New York ISO
Independent System Operator

Modeling Improvements for Capacity Accreditation: Natural Gas Constraints

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Agenda

- Previous Discussions
- Background
- Estimate of Winter Gas Constraints
  - MMUs methodology for estimating gas availability
- Classification and Market Design Considerations
- Next Steps

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Previous Discussions

Previous Discussions

Date	Working Group	Discussion Points and Links to Materials
January 23, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation: Project Kick Off: https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff
February 28, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation: Correlated Derates Overview: https://www.nyiso.com/documents/20142/36499713/Correlated_Derates_MIWG_022823_FINAL.pdf/35eaab46-740e-aed0-9e2d-2207c06a0659 Modeling Improvements for Capacity Accreditation: Natural Gas Constraints Overview: https://www.nyiso.com/documents/20142/36499713/Gas%20Constraints%2002_28_2023%20ICAPWG_Final.pdf/e258d867-12f9-8453-c93b-49bc94b8e803 Modeling Improvements for Capacity Accreditation: SCR Modeling Overview: https://www.nyiso.com/documents/20142/36499713/2023-02-28%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/c1a52495-bc30-3e7c-f5c1-61c38f30fbe4

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Background

Background

- Capacity accreditation reflects resources' contribution to resource adequacy with the goal of producing more efficient ICAP Market outcomes
- Recent winter reliability concerns have raised questions of the availability of generation utilizing natural gas as a primary fuel source on a non-firm basis due to pipeline and/or other constraints
- For this portion of the Modeling Improvements for Capacity Accreditation project, the NYISO is looking to develop methodologies to identify and quantify natural gas constraints and resources impacted by such constraints in addition to corresponding methodologies for implementation in GE MARS.
  - The Special Case Resource modeling and Correlated Derates portions of Modeling Improvements for Capacity Accreditation will be covered in separate discussions.
- The 2023 Project deliverable is Q4 – Functional Requirements

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Estimate of Winter Gas Constraints

Estimate of Winter Gas Constraints

- **MMU has previously developed a methodology to estimate the amount of natural gas available to NY generators during peak hours in the winter**
  - Broadly important for specifying the times/duration, location, system conditions, and impacted units
    - Important for modeling accurate capacity reductions in GE MARS
    - Important for identifying the shared characteristics which will inform Capacity Accreditation
- **MMU's methodology utilizes EPA Emissions data to identify when units are running on natural gas vs. an alternate fuel, yielding an aggregate joint gas limit at different load levels**
- **Gas available to NY generators is equal to total pipeline import/export capacity – firm demand (mostly residential and commercial)**
  - LNG deliveries also sporadically add to the supply of gas in eastern NY
  - MMU subtracts out surplus in eastern NY to derive the joint limit except on moderate load days when there is spare pipeline capacity
- **<u>The NYISO is looking at MMU's methodology and inputs alongside internal data in order to appropriately model gas availability in GE MARS</u>**

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Estimate of Winter Gas Constraints

- **Using the charts shown on the following slides, we can estimate gas availability during notable 2022/2023 Winter Conditions:**

Winter Storm Elliot (MMU Methodology – does not include all units in these zones) • 12/23/2022 – 12/27/2022 • Peak Load 12/24 – 22,004 MW HB 17	Winter Storm Elliot (Internal Estimate – Units running on gas) • 12/23/2022 – 12/27/2022 • Peak Load 12/24 – 22,004 MW HB 17
• East F/G/K ~ 2,400 MW Gas • NYC LDC Units ~ 2,100 MW Gas • LI ~ 650 MW Gas	F/G/K - 1,717 MW Gas NYC – 0 MW Gas LI – 0 MW Gas
February 2023 Cold Snap (MMU Methodology– does not include all units in these zones) • 02/02/2023 – 02/05/2023 • Peak Load 02/03 – 23,369 MW HB 18	**February 2023 Cold Snap (Internal Estimate – Units running on gas)** • 02/02/2023 – 02/05/2023 • Peak Load 02/03 – 23,369 MW HB 18
East F/G/K ~ 1,100 MW NYC LDC Units ~ 1,725 MW LI ~ 700 MW	F/G/K – 1,718 MW Gas NYC – 2,068 MW Gas LI – 197 MW Gas

- **Primarily seen with Winter Storm Elliot, differences between MMU and Internal estimates are driven by the former's inability to completely capture the impact of events outside of the normal relationship between zonal demand and MWs from gas (e.g., Wellhead freeze-offs, compressor station failures, OFOs, etc.)**

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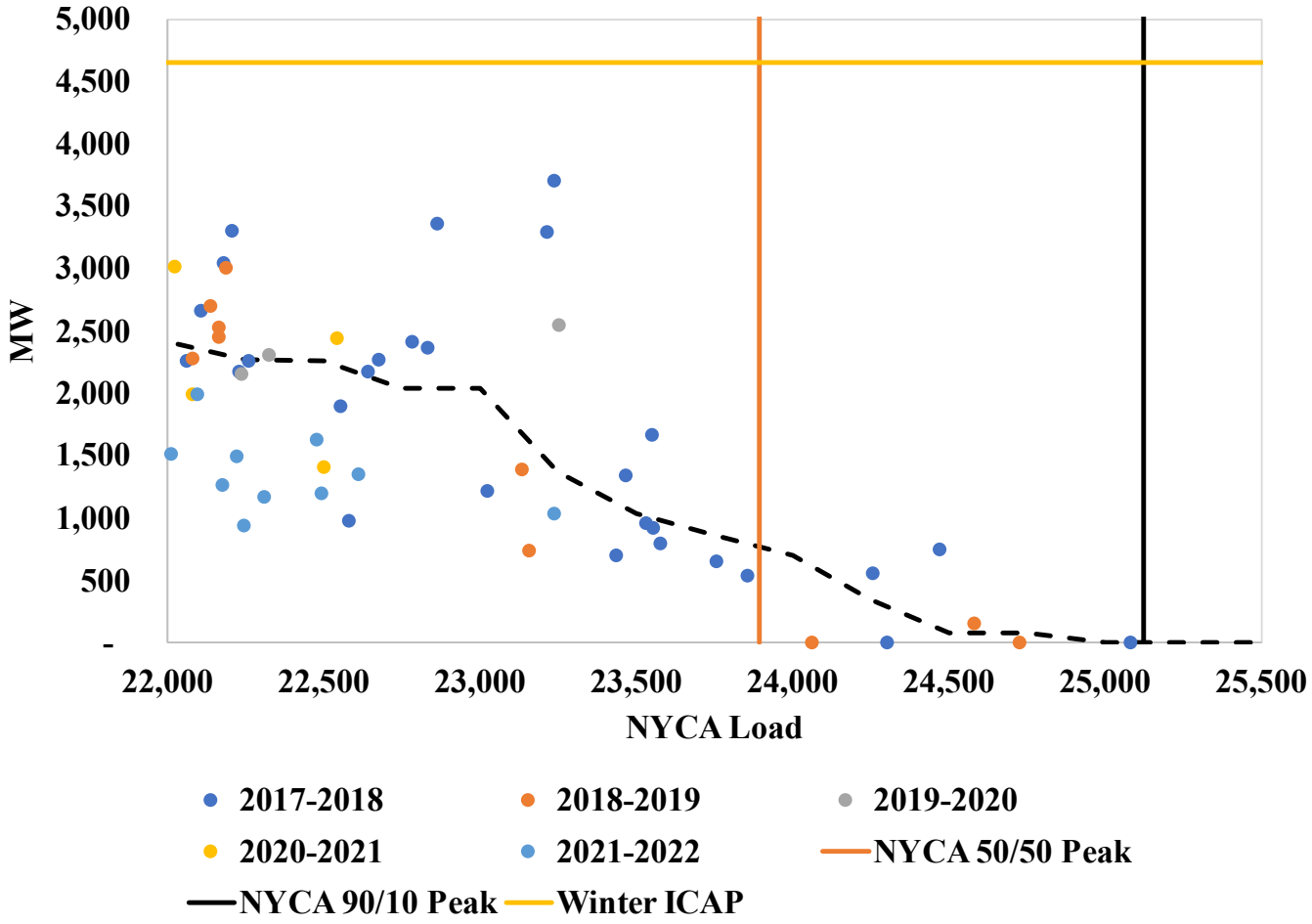
Estimate of Winter Gas Constraints – East F/G/K



Source: MMU Analysis

The dynamic limit shown here is calculated as median output at historical loads within 500 MW (systemwide) of each load level and is constrained to be strictly non-increasing.

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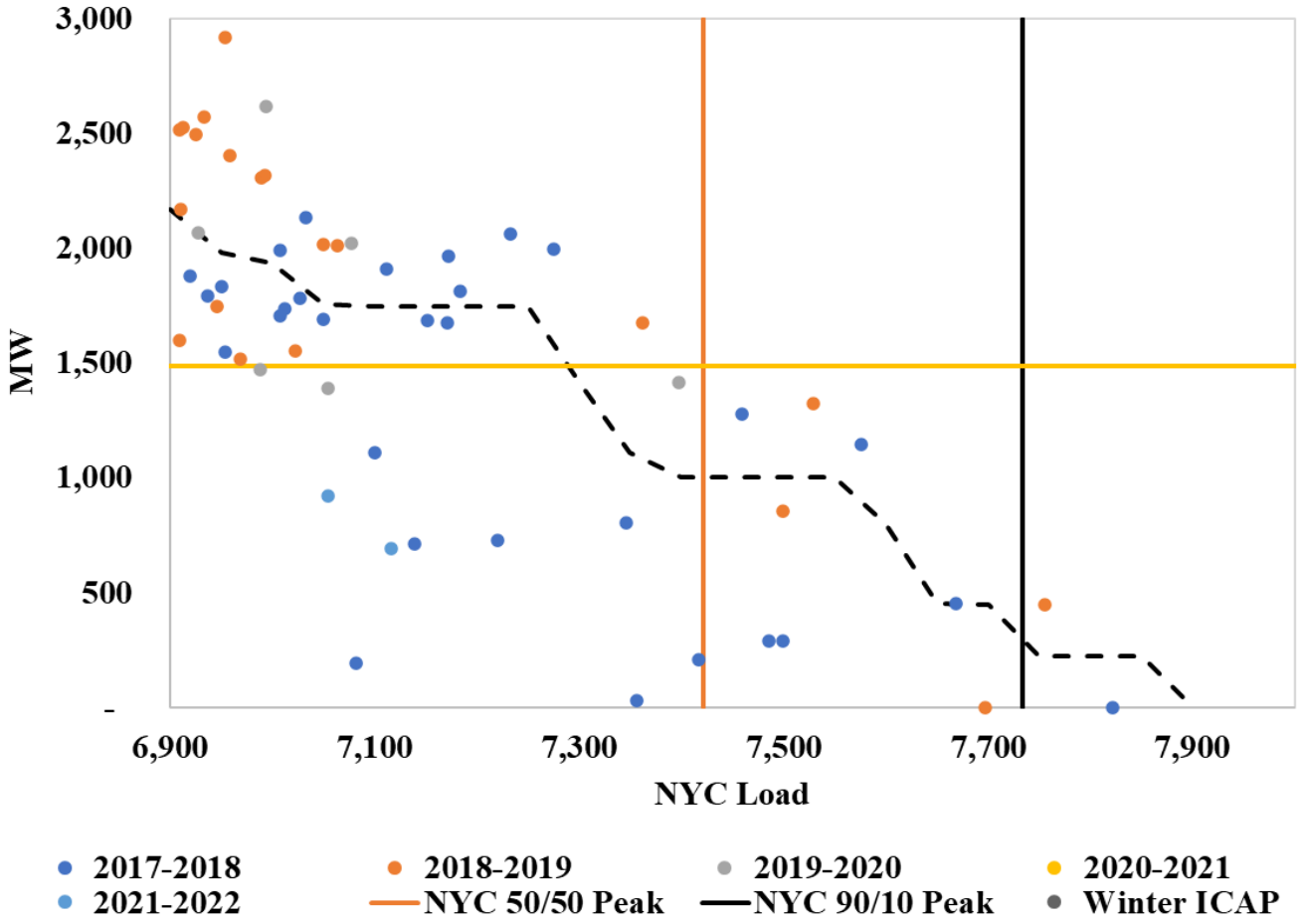
Estimate of Winter Gas Constraints - NYC LDC Connected Units



Source: MMU analysis

The dynamic limit shown here is calculated as median output at historical loads within and 100 MW of each load level and is constrained to be strictly non-increasing.

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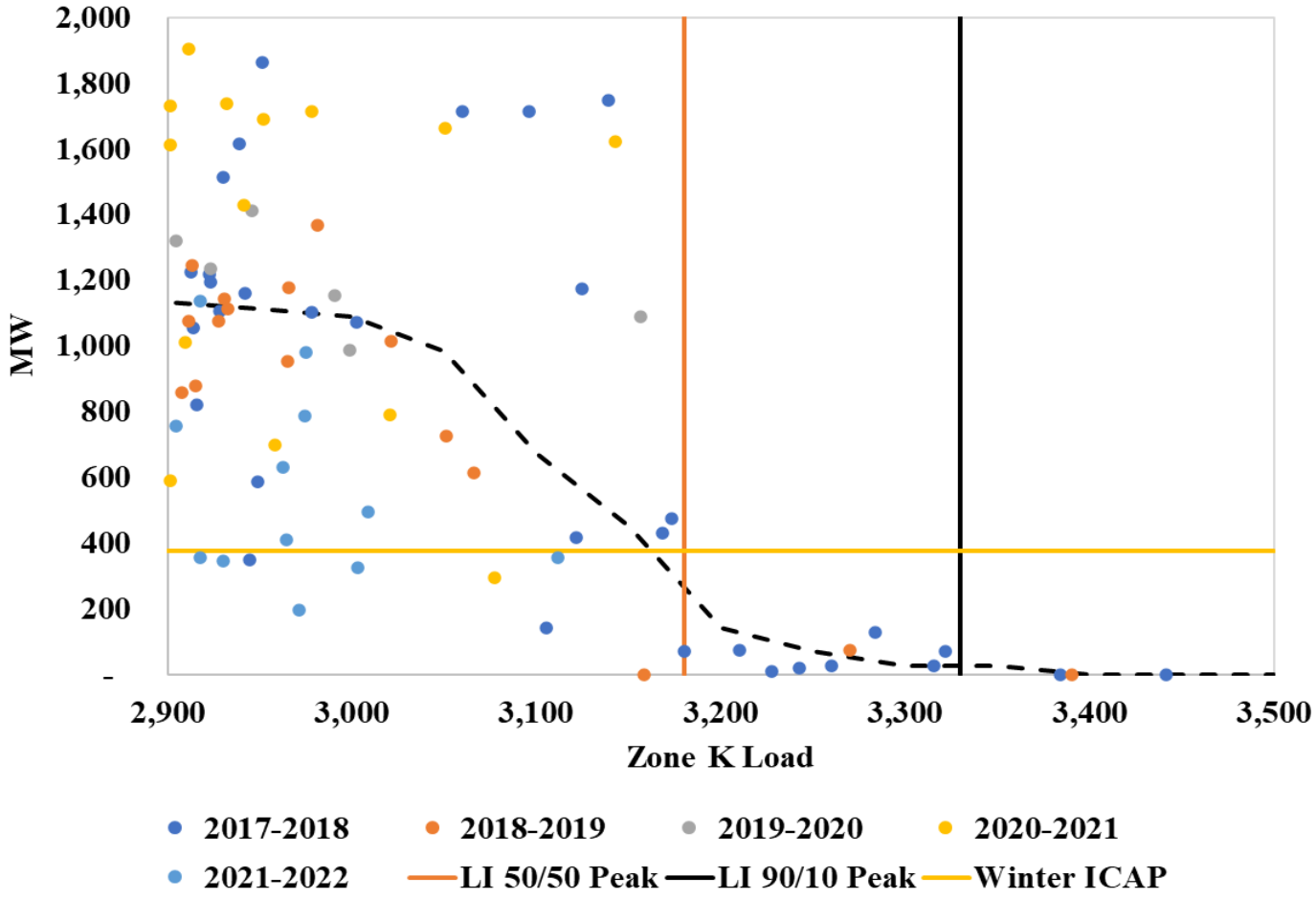
Estimate of Winter Gas Constraints – Long Island



Source: MMU analysis

The dynamic limit shown here is calculated as median output at historical loads within and 100 MW of each load level and is constrained to be strictly non-increasing.

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Market Design Considerations and Classification

Classification

- **In order to produce CAFs reflecting a unit's ability to meet Winter Reliability needs, the NYISO is looking at potential considerations including:**
  - Dual Fuel
  - Firm Fuel Procurement
- **These considerations will help determine whether a unit is fuel secure or fuel insecure**
  - Will also influence reporting and verification

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Market Design Considerations - Dual Fuel

- **Dual fuel capability over Winter Capability Period**
  - Capability and quantity
  - Length of coverage
- **Verification**
  - Data submittal
    - Type
    - Timelines
  - Needs to align with how units procure alternate fuel in the market
- **Potential Classifications**
  - Dual fuel capable (Has capability plus adequate alternate fuel on hand when gas is unavailable)
  - No dual fuel (No capability or capable but no alternate fuel on hand to cover periods when gas is unavailable)

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Market Design Considerations – Firm Gas

- **Firm Gas over Winter Period**
  - Portion of capacity
  - Period(s) of coverage
- **Verification**
  - Data submittal
    - Type
    - Timelines
  - Needs to align with how units procure firm contracts in the market
    - Stakeholders have previously indicated that firm gas is available in “gas packets” that are sold to units
- **Potential Classification**
  - Firm
  - Non-Firm (Behind LDC or Direct Connect without firm fuel contract)
    - Units behind an LDC that are determined to be unable to procure Firm gas can be subject to OFOs and other restrictions during Winter Weather events (Significant OFOs from Winter Storm Elliot and the February cold snap are listed in the Appendix)

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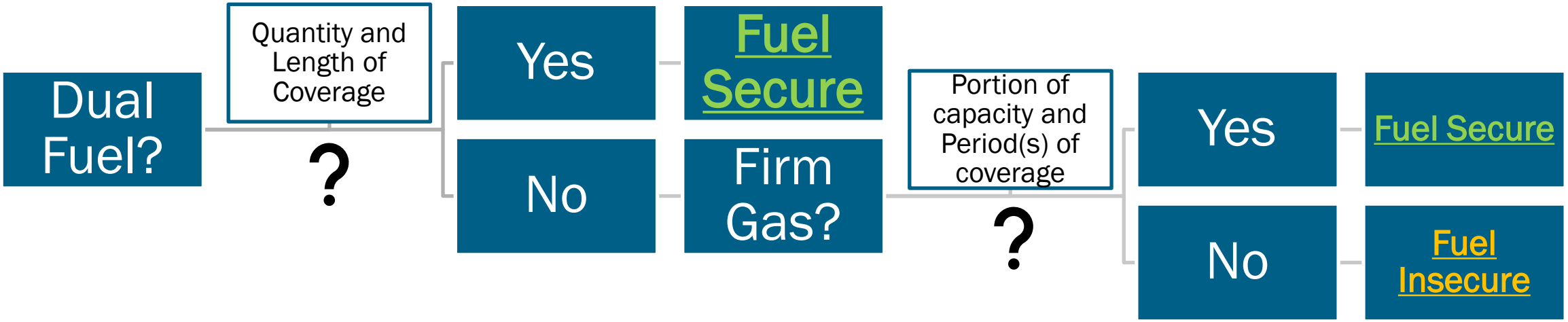
Potential Classification



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Next Steps

Next Steps

- Return to a future ICAPWG to continue the discussion with stakeholders on rules for classifying units
- The NYISO will be reviewing the information coming out of the 2023 Fuel and Energy Security study as it becomes available to identify additional constraints and/or any needed revisions

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Questions?

Appendix

Significant OFOs

- **From Winter 2023-2023 Cold Weather Operations 3/29 MC Presentation**
  - Winter Storm Elliot
    - Con Ed Interruption of Service, 12/24/22 15:05 - 12/26/22 10:00
    - NG Downstate Power Generators Interruption, 12/24/22 15:45 – 12/26/22 14:00
  - 2/3/2023 – 2/5/2023
    - Con Ed 1/24th Hourly OFO, 2/4/23 04:00 - 2/4/22 10:00
    - NG Downstate 1/24th Hourly OFO, 2/3/22 10:00 – 2/5/23 10:00
    - NG Upstate East and West gate Interruption, 2/3/23 10:00 – 2/4/23 10:00

Source: https://www.nyiso.com/documents/20142/36781062/2022%20-%202023%20MC%20Cold%20Weather%20Operating%20Conditions.pdf/553413c0-7e4d-227c-39dc-6298e3a6fddc

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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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