New York ISO
Independent System Operator

Operating Reserves Performance – Penalty Proposal

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Previous Presentation

Date	Working Group	Topic/Links to Materials
August 7th, 2024	MIWG/ICAPWG	Operating Reserves Performance

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Agenda

- Project Background
- Penalty Proposal and Examples
- 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 generators and limited duration or limited energy resources
  - When a provider's Day Ahead operating reserves schedule is converted to Energy in real time, the resource must buy out its Day Ahead reserves schedule. If the resource does not perform, it will also buy out the Energy not provided. However, under current market rules, there is no defined operating reserves penalty for failure to perform
  - This project will seek to assess methods for evaluating the performance of an operating reserves provider and to develop a proposal for 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
- **2024 Deliverable: Market Design Complete (tariff and vote)**

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Project Background

- **At the August 7 MIWG, the NYISO presented on resource performance during reserve pick-ups ("RPUs") and an associated penalty**
  - As a result of discussions on the RPU penalty, the NYISO is proposing to instead apply a penalty to resources with a Day-Ahead schedule to provide Operating Reserves and who fail to adequately perform in real-time
- **Design Principle:**
  - Recover costs to consumers for Operating Reserves that were paid for but not provided while incenting Reserve providers to provide the scheduled Reserves.

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Penalty Proposal and Examples

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Design Proposal

- **The penalty will apply if:**
  - The resource is Out-of-Merit for failing to follow basepoints; or
  - The following three conditions are met ("trigger conditions"):
    1. Real-Time Output < Day-Ahead Energy + Day-Ahead Reserves schedules
       - i.e., the Resource is operating at a level below what they were committed to provide Day-Ahead
    2. The Resource's Day-Ahead Reserves Schedule > 0
    3. The Resource is undergenerating relative to its Real-Time Energy Schedule by at least 3% of its UOL for at least 900 seconds (15 minutes)

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Design Proposal

- **Penalty Structure:**
  - Reserves Performance Penalty = min[(Day-Ahead Energy Schedule + Day-Ahead Reserves Schedule – Real-Time Output, Day-Ahead Reserves Schedule)] * (Day-Ahead Reserves Price) * (RTD length in seconds/3600 s) * 1.5
    - This represents a penalty for an individual RTD interval
- **This penalty will be incremental to any existing applicable penalties**
- **A resource will not be subject to the proposed penalty if it is committed Out-of-Merit for reliability**
- **Additionally, the NYISO will propose procedures for removing the ability of resources to provide Operating Reserves that consistently fail to adequately perform**
- **The following slides provide illustrative examples regarding whether specific behavior satisfies the penalty "trigger conditions". The examples illustrate a resource meeting trigger conditions 1 and 2, and it is assumed that condition 3 (900 second lagging condition) is met**

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Example #1 – Reserves Penalty Applied

	Day Ahead	Real Time
Energy Schedule	70 MW	100 MW
Reserves Schedule	30 MW	0 MW
Actual Output	--	***85 MW***

- **MW subject to the penalty = min(70 MW + 30 MW – 85 MW, 30 MW) = min(15 MW, 30 MW) = *15 MW***

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Example #2 – Reserves Penalty Applied

	Day Ahead	Real Time
Energy Schedule	60 MW	60 MW
Reserves Schedule	40 MW	40 MW
Actual Output	--	***50 MW***

- **MW subject to the penalty = min(60 MW + 40 MW – 50 MW, 40 MW) = min(50 MW, 40 MW) = *40 MW***

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Example #3 – Reserves Penalty Applied

	Day Ahead	Real Time
Energy Schedule	70 MW	100 MW
Reserves Schedule	30 MW	0 MW
Actual Output	--	*0 MW*

- **MW subject to the penalty = min(70 MW + 30 MW – 0 MW, 30 MW) = min(100 MW, 30 MW) = *30 MW***

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Example #4 – No Reserves Penalty

	Day Ahead	Real Time
Energy Schedule	40 MW	100 MW
Reserves Schedule	20 MW	0 MW
Actual Output	--	***85 MW***

- **The resource does not satisfy the conditions for the penalty (in this case, the Real-Time Output exceeds the Day-Ahead Energy + Reserves schedules), and therefore no Reserves penalty would apply. The resource is still subject to applicable under-generation charges**

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Penalty Example #1

	Day Ahead	Real Time
Energy Schedule	70 MW	100 MW
Reserves Schedule (10-min spin)	30 MW	0 MW
Actual Output	--	*80 MW*

Prices	Day Ahead	Real Time
Reserves	$4.00/MWh	$0/MWh
Reg. Capacity	$5.50/MWh	$4.50/MWh

- **Reserves Performance Penalty = min(70 MW + 30 MW – 80 MW, 30 MW) * ($4.00/MWh) * (300 s/3600 s) * 1.5 = $10 for each RTD interval**
  - Undergeneration Penalty = (20 MW) * max($5.50/MWh, $4.50/MWh) * (300 s/3600 s) = $9.17
  - Reserves Revenue = [(30 MW * $4.00/MWh) – (30 MW * $0/MWh)] * (300 s/3600 s) = $10

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Penalty Example #2

	Day Ahead	Real Time
Energy Schedule	70 MW	100 MW
Reserves Schedule (10-min spin)	30 MW	0 MW
Actual Output	--	*50 MW*

Prices	Day Ahead	Real Time
Reserves	$4.00/MWh	$0/MWh
Reg. Capacity	$5.50/MWh	$4.50/MWh

- **Reserves Performance Penalty = min(70 MW + 30 MW – 50 MW, 30 MW) * ($4.00/MWh) * (300 s/3600 s) * 1.5 = $15 for each RTD interval**
  - Undergeneration Penalty = (50 MW) * max($5.50/MWh, $4.50/MWh) * (300 s/3600 s) = $22.92
  - Reserves Revenue = [(30 MW * $4.00/MWh) – (30 MW * $0/MWh)] * (300 s/3600 s) = $10

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Next Steps

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Next Steps

- Bring additional proposal details and associated tariff to upcoming MIWGs

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