data

- Market participants review financial reference level value reports, DCA reports, NCA reports, other relevant data for the RTM after the DAM completes and prior to the close of the RT offer window (2 hours in advance of the dispatch hour)
- During this time market participants assess all relevant data, including system conditions, forecasts, reference levels.
- Market participants determine their optimal offer strategy given all the available information

Participating in the RTM: Submit Temporary RT Reference Level Change Requests

- In advance of the mandatory offer window, market participants are also able to submit temporary reference level change requests, including fuel cost change requests and alternate cost profile change requests
- Fuel cost change requests are used to provide an updated fuel cost to the resource's reference level value calculation
- When a fuel cost change request is submitted, this results in an updated calculation of the reference level values and an updated version of the relevant financial reference level value report

Participating in the RTM: Submit Temporary RT Reference Level Change Requests

- Resources that have registered more than one set of reference levels can request that the IESO use the higher cost profile in this window as well (referred to as 'alternate cost profile requests')
- The IESO defaults to using the lower cost profile by default, allowing market participants to request use of the higher cost profile when conditions are met
- The conditions to request use of the higher cost profile are either found in the market manual (e.g. FROC) or are determined for the resource as part of the process to register reference levels

Participating in the RTM: Validation Mitigation

- The IESO has introduced new validations related to market power mitigation into the Market Information Management system that market participants use to submit dispatch data
- When market participants submit certain non-financial dispatch data, the IESO compares the submitted dispatch data to the relevant non-financial reference level value. Submitted values that are outside the allowed thresholds are rejected, such as submitted Energy Ramp Rates that are much slower than the reference level
- Market participants are able to then resubmit this data, within regular market operation timelines

Participating in the RTM: Managing Scarcity With High Offer Prices

- Market participants can manage scarcity in a variety of ways, as they do today
- In the legacy market, market participants are not subject to ex-ante mitigation and can use very high offer prices to reflect scarcity
- However, the DSO may schedule the resource to satisfy operating reserve requirements. When this is the case the DSO will schedule the resource regardless of the offer price
- The risk of submitting very high offer prices and receiving an operating reserve schedule exists in the legacy market

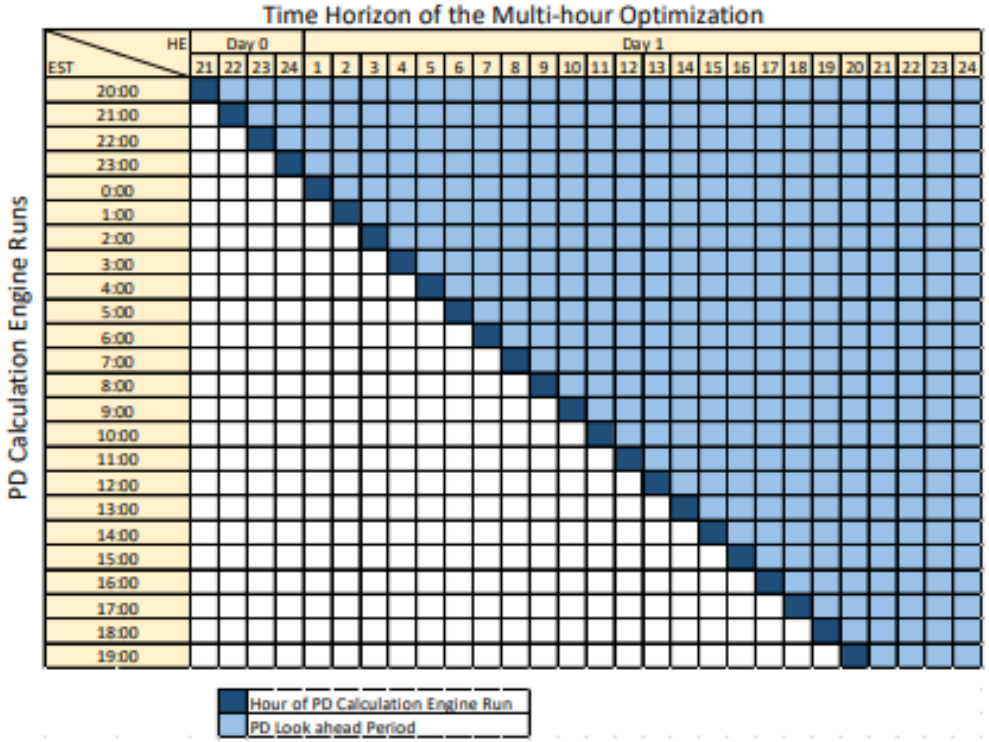
Participating in the RTM: Managing Scarcity With High Offer Prices

- Under MRP, resources that have market power (i.e. where supply conditions are tighter) may be scheduled even with high offer prices
- Operating reserve reference levels are set based on the short-run marginal costs of providing standby capacity and include various eligible costs documented in Market Manual 14.2
- If a market participant registers reference levels that reflect these eligible costs, this allows them to reflect the value of their operating reserve supply in their offer prices

Participating in the RTM: Managing Scarcity With High Offer Prices

- One of the significant enhancements that MRP has made available to Market Participants about avoiding infeasible schedules is the introduction of new dispatch data parameters
- These parameters, largely focused on hydroelectric resources, allow market participants to significantly impact the way the DSO schedules their resources, ensuring that DA and PD schedules are consistent with operating capabilities
- If a market participants receives an infeasible schedule, they are obligated to inform the IESO, a feature of the market that exists today and continues under MRP

Participating in the RTM: PD Calculation Engine Background



Participating in the RTM: RTM Ex-Ante Mitigation

PD Scheduling and Pricing

- Executes at ~XX:01 each hour
- Determine PD results (including schedules and LMPs) for the look ahead period

Determine Constrained Area Conditions & Conduct Test

- Review PD results
- Identify resources and dispatch data parameters that meet a constrained area condition for a particular dispatch hour in the look ahead period

Reference Level S & P

- Replace relevant dispatch data with reference level values for resources that failed the conduct test
- Determine schedules and LMPs midway through the hour

Impact Test

- Compare LMPs from PD results to Reference Level LMPs for resources that failed the conduct test
- If the relevant LMPs are too different, then the impact test is failed for a dispatch hour

Apply Mitigation

- Where the impact test was failed, use reference level values to determine schedules and prices in subsequent PD scheduling and pricing

Participating in the RTM: PD Schedule Reports

- The IESO publishes the Predispatch Schedule Report hourly
- This report communicates energy and operating reserve schedules for each hour of the next day as established by the PD calculation engine
- This report also communicates dispatch hours where mitigation was applied to a resource (if any) and the most restrictive constrained area condition that was applied to a resource for each dispatch hour
- As mitigation decisions are made by the PD calculation engine (not the real-time calculation engine) there is no reporting on mitigation in real-time calculation engine reports

Participating in the RTM: Ex-Ante Mitigation in PD and RT Calculation Engines

PD Calculation Engine (including Ex-Ante Mitigation)

- Determines which resources, dispatch hours and dispatch data to apply mitigation
- For identified resources, for each identified dispatch hour, use reference level values to determine PD schedules, commitment decisions etc.
- Mitigation decisions from the DAM are NOT 'carried forward' into PD.
- PD makes entirely separate mitigation decisions from DAM mitigation decisions

RT Calculation Engine

- PD mitigation decisions are carried forward into the real-time calculation engine to determine 5-minute schedules and prices. No new mitigation decisions are made by the real-time calculation engine

Next Steps

July 23: Education session #2 which will address settlement mitigation, ex-post mitigation for physical withholding and ex-post mitigation for intertie economic withholding

August 6: Deadline for submitting written feedback on the Final Alignment batch

Thank You

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