

Energy Workstream – Market Power Mitigation Design Considerations

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Agenda

- Recap
- Economic Withholding
 - Cost-based reference levels
 - Global market power mitigation
- Other Mitigation Considerations
 - Uneconomic Production
 - Uncompetitive Interties
- Physical Withholding
 - Reference Quantity
- Summary and Next Steps

Mitigation: Recap

Avoiding the exercise of market power is an important goal:

- For electricity markets, competition drives offers to marginal cost pricing, resulting in efficient dispatch at the lowest cost
- Exercises of market power reduce economic efficiency
- The IESO will test for economic withholding and physical withholding
 - A conduct and impact test will be used

Mitigation Design: Considerations for Economic Withholding

Cost-based
Reference
levels:

Should cost-based reference levels be determined daily - by the IESO - or submitted daily - by market participants?

Global
mitigation

In the absence of binding internal transmission constraints, will the IESO still test for the exercise of market power?

Mitigation Design: Other Mitigation Considerations

Uneconomic
production:

Under what circumstances should offers that are too low be mitigated?

Uncompetitive
Interties:

In what circumstances should interties which are not competitive be mitigated and how?

Mitigation Design: Consideration for Physical Withholding

Reference
Quantities

Will the impact of operating restrictions on reference quantities be determined ex-ante?

ECONOMIC WITHHOLDING

Cost-based Reference Levels

Q: Should cost-based reference levels be determined daily - by the IESO - or submitted daily - by market participants?

Reference Levels - Recap

- Reference levels:
 - Proxy variables or estimates
 - Intended to reflect marginal cost, competitive offers
 - What would have been offered if the participant had been in a competitive environment
- Reference levels impact when and to what level to mitigate offers

Cost-based Reference Levels

- Two approaches to determine cost-based reference levels:

1st approach
(determined daily):

- Cost-based reference levels determined daily by the IESO
- Reference levels can also be based on historical offers, or LMPs, when appropriate

2nd approach
(submitted daily):

- Cost-based offers submitted daily by participants
- Those offers would be required to include only eligible costs

Cost-Based Reference Levels – Common Features

- Under either approach:
 - a methodology for determining cost based reference levels and estimates of opportunity costs must be developed and documented
 - The cost-based reference levels should be the same regardless of method
- Cost-based reference levels are determined based on the short-run marginal cost of a specific facility

Cost-based Reference Levels – Common Features

- Both approaches also provide the IESO and market participants with the incentive to correct the reference level if it is too low:
 - Market participants have the incentive to provide the information that will inform a change
 - Avenues will exist for market participants to dispute cost-based reference levels where they are too low
 - The IESO will have the incentive to avoid cost-based reference levels that are too low to prevent inefficient dispatch and to avoid unnecessary administrative burden

Cost-based Reference Levels - Considerations

- 1st approach ensures that cost submissions are consistent with the established methodology
 - Could incorporate the ability for participants to submit fuel cost adjustments
- The 2nd approach could allow cost-based reference prices to be calculated and submitted incorrectly

Next Steps for Cost-Based Reference Levels

- The IESO will continue its analysis of each approach and aim to provide a preliminary decision at the July SSM session

Global Market Power Mitigation

Global Market Power - Background

- So far, mitigation has been discussed in the context of local market power
 - Local binding transmission constraints
- Market power could be exercised on the Ontario market as a whole, raising prices across the province
- Global market power is not a function of local constraints
 - Other conditions can restrict competition across the market as a whole

Global Market Power

Q: In the absence of binding internal transmission constraints, will the IESO still test for the exercise of market power?

A: Yes. When system-wide constraints are expected to bind, the IESO will test for global market power

Global Market Power – Rationale

- For local market power, mitigation should only apply when competition is restricted
 - Binding transmission constraints can restrict the pool of competitors
- Similarly, for global market power, mitigation should only apply when competition is restricted
 - Interties are import-constrained
 - There is scarcity in flexible capacity

Global Market Power – Importance of Import Congestion

- Absent import competition, market power can exist even though there is no binding transmission constraint
- The marginal resource in the system could attempt to exercise market power
 - When demand is low and there is abundant cheap supply attempting to price up should be ineffectual
 - However when demand is high and supply is tight there is more opportunity to exercise market power
 - Under these circumstances, the presence of imports is an important competitive constraint

Global Market Power – Importance of Ramp Constraints

- The high penetration of variable generation (wind, solar) in Ontario has increased the need for ramp on the system
 - There are occasions where these resources provide less energy than was forecast
 - this energy must be provided by other flexible resources
- There may be a limited number of flexible resources online to respond to this increased demand
 - These resources may have market power due to the demand for flexibility
- Variable penetration will likely increase in the future, ramping constraints could persist

Global Market Power – Importance of Ramp Constraints

- Market power in this case is conferred due to high demand for the operating characteristic of flexibility – rather than high demand for energy or operating reserve
- A flexible resource anywhere in Ontario could have this market power – it is not limited or denoted by location on the grid
- Resources with this market power could increase their prices and the system would be forced to pay these higher costs

Global Market Power – Considerations

- For local market power
 - Test those facilities who are behind a binding constraint for market power
- For global market power
 - Test all facilities for market power when there is import congestion on the interties

Global Market Power – Considerations

- The testing for global market power will use the conduct and impact methodology
- When the market is competitive, it will be unlikely that any market participant will impact price
- Only when conditions occur that otherwise restrict competition will market participants meet the impact test

Global Market Power – Preliminary Decision

- Test for global market power when both the Michigan and New York interfaces are import congested, or the NISL is binding for imports
- Other interties are not of sufficient size or connected to a sufficiently liquid market to discipline competition

Next Steps

With stakeholders, the IESO will need to determine

- When internal ramping constraints warrant mitigation

Uneconomic Production

Uneconomic Production – Background

- What is uneconomic production?
 - Uneconomic production refers to supply which is offered at prices which are too low
 - Cost-based reference levels could result in negative reference levels if for example, not producing in one hour means that a resource cannot produce in the next hour
 - The determination of what is ‘too low’ will contemplate these opportunity costs to not producing
- Uneconomic production will always impact price but may not always impact dispatch
 - Does not always reduce dispatch efficiency

Uneconomic Production–Day-ahead->Real-time

- A day-ahead market can introduce market power issues from uneconomic production
 - These issues can occur when resources have a day-ahead schedule and a constraint is reduced after the day-ahead market clears
 - In these cases participants can submit low offer prices intended to maximize their two-settlement outcome
 - It is difficult to implement mitigation criteria that directly measure to these conditions, in practice other approaches are necessary

Uneconomic Production – Simplified Example

Generator Schedule and Offers:

- DA schedule = 100 MW @ \$30/MWh
- Outage on a transmission line causes a transmission constraint to bind between DA and RT dispatch
- Reduces its offer after the outage occurs to -\$2,000/MWh
- RT schedule = 50 MW
- LMP= -\$2,000/MWh

Settlement:

$$\begin{aligned} &= (\text{MW}_{\text{DA}} * \text{Price}_{\text{DA}}) + ((\text{MW}_{\text{RT}} - \text{MW}_{\text{DA}}) * \text{Price}_{\text{RT}}) \\ &= (100 \text{ MW} * \$30) + ((-50 \text{ MW}) * -\$2,000) \\ &= \$3,000 + \$100,000 \\ &= \mathbf{\$103,000} \end{aligned}$$

Uneconomic Production – Other Jurisdictions

- The IESO has previously presented materials that describe the approach taken to mitigate uneconomic production in some other jurisdictions
- This material is found in the appendix to the presentation on market power mitigation dated [June 29, 2017](#)
- NYISO, MISO and SPP mitigate offers that are too low when they are found to have market power
- ISO-NE does not currently mitigate uneconomic production

Uneconomic Production – Preliminary Decision

Q: Under what circumstances should offers that are too low be mitigated?

A: When resources are contributing to congestion and the offers meet conduct and impact thresholds, offers will be mitigated

Uneconomic Production – Preliminary Decision

- The IESO will use conduct and impact tests to mitigate for uneconomic production:
 - Thresholds and reference level methodology will be determined as part of detailed design
- Only resources that contribute to transmission congestion will be mitigated
- This process will try to avoid mitigation of resources that may be trying to achieve feasible scheduling - not settlement outcomes
 - Recognizing resource limitations could reduce this risk

Next Steps

With stakeholders, the IESO will need to determine:

- Conduct thresholds
 - Impact thresholds
 - Reference Level methodology
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- The IESO continues to consider this topic in the context of dispatchable loads

Uncompetitive Interties

Uncompetitive Interties – Background

- What are uncompetitive interties?
 - Uneconomic interties are interties where competition is restricted
 - These restrictions can be based on structural barriers that are known to the IESO (e.g. ease of access)
 - Restrictions are also inferred if a single market participant is responsible for most trade on a given intertie over a period of time (e.g. 90 days)

Uncompetitive Interties – Background

- Mitigation of uncompetitive interties prevents similar adverse outcomes to those previously discussed regarding uneconomic production
 - To mitigate uncompetitive interties, the IESO will mitigate clearing prices on the intertie rather than mitigating offer and bid prices
- These adverse outcomes can occur in either the day-ahead or real-time timeframes
- In either timeframe traders can have the incentive to maximize congestion costs
 - Importers submit low offer prices
 - Exporters submit high bid prices

Uncompetitive Interties – Background

Day-ahead

- If the intertie is derated prior to the day-ahead market and there are more FTRs issued than the capacity of the intertie, then there can be incentive issues

Real-time

- If the intertie is derated between the day ahead market and real-time, then there can be incentive issues

Uncompetitive Interties – Background

- Mitigation of uncompetitive interties prevents similar adverse outcomes to those previously discussed regarding uneconomic production
- These adverse outcomes can occur when resources have a day-ahead schedule and a constraint binds after the day-ahead market clears
- In these cases traders can submit offers to maximize their two settlement outcomes:
 - Importers submit low offer prices
 - Exporters submit high bid prices

Uncompetitive Interties – Simplified Example

An importer is scheduled day-ahead when the intertie is de-rated after day-ahead

Import Schedule and Offers:

- DA schedule = 100 MW @ \$30/MWh
- Derate of the intertie after the day-ahead market
- New offer price = -\$2,000/MWh
- RT schedule = 50 MW
- LMP= -\$2,000/MWh

Settlement:

$$\begin{aligned} &= (MW_{DA} * Price_{DA}) + ((MW_{RT} - MW_{DA}) * Price_{RT}) \\ &= (100 \text{ MW} * \$30) + ((-50 \text{ MW}) * -\$2,000) \\ &= \$3,000 + \$100,000 \\ &= \$103,000 \end{aligned}$$

Uncompetitive Interties – Background

- While the issues with uncompetitive interties are similar to the issues discussed with uneconomic production, the remedy must be different
- Ex-ante mitigation to replace uncompetitive offers and bids with competitive values would be ideal
 - This methodology is a better approximation of the competitive outcome
- It is not practical to determine a proxy for competitive offers or bids for imports and exports
 - An alternate methodology should be used

Uncompetitive Interties – Preliminary Decision

Interties which have been designated as uncompetitive will apply pricing rules in day-ahead and real-time to prevent the exercise of market power

- Similar to today's after-the-fact approach to mitigation of uncompetitive interties

Uncompetitive Interties – Considerations

- Only interties where competition is not likely to discipline behaviour will be designated
- For competitive interties, it is assumed that the presence of sufficient competition will prevent market participants from exercising market power

Uncompetitive Interties – Considerations

- There are two features that need to be established:
 1. Designation criteria for uncompetitive interties
 2. Pricing rules to determine prices on an uncompetitive intertie
- Designation criteria will ensure that there is only mitigation when competition is restricted
- Pricing rules will determine when settlement prices on designated interties need to be modified

Uncompetitive Interties – Summary

Designation

- Similar to today:
 - Intertie where the majority of trade comes from one market participant
 - IESO has reasonable grounds to believe that a market participant controls the levels of transactions on an intertie
- Specific designation criteria will be determined in detailed design

Pricing

- Pricing rules on the intertie will address the following circumstances:
 - A congested intertie is derated prior to the DAM and the IESO pays significantly more to FTR-holders than it collects from traders
 - A congested intertie is derated after the DAM and the IESO is pays traders significant amounts to buy them out of their day-ahead positions
- Specific pricing rules will be determined in detailed design

Next Steps on Uncompetitive Interties

- In the July stakeholder session, the IESO will bring material that advances the discussion on:
 - Criteria for designation of uncompetitive interties
 - Criteria for when the price on uncompetitive interties will be mitigated
 - Methodology for what the price on uncompetitive interties will be when mitigated

Reference Quantities

Reference Quantity - Recap

Preliminary decision:

- All registered supply resources would offer or forecast a reference quantity reflective of their expected energy availability, and if capable, would offer a reference quantity reflective of their operating reserve ramp capability into the DAM
- Reference Quantity = Installed capacity less the most restrictive of outages or operating restrictions

Reference Quantity - Recap

- IESO requested input on the following:
 - What operating characteristics should be captured in defining the proposed definition for *pre-approved* operating restrictions
 - MW value or range
 - Time when these restrictions are in force
 - Issues with implementing a range-based reference quantity
- One of the goals of this request was to inform whether or how much pre-approved operating limits would increase the efficiency of assessing physical withholding (for market participants and for the IESO)

Reference Quantity – Existing Process

- As part of the existing Day-ahead Commitment Process (DACP), market participants must submit offers in the day-ahead timeframe in order to be able to offer in real-time
- The MWs that are offered into the DACP set the upper limit for the MWs that can be offered in real-time
- This day-ahead quantity is referred to as the Availability Declaration Envelope (ADE)
- The ADE provides advance information used by the IESO when assessing reliability in the day-ahead timeframe
- The IESO is considering whether to retain the use of the ADE in the context of reliability

Reference Quantity - Preliminary Decision

1. The reference quantity would not amount to a strict obligation to come to market
 - The reference quantity will instead be used when conducting after-the-fact assessments of potential physical withholding
2. The impact of operating restrictions on reference quantities will be evaluated ex-post on a case-by-case basis
 - Making ex-ante assessments of appropriate reference quantities would not be efficient
 - There were frequent cases when these operating limits potentially overlapped. Some operating restrictions applied only during certain conditions
 - Assessing which operating restrictions were in force at any given time may be overly burdensome to both the IESO and market participants

Reference Quantity – Next Steps

- The IESO will determine whether to retain the existing ADE for the purpose of assessing reliability

Summary: Economic Withholding and Other Mitigation Topics

Global mitigation

When system-wide constraints are expected to bind, the IESO will test for system-wide market power

Uneconomic production:

The IESO will only mitigate uneconomic production when certain conditions are met (congestion, conduct and impact)

Uncompetitive Interties:

Interties which have been designated as uncompetitive will apply pricing rules in day-ahead and real-time to prevent the exercise of market power

Summary: Consideration for Physical Withholding

Reference
Quantities

The impact of operating restrictions on reference quantities will be evaluated ex-post on a case-by-case basis

Next Steps - Market Power Mitigation

At the July stakeholder session, the IESO will present:

- Materials that advance the discussion on how the IESO could designate uncompetitive interties and pricing rules for those interties
- Discussion regarding the principles that could be used to determine the conduct and impact thresholds
- Preliminary decisions on:
 - Cost-based reference levels
 - Retention of the ADE

Feedback on today's materials is requested to be submitted by June 21st