

# Improving Accessibility of Operating Reserve (OR)

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April 10, 2019

# Engagement Objective for April 10

- The IESO will discuss with stakeholders:
  - What is Operating Reserve (OR)
  - Issue with fully receiving the OR scheduled
- The IESO is seeking feedback on the underlying causes of the issue

# Agenda

- Today's meeting will cover:
  - Stakeholder engagement plan
  - Operating Reserve (OR) 101
  - What is the issue?
  - IESO analysis
  - Summary of findings
  - Next steps

# Stakeholder Engagement Plan

- Engagement Objectives
  - Ensure stakeholders understand the importance of OR in maintaining grid reliability and how this issue could impact the reliability of the grid
  - Gather feedback from stakeholders to understand the underlying causes of the issue
  - Develop solutions with stakeholders on how to address the issue
- Opportunities for Feedback
  - Written feedback on material discussed today due by April 25
  - Additional webinars/meetings to be held until solution is finalized, as outlined in engagement schedule

# Stakeholder Engagement Plan - Schedule

Timing	Engagement Activity
April 10, 2019	Webinar to kick-off engagement <ul style="list-style-type: none"><li>• Discuss the issue with stakeholders and solicit initial feedback on the proposed engagement approach.</li></ul>
April 11 – 25, 2019	Formal feedback period to gather initial feedback from stakeholders on underlying causes of the issue.
July, 2019	Webinar/meeting to address feedback from stakeholders and to propose potential solutions to address the issue.
Two-week comment period after webinar/meeting	Formal feedback period on solutions proposed by the IESO.
September, 2019	Webinar/meeting to address any outstanding stakeholder feedback or concerns and finalize the solution.

# Operating Reserve (OR)

- Having enough energy to meet demand is an important part of reliability. Although we always schedule sufficient generation to meet demand, unplanned events can upset the balance of supply and demand. Such contingencies could include:
  - A sudden, unexpected increase in demand
  - A generation loss, or when several generators are unable to follow their dispatch instructions
  - The loss of a transmission element, which removes generation or results in a more restrictive operating limit that makes supply unavailable

# Operating Reserve (OR)

- Operating Reserve (OR) is standby supply (imports, generation or demand reduction) that the IESO can quickly call upon in the event of an unexpected mismatch between generation and consumption
- If a contingency occurs, OR is activated, quickly re-establishing the balance between supply and demand.

# Operating Reserve (OR)

- OR requirements are established by the IESO based on industry reliability standards
- Regulatory standards set the amount of OR the IESO must schedule and the associated performance requirements
  - North American Electric Reliability Corporation (NERC) Standard *BAL-002*
  - Northeast Power Coordinating Council, Inc. (NPCC) *Regional Reliability Reference Directory #5*
- The standards require us to carry sufficient OR such that we can restore the supply/demand balance following an event on the system within prescribed timelines



# Operating Reserve (OR)

- There are three classes of operating reserve
  - 10 minute spinning (10S)
  - 10 minute non-spinning (10NS)
  - 30 minute (30R)
- We must have enough 10 minute reserve to cover our single largest contingency
  - 25% of the requirement must be met from units already synchronized to the grid
  - 75% of the 10-minute reserve requirement *can* come from units that are not synchronized to the grid
- We must have enough 30 minute reserve to cover half of our next largest contingency
  - 30-minute reserve requirement *can* come from units that are not synchronized to the grid

# Operating Reserve (OR)

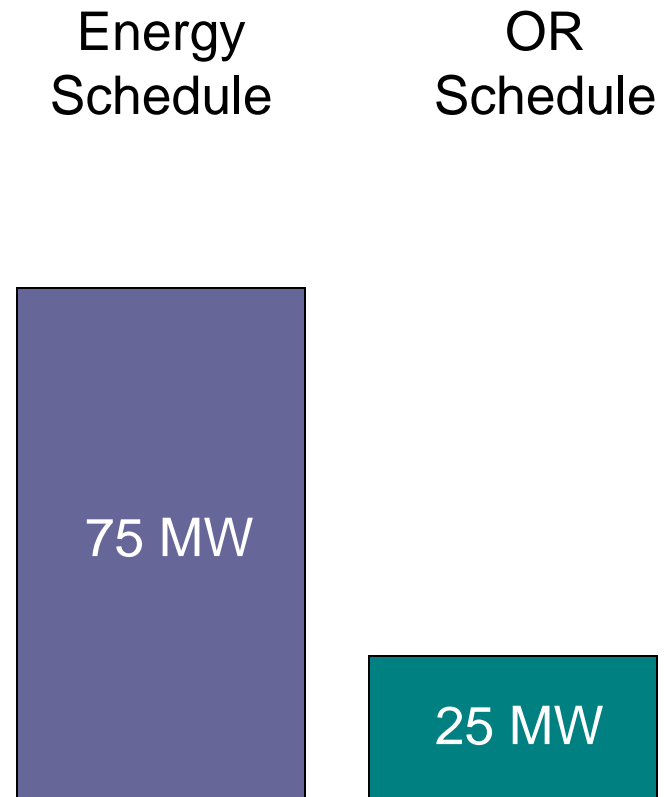
- OR is competitively acquired through the OR markets where a price is set for each class of operating reserve based on OR requirements and bid/offer prices
- The cost of OR is recovered through market uplifts (charged to loads and exports)

# OR Activation (ORA)

- When the IESO needs to activate OR, the scheduled OR resources are activated based on their energy bid/offer price, from lowest to highest
- During ORA, the scheduled OR participants must provide the energy within the time period for the product activated:
  - If activated for 10-minute reserve, a facility has 10 minutes to provide the energy
  - If activated for 30-minute reserve, a facility has 30 minutes to provide the energy
- ORA is sent as an energy dispatch instruction where a supplier is dispatched up or consumer is dispatched down, based on their energy dispatch prior to the activation
- The participant must be able to sustain the supply of operating reserve energy for at least one hour

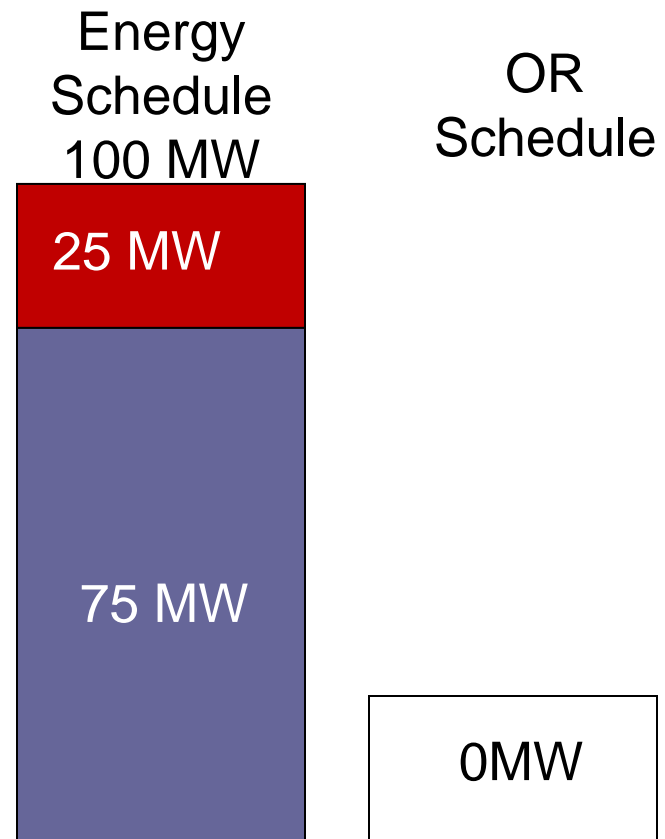
# ORA Example - Generators

- Generator offered:
  - 100 MW of energy
  - 100 MW of 10-minute spinning OR
- Scheduled to 75 MW of energy and 25 MW of 10-minute spinning OR



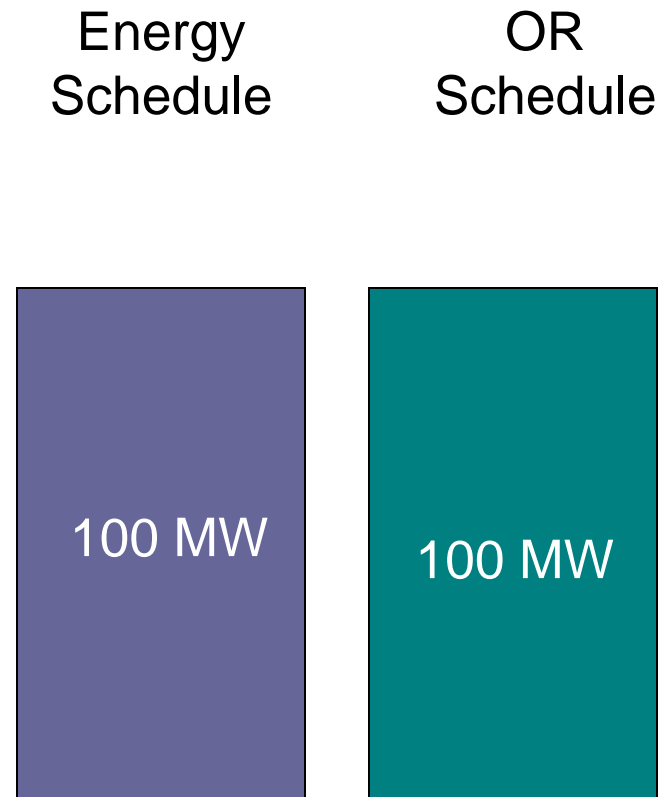
# ORA Example - Generators

- If activated for all 25 MW of OR, generator receives:
  - An energy dispatch instruction moving them from 75 MW to 100 MW
  - A 10-minute spinning OR schedule of 0 MW
- The IESO receives the change of 25 MW energy from the generator



# ORA Example - Loads

- Load offered:
  - 100 MW of energy
  - 100 MW of 10-minute spinning OR
- Scheduled to 100 MW of energy and 100 MW of 10-minute spinning OR



# ORA Example - Loads

- If activated for all 100 MW of OR, load receives:
  - An energy dispatch instruction moving them from 100 MW to 0 MW
  - A 10-minute spinning OR schedule of 0 MW
- The IESO receives the change of 100 MW energy from the load

Energy  
Schedule

OR  
Schedule

0MW

0MW

# What is the Issue?

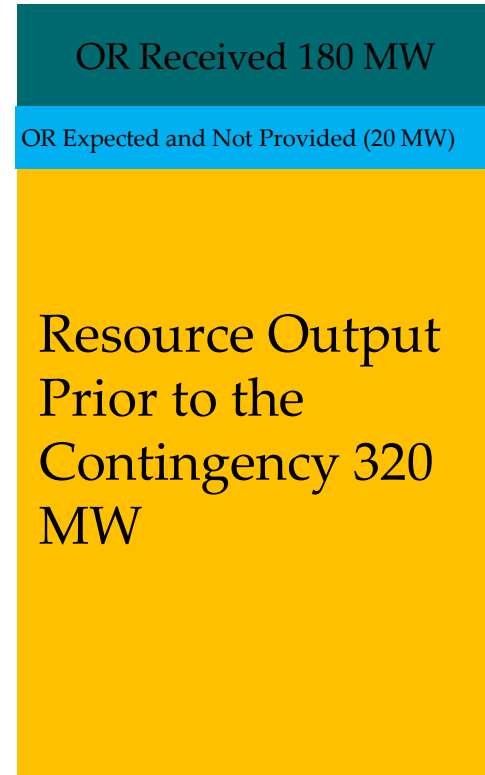
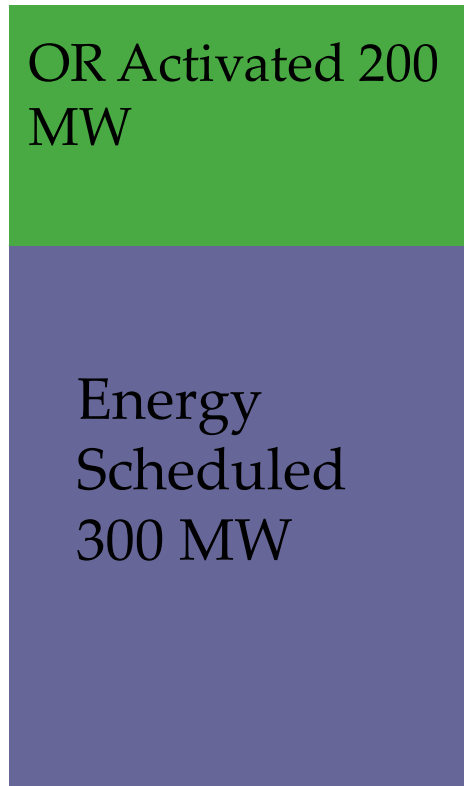
- When activating OR, the IESO is frequently seeing a change in energy (a decrease in energy consumption and/or an increase in energy production) that is less than the quantity activated
  - This can be caused by a resource operating off their energy dispatch target prior to OR activation (that is, within their compliance deadband, as permitted by the Market Rules)



# What is the Issue?

- The IESO is not receiving the full amount of scheduled OR when OR is activated
  - The amount of energy provided is affected by where the resource is loaded preceding the activation
  - Any deviation from the dispatch instruction preceding the activation results in a difference between the **amount of OR scheduled** and the **energy that is actually provided when OR is activated**

# Example:



Total energy dispatch following OR activation is 500 MW

20 MW of OR not provided

# Impact

- Causes challenges in recovering the supply-demand balance after a system event
  - Failure to recover the supply/demand balance can result in:
    - Reliability implications as the system may collapse and cause blackouts
    - Penalties imposed on the IESO in the form of increased synchronized reserve requirements for not recovering the system after an event in a timely manner
- Compensates resources that have not fully delivered the required energy during ORA
  - As identified in the Market Surveillance Panel report dated May 8, 2017
- Requires IESO to take additional actions to maintain reliability (such as activating more OR than the contingency amount)

# Historical Analysis of the Issue

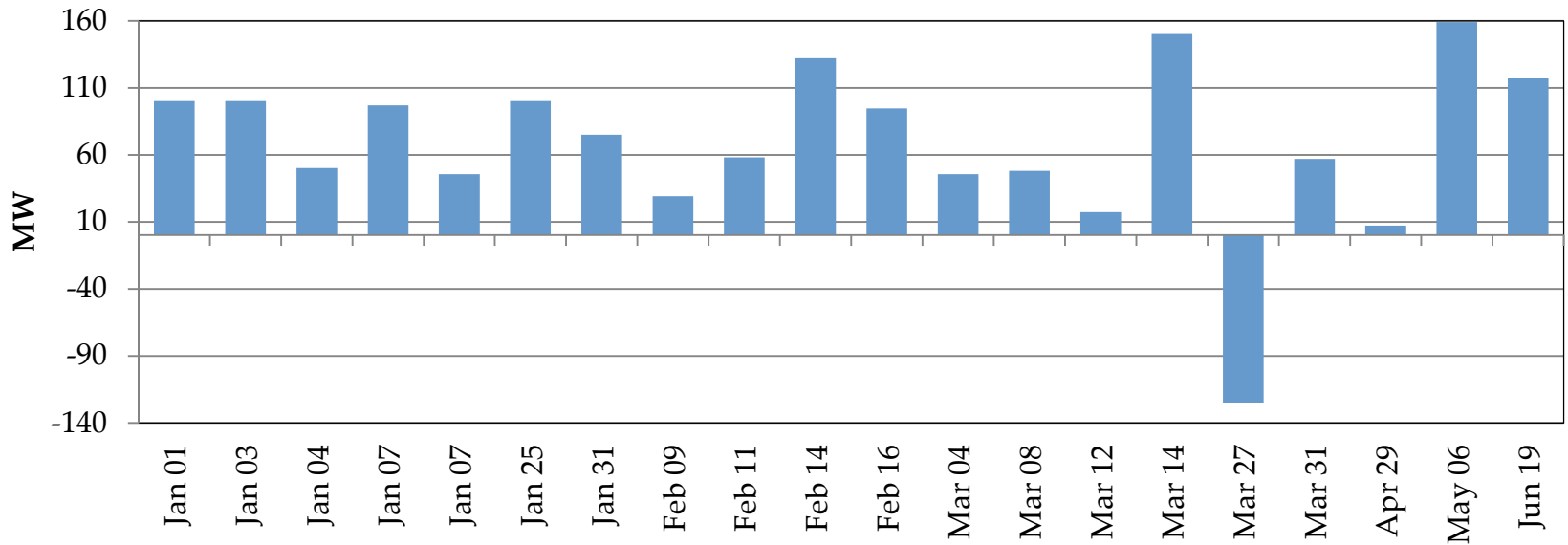
- Time frame studied: January 1 to June 30, 2018
- Focus of historical analysis:
  - OR activations
  - OR performance

# Historical Analysis of the Issue

- Analysis:
  - Determined the magnitude of each contingency
  - Determined the amount of OR activated
  - Determined the energy received following the OR activation
- Results:
  - Energy received following an OR activation is often less than the quantity activated.
  - The IESO consistently activates OR in excess of the magnitude of the contingency. This action is necessary to restore the supply/demand balance following a system event to ensure reliability.

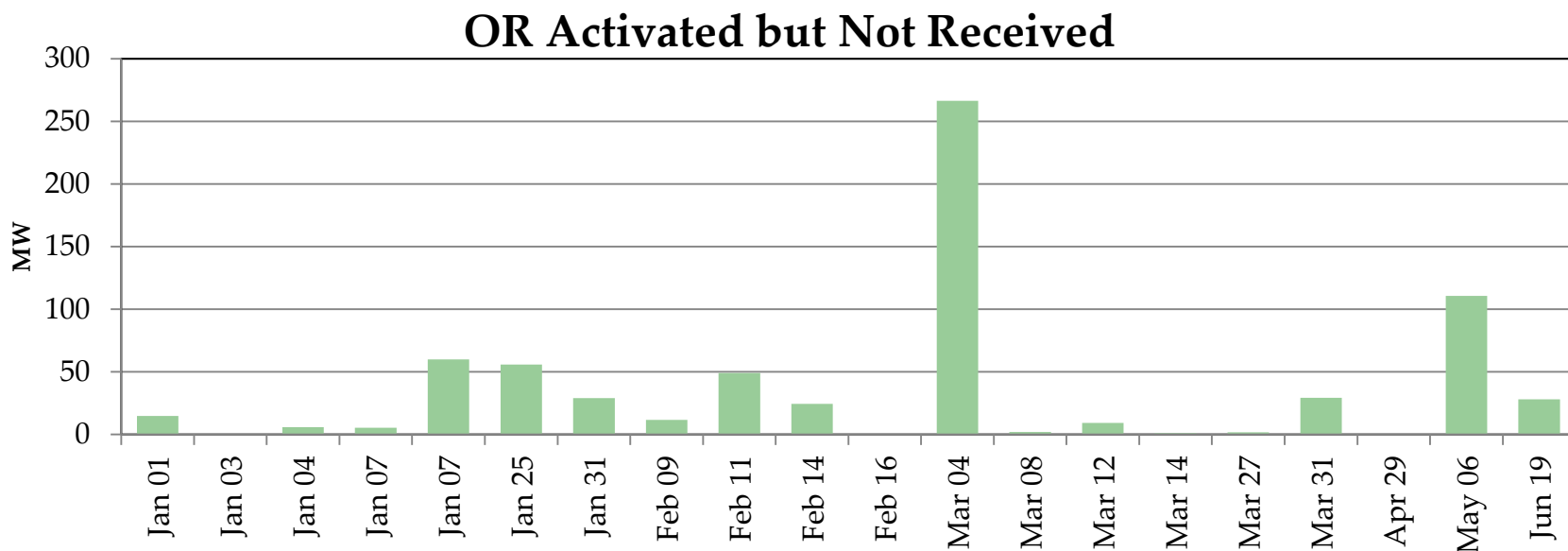
# Historical Analysis of the Issue

## OR Activated Above Contingency Amount



- In 95% of OR activations, the IESO activated more OR than the contingency amount
- The amount of OR activated was **on average** approximately 80 MW or 29% above the contingency amount

# Historical Analysis of the Issue



- In 70% of the activations, the energy received after 10 minutes was less than the amount of OR activated (the average activated OR was approximately 350 MW)
- Average OR activated but not received was about 45 MW (about 12% of the average activated)

# OR Performance - Historical

- For dispatchable generators, on average
  - 13% of OR scheduled (**MW**) was inaccessible
  - 61% of the time OR was scheduled, there was inaccessible OR
- For dispatchable loads, on average
  - 25% of OR scheduled (**MW**) was inaccessible
  - 53% of the time OR was scheduled, there was inaccessible OR



# Summary of Findings

- The IESO often activates OR in excess of the size of the contingency because of lack of confidence that the full amount of OR activated will be provided
- The full quantity of scheduled OR is often not accessible due to dispatchable generators or loads producing above or consuming below their energy dispatch target while scheduled for OR. As a result, when activated to a dispatch target, we are seeing less energy delivered than expected
- Flexibility for resources to operate within their compliance deadband creates unintended challenges in the OR market

# Next Steps

- Stakeholders are encouraged to provide feedback on:
  - Any underlying issues/context that prevent OR providers from fully delivering scheduled OR during an activation
  - Further information that may be needed to begin discussing potential solutions
- Written feedback should be submitted to [engagement@ieso.ca](mailto:engagement@ieso.ca) by April 25, 2019

# Next Steps

- In a subsequent meeting or webinar, the IESO will:
  - Review initial stakeholder feedback received by April 25
  - IESO to propose potential solutions to address the issue