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Operating Reserves from DER Aggregations – Market Design Concept Proposed: Operating Reserve Limit

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Agenda

- **Background**
- **DER Aggregation ORL MDCP Summary**
  - Operating Reserve Limit Derating
  - Demand Side Resources and ORL Management
  - DER Aggregation ORL Monitoring & Mitigation
- **Next Steps**

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Background

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Operating Reserve Limit in Practice – Aggregations

- The revised Ancillary Services market rules will enable an Aggregation of heterogenous DER to provide the services they are qualified to provide in an Aggregation, within the bounds of NYISO's software capabilities and consistent with applicable reliability standards.
- An Aggregator must provide an ORL when initially enrolling an Aggregation, and with each offer in DAM and RTM thereafter
  - An Aggregation's ORL must reflect its reserves capabilities for the Bidding increment
    - The enrolled ORL represents the maximum value for any bid ORL

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Operating Reserve Limit Derate – Post Market Close

- **An Aggregator must derate the ORL of an Aggregation using the Grid Operations Coordination Portal (GOCP) as soon as practical upon recognition of one or more conditions that are expected to limit Operating Reserve capability.**
  - An ORL derate submitted in the GOCP will pass to NM for inclusion in the next available RTD initialization
  - It is the Aggregator's responsibility to timely inform the NYISO of ORL derates

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DER Aggregation ORL MDCP Summary

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Operating Reserve Limit Derating

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Operating Reserve Limit Derate Example

- **Consider 'Aggregation A':**
  - a 5 MW (20 MWh) ESR that can provide up to 5 MW of synchronized 10-minute Operating Reserves;
  - a 10 MW wind turbine, an Intermittent Power Resource that is not eligible to provide Operating Reserves in the New York Control Area;
  - a 5 MW gas turbine that can start-up in 10 minutes or less, and can provide up to 5 MW of 10-minute non-synchronous Operating Reserves;
  - a 5 MW gas turbine that can start-up in more than 10 minutes but less than 30 minutes, and can provide up to 5 MW of 30-minute Operating Reserves; and
  - a facility that is capable of 5 MW load curtailment from its baseline, and can provide up to 5 MW of synchronized 10-minute Operating Reserves.

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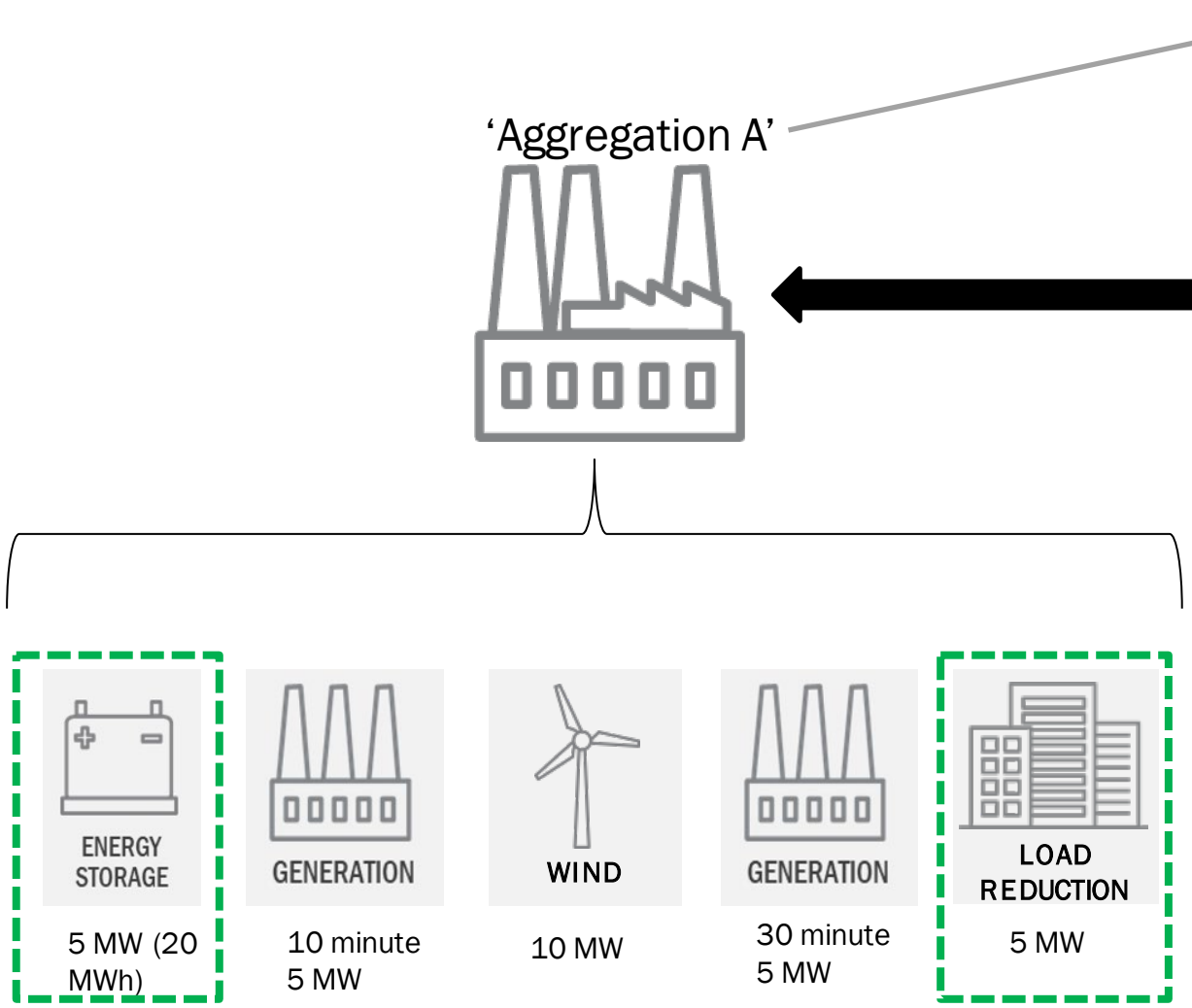
Operating Reserve Limit Derate Example

✓ "Dispatch Only" - Aggregations are always considered online and available for dispatch



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- **Assume:**
  - Ramp rate of the ESR is 1 MW/minute
  - Ramp rate of the load reduction facility is 1 MW/minute
- **Assume an aggregate ramp rate of 2 MW/minute to provide 10-minute synchronized reserves**
- **'Aggregation A' is eligible to provide:**
  - Up to 10 MW 10-Minute Synchronized Reserves based on the ESR and load reduction facility

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Operating Reserve Limit Derate Example

Aggregation-level attribute	Value
UOL	30 MW
Scheduled Energy MW	20 MW, which will come from the Wind turbine, 10-minute gas turbine, and 30-minute gas turbine (10 MW, 5 MW, & 5 MW, respectively)
Ramp Rate	2 MW/minute, considering only the two facilities that are technically capable of 10-minute Synchronized Reserves
Operating Reserve Limit	Declared in DAM/RTM offers at 10 MW (the Aggregator does not intend to use the technically capable facilities to meet its scheduled Energy MW, and therefore may use them to hold up to 10 MW of 10-minute Synchronized Reserves for the Aggregation)

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Operating Reserve Limit Derate Example

- **For the load reduction facility, the Aggregator anticipates an average ECBL across HB 12 of 5 MW, and 5 MW of Spinning Reserves throughout the hour.**
  - In this example the load reduction facility facilitates its curtailment by reducing onsite industrial process load.
- **After being scheduled for 5 MW of Spinning Reserves during HB 12, the load reduction facility must remain operating due to unforeseen circumstances and is only able to curtail 2 MW of its load.**
  - It is the responsibility of the Aggregator to recognize whether the Aggregation's real time capability will prevent the Aggregation from achieving its reserve offer and schedule (i.e., can the Aggregation provide injection, withdrawal, and/or load reduction in sufficient amount based on its schedule?)
- **The ORL capability must be derated from 10 MW to 7 MW.**
  - After Real-Time market close:
    - The Aggregator must derate its ORL to 7 MW of 10-minute Synchronized Reserves
    - The UOL of the Aggregation must be reduced to 27 MW
      - The Aggregator must enter the ORL derate into the GOCP as soon as practical upon recognizing the anticipated deficiency

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Operating Reserve Limit Derate Example

- **Post RTM close example (actual processing time may vary):**
  - Aggregator recognizes load curtailment deficiency at 12:03 and submits ORL and UOL derates to GOCP at 12:06 for an effective derate record start of 12:15 down to 7 MW and 27 MW, respectively
  - The default 'end date/time' of the derates in the GOCP will be set to the end of HB 23 for the current operating day – however in this example, the original curtailable load value is restored at 5 MW again beginning at 12:45

	RTM Close	12:00	12:05	12:10	12:15	12:20	12:25	12:30	12:35	12:40	12:45	12:50	12:55	1:00
UOL	30 MW	30 MW	30 MW	30 MW	27 MW	27 MW	27 MW	27 MW	27 MW	27 MW	30 MW	30 MW	30 MW	30 MW
Energy	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW	20 MW
ORL	10 MW	10 MW	10 MW	10 MW	7 MW	7 MW	7 MW	7 MW	7 MW	7 MW	10 MW	10 MW	10 MW	10 MW

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Demand Side Resources & ORL Management

Operating Reserve Limit – Demand Side Resources

- **At the August 24 ICAPWG, NYISO reviewed considerations for an Aggregation containing Demand Side Resources, which are not permitted in the HSR model.**
  - An Aggregation with Operating Reserves capability that is economically converted to Energy in Real Time shall only be compensated for the Energy if that conversion occurs at an LBMP at the applicable Transmission Node that meets or exceeds the Monthly Net Benefits Threshold
  - An Aggregator offering such an Aggregation should consider all facilities' Economic Customer Baseline Load (ECBL), as well as the actual Real Time curtailable load, when assessing ORL (and UOL) capabilities

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Demand Side Resource ORL Management

- One or more Demand Side Resources ("DSR") may participate as a DER Aggregation under the NYISO's 2019 DER participation model rules.
- Because the Aggregation could simultaneously offer its full operating range to be scheduled as Energy and/or to satisfy an Operating Reserves product, upon enrollment and until the Aggregation receives an Energy schedule, its UOL and ORL should be equivalent.
- The UOL of the Aggregation should be 1) set upon enrollment and 2) offered considering the applicable ECBL(s) and actual curtailable load levels.
  - Reminder: Under the DER participation model, compensable curtailable load is a function of actual demand reduction from the baseline
    - Compensable Demand Reduction = max[(ECBL – Actual telemetered load), 0]
  - The Aggregator may elect to set the UOL at a % MW below the ECBL based on a risk tolerance
    - By adjusting the UOL to account for ECBL and curtailable load fluctuations, the Aggregator can reduce the likelihood of needing to derate the Aggregation's UOL/ORL in Real-Time if load patterns shift intra-hour and conflict with a dispatch signal
- Reminder: An Aggregator may consider structuring the offers of an Aggregation such that the Aggregation will not be economically dispatched or converted to Energy for a particular reserve product unless the LBMP of the applicable Transmission Node meets or exceeds the Monthly Net Benefits Threshold ("MNBT").

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Demand Side Resource ORL Management

- The Aggregator may set the Aggregation UOL by anticipating the actual load available for curtailment throughout a given hour, and adjusting the offered UOL and ORL accordingly such that dispatch signals remain feasible.
- Should an Aggregation's composite ECBL (considering all comprising DSRs) and/or real time curtailable load fall below the MW amount dispatched by the NYISO, and the Aggregator intended to use the curtailable load to meet some or all of an Aggregation's UOL or ORL, the Aggregator must derate the UOL and ORL as soon as practical.
  - The Aggregation may be able to use injection response to compensate for the lost capability, if applicable

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DER Aggregation ORL Monitoring & Mitigation

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Operating Reserve Requirement Monitoring

- DER Aggregation ORL mitigation will adhere to the principles established under the HSR market design initiative.
  - Namely, thresholds for identifying physical withholding and imposition of sanctions if necessary
- NYISO will require an Aggregation to make available all Operating Reserve capability it is qualified to provide in Real Time compatible with its Energy schedule, Regulation Capacity, UOL, and LOL.
- Using an after-the-fact reporting process, the NYISO will validate whether the Aggregation may be withholding MWs by, for example, deflating its ORL compared to its actual capability.
- The NYISO does not currently intend to assess the Aggregation's enrolled ORL compared to its bid ORL (*i.e.,* the amount of reserves an Aggregator wishes to declare upon initial enrollment is a function of risk tolerance and resource capabilities, rather than behavior).

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Operating Reserve Requirement Monitoring

- **If an Aggregation is found to be withholding, the NYISO will assess for impact.**
  - Consistent with the rules developed for the HSR model, the NYISO will explore applying a minimum value under which withholding will not result in a violation (*e.g.*, 5 MW)
- **If the NYISO determines that there was an impact to prices due to the withholding conduct of a particular Aggregation, the Aggregator will receive a financial sanction in accordance with MST 23.4.3.2.**
  - Consistent with the approach identified for HSRs

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Operating Reserve Performance Tracking

- **Should an Aggregation consistently under-deliver Operating Reserves based on its indicated ORL, the NYISO will investigate the circumstances and consider removing the Aggregation's Operating Reserves qualifications.**
  - The NYISO maintains Operating Reserves requirements to meet applicable reliability standards – an Aggregation that demonstrates consistent inability to deliver Operating Reserves is thereby a risk to system reliability and cannot be considered in the NYISO's Operating Reserves reporting requirements.

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Ancillary Service Verification Testing – 8/24 ICAPWG Follow up

- **The NYISO will conduct a verification test during the first month of market participation, based on the Operating Reserve capability of an Aggregation.**
- **Should an Aggregation fail the verification test procedure, the NYISO will end effective date the applicable bid flags, such that the Aggregation will no longer be able to offer the service(s).**
  - NYISO will coordinate with the Aggregator to investigate the cause for failure, and will reestablish an opportunity for the Aggregation to verify its capabilities during a future month when appropriate
  - Revenues earned prior to a failed verification test will not be disgorged
- **For details, please refer to the Ancillary Services Manual approved version (currently found in the 'Under Review' folder of the NYISO Manuals webpage) containing revisions to incorporate the DER participation model.**
  - Sections 4.11.2 and 6.12.2

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Next Steps

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Next Steps

- The content covered in this presentation, combined with the content reviewed at the 8/24 ICAPWG, provide the foundation for the NYISO's future Market Design Complete milestone.
- Final compliance filing on Operating Reserves for DER Aggregations is due by the end of 2024.

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Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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