

Reliability and Market Considerations for a Grid in Transition:

Reliability Gap Assessment Potential Market Design Improvements Part 2

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Agenda

- **Background**
- **Reliability Gap Assessment**
- **Concepts for Addressing Potential Reliability Gaps: Energy Market Mechanics**
- **Next Steps**

Background

A Grid in Transition

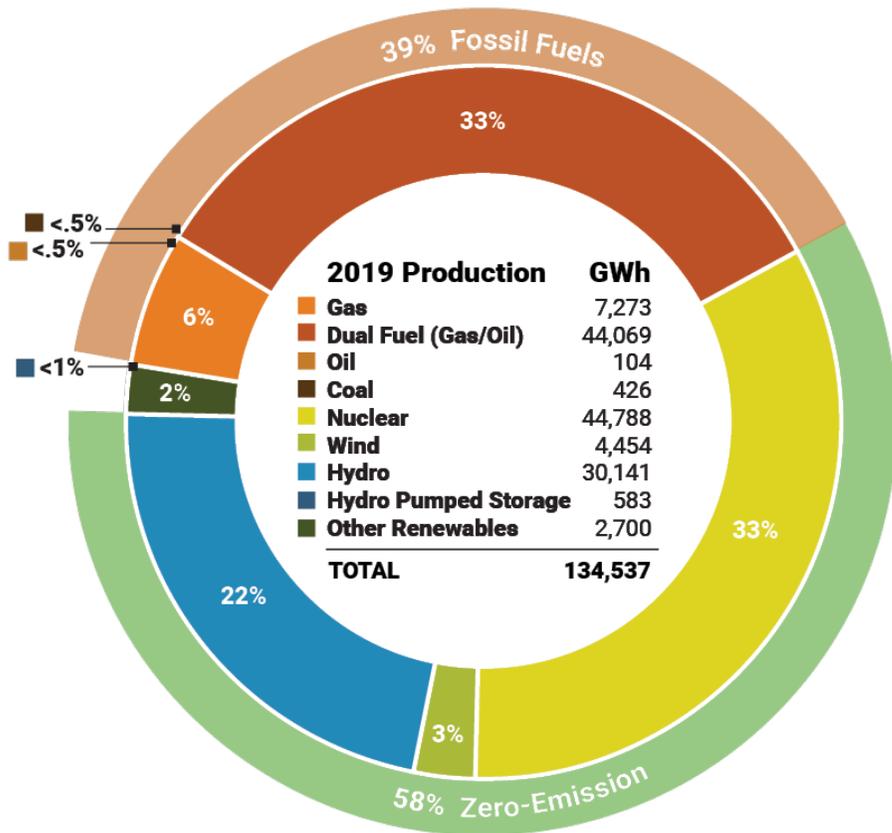
- The NYISO's competitive wholesale markets provide a framework for a changing grid
- The NYISO's Grid in Transition Report:
 - Describes emerging reliability and economic challenges facing New York's electricity sector
 - Identifies gaps to address
 - Proposes a path forward



The Reliability and Market Considerations for a Grid in Transition report was published on December 20, 2019, and can be viewed here: <https://www.nyiso.com/documents/20142/2224547/Reliability-and-Market-Considerations-for-a-Grid-in-Transition-20191220%20Final.pdf/61a69b2e-0ca3-f18c-cc39-88a793469d50>

A Grid in Transition - Clean Energy Goals

- New York's clean energy goals are reshaping the grid.



Climate Leadership and Community Protection Act (CLCPA) Goals



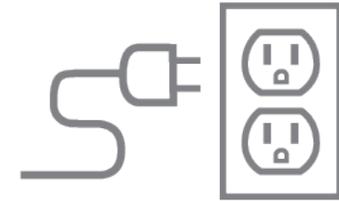
Renewables

**70%
by 2030**



Offshore Wind

**9,000 MW
by 2035**



Energy Efficiency

**185 trillion British Thermal
Units (BTU) reduction by 2025**

Zero-Emission
Electric Sector
by 2040



Distributed Solar Energy

**6,000 MW
by 2025**



Battery Storage

**3,000 MW
by 2030**

A Grid in Transition - Reliability Considerations

- New York's decarbonization policies are creating new challenges to meet NYISO's mission to support a reliable and economically efficient electric system.

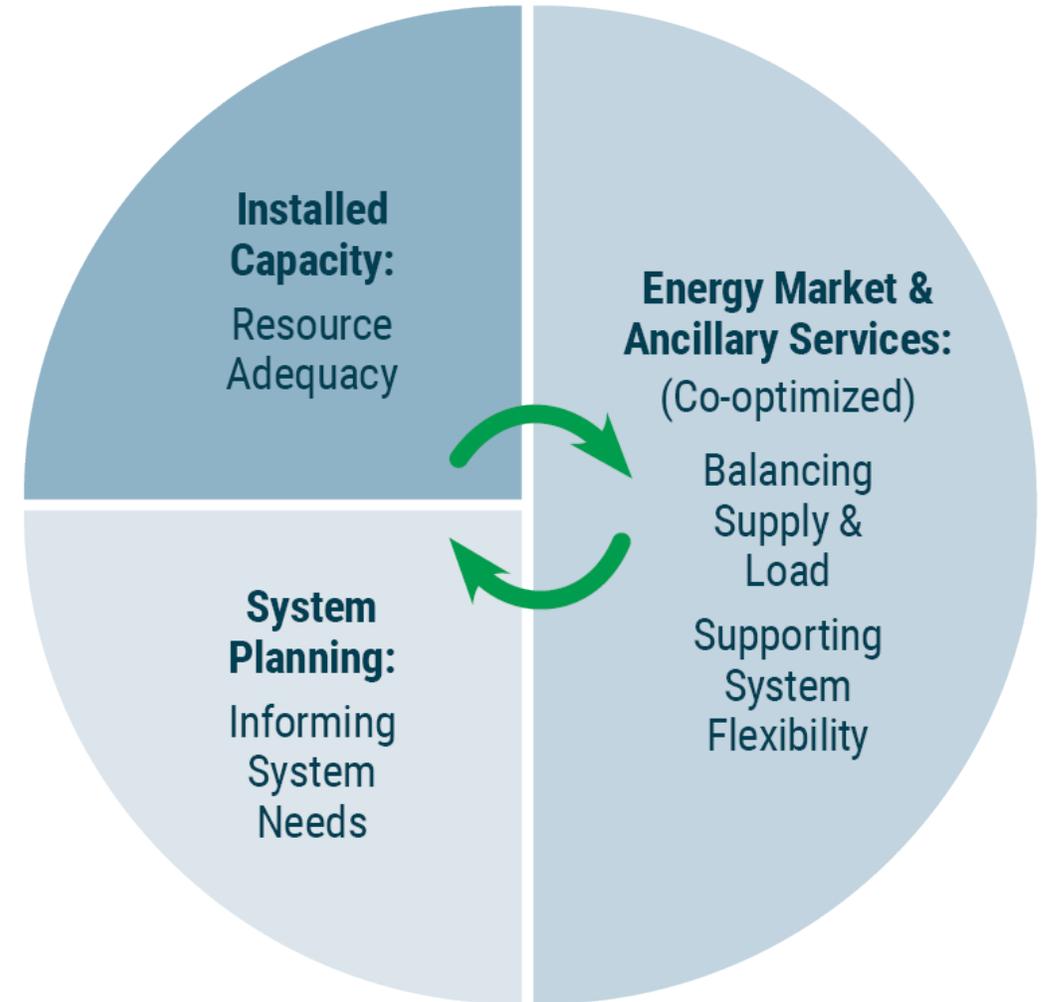


Reliability Challenges

- Balance Supply & Demand
- Maintain Ten-Minute Operating Reserves
- Maintain Total Thirty-Minute Operating Reserves
- Manage Daily Energy Needs
- Secure Transmission Operations with Congestion Management
- Coordinate System Restoration and Black Start
- Manage Voltage Support
- Maintain Frequency Response
- Maintain Resource Adequacy
- Coordinate Supply Outages

A Grid in Transition - Role of Markets

- **The NYISO supports reliability through three complementary markets for energy, ancillary services, and capacity.**
 - Each addresses distinct reliability needs through competitive market pricing that benefits New York consumers while reducing costs.
 - Together, energy, ancillary services, and capacity market revenues provide economic signals for new investment, retirement decisions, and participation by demand response providers.



A Grid in Transition – Path Forward

- **The NYISO’s wholesale markets can serve as an effective platform for achieving New York State environmental objectives.**
 - Through active engagement with stakeholders and policymakers, the NYISO is developing design improvements to meet the future challenges expected to arise with high levels of intermittent renewable and distributed energy resources.
- **The plan includes a set of market design enhancements that work together coherently and efficiently to satisfy New York’s changing grid reliability needs.**
 - Nine areas of market design opportunities across three main points of focus (discussed on the next slide) require immediate attention and are recommended for implementation in the next five years, through 2024.



A Grid in Transition – The Plan

- Carbon Pricing
- Comprehensive Mitigation Review
- DER Participation Model
- Energy Storage Participation Model
- Hybrid Storage Model

Aligning Competitive Markets and New York State Clean Energy Objectives



- **Enhancing Energy & Shortage Pricing**
 - Ancillary Services Shortage Pricing
 - Constraint Specific Transmission Shortage Pricing
 - Enhanced Fast Start Pricing
- **Review Energy & Ancillary Services Product Design**
 - More Granular Operating Reserves
 - Reserve Enhancements for Constrained Areas
 - Reserves for Resource Flexibility

Valuing Resource & Grid Flexibility



- **Enhancements to Resource Adequacy Models**
- **Revise Resource Capacity Ratings to Reflect Reliability Contribution**
 - Expanding Capacity Eligibility
 - Tailored Availability Metric
- **Capacity Demand Curve Adjustments**

Improving Capacity Market Valuation



Reliability Gap Assessment

Reliability Gap Assessment

- The Reliability and Market Considerations for a Grid in Transition (Grid in Transition) white paper* includes a Reliability Gap Assessment (The full assessment is in Appendix B and a high level discussion is available starting on page 20)
- The NYISO presented the high-level market design improvements recommended in the Reliability Gap Assessment at the April 14 ICAP/MIWG and also reviewed recommendations related to NYISO's Operations processes at the June 10 ICAP/MIWG.
- Today's presentation is the second of several more in-depth discussions on the market design improvement recommendations.
 - The goal is to get feedback on the recommendations from stakeholders and move towards incorporating the market design improvements into the Master Plan for 2022 and beyond.
 - Key questions for stakeholders are
 - Is there anything missing in the Gap Assessment?
 - What should be the immediate focus and what should be done later?

* <https://www.nyiso.com/documents/20142/9869531/Reliability%20and%20Market%20Considerations%20for%20a%20Grid%20in%20Transition%20-%2020191220%20Final.pdf/7846db9c-9113-a85c-8abf-1a0ffe971967>

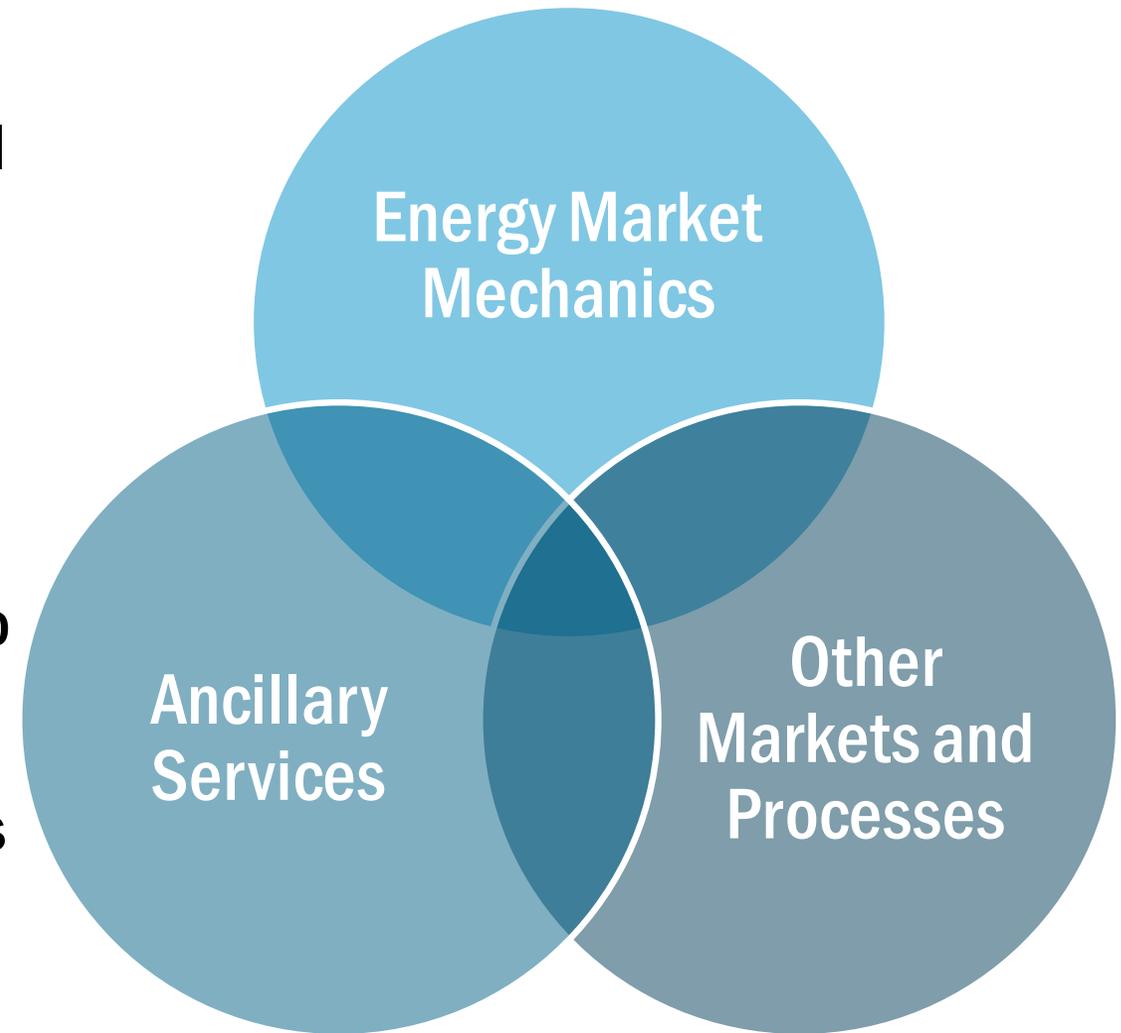
A Grid in Transition - Reliability Considerations

- **The Grid in Transition Report identified the following areas of future reliability gaps:**

- Balance Supply & Demand
- Maintain Ten-Minute Operating Reserves
- Maintain Total Thirty-Minute Operating Reserves
- Manage Daily Energy Needs
- Secure Transmission Operations with Congestion Management
- Coordinate System Restoration and Black Start
- Manage Voltage Support
- Maintain Frequency Response
- Maintain Resource Adequacy
- Coordinate Supply Outages

Three main areas

- In April, we reviewed the high-level, potential market design concepts for existing and future components of NYISO's wholesale energy markets
- The recommendations can be grouped into three main areas
- Within each area there are recommended enhancements and recommended metrics to track.
- The June 20 ICAP/MIWG discussion was focused on Ancillary Services enhancements and market changes
- Today's discussion will be on Energy Market Mechanics
 - This includes the items related to DAM, RTC, and RTD



Schedule and what comes next

- **The expected schedule for the next discussion is:**
 - Other Markets and Processes enhancements and market changes: ICAP/MIWG Thursday July 23
 - This includes such items as Resource Adequacy and Planning, Reactive Supplier Requirement, and Voltage Support Requirements
- **After that we will be looking at tracking, metrics and developing a plan for moving forward.**

Concepts for Addressing Potential Reliability Gaps: Energy Market Mechanics

Energy Market Improvements

■ Identified reliability gaps

- Maintain Ability to Balance Load and Generation
- Maintain Ten-Minute Operating Reserves
- Maintain Total Thirty-Minute Operating Reserves
- Maintain Ability to Meet Daily Energy Requirements
- Maintain Reliable Transmission Operations

Energy Market Improvements (Cont.)

■ Potential Market Design improvements

• RTD

- Strong incentives for participations by flexible resources in RT dispatch
- Potential gains from ACE diversity in the region
- Ramping Services
 - Investigate the need for ramping services
 - Investigate the need for a zonal ramping product
- Manage forecast uncertainty
 - Reduce load latency
 - Forecast latency improvements
 - Account for increased RT load forecast uncertainty
 - Run a Corrective Action Mode (CAM) when forecast is off
 - Consider if commitment of quick start units should be in RTD (less impacted by RTC forecast latency)
 - » Should interchange scheduling also move to RTD
 - Shift to ERCOT type no look-ahead dispatch
 - Develop other approaches

Energy Market Improvements (Cont.)

■ Potential Market Design improvements

- RTC
 - Does RTC need to look out further to commit slower resources (this may require another settlement)
 - Is more frequent interchange scheduling needed
- Day Ahead
 - Ramping services
 - Consider explicitly modeling ramp in DAM
 - What are locational ramp requirements?
 - Are changes in the forecast load and the reliability commitment pass needed?
 - Are mid-hour schedules needed to balance predictable solar ramp?
 - Are resource maintenance scheduling improvements needed?

Energy Market Improvements (Cont.)

■ Potential Market Design improvements

- Energy Limited Resource Management
 - Develop new concepts: dispatch price based on energy in storage
 - Develop the ability to manage energy limits over a day or more (ie, more than 24 hours)
 - Are additional market power mitigation measures needed?

Questions for stakeholders

- Are there additional potential improvements that we should consider?
- What should be the next focus and what should be done later?

Next Steps

Next Steps:

- **We continue to encourage stakeholders to provide comments on the Market Design Improvements identified in the Reliability Gap Assessment as well as on any additional potential improvements that should be considered.**
- **The next topic for discussion will be the Markets and Processes enhancements and market changes scheduled for the Thursday July 23 ICAP/MIWG**
 - This includes such items as Resource Adequacy and Planning, Reactive Supplier Requirement, Energy Limited Resource Management and Voltage Support Requirements

Questions?

Our mission, in collaboration with our stakeholders, is to serve the public interest and provide benefit to consumers by:

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policymakers, stakeholders and investors in the power system

