

Improve Accessibility of Operating Reserve (OR)

Webinar – July 31, 2019

Agenda

- Recap of first webinar
- Review stakeholder feedback and IESO response
- Discussions with other ISOs
- Potential solutions and evaluation framework
- Next steps

Today's Objective

- Present proposed solutions to the Operating Reserve (OR) accessibility issue
- Present the proposed framework for evaluating the potential solutions to the issue
- Seek stakeholder feedback on the proposed solutions and the evaluation framework

Recap of First Webinar

Objectives of April 10 Webinar

- Ensure stakeholders understand OR and its role in maintaining grid reliability
- Explain the issue with OR providers not fully delivering the amount of OR they are scheduled for during an OR activation (ORA)
- Gather stakeholder feedback to understand the underlying causes of the issue

Stakeholder Feedback – April 10th Webinar

Performance to Industry Standards

Stakeholder Feedback:

- The IESO is allowed to carry the minimum amount of reserve required by NPCC due to its success responding to disturbances on the grid. This is an indication that although there are some issues related to the amount of OR accessible, the IESO is performing very well compared to industry standards.

IESO Response:

- *The IESO's success in recovering from disturbances is a result of over-activating OR. This is done with the understanding that activated resources do not always fully provide the incremental energy equal to the OR quantity activated. On average, the IESO activates 29% (~80 MW) above the contingency amount.*

Comparison to Neighbouring Jurisdictions

Stakeholder Feedback:

- According to PJM's 2018 Synchron Reserve Performance Report, PJM achieved only 54% response from Tier 1 (headroom) resources and 92% response from Tier 2 (scheduled) resources. How does the IESO's reserve market compare to its peers?

IESO Response:

- *The IESO has reached out to neighbouring jurisdictions to better understand their reserve markets and compare performance metrics. These discussions have been summarized on slides 13 – 14.*

Dispatchable Loads Exemptions

Stakeholder Feedback:

- The OR performance of dispatchable loads may be impacted by the following exemptions and should be considered when developing potential solutions:
 - Batch loads that are down for several intervals every hour are allowed to continue providing OR in a derated fashion
 - Dispatchable loads are unable to derate their facilities within the dispatch hour due to IESO tools and must manage changes through energy bids and OR offers

IESO Response:

- *Exemptions were not considered in the IESO's initial performance analysis, but exemptions are now being taken into account in the development of proposed solutions*

Compliance Aggregation Setup

Stakeholder Feedback:

- Potential solutions are strongly recommended not to amend the current setup of compliance aggregations

IESO Response:

- *The IESO is not looking to make any changes to compliance aggregation* as it relates to this issue*

*Compliance aggregation allows participants to group (aggregate) interdependent generators and satisfy dispatch instruction by spreading total MW requirement across multiple facilities.

Potential Solutions to Consider

Stakeholder Feedback:

- Take an education based approach (e.g. issue a Quick Take on OR)
- Update tools to allow dispatchable loads to de-rate during the dispatch hour
- Take compliance deadband into account when scheduling OR
- Tighten the compliance deadband

IESO Response:

- *The IESO would like to thank all stakeholders who provided feedback on potential solutions. These suggestions have been considered in developing the proposed solutions where applicable.*

OR Jurisdictional Scan

Observations From Other ISOs

- IESO reached out to MISO, PJM and NYISO
- No manual actions taken by other ISOs with regards to OR accessibility as it does not appear to be an issue significantly impacting these jurisdictions for various reasons:
 - Financial disincentives for non-performance (PJM)
 - Dynamic deadbands derived from dispatch instructions (MISO, PJM)
 - Tools allow for accurate reserve scheduling and dispatching (MISO, PJM)

Other ISO OR performance

MISO	PJM	NYISO
<p>ORA Response: 95.7% response rate since January 2009</p> <p>ORA response is considered successful by satisfying any of the following measures:</p> <ul style="list-style-type: none"> • Output at the end of ORA \geq ORA Dispatch Target • Incremental change at the end of ORA \geq Change in dispatch instructions • Output at the end of ORA \geq Expected Output (tool calculated) • Incremental change at the end of ORA \geq Expected Change (tool calculated) <p>Deadband:</p> <ul style="list-style-type: none"> • Derived from set point and ramp rates 	<p>ORA Response:</p> <p>Tier 1 Reserve* response is tracked on amount of estimated headroom injected as energy</p> <ul style="list-style-type: none"> • 60.1% of estimated headroom provided in 2017 during contingency events <p>Tier 2 Reserve* response is successful if the resource's output reaches its dispatch target within 10 minutes</p> <ul style="list-style-type: none"> • Financial penalty for failing to successfully respond • 87.6% successful response rate in 2017 <p>Deadband:</p> <ul style="list-style-type: none"> • 10% of dispatch instruction 	<ul style="list-style-type: none"> • No performance metrics available but stated they do not experience the issue of fully accessing scheduled OR

*Tier 1 Reserve

Estimated headroom available from online (synchronized) resources. No stand by payments

*Tier 2 Reserve

Scheduled reserve with standby payments to cover shortfall in Tier 1 reserve. Only activated for larger contingencies

Proposed Solutions and Evaluation Framework

Defining the Problem

- When activating OR, the IESO is frequently seeing a decrease in energy consumption and/or an increase in energy injected that is less than the quantity activated. This has led to reliability concerns and market inefficiencies including:
 - Challenges in recovering the supply-demand balance after a system event
 - Scheduling and compensating resources that are unable to provide the incremental change the IESO requires from an OR activation;
 - Potentially not selecting resources otherwise capable of providing that product.

Proposed Solutions to Address Issue

Option 1
Market Rule
Amendments

Option 2
Modify ORA
Dispatch Signal

Option 3
Enhancing OR
Scheduling and
Dispatching

Option 1- Market Rule Amendments

- Review/revise the market rules/market manuals
 - ORA performance will be based on incremental energy provided during activation while taking market rule exemptions for dispatchable loads into consideration
- Implement market rule changes to enable an after-the-fact settlement process to claw back OR payment for inaccessible OR
 - The inaccessible OR will be calculated as the amount of MW that cannot be delivered if the scheduled OR was activated
 - Market rule exemptions for dispatchable loads will be taken into consideration when calculating the claw-back

Option 1 – OR Payment Claw-back

- The claw-back process is triggered
 - For generators, if the difference between a resource's output and its maximum capability* is less than the OR scheduled
 - For dispatchable loads, if the consumption is less than OR scheduled
- The claw-back amount is calculated based on the difference between the resource's output/consumption and its energy schedule

*Maximum capability is determined based on a resource's maximum energy offer/bid while factoring in any known de-rates

Option 1 – OR Payment Claw-back Example

	Maximum Capability	Energy Schedule	OR Schedule	Output/Consumption	Compliance Deadband	Proposed Claw-back Payments base MW amount
Gen.	200	100	50	110	±15	0
	200	100	50	90	±15	0
	150	100	50	110	±15	10
	150	100	50	90	±15	0
Disp. load	200	100	100	90	±15	10
	200	100	100	110	±15	0
	100	100	100	90	±15	10

Option 1 – Impacts

- Reduces the risk of inaccessible OR, but does not completely eliminate it
- Drives efficient market behaviour
- Requires changes to IESO settlement processes
- No tool changes are required
- Requires market rule changes
- Requires monitoring of revised ORA performance requirements

Option 2 – Modify ORA Dispatch Signal

- ORA dispatch change: Modify ORA dispatch targets to account for the resource's output/consumption at the time of the activation
- Review/revise the market rules/market manuals (same as Option 1)
 - ORA performance will be based on incremental energy provided during activation while taking market rule exemptions for dispatchable loads into consideration
- Implement market rules changes to enable an after-the-fact settlement process to claw back OR payments for inaccessible OR (same as in Option 1)

Option 2 - Example (Existing vs Proposed)

	Max Capability	Energy Schedule	Output/consumption at the time of activation	Compliance Deadband	OR schedule	Existing ORA dispatch target	Proposed ORA dispatch target
Gen	200	100	110	±15	50	150	160
	200	100	90	±15	50	150	140
	150	100	110	±15	50	150	150
	150	100	90	±15	50	150	140
Disp. loads	200	100	100	±15	100	0	0
	200	100	110	±15	100	0	10
	100	100	100	±15	100	0	0
	100	100	90	±15	100	0	0

This is an example of one possible scenario

Generator: OR economic offer = 50 MW

Dispatchable load: OR economic bid = 100 MW

Option 2 - Impacts

- Reduces the risk of inaccessible OR, but does not completely eliminate it
 - Only enables the IESO to fully access the scheduled OR when the resources have sufficient headroom
- Drives efficient market behaviour
- Requires changes to IESO settlement processes
- Requires changes to IESO dispatch tool

Option 2 – Impacts (continued)

- Will be challenging and costly to implement
 - Significant changes to the IESO tools
 - Substantial IESO resource commitment required and will conflict with other ongoing IESO priorities
 - Lengthy implementation time
- May not be aligned with the Market Renewal Program (MRP)
 - MRP implementation may render these changes obsolete
- Requires market rule changes
- Requires monitoring of revised ORA performance requirements

Option 3 - Enhancing OR Scheduling & Dispatching

- **OR scheduling change:** Modify scheduling tool to only schedule OR that can be accessed by accounting for the flexibility available to OR providers through compliance dead-band:
 - When scheduling OR, OR providers will be assumed to be at the upper range of their compliance deadband for generators and lower range of the compliance deadband for dispatchable loads

Option 3 - Enhancing OR Scheduling & Dispatching (continued)

- **ORA dispatch change:** Modify ORA dispatch targets to account for the resource's output/consumption at the time of the activation
- Explore the potential to update tools to enable dispatchable loads to derate in real-time
- Develop a process to claw back Congestion Management Settlement Credits(CMSC) payments as inaccessible OR may still get scheduled in the unconstrained sequence (market schedule)

Option 3 - Example (Existing vs Proposed)

	Energy Schedule	Output at the time of activation	Compliance Deadband	Existing OR schedule	Existing ORA dispatch Target	Proposed OR schedule	Proposed ORA dispatch Target
Gen	100	110	±15	50	150	35	145
	100	90	±15	50	150	35	125
Disp. Loads	100	90	±15	100	0	85	5
	100	100	±15	100	0	85	15

Further details of the example can be found in the Appendix

Generator: OR economic offer = 50 MW
 Dispatchable loads: OR economic bid = 100 MW

Option 3 – Impacts

- Schedules accessible OR only thereby reducing IESO's reliability risk
- Ensures that scheduled OR is fully accessible during activation
- Does not drive efficient market behaviour
- Requires changes to IESO scheduling and dispatch tools

Option 3 – Impacts

- Will be challenging and costly to implement
 - Significant changes to the IESO tools
 - Substantial IESO resource commitment required and will conflict with other ongoing IESO priorities
 - Lengthy implementation time
 - Complex CMSC claw-back process
- May not be aligned with OR scheduling and settlement in the Market Renewal Program (MRP)
 - MRP implementation will render these changes obsolete

Summary of Proposed Solutions

	OR Scheduling	OR Activation	After-the-Fact Corrections
Market Rule Amendments (Option 1)	No change	Revise ORA performance	Claw-back of OR payment
Modify ORA Dispatch Signal (Option 2)	No change	<ul style="list-style-type: none"> Dispatch tool change Revise ORA performance 	Claw-back of OR payment
Enhancing OR Scheduling and Dispatching (Option 3)	Scheduling tool Change	Dispatch tool change	Claw-back of OR CMSC

Proposed Evaluation Framework

To assist with reviewing the benefits and challenges of each option, the IESO plans to measure options against a set of evaluation criteria

Proposed criteria identified by the IESO

Reliability

- Ability to reduce/eliminate reliability risk associated with inaccessible OR

Market Efficiency

- Meeting OR needs cost-effectively
- Addressing Market Surveillance Panel (MSP) recommendations

Implementability

- Complexity of the solution and its impact on IESO and MP processes
- Dependencies with other IESO initiatives

Compliance Monitoring

- Ability to measure and monitor compliance

Request for Stakeholder Feedback

- Stakeholder feedback requested on proposed solutions and evaluation framework
- Questions to consider when providing feedback on proposed solutions:
 - Any other options/parameters that the IESO should consider?
 - Please provide context along with your comments
- Questions to consider when providing feedback on framework to evaluate solutions:
 - Is there any other evaluation criterion that the IESO should consider?
 - Is there any evaluation criterion that is not appropriate to evaluate these solutions?

Next Steps

- Please submit your feedback to engagement@ieso.ca using the feedback form on the Improving Accessibility of OR webpage
- Feedback due by August 15, 2019
- IESO will review and respond to stakeholder feedback by September 13, 2019
- IESO will propose the recommended solution and implementation strategy at the next engagement meeting in Q4 2019

Appendix

Option 3 Example

Generator:

Energy schedule = 100 MW, OR economic offer = 50 MW, Actual output = 110 MW, Compliance deadband = ± 15 MW

- Proposed OR schedule:
 $50 - 15 = 35$ MW
- Proposed dispatch target:
 $110 + 35 = 145$ MW

Dispatchable Load:

Energy schedule = 100 MW, OR economic bid = 100 MW, Actual output = 90 MW, Compliance deadband = ± 15 MW

- Proposed OR schedule:
 $100 - 15 = 85$ MW
- Proposed dispatch target:
 $90 - 85 = 5$ MW

Relevant Information

Compliance Aggregation:

<http://www.ieso.ca/-/media/Files/IESO/Document-Library/training/QT-Compliance-Aggregation.pdf>

Interpretation Bulletins:

<http://www.ieso.ca/en/Sector-Participants/Market-Oversight/Enabling-Compliance/Interpretation-Bulletins>

IESO Training Guide – Guide to Operating Reserve:

<http://www.ieso.ca/-/media/Files/IESO/Document-Library/training/ORGuide.pdf?la=en>