New York ISO
Independent System Operator

Dynamic Reserves

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MIWG

November 8, 2022

Agenda

- Background
- Use of Forecast Load in Dynamic Reserves Formulation
- Next Steps

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Background

Previous Presentations

Title/Topic	Link
2021 RECA Study (Updated 2/2022)	https://www.nyiso.com/documents/20142/26734185/RECA(Dynamic%20Reserves)%20Study%20Report.pdf/27990919-e81b-76a4-12e1-57b9458b553d
March 3, 2022 MIWG Project Kickoff	https://www.nyiso.com/documents/20142/28897222/Dynamic%20Reserves%20Kickoff%20MIWG%2003032022_Final.pdf/b2b5cd26-4740-ab35-015c-5e93bf3ca23e
May 11, 2022 MIWG	https://www.nyiso.com/documents/20142/30555355/Dynamic%20Reserves%20MIWG%2020220511.pdf/35e8b44a-6a54-c8e0-ee30-b9e0709738af
June 16, 2022 MIWG	https://www.nyiso.com/documents/20142/31532822/6%20Dynamic%20Reserves.pdf/ca9ad944-c911-1874-2710-9ba04521d789
August 9. 2022 MIWG	https://www.nyiso.com/documents/20142/32687686/20220809%20Dynamic%20Reserves%20MIWG.pdf/c63d67ab-4498-efc9-7ad6-954c0d07af04
October 4, 2022 MIWG (Presented by FTI Consulting)	https://www.nyiso.com/documents/20142/33562316/20220928%20Dynamic%20Reserves%20Examples%20MIWG%20draft%20revised%20v2%20(002).pdf/75b413e2-30b8-2cda-6100-1620deebd5de
October 19. 2022 MIWG	https://www.nyiso.com/documents/20142/33857891/05_20221019%20Dynamic%20Reserves%20MIWG.pdf/1e4d90d6-10d8-2da8-b10f-96afa50e9ce0

Use of Forecast Load in Dynamic Reserves Formulation

DRAFT – FOR DISCUSSION PURPOSES ONLY

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Use of Forecast Load: Review

- **To determine the available transmission capability into a locality reserve area (e.g., East, SENY, NYC, Long Island) in the Day-Ahead Market (DAM), the current Dynamic Reserves formulation and prototype use the forecast load**
  - This was discussed in the 2021 RECA Study and at the 5/11/22 MIWG
- **NYCA reserve requirements do not account for transmission headroom to import reserves as reserves must be procured internally**
  - All external proxies are treated as internal generation
  - Only Loss of Generation constraints are considered for NYCA reserve requirements

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Feedback Received at 10/19 MIWG

- **At the 10/19 MIWG, NYISO received stakeholder feedback on the Intermittent Resource Contingency constraint**
  - Stakeholders across multiple sectors supported a change to the formulation of the Loss of Generation constraint for the 30-Minute NYCA Reserve Requirement to address concerns regarding both the use of Forecast Load in the formulation and the proposed Intermittent Resource Contingency constraint
    - The basis for this change was rooted in the fact that not accounting for Forecast Load at the NYCA level may lead to inefficient scheduling of resources and may not facilitate a reliable solution coming out of the Bid Pass
  - The proposed change would not affect any of the nested reserve regions (East, SENY, NYC, or LI) and would not affect the 10-minute (spin, total) NYCA reserve products

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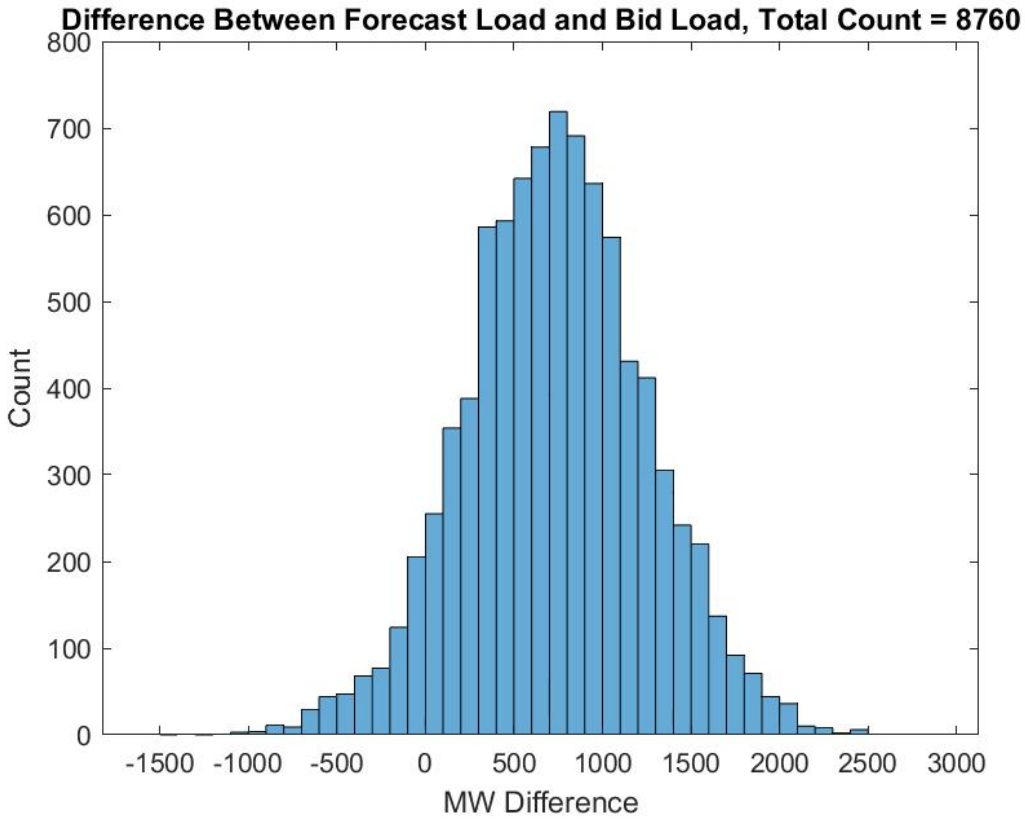
Bid Load vs. Forecast Load: Data Analysis

- **A comparison of Bid Load and Forecast Load *NYCA-wide* for the Day-Ahead Market in calendar year 2021 indicated the following:**
  - Forecast Load exceeds Bid Load in 93% of intervals, with an average exceedance of 814 MW
  - The average DAM Bid Load as a percent of Forecast Load is 95%
  - Each bin in the histogram is equal to 100 MW



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Potential Enhancement: NYCA 30-Minute Reserve Requirement

- **A potential solution to stakeholder feedback received at the 10/19 MIWG would be to adopt a change to the formulation of the NYCA 30-Minute Reserve Requirement**
  - The change would increase the reserve requirement by a positive difference between Forecast Load and Bid Load (there would be no other change to the formulation)
  - When Forecast Load exceeds Bid Load, the difference could be added to the reserve requirement as such:

$$Res_{RA_{a_i}}^{30Total} \geq Mult_{\mathrm{RA}_a}^{30Total} * \{ \max_{\mathrm{k} \in \mathrm{Gen}_{RA_a}} \{ gen_{k_i} + res_{k_i}^{30Total} \} \} + \max[(\text{Forecast Load} - \text{Bid Load}), 0]$$

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Potential Enhancement: Discussion

- **NYISO notes that this change would have several benefits, such as:**
  - Calculates reserve requirements considering forecast load for all reserve regions
  - Supports reliable operations by providing needed resources Day-Ahead schedules
  - Signals market need and values for flexibility and dispatchability
  - Mitigates the need for Forecast Pass commitments
  - Partially fulfills an enhancement to the Dynamic Reserves formulation included in the 2021 SOM
- **This construct best fits into the existing 30-Minute reserve product. However, as future projects (e.g., Balancing Intermittency) explore the potential for longer-duration (>30 minute) products, this constraint may be used to procure a longer-term product**
- **The NYISO proposes that this potential solution continue to be evaluated during the Market Design Complete phase in 2023**
  - This will allow the opportunity for more analysis and understanding of the potential implications on topics such as scheduling and pricing

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Next Steps

Components Previously Discussed: Q2

- **To date, NYISO has completed initial stakeholder discussions on the following topics:**
  - Correlated contingencies that might impact reserve requirements
  - Use of forecast load in mathematical formulation
  - Interaction of dynamic modeling with intermittent resource contingencies
  - Securing of reserves in export constrained areas (e.g., Long Island)
  - Interplay between Thunderstorm Alerts (TSAs) and dynamic reserves
  - Process for posting of dynamic reserve requirements

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Components Previously Discussed: Q3

- **To date, NYISO has completed initial stakeholder discussions on the following topics:**
  - Interaction of dynamic reserves with operating reserve demand curves
  - Interaction of dynamic reserves with transmission demand curves
  - Interplay between dynamic reserves scheduling and additional reserve requirements
  - Reserve cost allocation

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Component Previously Discussed and Next Steps: Q4

- **To date, NYISO has completed initial stakeholder discussions on the following topics:**
  - LBMP formation (pricing and scheduling of resources under Dynamic Reserves)
  - Follow-up on the Intermittent Resource Contingency Constraint and LBMP formation
  - Impacts on scarcity pricing logic
  - Update on prototyping
  - Interplay with current/future efforts: More Granular Operating Reserves, Long Island Constraint Pricing, Reserves for Congestion Management
- **Project deliverable is Market Design Concept Proposed in Q4**
  - NYISO is targeting a November ICAPWG/MIWG for the Market Design Concept Proposed presentation

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Next Steps: 2023 - 2026

- **As discussed at the 10/19/22 MIWG, NYISO is exploring the option of a phased deployment such as the following:**
  - 2023: Market Design Complete
  - 2024: Functional Requirements, Development Complete (Phase 1)
  - 2025: Deployment (Phase 1); Functional Requirements, Development Complete (Phase 2)
  - 2026: Deployment (Phase 2)
- **The proposed phases would be based on deploying certain constraints in each phase:**
  - Phase 1: Loss of Generation Constraint (based only on the largest single-source generator), Loss of Transmission Constraint, Simultaneous Loss of Generation and Transmission Constraints, Dynamic 30-Minute NYCA ORDC, enhancements to Long Island reserve scheduling
    - All Loss of Generation constraints in Phase 1 would be based only on the largest single-source generator. This phase would match the constraints that NYISO is currently prototyping. This would include the change to the 30-Minute NYCA reserve requirement discussed today.
  - Phase 2: Introduce Correlated Loss of Multiple Generators Constraint, Intermittent Resource Contingency Constraint
    - Phase 2 could also include any changes to concepts that have been identified for further review as part of the MDCP, such as Transmission Demand Curves, Thunderstorm Alerts, and Scarcity Pricing.

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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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