New York ISO
Independent System Operator

Reserve Pick-Up Performance Analysis

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New Resource Integration

MIWG

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Agenda

- Background
- RPU Performance Analysis Methodology
- RPU Performance Analysis Results

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Background

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Background

- **NYISO is considering the introduction of a penalty for all resources that fail to convert reserves to energy during an RPU event**
  - As more intermittent power resources (IPRs) and duration limited resources enter the market through models like the Hybrid Storage Resource (HSR) model, guaranteeing reserves performance becomes increasingly important to maintaining reliability

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Background

- **The NYISO is required to procure additional Reserves and may be subject to a financial penalty for failure to recover from a Disturbance Control Standard (DCS) event**
  - **NERC Disturbance Control Standard Requirement R6.** A Balancing Authority or Reserve Sharing Group shall fully restore its Contingency Reserves within the Contingency Reserve Restoration Period for its Interconnection.
  - **NPCC Directory 5 Requirement R4.2.** A Balancing Authority's calculated requirement for synchronized reserve available within ten minutes shall increase by 20 percent of the ten-minute reserve requirement for every time it fails to return its ACE to pre-contingency values or to zero within fifteen minutes following the start of a reportable event that is less than a NERC reportable Balancing Contingency Event. Recovery of reporting ACE occurs when a Balancing Authority returns its reporting ACE to pre-contingency values (if it's pre-contingency reporting ACE was negative) or to zero (if it's pre-contingency reporting ACE was positive or equal to zero)
- **Additionally, the NYISO is subject to NPCC requirements that Operating Reserve providers that are converted to providing Energy must be capable of sustaining their Energy Schedule for at least one hour**
  - **NPCC Directory 5 Requirement R6.** A Balancing Authority's **synchronized reserve, ten-minute reserve,** and **thirty-minute reserve**, if activated, shall be sustainable for at least one hour from the time of activation.

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Reserve Pick-Up Performance Analysis Methodology

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NYISO Analysis

- The NYISO is seeking to assess how often resources meet their new energy schedules when called to convert reserves to energy
- In order to determine this, NYISO performed an analysis of NYCA Resource performance during reserve pick-ups (RPUs)

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Methodology

- **Resources receive a basepoint at the start of the 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, resources are assessed using different methodologies for RPUs with a duration shorter than 10 minutes

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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 10 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 call 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 RPU calls
    - If a resource is dispatched to 200 MW and its output is 198 MW, it is generating at 99% of its expected 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
- **The analysis excludes:**
  - Intermittent power resources
  - Nuclear plants
  - 30-minute GTs
  - Resources called to decrease their output
  - Resources with fixed schedules
  - Resources without a 10-minute Reserves schedule

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Reserve Pick-Up Performance Analysis Results

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Results Overview

- From January 2017 – November 2021, there were 349 RPU events
- Average RPU duration of 7.79 minutes
- 95 resources received at least one call to dispatch during an RPU
- Total of 3053 calls with 464 fails (in part or in whole), resulting in an overall fail rate of 15.2%
- When a unit failed to reach its expected basepoint, it was under-generating by 15.6 MW on average, and was generating at 81.5% 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	13.1%	37.8	82.9%	102.9%
2018	85	14.1%	35.7	85.1%	101.9%
2019	78	10.8%	29.9	90.5%	102.9%
2020	72	15.6%	37.7	88.5%	102.8%
2021	62	15.6%	51.6	82.3%	103.4%

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Duration-Based Results, 2017 – Nov. 2021

RPU Duration	Number of RPU Events	Number of Calls to Dispatch	Number of Fails	Fails/Calls to Dispatch (%), Average for Events	Average MW Below Expected Basepoint, Fails	Average Percent of Expected Basepoint, Fails	Average Percent of Expected Basepoint, All Calls
1 minute +	349	3053	464	14.8%	16.0	86.3%	102.3%
2 minutes +	348	3049	463	14.8%	16.1	86.2%	102.3%
3 minutes +	335	2993	457	14.6%	16.0	85.8%	101.9%
4 minutes +	316	2862	443	14.7%	16.3	85.3%	101.4%
5 minutes +	283	2605	415	15.3%	16.3	84.3%	100.9%
6 minutes +	247	2286	371	15.9%	16.2	84.5%	100.5%
7 minutes +	212	1956	321	16.1%	15.5	84.5%	100.4%
8 minutes +	180	1639	268	15.9%	16.0	86.1%	100.3%
9 minutes +	141	1270	213	16.3%	17.0	84.6%	99.8%
10 minutes +	91	789	145	18.4%	17.8	85.3%	99.7%

Resource-Based Results, 2017 – Nov. 2021

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%)	34	39	21.4	89.2%	105.2%
[10%, 20%)	20	45	13.1	86.6%	102.7%
[20%, 30%)	14	13	19.4	51.7%	91.5%
[30%, 40%)	13	42	16.5	61.5%	89.5%
[40%, 50%)	4	13	14.0	65.8%	88.6%
[50%, 60%)	3	7	18.8	50.1%	73.9%
[60%, 70%)	3	6	22.7	49.1%	70.6%
[70%, 80%)	1	7	23.0	37.4%	55.3%
[80%, 90%)	0	N/A	N/A	N/A	N/A
[90%, 100%]	3	4	10.6	68.1%	68.1%

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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 attributed to duct-firing modeling, which is currently being considered in another project
- Additionally, some resources with poor performance no longer qualify to provide Reserves

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Resource-Based Results, 2017 – Nov. 2021

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	1065	110	10.3%	14,602	10.5	94.7%	103.3%
Combined Cycle Steam	1040	206	19.8%	29,981	16.5	94.2%	102.5%
Single 10-min GTs, Dispatchable and Fast Start Hydro	708	63	8.9%	37,692	16.3	71.2%	104.3%
Group 10-min GTs	240	85	35.4%	8,749	19.7	41.2%	82.2%

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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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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Questions?

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