New York ISO
Independent System Operator

# Dynamic Reserves: Tariff changes discussion

**Ashley Ferrer**
Energy Market Design

**Matthew Musto**
**Kanchan Upadhyay**
**Ting Dai**
Market Solutions Engineering

**ICAPWG/MIWG**
November 27, 2023

# Background



New York ISO

# Agenda

- Background
- Dynamic Reserve Criteria discussion
- Draft Tariff
- Next Steps

New York ISO

# Previous Presentations

| Title/Topic | Link |
|---|---|
| March 7, 2023 MIWG | https://www.nyiso.com/documents/20142/36639552/Dynamic%20Reserves%20-%2020230307%20MIWG_final.pdf/a29ccf5d-4c26-5cbf-0103-5bece7edb276 |
| March 31, 2023 MIWG | https://www.nyiso.com/documents/20142/36828420/MIWG%20March%2031%20Dynamic%20Reserves%20Postings%20and%20LMP.pdf/81c35384-2438-1e03-e021-6e7ecc18f9d7 |
| September 5, 2023 MIWG | https://www.nyiso.com/documents/20142/39768278/2%2020230905%20MIWG%20-%20Dynamic%20Reserves.pdf/d58e28ab-de87-7a86-4296-a8c21f7c764f |
| September 14, 2023 MIWG | https://www.nyiso.com/documents/20142/40004830/20230914%20MIWG%20-%20Dynamic%20Reserves.pdf/a1c6d806-5b67-a8fc-9d04-a1669a926f54 |
| September 18, 2023 MIWG | https://www.nyiso.com/documents/20142/40044890/5%2020230918%20MIWG%20-%20Dynamic%20Reserves.pdf/0b1b7e63-737d-5bee-4abc-be65c234aa3b |
| September 26, 2023 MIWG | https://www.nyiso.com/documents/20142/40204141/4%2020230926%20MIWG%20-%20Dynamic%20Reserves.pdf/90e8c0b2-aeaf-0935-5c4e-bd260c948f3c |
| October 3, 2023 MIWG | https://www.nyiso.com/documents/20142/40342797/20231003%20MIWG%20-%20Dynamic%20Reserves.pdf/51657652-ac7e-c9e2-ed5f-85b52e7e49f7 |
| October 12, 2023 MIWG | https://www.nyiso.com/documents/20142/40559142/Dynamic%20Reserves.pdf/a17ba0a7-8e59-53b9-e028-4942f595c2f1 |

New York ISO

# Previous Presentations

| Title/Topic | Link |
|---|---|
| October 19, 2023 MIWG | https://www.nyiso.com/documents/20142/40696384/20231019%20MIWG%20-%20Dynamic%20Reserves.pdf/ef4371c2-5bff-7adb-5871-1d77d6fa98eb |
| November 8, 2023 MIWG | https://www.nyiso.com/documents/20142/41049783/20231108%20MIWG%20-%20Dynamic%20Reserves.pdf/e38b6d72-aa3f-69f3-b43f-8b3591b0e314 |
| November 17, 2023 MIWG | https://www.nyiso.com/documents/20142/41273741/20231117%20MIWG%20-%20Dynamic%20Reserves_final.pdf/d18195bc-c940-1a1f-51c1-3220a02c23bd |

New York ISO

# Dynamic Reserve criteria: Based on Stakeholder Feedback



New York ISO

# Reserve Criteria (10 Spin)

| | NYCA | East | SENY | NYC | LI |
|---|---|---|---|---|---|
| **10-Minute Spinning Reserves**<br><br>**Static Value**<br><br>**Reliability Rule**<br><br>**Dynamic Reserves Calculation** | 1/2*A = 655 MW<br>10-minute spinning reserve is equal to at least one-half of the 10-minute total reserve. [NYSRC Reliability Rules, Section E]<br><br>DR: ½ Largest Schedule (The Largest Schedule is formulated as the capability of the largest generator, as the combined energy, regulation, 10-Minute Spin, 10-Minute Total, 30-Minute Total schedules) | 1/4*A = 330 MW*<br>10-minute spinning reserve is based on the NERC requirement to plan to meet energy reserve requirements, including the deliverability/capability for any single Contingency and the NPCC requirement that reserves be distributed to ensure that they can be used without exceeding individual element ratings or transfer limitations. [NERC TOP-002-2.1b; NPCC Reliability Directory No. 5, Section 5.6]<br>Hold a portion of 10-min Total requirements as Spin. Please refer to 10-min Total requirement criteria on next slide<br><br>a. For one transmission contingency<br>(Gen Energy + Gen 10S Reserves/0.5 + Load) * Shift Factor <= Central East Voltage Collapse(VC) limit – (N-1) Derate<br><br>b. For one Generation contingency<br>Gen Energy + Gen 10S Reserves/0.5 – Largest Gen Schedule + Load) * Shift Factor <= Central East Voltage Collapse(VC) limit | 0 | 0 | 0 |

https://www.nyiso.com/documents/20142/3694424/Locational-Reserves-Requirements.pdf
https://www.nysrc.org/wp-content/uploads/2023/07/RRC-Manual-V46-final.pdf

New York ISO

# Reserve Criteria (10 Total)

| | NYCA | East | SENY | NYC | LI |
|---|---|---|---|---|---|
| **10-Minute Total Reserves**<br><br>Static Value<br><br>**Reliability Rule**<br><br>**Dynamic Reserves Calculation** | A = 1310 MW<br>10-minute total reserve is equal to the operating capability loss caused by the most severe contingency under normal transfer conditions. [NYSRC Reliability Rules, Section E]<br><br>DR: Largest Schedule | 1200 MW<br>10-minute total reserve is based on Reliability Rules that require immediate measures (activation of EAST 10-minute reserves) be applied to bring loadings on an internal NY transfer interface to within limits in 15 minutes. [NYSRC Reliability Rules, Section D]<br><br>a. Hold enough 10-min Total reserves such that all modelled EAST Interface lines can be brought down to the lower Central East VC limit in 10-minutes following one transmission contingency that can derate the limit<br><br>(Gen Energy + Gen 10T Reserves + Load) * Shift Factor <= Central East Voltage Collapse(VC) limit – (N-1) Derate<br><br>b. Hold enough 10-min Total reserves such that all modelled EAST Interface lines can be brought down to the Central East VC limit following one generation contingency<br><br>(Gen Energy + Gen 10T Reserves – Largest Gen Schedule + Load) * Shift Factor <= Central East Voltage Collapse(VC) limit | 0 | 500 MW<br>10-minute total reserve is based on Reliability Rules that require a calculated percentage of the NYCA 10-minute total reserve requirement be procured within NYC. [NYSRC Reliability Rules, Section G] During Thunderstorm Alerts, will be reduced to zero.<br><br>Hold enough 10-min Total reserves such that all modelled NYC Interface lines can be brought down to LTE in 10-minutes following the one transmission and generation contingency in NYC<br><br>a. For one transmission contingency:<br>(Gen Energy + Gen 10T Reserves + Load) * Shift Factor <= LTE limit<br><br>b. For one generation contingency:<br>(Gen Energy + Gen 10T Reserves – Largest Gen Schedule + Load) * Shift Factor <= LTE limit | 1/10*East = 120*<br>[NERC TOP-002-2.1b; NPCC Reliability Directory No. 5, Section 5.6] |

New York ISO

# Reserve Criteria (30 Total)

| | NYCA | East | SENY |
|---|---|---|---|
| **30-Minute Total Reserves**<br><br>Static Value<br><br>**Reliability Rule**<br><br>**Dynamic Reserves Calculation** | 2*A = 2620 MW<br>30-minute total reserve is equal to two times the 10-minute reserve necessary to replace the operating capability loss caused by the most severe contingency under normal transfer conditions. [NYSRC Reliability Rules, Section E]<br><br>DAM : Largest Schedule + 2nd Largest Schedule + max(0, Forecast Load – Scheduled Load)<br><br>RTM : Largest Schedule + 2nd Largest Schedule | 1200 MW<br><br>Hold 30-Minute total reserve to bring loadings on an internal NY transfer interface to within limits in 30 minutes. [NERC TOP-002-2.1b; NPCC Reliability Directory No. 5, Section 5.6]<br><br>a. Hold enough 30-min Total reserves such that all modelled EAST Interface lines can be brought down to the lower Central East VC limit in 30-minutes following two transmission contingencies. In DA, the Load considered for the calculation would be higher of Scheduled and Forecast load:<br><br>(Gen Energy + Gen 30T Reserves + Load) * Shift Factor <= Central East Voltage Collapse(VC) limit – (N-2) Derate<br><br>b. Hold enough 30-min Total reserves such that all modelled EAST Interface lines can be brought down to the Central East VC limit in 30-minutes following two generation contingencies. In DA, the Load considered for the calculation would be higher of Scheduled and Forecast load:<br><br>(Gen Energy + Gen 30T Reserves - Largest Schedule – Second Largest Schedule + Load) * Shift Factor <= Central East Voltage Collapse(VC) limit<br><br>c. Hold enough 30-min Total reserves such that all modelled EAST Interface lines can be brought down to the Central East VC limit in 30-minutes following one transmission and one generation contingency. In DA, the Load considered for the calculation would be higher of Scheduled and Forecast load:<br><br>(Gen Energy + Gen 30T Reserves - Largest Schedule + Load) * Shift Factor <= Central East Voltage Collapse(VC) limit – (N-1) Derate | 1300-1800<br><br>30-minute total reserve is, depending on the hour, based on Reliability Rules that require the ability to restore a transmission circuit loading to Emergency or Normal Transfer Operating Criteria within 30 minutes of the contingency.<br><br>Hold enough 30-min Total reserves such that all modelled SENY Interface lines can be operated to Normal Transfer criteria following one transmission or one generation contingency in SENY. In DA, the Load considered for the calculation would be higher of Scheduled and Forecast load:<br><br>a. For one transmission contingency:<br>(Gen Energy + Gen 30T Reserves + Load) * Shift Factor <= Normal Limit<br><br>b. For one generation contingency:<br>(Gen Energy + Gen 30T Reserves –Largest Schedule+ Load) * Shift Factor <= Normal Limit<br><br>c. For two transmission contingencies:<br>(Gen Energy + Gen 30T Reserves + Load) * Shift Factor <= LTE Limit<br>d. For two generation contingencies:<br>(Gen Energy + Gen 30T Reserves – Largest Schedule –Second Largest Schedule + Load) * Shift Factor <= LTE Limit<br><br>e. For a combination of one transmission and one generation contingency:<br>(Gen Energy + Gen 30T Reserves – Largest Schedule + Load) * Shift Factor <= LTE Limit |

New York ISO

# Reserve Criteria (30 Total) cont'd

| | NYC | LI |
|---|---|---|
| **30-Minute Total Reserves**<br><br>Static Value<br><br>**Reliability Rule**<br><br>Dynamic Reserves Calculation | 1000 MW<br>30-minute total reserve is based on Reliability Rules that require the ability to bring transmission line loadings to Normal Operating Criteria within 30 minutes following a contingency. [NYSRC Reliability Rules, Section C] During Thunderstorm Alerts, will be reduced to zero.<br><br>Hold enough 30-min Total reserves such that all modelled NYC Interface lines can be operated to Normal Transfer criteria following one transmission or one generation contingency in in NYC. In DA, the Load considered for the calculation would be higher of Scheduled and Forecast load:<br><br>a. For one transmission contingency:<br>(Gen Energy + Gen 30T Reserves + Load) * Shift Factor <= Normal Limit<br><br>b. For one generation contingency:<br>(Gen Energy + Gen 30T Reserves –Largest Schedule+ Load) * Shift Factor <= Normal Limit<br><br>c. For two transmission contingencies:<br>(Gen Energy + Gen 30T Reserves + Load) * Shift Factor <= LTE Limit<br><br>d. For two generation contingencies:<br>(Gen Energy + Gen 30T Reserves – Largest Schedule –Second Largest Schedule + Load) * Shift Factor <= LTE Limit<br><br>e. For a combination of one transmission and one generation contingency:<br>(Gen Energy + Gen 30T Reserves – Largest Schedule + Load) * Shift Factor <= LTE Limit | 270-540 MW<br>[NYSRC Reliability Rules, Section D]<br><br>Hold enough 30-min Total reserves such that all modelled LI Interface lines can be operated to Normal Transfer criteria following one transmission or one generation contingency in in LI. In DA, the Load considered for the calculation would be higher of Scheduled and Forecast load:<br><br>a. For one transmission contingency:<br>(Gen Energy + Gen 30T Reserves + Load) * Shift Factor <= Normal Limit<br><br>b. For one generation contingency:<br>(Gen Energy + Gen 30T Reserves –Largest Schedule+ Load) * Shift Factor <= Normal Limit<br><br>c. For two transmission contingencies:<br>(Gen Energy + Gen 30T Reserves + Load) * Shift Factor <= LTE Limit<br><br>d. For two generation contingencies:<br>(Gen Energy + Gen 30T Reserves – Largest Schedule –Second Largest Schedule + Load) * Shift Factor <= LTE Limit<br><br>e. For a combination of one transmission and one generation contingency:<br>(Gen Energy + Gen 30T Reserves – Largest Schedule + Load) * Shift Factor <= LTE Limit |

New York ISO

# Reserve Criteria Summary

- **Dynamic Reserve design aligns with the criteria used to procure Operating reserves today**
  - NYCA level requirement will ensures enough 10-min reserves to secure for loss of gen with largest schedule. 30-min reserve requirement will ensure enough reserves to replenish the 10-min reserve requirement following the largest contingency
  - Locational 10-min reserve requirement will ensure appropriate distribution of 10-min reserves such that loadings on transmission circuits/interface are brought down to appropriate limits in 15-minutes following a contingency
  - Locational 30-min reserve requirement will ensure appropriate distribution of 30-min reserves to ensure the ability to bring such that loadings on transmission circuits/interface to Normal Operating criteria within 30-minutes following a contingency

New York ISO

# Draft Tariff Revisions



New York ISO

# Draft Tariff Revisions: Summary of Substantive Draft Tariff Revisions

- NYISO acknowledges the feedback received at Nov 17th MIWG and is working on addressing/discussing it. Any changes to tariff language based on that will be discussed at a later MIWG.
- MST 2.5
  - Minor edits to the definition of **Expected EDRP/SCR MW**
- MST 2.12
  - Included definition for **Locational Marginal Operating Reserve Prices ("LMORP")**
- MST 4.2
  - Edits to section 4.2.3
- MST 15.4
  - Edits based on Stakeholder feedback
  - Added clarification on the application of Operating Reserve demand curves in multiple sections
- MST 17.1.1
  - Minor edits to provide additional clarification
- OATT 6.5
  - Incorporated changes to Section 6.5.1 describing Operating Reserve Charges
  - Added a new Section 6.5.2 describing "Forecast Reserve Charge"

New York ISO

# Next Steps



New York ISO

# Next Steps

- The deliverable for 2023 is Market Design Complete
- Timeline to completion of MDC
  - Review market design elements and present additional examples at December MIWGs
  - Present MDC and tariff at December BIC
- NYISO will continue prototyping and testing the proposed functionality through early 2024 and will return to stakeholders should any issues be identified.
- Per the 2023 Market Vision, these concepts are expected to be deployed in 2026, assuming prototyping and testing are successful.

New York ISO

# Questions?



New York ISO

# 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

New York ISO