New York ISO
Independent System Operator

Operating Reserves Performance

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Agenda

- Project Background
- Reserve Pick-Up Performance Methodology
- Reserve Pick-Up Performance Analysis Results
- Penalty Proposal Concepts
- Next Steps

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Project Background

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Project Background

- **Project Description:**
  - Assessing an operating reserves provider's stated capabilities or performance is becoming a growing concern as the grid becomes more dependent on intermittent power resources and limited duration or limited energy resources
  - Under current market rules, operating reserves providers receive the same compensation regardless of their actual performance. This compensation structure may not provide adequate incentive to perform, may create an inefficiency in the market, and has potential negative impacts to system reliability
  - This project assesses methods for evaluating the performance of an operating reserves provider and proposes improving the market rules to create financial consequences for resources that misstate operating reserve capability and/or perform poorly when called upon to convert operating reserves to energy
- **Deliverable:**
  - Market Design Complete Q4 2024

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Project Background

- As part of the 2022 Hybrid Storage Resource (“HSR”) project, the NYISO performed an analysis on resources’ responses to dispatches in response to a reserve pick-up (“RPU”)
- The NYISO presented at the April 6, 2022, MIWG on the data analysis for resources that fail to convert reserves to energy when dispatched during an RPU
- This aspect of the HSR project was put on hold and established as a distinct project for 2024

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Reserve Pick-Up Performance Methodology

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Methodology

- **Resources receive a basepoint at the start of the reserve pick-up ("RPU"), which denotes the output level the unit must achieve in 10 minutes. This dispatch is referred to as a "call" in this analysis**
  - It is expected that a resource of any type will reach its basepoint in 10 minutes
  - Depending on the resource's reserves capabilities (i.e., spin vs. non-sync reserves providers), resources are assessed using different methodologies if an RPU ends prior to 10 minutes
    - More details on the treatment and calculations may be found on the following slides

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Methodology, cont.

- **For resources capable of providing spin reserves, an expected basepoint is calculated using a linear rate between the resource's basepoint before the RPU and the new basepoint issued at the start of the RPU based on the length of the event. The actual output value used is the maximum output at any point between the start of the event and one minute after the end of the RPU**
  - For example, if a spin resource's basepoint before the RPU was 10 MW, and it receives a new basepoint of 20 MW at the start of the RPU, its expected basepoint for a 5-minute RPU event is 15 MW
  - The output assessed is the highest actual generation between the start of the RPU and one minute after the end of the event
- **Resources capable of providing non-sync reserves are assessed using the basepoint received at the start of the event. The actual output value used is maximum output between the start of the event and 11 minutes after the start of the RPU, regardless of the length of the RPU**
  - For example, if a non-sync resource's basepoint before the RPU was 0 MW, and it receives a new basepoint of 20 MW at the start of the RPU, its expected basepoint is 20 MW
  - The output assessed is the highest actual generation between the start of the RPU and 11 minutes after the start of the event

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Methodology, cont.

- A resource is considered to fail (in part or in whole) to respond to the RPU dispatch if its output is more than 1 MW below its expected basepoint (extrapolated based on the type of resource and length of the RPU) **AND** if its output is less than 98% of the expected basepoint
  - This provides a margin of error for both large and small basepoints
    - If a resource is dispatched to 200 MW and its output is 198 MW, it is generating at 99% of its expected basepoint despite operating more than 1 MW below the basepoint
    - If a resource is dispatched to 5 MW and its output is 4.5 MW, it is generating within 1 MW of its expected basepoint despite operating at 90% of its basepoint
- This method for determining the expected basepoint and actual output is consistent with the methodology and metrics used for resource audits
- The analysis excludes resources that are not eligible to provide 10-minute reserves, including:
  - Intermittent power resources
  - Nuclear plants
  - 30-minute GTs
  - Resources with fixed schedules

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Reserve Pick-Up Performance Analysis Results

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Results Overview

- From January 2017 – December 2023, there were 470 RPU events
- Average RPU duration of 7.61 minutes
- 86 resources received at least one call to dispatch during an RPU
- Total of 7822 calls with 813 fails (in part or in whole), resulting in an overall fail rate of 10.4%
- When a unit failed to reach its expected basepoint, it was under-generating by 14.9 MW on average, and was generating at 82.4% of its expected basepoint

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Event-Based Results

Year	Number of RPU Events	Fails/Calls to Dispatch (%), Average for Events	Average MW Below Expected Basepoint, Fails per Event	Average Percent of Expected Basepoint, Fails per Event	Average Percent of Expected Basepoint, All Calls per Event
2017	52	10.11%	-12.6	84.5%	106.2%
2018	85	10.45%	-15.1	81.5%	103.8%
2019	78	9.36%	-14.1	82.1%	104.1%
2020	72	11.81%	-12.9	87.6%	105.1%
2021	65	10.85%	-17.4	78.3%	105.9%
2022	74	9.26%	-16.2	77.1%	105.4%
2023	44	10.93%	-15.3	87.5%	104.2%

Resource-Based Results

Fails/Calls to Dispatch (%)	Number of Resources	Average Number of Calls to Dispatch per Resource	Average MW Below Expected Basepoint, Fails	Average Percent of Expected Basepoint, Fails	Average Percent of Expected Basepoint, All Calls
[0%, 10%)	43	108	-19.3	82.6%	104.4%
[10%, 20%)	24	85	-13.4	71.5%	100.7%
[20%, 30%)	10	46	-16.6	65.5%	106.6%
[30%, 40%)	5	126	-14.0	90.4%	96.9%
[40%, 50%)	2	14	-16.4	78.3%	95.5%
[50%, 60%)	1	6	-6.7	93.3%	98.2%
[60%, 70%)	0	--	--	--	--
[70%, 80%)	0	--	--	--	--
[80%, 90%)	1	6	-18.4	78.6%	82.7%
[90%, 100%]	0	--	--	--	--

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Resource-Based Results

Resource Type	Total Number of Calls to Dispatch	Total Number of Fails	Fails/Calls to Dispatch (%)	Total MW Called	Average MW Below Expected Basepoint, Fails	Average Percent of Expected Basepoint, Fails	Average Percent of Expected Basepoint, All Calls
Single Steam CT	2444	216	8.84%	29,716	-11.5	93.9%	102.7%
Combined Cycle Steam	2908	342	11.76%	68,093	-16.3	94.2%	102.3%
Single 10-min GTs, Dispatchable and Fast Start Hydro	1630	108	6.63%	91,500	-19.6	61.3%	105.8%
Group 10-min GTs	840	147	17.50%	20,812	-12.9	53.8%	96.7%

Note: 30-min GTs are not included in the analysis because they are either ON and not dispatchable or OFF and not able to be committed during RPU events

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Poor Performing Resources

- The NYISO's Market Monitoring Unit ("MMU") stated in the "2020 State of the Market Report" that a resource may perform well during an audit but poorly during normal market operations and suggested enhancements to the audit process
- Some fails may be associated with combined-cycle duct firing capability. NYISO's Improved Duct Firing project will provide such resources additional tools to manage their Operating Reserve schedules and RPU basepoints
- Additionally, some resources with poor performance no longer qualify to provide Reserves

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Penalty Proposal Concepts

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Proposed Penalty Applicability

- Operating Reserves suppliers receive compensation to remain available and ready to meet Real-Time Energy dispatch schedules. The Energy provided by such suppliers helps maintain grid reliability, e.g., by facilitating contingency recovery and managing uncertainty
- NYISO is considering a penalty based on the difference between a resource's basepoint and actual output (measurement method is described above) to incentivize improved performance during reserve pick-ups
  - The penalty would be applied to any eligible Operating Reserves supplier that fails to perform acceptably during an RPU
  - Penalties will increase for repeated failure to perform acceptably
  - The penalty would not apply to resources that are dispatched down and over-generate during a small event RPU
- The RPU penalty will be incremental to any existing penalties
  - An RPU is a stressed system condition, and applying the RPU penalty in addition to existing penalties is an incremental incentive to support system reliability

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Next Steps

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Next Steps

- Return to an upcoming MIWG with a proposed penalty structure and example calculations

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Questions?

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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