

# Improving Accessibility of Operating Reserve

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Webinar – March 30, 2020

# Agenda

- Recap of last webinar
- Review stakeholder feedback and IESO response
- Present detailed design of proposed solution
  - Operating Reserve (OR) settlement claw-back
- Implementation timelines for the OR settlement claw-back
- Update on the OR performance measurement criteria - incremental energy change during OR activations (ORA)
- Next steps

# Objective

- Present the detailed design and seek feedback from stakeholders on the OR settlement claw-back
- Provide an update on the OR performance measurement criteria – incremental energy change during ORAs

# Recap of the last Webinar

# December 10<sup>th</sup> Webinar

- Reviewed the evaluation of the proposed options to address the OR accessibility issue based on the evaluation framework
- Presented the high level design of the recommended solution to address the OR accessibility issue, including:
  - The steps required to implement the changes for ORA performance to be based on incremental energy provided
  - An after-the-fact settlement process to claw-back OR payments for inaccessible OR

# December 10<sup>th</sup> Webinar

- Requested feedback from stakeholders on the recommended solution
- The deadline for stakeholder feedback was January 10, 2020
- The summary of the feedback received and the IESO response are provided in the following slides

# Stakeholder Feedback – December 10<sup>th</sup> Webinar

# Stakeholder Feedback and IESO Response

- **Stakeholder Feedback:**

- Stakeholders recommend the IESO make dispatch tool changes to determine the amount of incremental energy required during an ORA event and translate this to the ORA dispatch target amount for respective generators and dispatchable loads (DLs)
- The dispatch instructions should include the final expected output which will ensure the ORA dispatch instructions are clear and allow Market Participants (MPs) to focus on delivering the incremental energy
- The IESO should determine that a MP is compliant with an ORA utilizing the following condition: the volume from the ORA is equal or greater than the difference between energy output (10 or 30 minutes – dependent on OR product) less the energy output (at the time of the ORA)



# Stakeholder Feedback and IESO Response

- **IESO Response:**

- The IESO intends to have further discussions with stakeholders before finalizing the proposed design for the ORA performance measurement criteria. Ultimately, the design will be informed by stakeholder input while striking a balance with the following factors:
  - IESO believes that changing IESO tools might not drive the desired MP behaviour, i.e. following energy dispatch instructions
  - The IESO will ensure OR participants have the necessary information to respond to the incremental energy requirement during ORAs
  - Compliance with ORA will be determined based on both the incremental energy provided and meeting the ORA dispatch target
  - Changing the IESO tools requires a substantial IESO resource commitment which may conflict with other ongoing priorities and will involve lengthy implementation time

# Stakeholder Feedback and IESO Response

- **Stakeholder Feedback:**
  - Before the proposed ORA performance requirements are implemented, there needs to be a comprehensive review of the compliance deadband
- **IESO Response:**
  - The IESO acknowledges that the compliance deadband is related; however, any changes to it are not anticipated as part of this stakeholder engagement

# Stakeholder Feedback and IESO Response

- **Stakeholder Feedback:**

- One stakeholder expressed general support for the proposed design of the OR claw-back mechanism with request for an opportunity to comment on the detailed design
- When drafting the detailed design of the claw-back mechanism, MPs should be provided information regarding what granularity and detail the IESO will be using to facilitate claw-back of OR payments for inaccessible OR

- **IESO Response:**

- Detailed design of the OR settlement claw-back is covered in slides 17 to 25 for stakeholder review

# Stakeholder Feedback and IESO Response

- **Stakeholder Feedback:**

- Should failures occur as a result of a force majeure, or unplanned operational event, the MP should not be subject to a non-compliance investigation and sanctions from MACD, particularly if the IESO had been properly notified by the MP of the operational deviation

- **IESO Response:**

- The proposed changes do not impact the existing principles of compliance investigation and sanctions

# Stakeholder Feedback and IESO Response

- **Stakeholder Feedback:**

- The IESO should consider introducing a deadband for accessible OR

- **IESO Response:**

- The IESO believes that adding a deadband would work against the objective of this stakeholder engagement to improve OR accessibility and may not drive the desired MP behaviour

# Stakeholder Feedback and IESO Response

- **Stakeholder Feedback:**

- The IESO should allow MPs to enter a minimum and maximum level of energy (i.e. range) to which OR can be provided

- **IESO Response:**

- The IESO believes that this will not drive the desired MP behaviour
- In addition, this proposal requires significant changes to IESO tools and will involve lengthy implementation time which may conflict with other ongoing IESO priorities

# Stakeholder Feedback and IESO Response

- **Stakeholder Feedback:**

- The IESO should implement exceptions to the claw-back mechanism for inaccessible OR. For example, an exception can be applied when incremental energy requested by the IESO through ORA dispatch has been met

- **IESO Response:**

- The proposed after-the-fact OR settlement claw-back:
  - will not be triggered by activation but by OR schedule and current energy output/consumption, and calculated on an interval basis
  - will not change the current OR activation claw-back for ORA failures, as per the existing market rules

# Detailed Design of the Proposed Solution – OR Settlement Claw-back Mechanism



# OR Settlement Claw-back

- The proposed OR settlement claw-back mechanism will ensure the IESO is receiving the OR service that it is procuring
- The proposed OR settlement claw-back:
  - is not triggered by activation but by differences between the OR schedule and current energy output/consumption, and calculated on an interval basis
  - specifically targets OR that is inaccessible to the IESO
- Any failure to provide the activated OR would be a compliance issue independent of the proposed settlement claw-back. MPs may still be subject to compliance assessment by the MACD

# OR Standby Payment Claw-back – DLs

- The IESO has completed its assessment of existing market rule exemptions granted to DLs to assess the impact of these exemptions on proposed OR settlement claw-back and has determined that in general, the existing market rule exemptions do not preclude the IESO from applying the proposed OR settlement claw-back on DLs with market rule exemptions

# OR Standby Payment Claw-back Details

- Standby payments will be adjusted based on the OR that cannot be accessed
- **Total accessible OR** for all OR classes will be calculated as follows:
  - For generators: the difference between a resource's output and its maximum capability
    - Maximum capability is determined based on a resource's maximum energy offer/bid while factoring in any known de-rates
  - For loads: actual consumption
    - Allocated quantity of energy withdrawn (AQEW) for each interval
- Total accessible OR will be counted towards OR providers' scheduled reserve in the following order:
  1. 10-minute spinning (10S)
  2. 10 minute non-spinning (10N)
  3. 30 minute non-spinning (30R)

# OR Standby Payment Claw-back Details

- **Total inaccessible OR** is calculated as the difference between total OR scheduled for all classes and total accessible OR for all classes
  - Claw-back is triggered when the total inaccessible OR is greater than 0
- **The accessible OR for each class** will be calculated on an interval basis in the following order:
  1. Total inaccessible OR will be subtracted from OR constrained schedules for 30R;
  2. Then the remaining inaccessible OR will be subtracted from OR constrained schedules for 10N;
  3. Then the remaining inaccessible OR will be subtracted from OR constrained schedules for 10S.

# OR Standby Payment Claw-back Details

- OR standby payment claw-back for each OR class is calculated as follows:
  - The difference between the OR standby payment for each OR class received and the OR standby payment calculated based on accessible OR for each class
- More illustrative examples of OR standby payment claw-back are provided in Appendix A

# OR Standby Payment Claw-back – Example

Example for generators: claw-back applies to all OR classes

Energy		Output	Total OR Sched.	Total Accessible OR	Total Inaccessible OR	10S			10N			30R					
						MCP	Schedule	Standby Payment	MCP	Schedule	Standby Payment	MCP	Schedule	Standby Payment			
Max. Capability	Sched.					DSO*	42	\$1260		DSO*	2	\$40		DSO*	6	\$60	
150	100	110	50	40	10	\$30	Acce.^	40	\$1200	\$20	Acce.^	0	\$0	\$10	Acce.^	0	\$0

- \*DSO: Constrained OR schedules for each class: 10S=45 MW, 10N=2MW, 30R=6 MW
- Total OR Sched. = 10S + 10N + 30R = 42+2+6=50 MW
- Total Accessible OR = Maximum capability – output=150-110=40 MW
- Total Inaccessible OR= Total OR scheduled - Total Accessible OR = 50 -40 =10 MW
- ^Acce.: Accessible OR for each class:
  - Accessible OR for 30R = OR scheduled for 30R –Total inaccessible OR = 6-10= -4<0, then accessible OR for 30R = 0
  - Remaining inaccessible OR=10-6=4
  - Accessible OR for 10N = OR scheduled for 10N – remaining inaccessible OR =2-4=-2<0, then accessible OR for 10N = 0
  - Remaining inaccessible OR =10-6-2=2
  - Accessible OR for 10S = OR scheduled for 10S- Remaining inaccessible OR =42-2=40

OR standby payment claw-back = sum of (OR standby payment for 10S, 10N & 30R) - sum of (OR standby payment calculated based on accessible OR for 10S, 10N & 30R) = (\$1260+\$40+\$60)-(\$1200+\$0+\$0)=\$160

# OR Standby Payment Claw-back - Example

Example for loads: claw-back applies to all OR classes

Energy	Consum.	Total OR Sched.	Accessible OR	Total Inaccessible OR	10S			10N			30R					
					MCP	Schedule	Standby Payment	MCP	Schedule	Standby Payment	MCP	Schedule	Standby Payment			
Constrained Schedule						*DSO	92	\$2760		*DSO	2	\$40		*DSO	6	\$60
100	90	100	90	10	\$30	Acce.^	90	\$2700	\$20	Acce.^	0	\$0	\$10	Acce.^	0	\$0

- \*DSO: Constrained OR schedules received by a MP for each class: 10S=92 MW, 10N=2MW, 30R=6MW
- Total OR Sched. = 10S + 10N + 30R = 92+2+6=100 MW
- Total Accessible OR = actual consumption = 90 MW
- Total Inaccessible OR = Total OR scheduled - Total accessible OR = 100 - 90 = 10 MW
- ^Acce.: Accessible OR for each class:
  - Accessible OR for 30R = OR scheduled for 30R - Total inaccessible OR = 6-10 = -4 < 0, then accessible OR for 30R = 0
  - Remaining inaccessible OR = 10-6 = 4
  - Accessible OR for 10N = OR scheduled for 10N - remaining inaccessible OR = 2-4 = -2 < 0, then accessible OR for 10N = 0
  - Remaining inaccessible OR = 10-6-2 = 2
  - Accessible OR for 10S = OR scheduled for 10S - Remaining inaccessible OR = 92-2 = 90

OR standby payment claw-back = sum of (OR standby payment for 10S, 10N & 30R) - sum of (OR standby payment calculated based on accessible OR for 10S, 10N & 30R) = (\$2760 + \$40 + \$60) - (\$2700 + \$0 + \$0) = \$160

# OR Standby Payment Claw-back - Compliance Aggregation

- Resources that are in a compliance aggregate will be treated as one resource to determine the OR that cannot be accessed and OR settlement claw-back
- An illustrative example of the OR standby payment claw-back for resources in a compliance aggregate are provided in Appendix B



# OR Congestion Management Settlement Credits (CMSC) Claw-back:

- OR CMSC claw-back is calculated as the difference between the OR CMSC that was issued and the OR CMSC calculated based on the accessible OR
  - If the OR CMSC calculation based on the accessible OR resulted in less OR CMSC payment, the difference will be clawed back
  - If the CMSC calculation based on the accessible OR resulted in a higher OR CMSC payment, no OR CMSC will be clawed back
- This is based on the principle that a MP should not receive higher CMSC settlement when it is primarily caused by the MP not following their energy schedule
- Illustrative examples of the OR CMSC claw-back are provided in Appendix C

# OR CMSC Claw-back Implementation

- The IESO will conduct a cost-benefit analysis to determine whether to implement the OR CMSC claw-back at this time or revisit the claw-back when Market Renewal Program (MRP) is implemented. The IESO will take into consideration the following factors:
  - the materiality of OR CMSC involved
  - the implementation cost, complexity and timelines in light of MRP implementation in 2023

# OR Settlement Claw-back – Stakeholder Feedback

- Stakeholder feedback is requested on the detailed design of the OR settlement claw-back mechanism
  - Is the detailed design of the proposed solution clear and understandable?
  - Are there modifications to the design of the proposed solution that the IESO should consider?
- Please provide feedback to [engagement@ieso.ca](mailto:engagement@ieso.ca) by April 30, 2020

# OR Settlement Claw-back – Implementation Steps and Timelines

- Feedback received by April 30 will be considered in the final design of the OR settlement claw-back mechanism
- Detailed market rule changes, if required, will be presented at the next engagement meeting/webinar in Q2 2020 for stakeholder review and feedback
- Review feedback received, finalize the required market rule changes and complete the approval of any required market rule amendments through Technical Panel by Q3 2020
- Seek approval from the IESO Board on any required market rule amendments by Q4 2020

# Proposed OR Performance Measurement Criteria- Incremental Energy Change during ORA

# Proposed OR Performance Measurement Criteria

- When MPs receive an ORA dispatch, they will need to compare the ORA dispatch to their previous energy dispatch to determine the incremental amount of energy they are required to provide
  - In some instances, when MPs are utilizing their deadbands, they may need to increase their outputs above (for generators) or reduce their consumption below (for DLs) their ORA dispatch targets in order to provide the incremental energy required to comply with the ORA
- MPs must provide both the incremental energy and meet their ORA dispatch targets (at or above the targets for generators and at or below the targets for DLs) to be compliant

# Proposed OR Performance Measurement Criteria –Stakeholder Feedback

- Given the concerns raised by stakeholders, the IESO would like to better understand the impact of the proposed OR performance measurement criteria on existing OR participants
  - IESO will connect with OR participants who provided written feedback on an individual basis to discuss their concerns in more detail
  - Other interested stakeholders who may not have previously provided feedback through this engagement are asked to indicate their interest in participating in individual discussions with the IESO by email [engagement@ieso.ca](mailto:engagement@ieso.ca) by April 6, 2020
- In the next meeting, the IESO will bring the relevant information gathered through these meetings for stakeholders consideration along with the IESO's plan to address the stakeholder concerns raised

# Next Steps



# Next steps

- Please submit feedback by April 30 to [engagement@ieso.ca](mailto:engagement@ieso.ca) on the following:
  - Detailed design of OR settlement claw-back mechanism
    - Is the detailed design of the proposed solution clear and understandable?
    - Are there modifications to the design of the proposed solution that the IESO should consider?
- Indicate interest in holding individual discussion session with the IESO on proposed OR performance criteria by email to [engagement@ieso.ca](mailto:engagement@ieso.ca) by April 6, 2020

# Next steps

- The IESO will review and respond to stakeholder feedback on the OR settlement claw-back by May 30, 2020
- The IESO will report back on the outcome of discussions on the ORA performance measurement criteria at the next engagement meeting/webinar planned for Q2 2020

# Questions?

# Appendix A – Illustrative Examples of Proposed OR Standby Payment Claw-back

# OR Standby Payment Claw-back

Example for generators : claw-back applies to 30R only

Energy		Output	Total OR Sched.	Total Accessible OR	Total Inaccessible OR	10S			10N			30R					
						MCP	Schedule	Standby Payment	MCP	Schedule	Standby Payment	MCP	Schedule	Standby Payment			
Max. Capability	Sched.					DSO*	25	\$750		DSO*	15	\$300		DSO*	10	\$100	
150	100	110	50	40	10	\$30	Acce.^	25	\$750	\$20	Acce.^	15	\$300	\$10	Acce.^	0	\$0

- \*DSO: Constrained OR schedules: 10S=25 MW, 10N=15MW, 30R=10 MW
- Total OR Sched. = 10S + 10N +30R = 25+15+10=50 MW
- Total Accessible OR =Maximum capability – output=150-110=40 MW
- Total Inaccessible OR= Total OR scheduled - Total Accessible OR = 50 -40 =10 MW
- ^Acce.: Accessible OR for each class:
  - Accessible OR for 30R = OR scheduled for 30R –Total inaccessible OR = 10-10=0,
  - Remaining inaccessible OR =0
  - Accessible OR for 10N = OR scheduled for 10N and;
  - Accessible OR for 10S = OR scheduled for 10S

OR standby payment claw-back = sum of (OR standby payment for 10S, 10N & 30R)-sum of (OR standby payment calculated based on accessible OR for 10S, 10N & 30R) = (\$750+\$300+\$100)-(\$750+\$300+\$0)=\$100

# OR Standby Payment Claw-back

Example for generator: claw-back applies to both 10N and 30R

Energy		Output	Total OR Sched.	Total Accessible OR	Total Inaccessible OR	10S			10N			30R				
						MCP	Schedule	Standby Payment	MCP	Schedule	Standby Payment	MCP	Schedule	Standby Payment		
Max. Capability	Sched.															
150	100	110	50	40	10	\$30	DSO* 25	\$750	\$20	DSO* 19	\$380	\$10	DSO* 6	\$60		
							Acce.^ 25	\$750		Acce.^ 15	\$300		Acce.^ 0	\$0		

- \*DSO: Constrained OR schedules: 10S=25 MW, 10N=19MW, 30R=6 MW
- Total OR Sched. = 10S + 10N +30R = 25+19+6=50 MW
- Total Accessible OR =Maximum capability – output=150-110=40 MW
- Total Inaccessible OR= Total OR scheduled - Total Accessible OR = 50 -40 =10 MW
- ^Acce.: Accessible OR for each class:
  - Accessible OR for 30R = OR scheduled for 30R –Total inaccessible OR = 6-10= -4<0, then Accessible OR for 30R =0
  - Remaining inaccessible OR=10-6=4
  - Accessible OR for 10N = OR scheduled for 10N – remaining inaccessible OR =19-4=15
  - Accessible OR for 10S = OR scheduled for 10S

OR standby payment claw-back = sum of (OR standby payment for 10S, 10N & 30R) - sum of (OR standby payment calculated based on accessible OR for 10S, 10N & 30R)= (\$750+\$380+\$60)-(\$750+\$300+\$0)=\$140

# Appendix B – Illustrative Examples of Proposed OR Settlement Claw-back for Resources in a Compliance Aggregate

# OR Standby Payment Claw-back - Compliance Aggregation

- Illustrative example of the OR standby payment claw-back for resources in a compliance aggregate:
  - Gen A, Gen B and Gen C are in one compliance aggregation:
    - Maximum capability of the aggregates = maximum capability of Gen A + maximum capability of Gen B + maximum capability of Gen C;
    - Total output of the aggregates = output of Gen A + output of Gen B + output of Gen C
    - Total OR schedules of the aggregates = OR schedule of Gen A + OR schedule of Gen B + OR schedule of Gen C
    - Total energy schedules of the aggregates = energy schedule of Gen A + energy schedule of Gen B + energy schedule of Gen C
    - Total accessible OR for the aggregates is calculated as the difference between total output of the aggregates and the maximum capability of the aggregates
  - The claw-back will be triggered using the same logic as the individual unit



# Compliance Aggregation- Example

Example: Only one class of OR example is demonstrated in the example, same logic as the single unit applies when more than one class of OR is scheduled for an aggregate

		Max Cap.	Eng.	OR	OR MCP	Output	OR Standby Payment	Accessible OR	Inaccess. OR	OR Standby Payment based on Acces.OR	Claw-back	OR Standby Claw-back
Scenario 1	Gen A	150	100	50	\$20	110	Total OR scheduled for the aggregates * OR MCP=140*\$20=2800	Max cap.- Output =450- 310=140	OR- Acces.OR= 140-140=0	Total acces.OR for aggregates * OR MCP=140*\$20=\$2800	No	0
	Gen B	150	100	40		90						
	Gen C	150	100	50		110						
	<b>Total</b>	<b>450</b>	<b>300</b>	<b>140</b>		<b>310</b>						
Scenario 2	Gen A	150	100	40	\$20	110	Total OR scheduled for the aggregates * OR MCP=140*\$20=2800	Max cap.- Output = 450-330=120	OR- Acces.OR= 140-120=20	Total acces.OR for aggregates * OR MCP=120*\$20=\$2400	Yes	\$2800- \$2400=\$400
	Gen B	150	100	50		110						
	Gen C	150	100	50		110						
	<b>Total</b>	<b>450</b>	<b>300</b>	<b>140</b>		<b>330</b>						

# Appendix C – Illustrative Examples of the OR CMSC Claw-back

# OR CMSC Claw-back Example: Generator

- Example 1: Constrained on with positive CMSC

Energy			Output	Accessible OR	OR						
Max. Capab.	U	C			MCP	OFFER	10S				
			U	C			CMSC	Standby Payment			
150	0	100	110	40	\$20	\$30	*DSO	0	50	\$500	\$1000
							Accessible OR	0	40	\$400	\$800

- \*DSO: OR schedules, OR CMSC and standby payments received by MPs, U= unconstrained schedule and C= constrained schedule
- Accessible OR = maximum capability – output=150-110=40 MW
- OR CMSC paid =\$500
- OR CMSC based on accessible OR= (OR MCP-OR offer)\* (OR unconstrained schedule – accessible OR)=\$(20-\$30)\*(0-40)= \$400

OR CMSC based on accessible OR resulted in \$100 less CMSC payment, therefore, OR CMSC claw-back is \$100

OR CMSC claw-back =Max(\$500-\$400),\$0)=\$100

OR standby claw-back=\$1000-\$800=\$200

Total claw-back= OR CMSC claw-back + OR standby claw-back = \$100+\$200

# OR CMSC Claw-back Example: Generator

- Example 2: Constrained on with negative CMSC

Energy			Output	Accessible OR	OR						
Max. Capab.	U	C			MCP	OFFER	10S				
			U	C			CMSC	Standby Payment			
150	0	100	110	40	\$20	\$10	*DSO	0	50	-\$500	\$1000
							Accessible OR	0	40	-\$400	\$800

- \*DSO: OR schedules, OR CMSC and standby payments received by MPs, U= unconstrained schedule and C= constrained schedule
- Accessible OR = maximum capability – output=150-110=40 MW
- OR CMSC paid = -\$500
- OR CMSC based on accessible OR= (OR MCP-OR offer)\* (OR unconstrained schedule – accessible OR)=\$(\$20-\$10)\*(0-40)= -\$400

OR CMSC based on accessible OR resulted in \$100 more unwarranted CMSC payment, therefore, No OR CMSC claw-back

OR CMSC claw-back=Max(-\$500-(-\$400),\$0)=\$0

OR standby claw-back=\$1000-\$800=\$200

Total claw-back= OR CMSC claw-back + OR standby claw-back = \$0+\$200 = \$200

# OR CMSC Claw-back Example: Load

- Example 1: Constrained on with positive CMSC

Energy			Consumption	Accessible OR	OR						
Max. Capab.	U	C			MCP	OFFER	10S				
			U	C			CMSC	Standby Payment			
100	0	100	90	90	\$20	\$30	*DSO	0	100	\$1000	\$2000
							Accessible OR	0	90	\$900	\$1800

- \*DSO: OR schedules, OR CMSC and standby payments received by MPs, U= unconstrained schedule and C= constrained schedule
- Accessible OR = actual consumption
- OR CMSC paid =\$1000
- OR CMSC based on accessible OR= (OR MCP-OR offer)\* (OR unconstrained schedule – accessible OR)=\$(\$20-\$30)\*(0-90)= \$900

OR CMSC based on accessible OR resulted \$100 less CMSC payment, therefore, OR CMSC claw-back is \$100

OR CMSC claw-back =Max(\$1000-\$900),\$0)=\$100

OR standby claw-back=\$2000-\$1800=\$200

Total claw-back= OR CMSC claw-back + OR standby claw-back = \$100+\$200=\$300

# OR CMSC Claw-back Example: Load

- Example 2: Constrained on with negative CMSC

Energy			Consumption	Accessible OR	OR						
Max. Capab.	U	C			MCP	OFFER	10S				
			U	C			CMSC	Standby Payment			
100	0	100	90	90	\$20	\$10	*DSO	0	100	-\$1000	\$2000
							Accessible OR	0	90	-\$900	\$1800

- \*DSO: OR schedules, OR CMSC and standby payments received by MPs, U= unconstrained schedule and C= constrained schedule
- Accessible OR = actual consumption
- OR CMSC paid = -\$1000
- OR CMSC based on accessible OR = (OR MCP - OR offer) \* (OR unconstrained schedule - accessible OR) = (\$20 - \$10) \* (0 - 90) = -\$900
- OR CMSC based on accessible OR resulted in \$100 more unwarranted CMSC payment, therefore, No OR CMSC claw-back
- OR CMSC claw-back = Max(-\$1000 - (-\$900), \$0) = \$0
- OR standby claw-back = \$2000 - \$1800 = \$200
- Total claw-back = OR CMSC claw-back + OR standby claw-back = \$0 + \$200 = \$200

# Appendix D – Illustrative Example Scenarios for Proposed ORA Performance Measure Criteria

# Providing Incremental Energy

- ORA is deemed successful when the incremental energy provided during an ORA is equal to or greater than the OR activated and when the ORA dispatch is met (at or above the targets for generators and at or below the targets for DLs)

Expected incremental energy = difference between the last sent energy dispatch and the new ORA target amount



# ORA Compliance – Generator

	Last Energy Schedule Received	OR Schedule	Output	Compliance Deadband	OR Activated	ORA Dispatch	Output After ORA	Incremental Energy Provided	Compliant to ORA?
A →	100	50	100	±15	50	150	160	60	Yes
	100	50	100	±15	50	150	150	50	Yes
	100	50	90	±15	50	150	150	60	Yes
	100	50	90	±15	50	150	140	50	No
B →	100	50	110	±15	50	150	160	50	Yes
	100	50	110	±15	50	150	150	40	No

- Scenario A: If a generator's output is equal to or less than its energy schedule when an ORA dispatch signal is received, its output needs to be at or above its ORA target in order to meet the ORA performance requirement (as highlighted in red)
- Scenario B: If a generator's output is greater than its energy schedule when an ORA dispatch signal is received, its output needs to be above its ORA target in order to meet the ORA performance requirement (as highlighted in yellow)

# ORA Compliance - DLs

	Last Energy Schedule Received	OR Schedule	Consumption	Compliance Deadband	OR Activated	ORA Dispatch	Consumption After ORA	Incremental Energy Provided	Compliant to ORA?
	100	100	100	±15	90	10	10	90	Yes
	100	100	100	±15	90	10	0	100	Yes
A →	100	100	110	±15	90	10	0	110	Yes
	100	100	110	±15	90	10	10	100	Yes
	100	100	110	±15	90	10	20	90	No
	100	100	90	±15	90	10	0	90	Yes
B →	100	100	90	±15	80	20	10	80	Yes
	100	100	90	±15	80	20	20	70	No
	100	100	90	±15	100	0	0	90	No

- Scenario A: If a DL's consumption is equal to or greater than its OR schedule, when an ORA dispatch signal is received, its consumption needs to be at or below its ORA target in order to meet the ORA performance requirement (as highlighted in red)
- Scenario B: If a DL's consumption is less than its OR schedule when an ORA dispatch signal is received, its output needs to be below its ORA target in order to meet the ORA performance requirement (as highlighted in yellow)