

**The State Energy Planning Board
Meeting will begin at 2:00 pm**



**Energy Planning
Board**

State Energy Planning Board Meeting

December 12, 2024

Welcome and Roll Call

Agenda

1. Chair Opening Remarks
2. Review Minutes of September 9th, 2024 Board Meeting
3. Vote on Bylaw Changes
4. Presentations on the Transition to a Zero-Emission Electric Grid:
 - ❖ Camilo Serna, North American Reliability Corporation (NERC)
 - ❖ Emilie Nelson and Zach Smith, New York Independent System Operator (NYISO)
 - ❖ Jessica Waldorf, New York Department of Public Service (DPS)
 - ❖ Carl Mas, New York State Energy Research and Development Authority (NYSERDA)
5. Other Business
6. Next Steps

Opening Remarks

Doreen M. Harris

President & CEO, NYSERDA

State Energy Planning Board Chair



Review Minutes of the September 9, 2024 Meeting of the Board

Resolution 12

To adopt changes to the State Energy Planning Board bylaws

Presentations

The Transition to a Zero-Emission Electric Grid

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

State of Reliability in North America

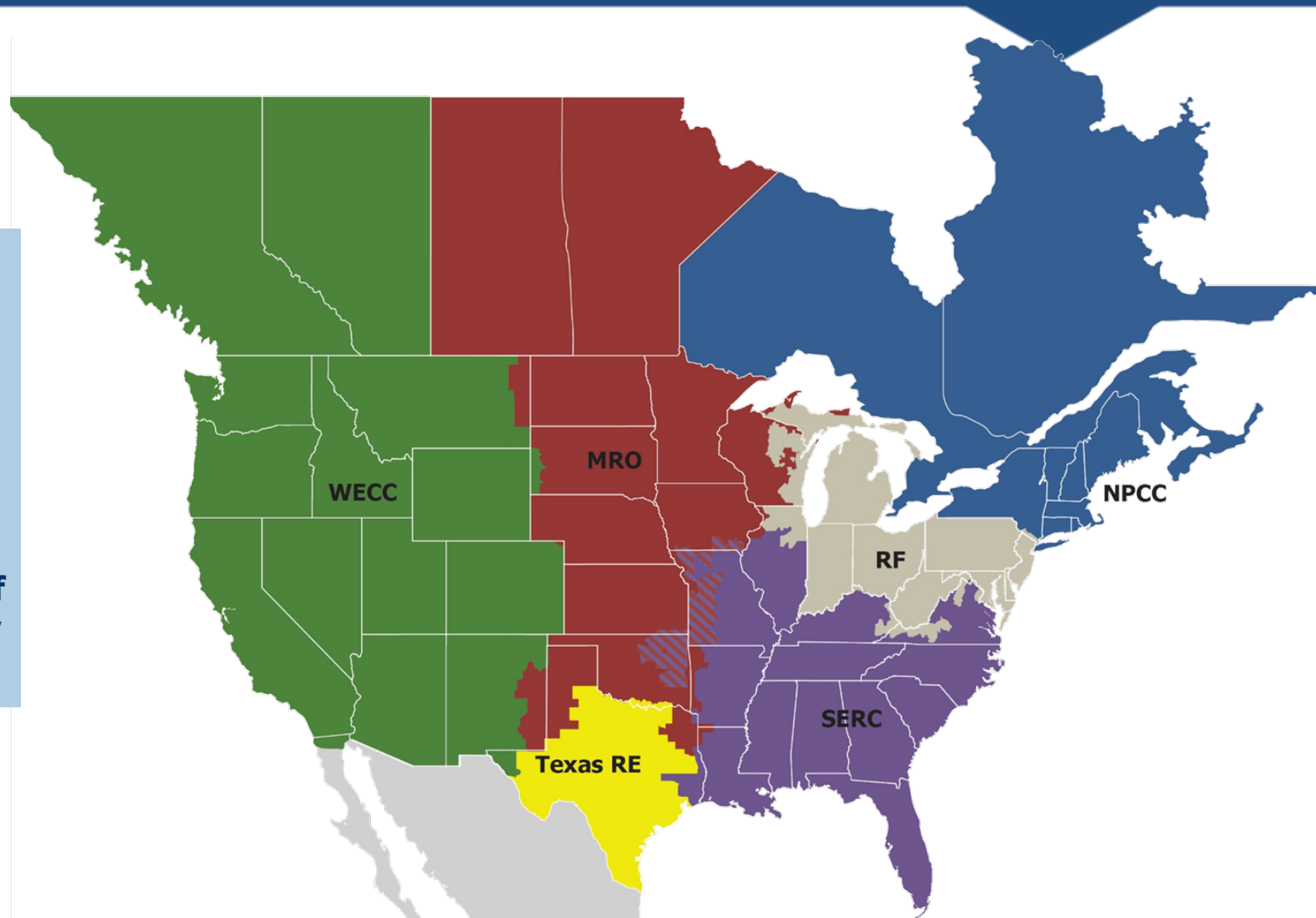
NYSERDA State Energy Planning Board Meeting
Camilo Serna – Senior Vice President, Strategy and External Engagement
December 12, 2024

RELIABILITY | RESILIENCE | SECURITY



The vision for the ERO Enterprise, which is comprised of NERC and the six Regional Entities, is a highly reliable and secure North American Bulk Power System (BPS).

Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.



- Maintain **situational awareness** of events and conditions that may threaten reliability
- Conduct **near-term and long-term assessments** of the reliability and future adequacy of the North American bulk power system (BPS)
- Operate the **Electricity Information Sharing and Analysis Center (E-ISAC)**, a security communications channel, providing threat awareness and analysis, mitigation strategies, and coordinates incident management
- Propose, monitor compliance with, and enforce **mandatory reliability standards** for the North American BPS, subject to regulatory oversight and approvals of FERC in the U.S. and applicable authorities in Canada
- **Certify Bulk Power System operators** as having and maintaining the necessary knowledge and skills

Hyper Complex Reliability Risk Environment

Rapidly Changing Resource Mix

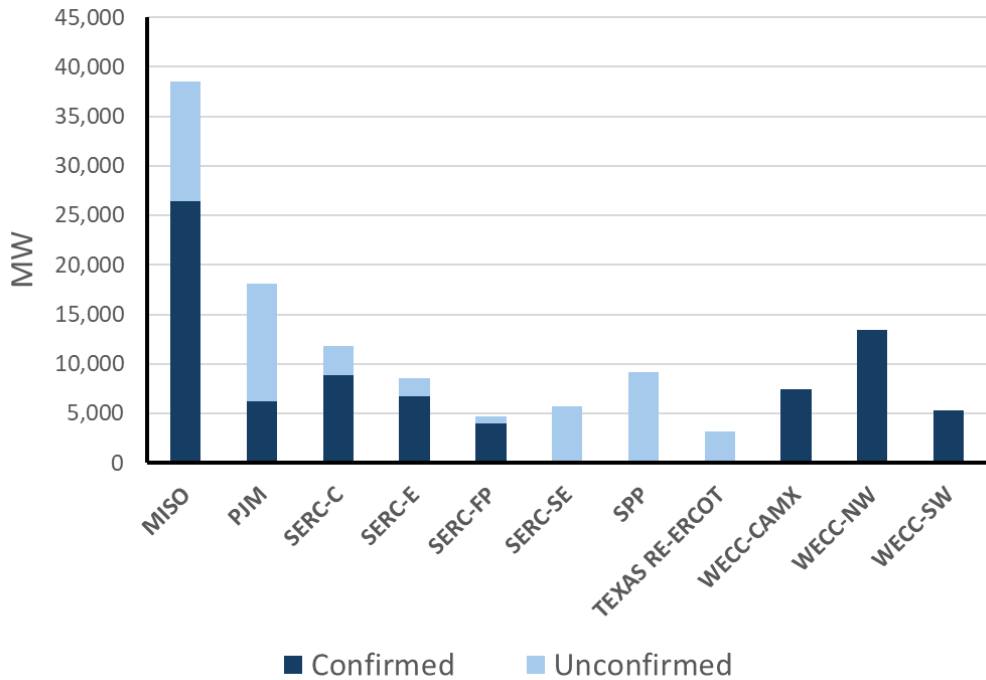
Extreme Weather Complexities



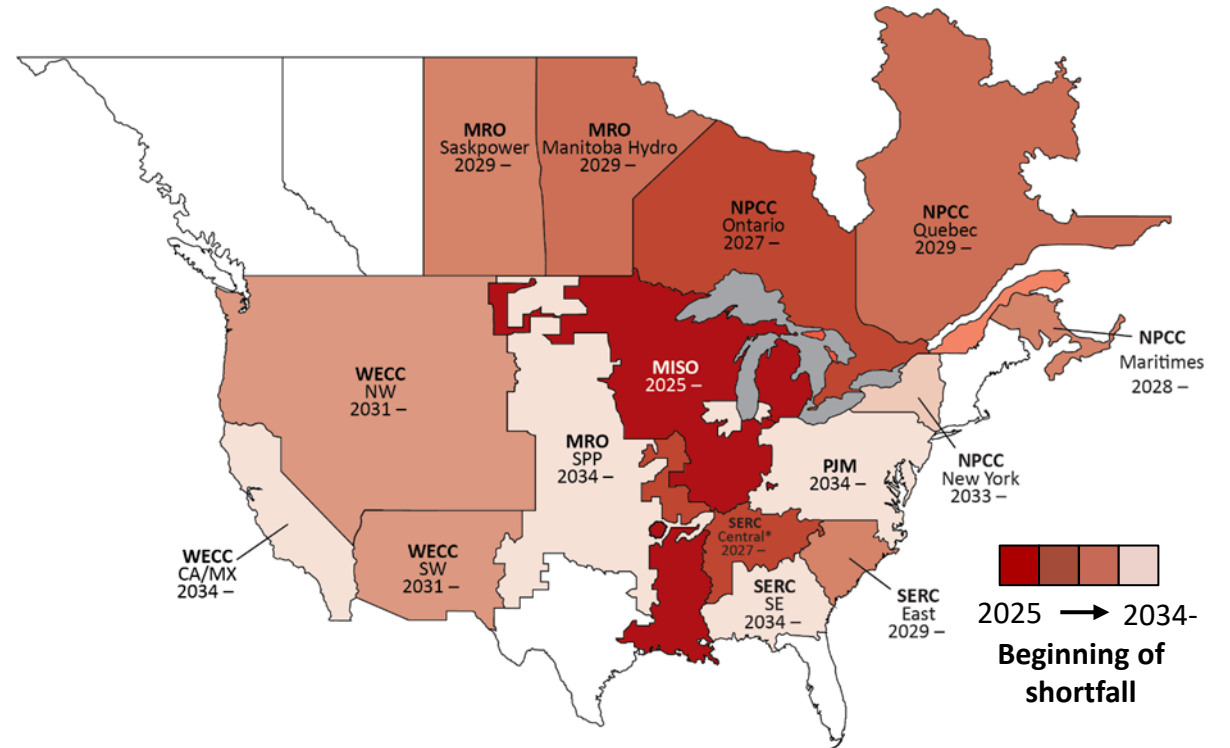
Accelerating Demand Growth

**Increasing Dependence on
Natural Gas**

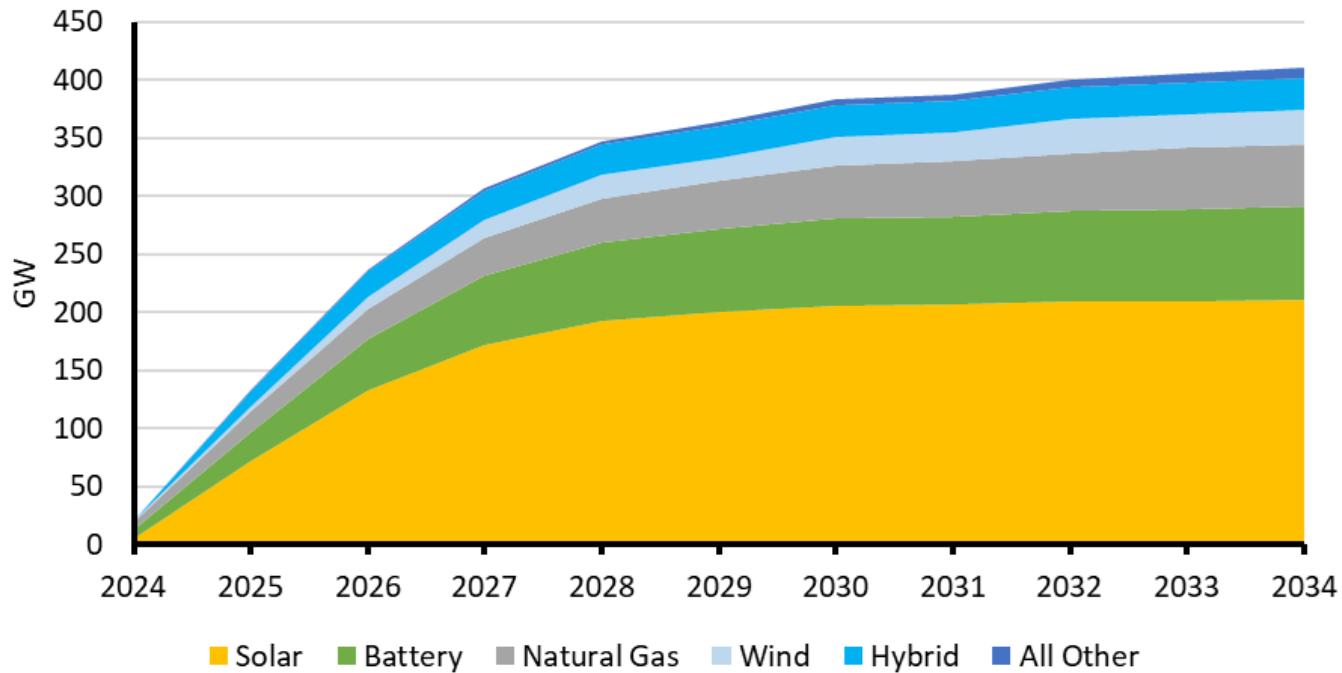
Fossil-fired Generator Retirements by 2034 by Region



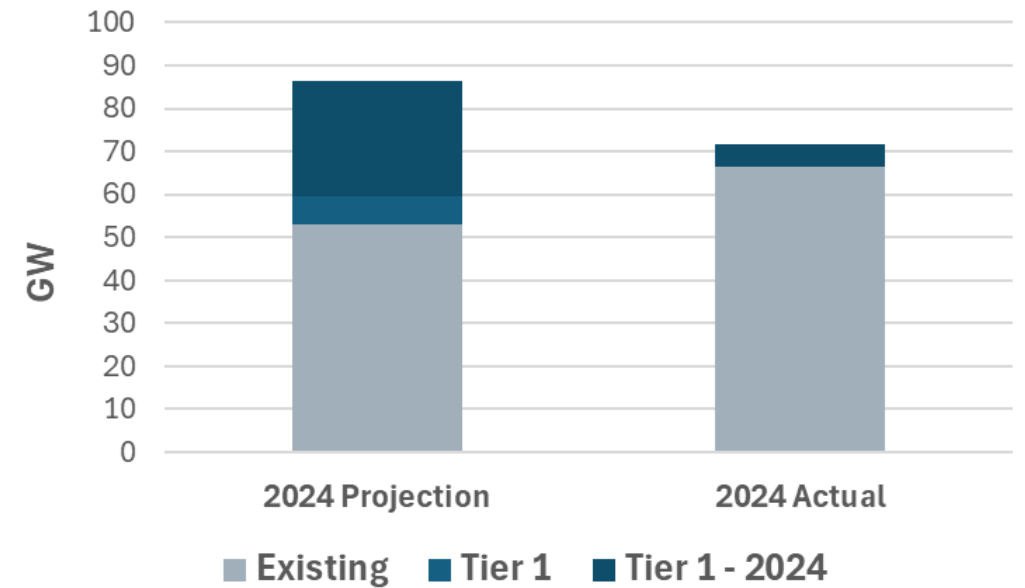
Reserve Margin Shortfall Projections



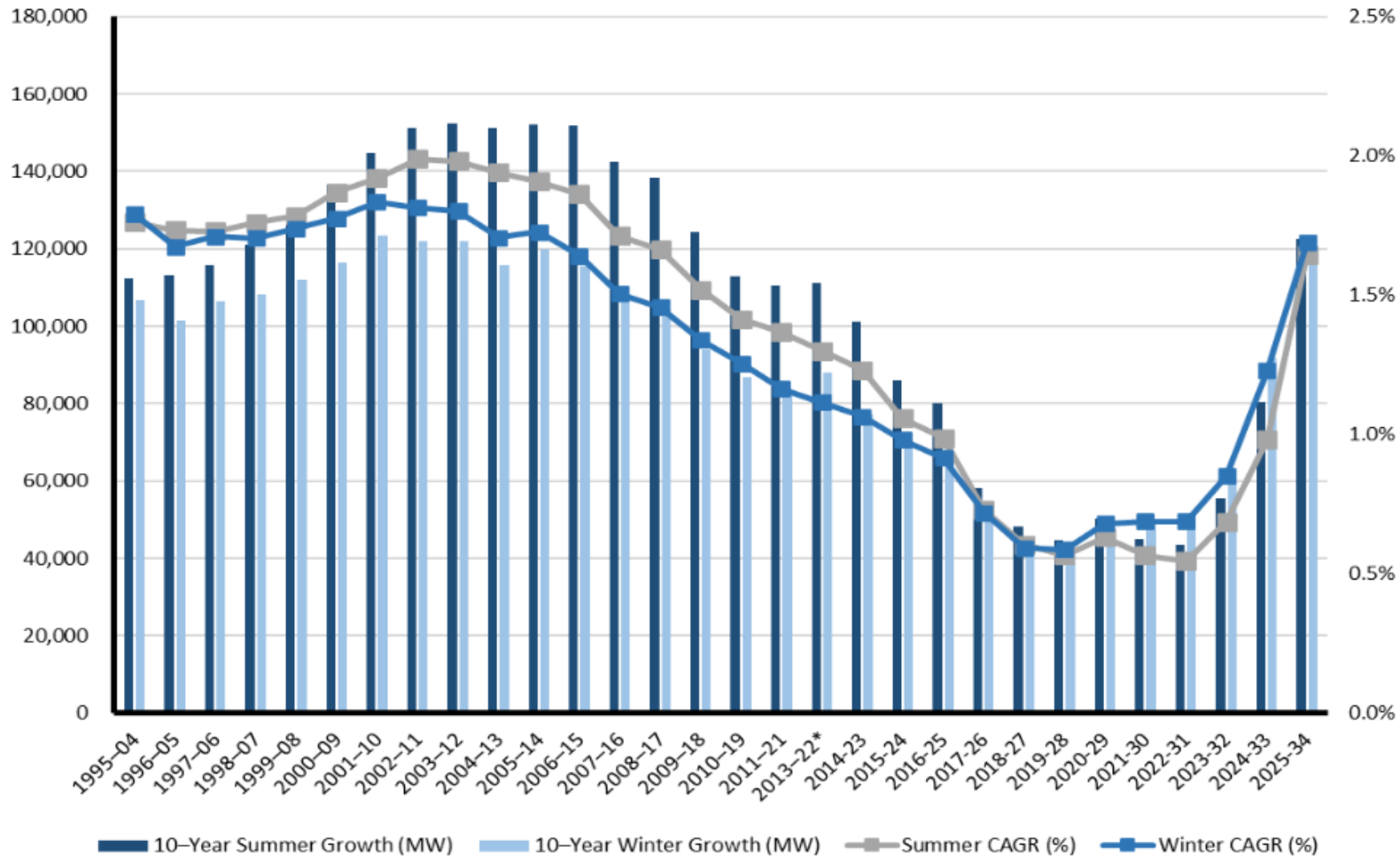
Resources in Interconnection Process
Includes Tier 1 (Signed Agreements) and Tier 2 (Processing)



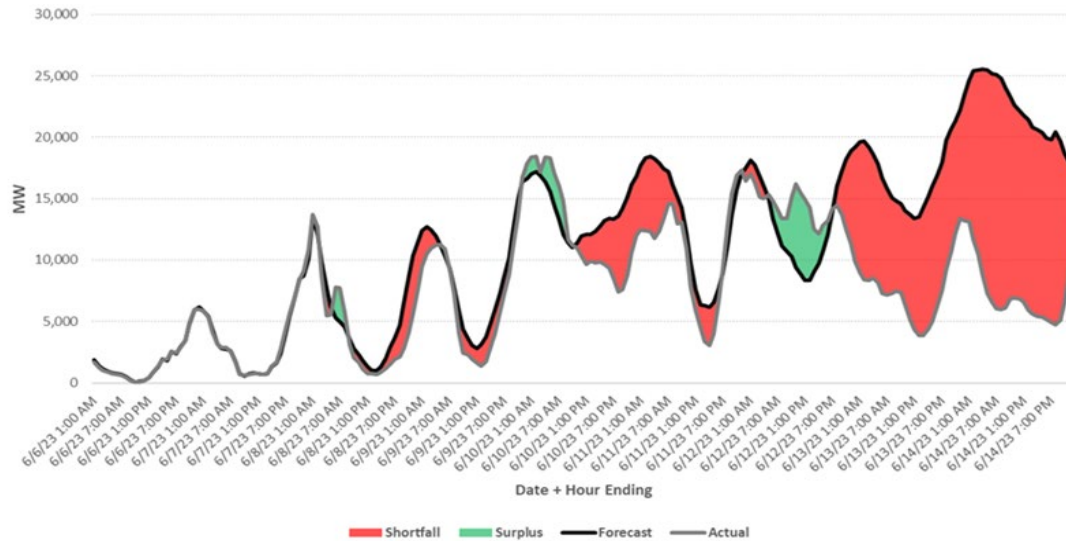
Solar On-Peak Capacity
Prior-Year Projection vs. Actual



NERC Wide - Projected Summer Peak Demand

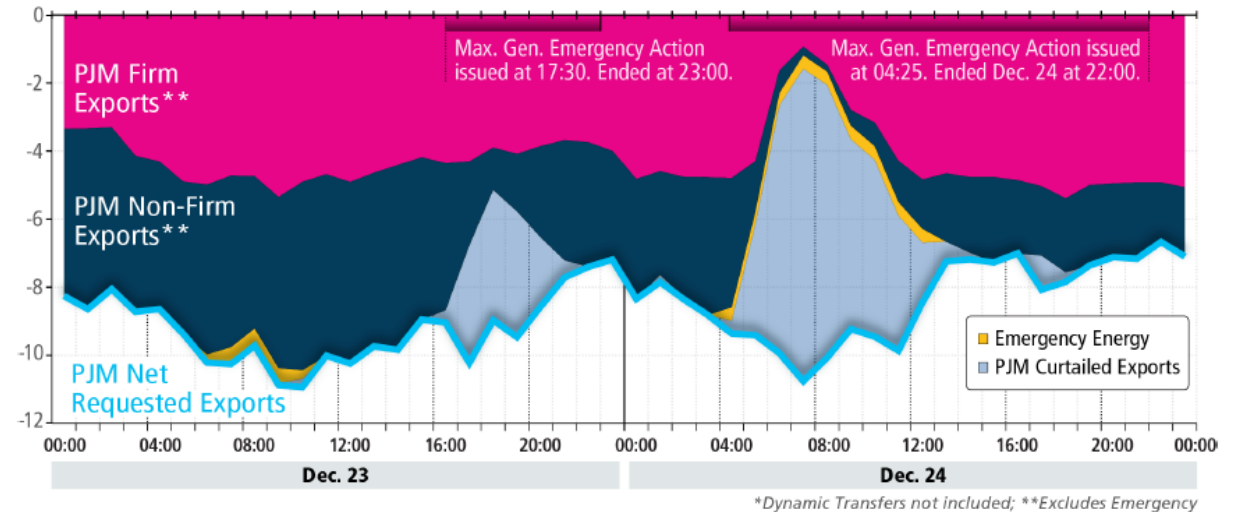


ERCOT Hourly Wind MW Forecast vs. Actual



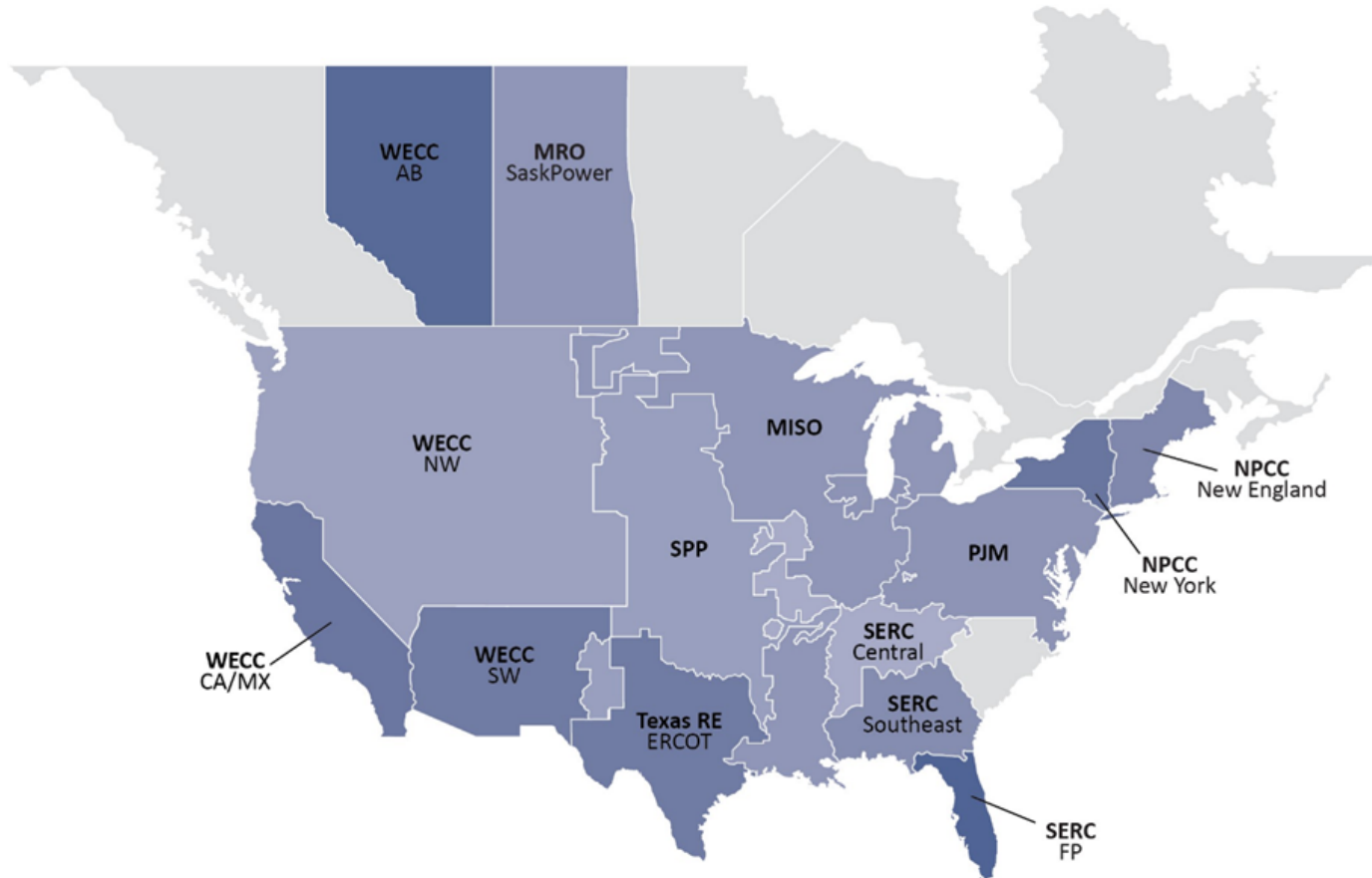
June 6, 2023: ERCOT, SPP, MISO: A “wind drought” caused 60 GW of installed wind capacity to generate 300 MW

Net Scheduled Export Interchange* (MWh, Thousands)



December 24, 2022: PJM: Transmission system during extreme cold weather limited the ability to export to support southern neighbors

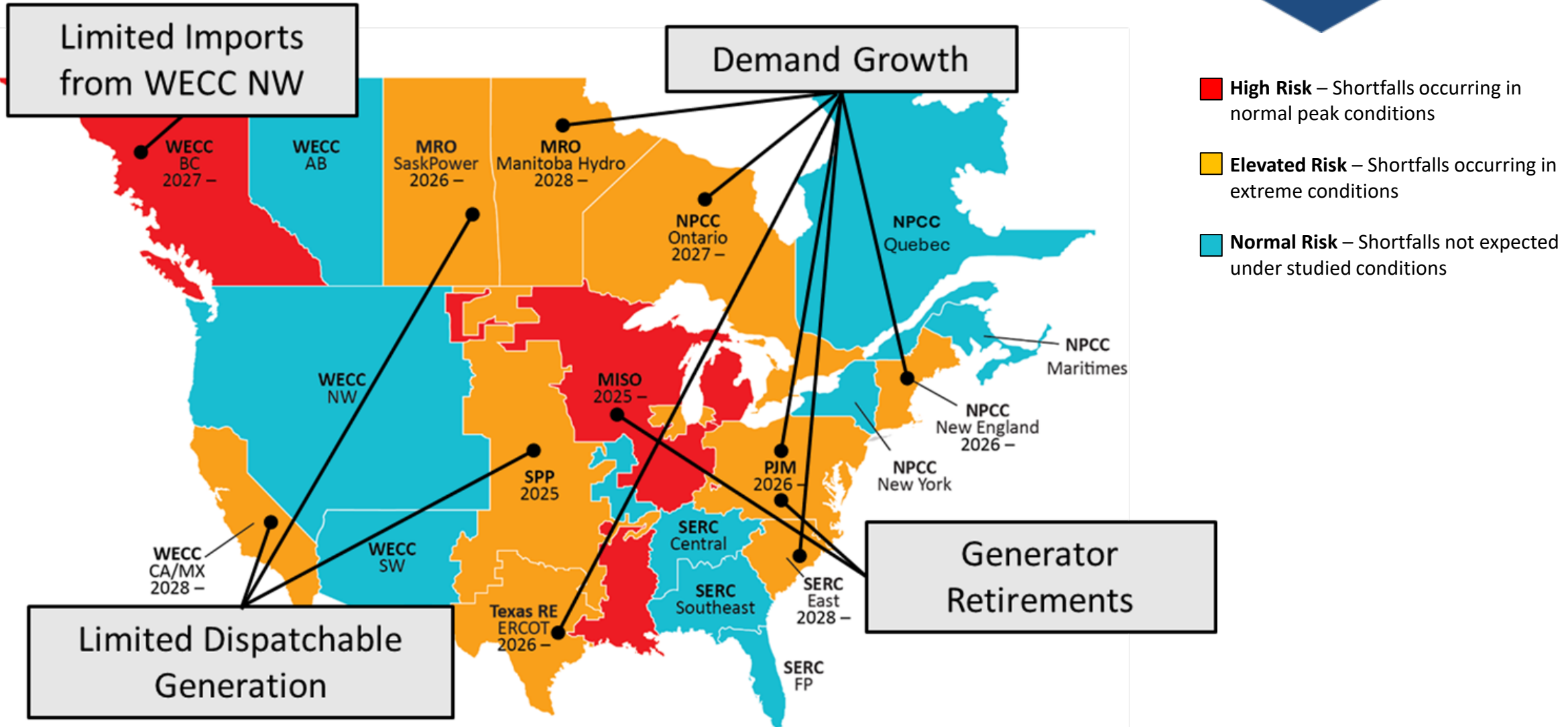
Natural-Gas-Fired Generation Capacity Contributions to 2023–2024 Winter Generation Mix



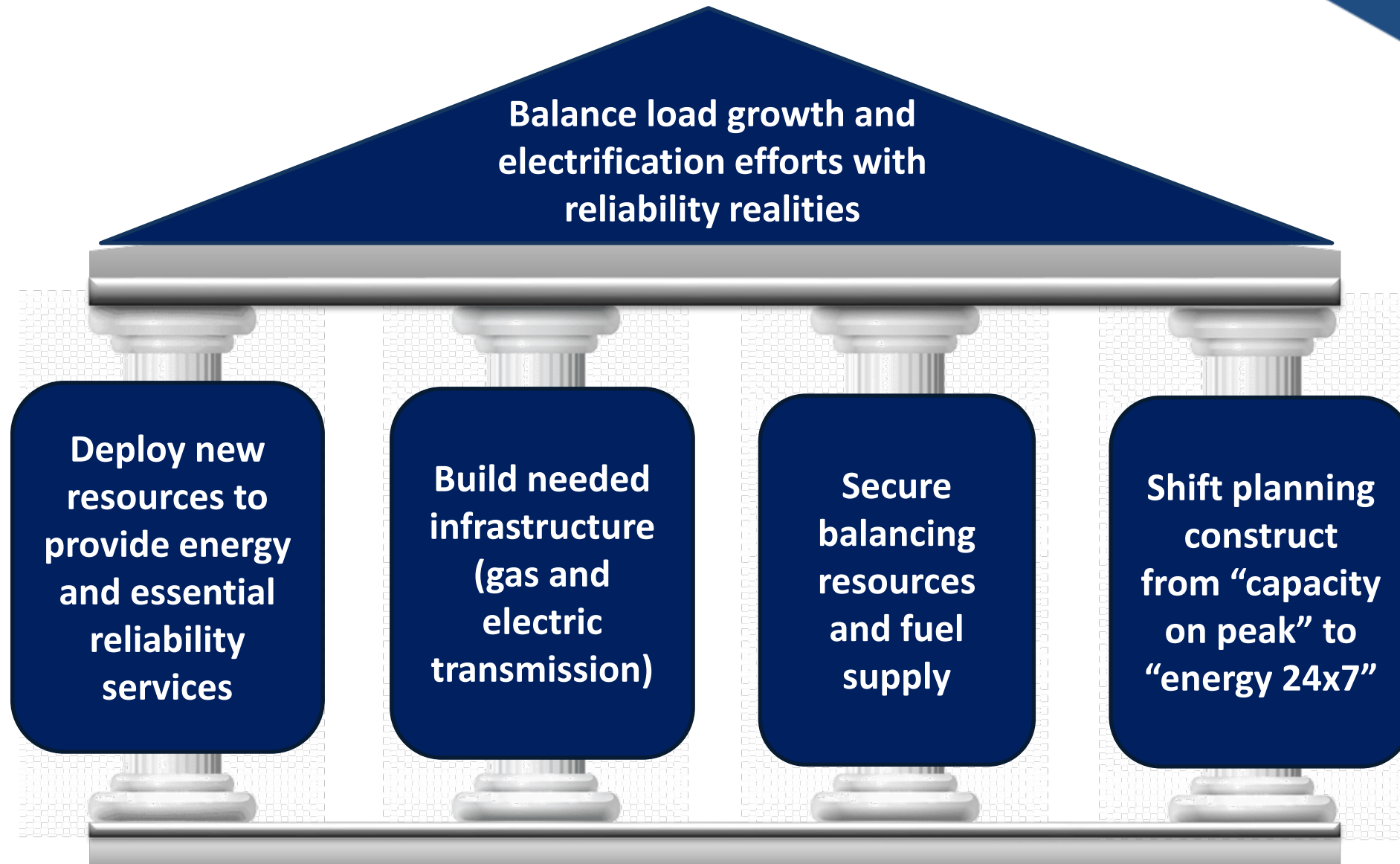
All other assessment areas have less than 35% natural gas fired generation contribution to winter resource mix.

	Natural-Gas-Fired Generation	
	Peak Winter Capacity	Contribution to Total Winter Resource Mix
MISO	67.5 GW	46%
MRO-SaskPower	2.1 GW	46%
NPCC-New England	17.3 GW	54%
NPCC-New York	24.5 GW	66%
PJM	84.9 GW	47%
SERC-Central	22.7 GW	44%
SERC-Florida Peninsula	50.6 GW	79%
SERC-Southeast	31.5 GW	51%
SPP	27.4 GW	41%
Texas RE-ERCOT	54.2 GW	62%
WECC-AB	11.4 GW	75%
WECC-CA/MX	39.9 GW	65%
WECC-NW	31.0 GW	39%
WECC-SW	18.2 GW	62%

- Demand growth outlook continues to accelerate rapidly (data centers, re-industrialization, electrification, but not evenly distributed). Population growth also is a demand driver and not evenly distributed across the country
- Resource development is lagging significantly, both in terms of energy production capability and provision of essential reliability services
 - Projected retirements continue to be large and problematic, especially in MISO and PJM
 - New resource growth predominantly wind/solar/and battery with all the challenges of variable (and uncertain) production and inverter-based integration (and cyber attack surface protection) and rate of new resource addition slowed in 2024
- As we extend our work beyond simple “resource adequacy and capacity sufficiency” we see new temporal problems emerge
- ITCS analysis shows while inter-regional projects will help, they will not replace the need for generation development well beyond what is currently under development (Tier 1)
- As a result, well over half of the continent is at elevated or high risk of energy shortfalls over next 5-10 years
- Assessment points to a wide range of challenges
 - New resource development and associated T&D infrastructure needs to be developed rapidly to mitigate retirement impacts and serve growing loads
 - To extent wind and solar remains resource of choice, much more transmission will be required to get power to load centers
 - Gas system performance and constraints continue to be of paramount concern, especially (but not exclusively) in winter



Risk Determination using established resource adequacy criteria (1-day-in-10 years) and National Academy of Engineering Report Criteria for load-loss and unserved energy.





Markets and Planning for a Reliable Grid

Emilie Nelson – NYISO EVP & COO

Zach Smith – NYISO SVP System & Resource Planning

State Energy Planning Board

December 12, 2024

Our Mission and Vision



Mission

Ensure power system reliability and competitive markets for New York in a clean energy future



Vision

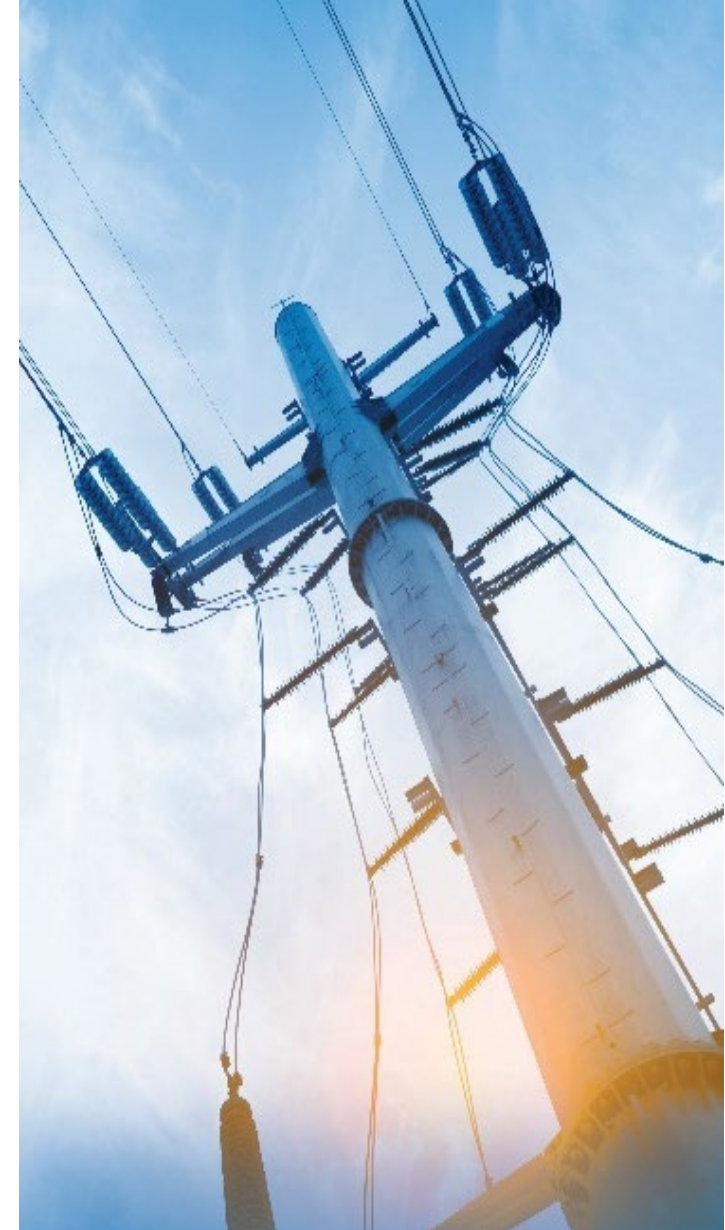
Working together with stakeholders to build the cleanest, most reliable electric system in the nation



A Powerful Purpose

We are dedicated to a reliable, sustainable power grid and competitive markets.

- ✓ **Maintaining** and enhancing regional reliability
- \$ **Operating** open and fair wholesale electricity markets
- 👁️ **Planning** the bulk power system for the future
- 🔍 **Providing** factual information to policymakers, stakeholders, and investors.



State of the Grid

State of the Grid – Key Themes

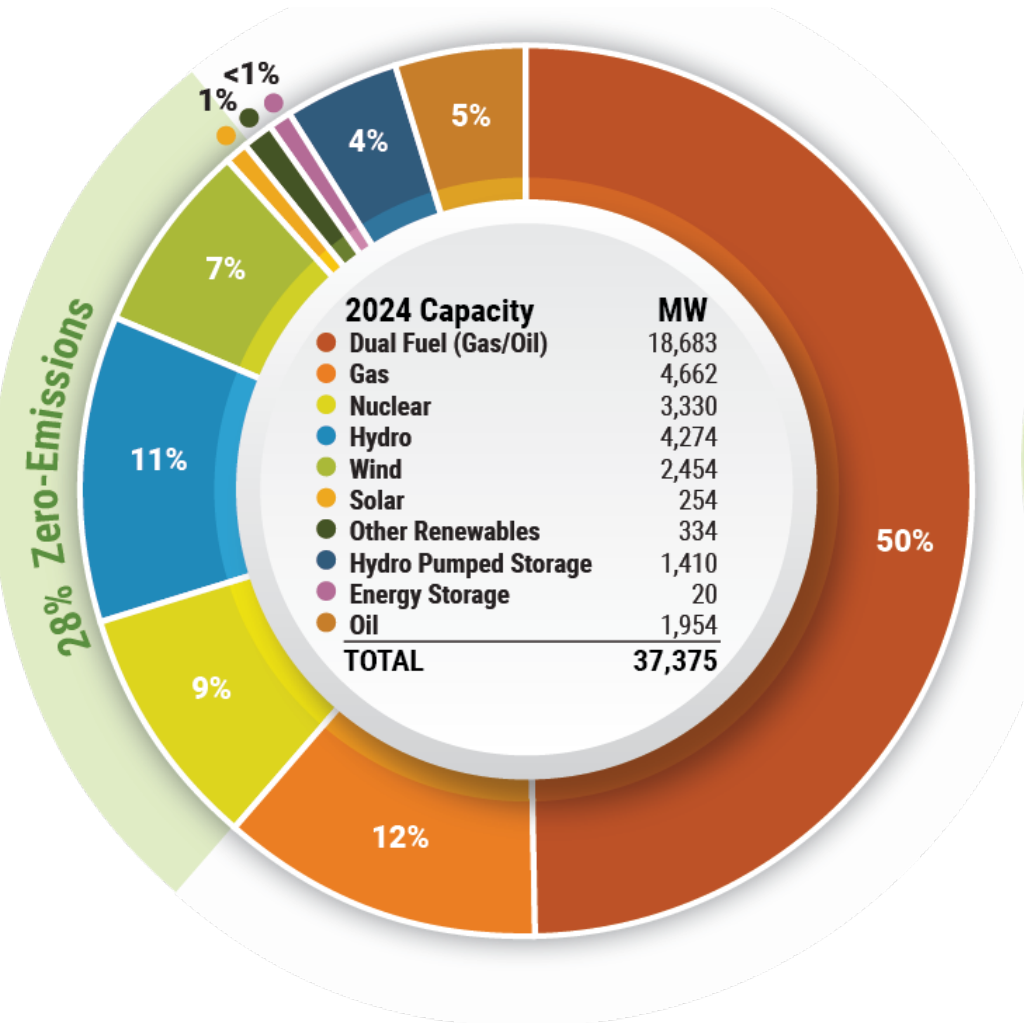
- Public policies continue to drive rapid change in the electric system in the state.
- **Narrowing Reliability Margins:** Electrification programs and economic development initiatives are driving projected demand higher. Generator deactivations are outpacing new supply additions.
- The potential for delays in construction of new supply and transmission, higher than forecasted demand, and extreme weather are threatening reliability and resilience to the grid
- New York is projected to become a winter-peaking system in the mid-2030s, primarily driven by electrification of space heating and transportation.

State of the Grid – Key Themes (Cont.)

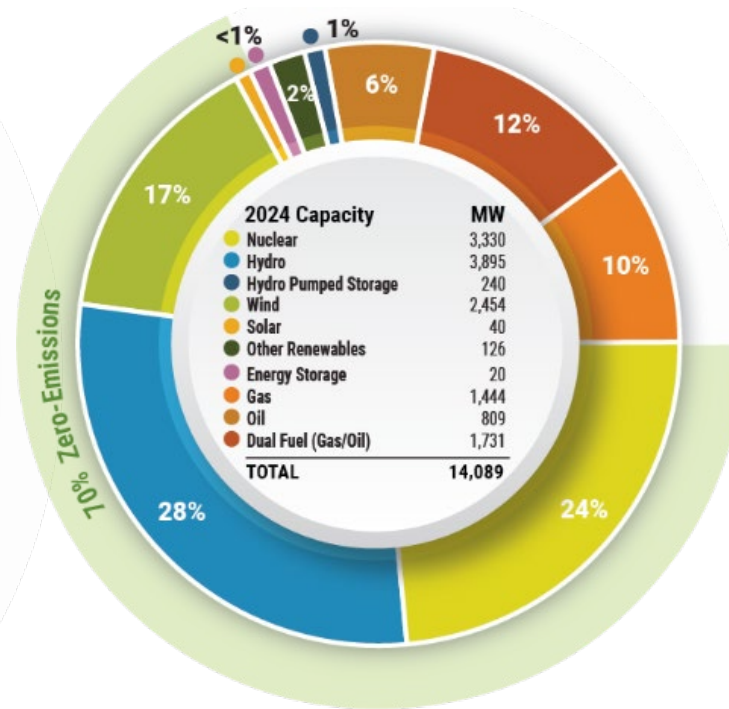
- On the coldest days, the availability of natural gas for power generation may be limited and significant interruptions to natural gas supply can disrupt reliable operations.
- NYISO's interconnection processes continue to evolve to balance developer flexibility with the need to manage the process to more stringent timeframes.
- To achieve the mandates of the CLCPA, new emission-free supply capable of providing the necessary reliability services are needed to replace the capabilities of today's generation. Such new supply is not yet available on a commercial scale.
- The wholesale electricity markets administered by the NYISO exist as an important tool to attract necessary investments to facilitate the transition of the grid in the coming decades.

Generating Capacity by Fuel Source: 2024

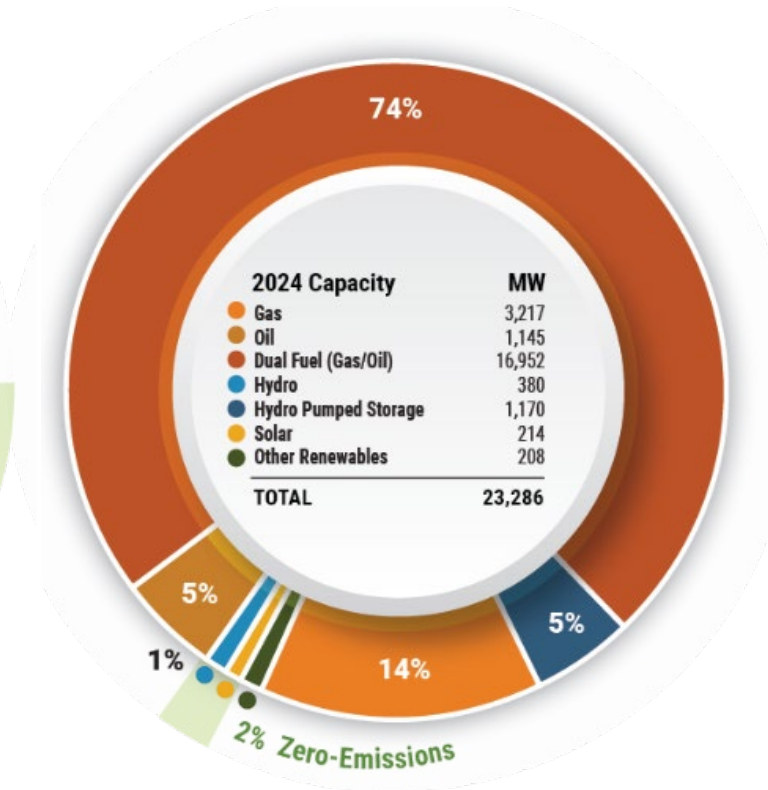
NYCA



Upstate (Zones A-E)



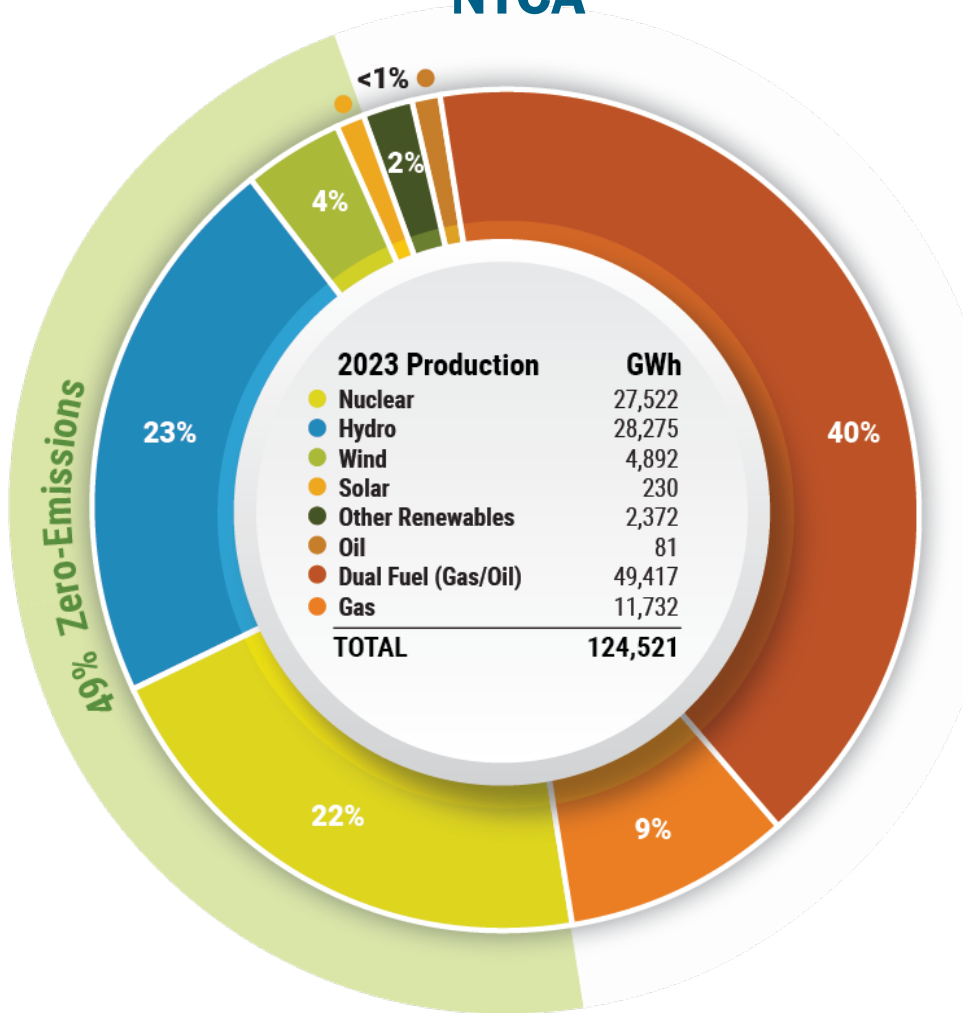
Downstate (Zones F-K)



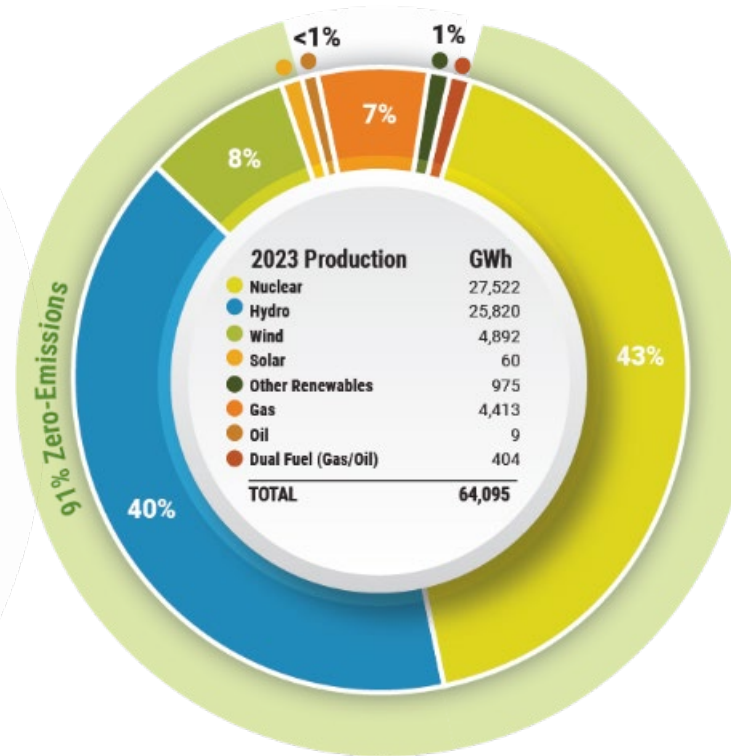
Generating Capacity is the maximum electric output a generator can produce

Energy Production by Fuel Source: 2023

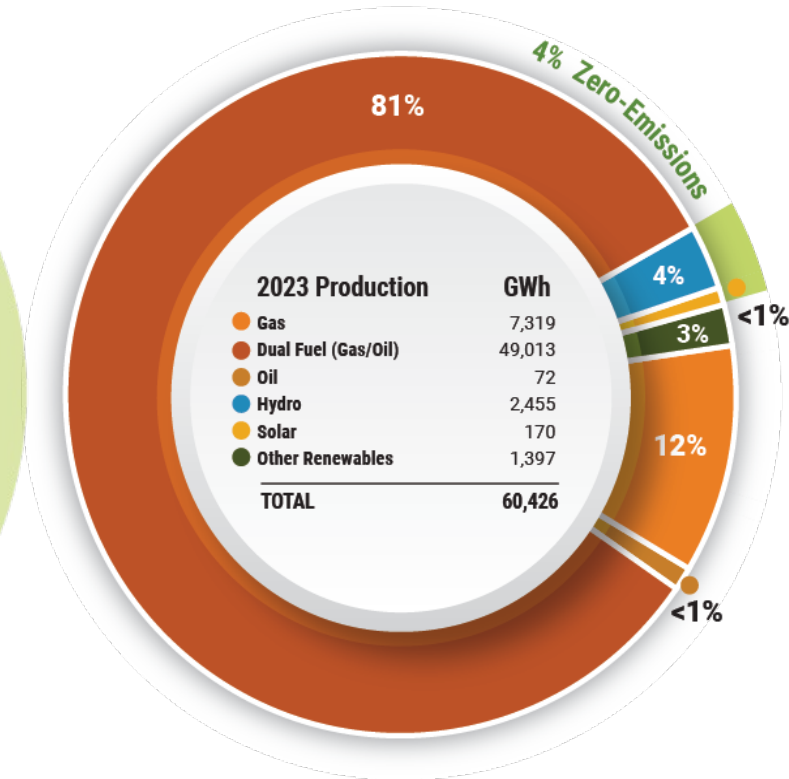
NYCA



Upstate (Zones A-E)



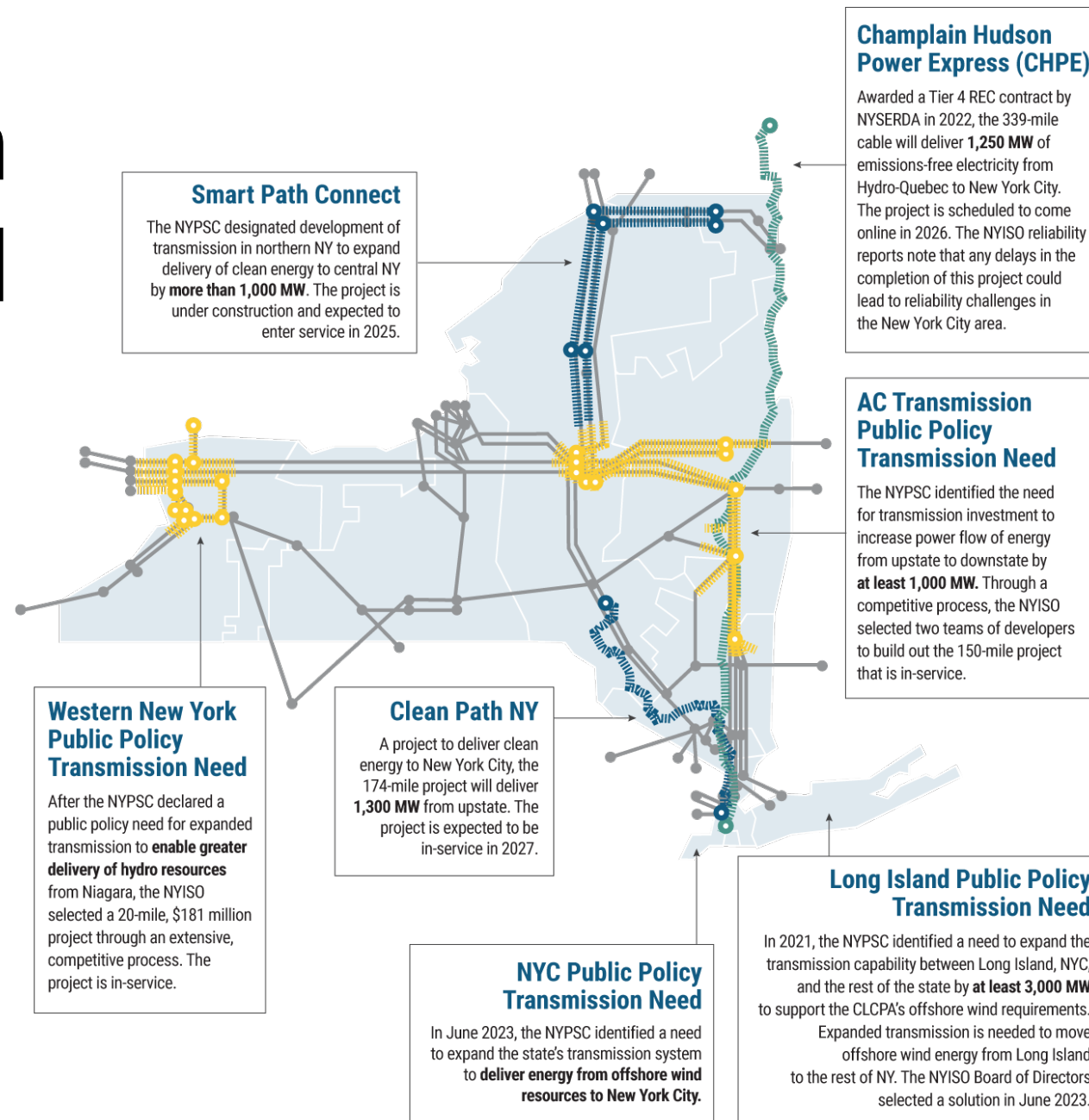
Downstate (Zones F-K)



Energy is the amount of electricity a generator produces over time

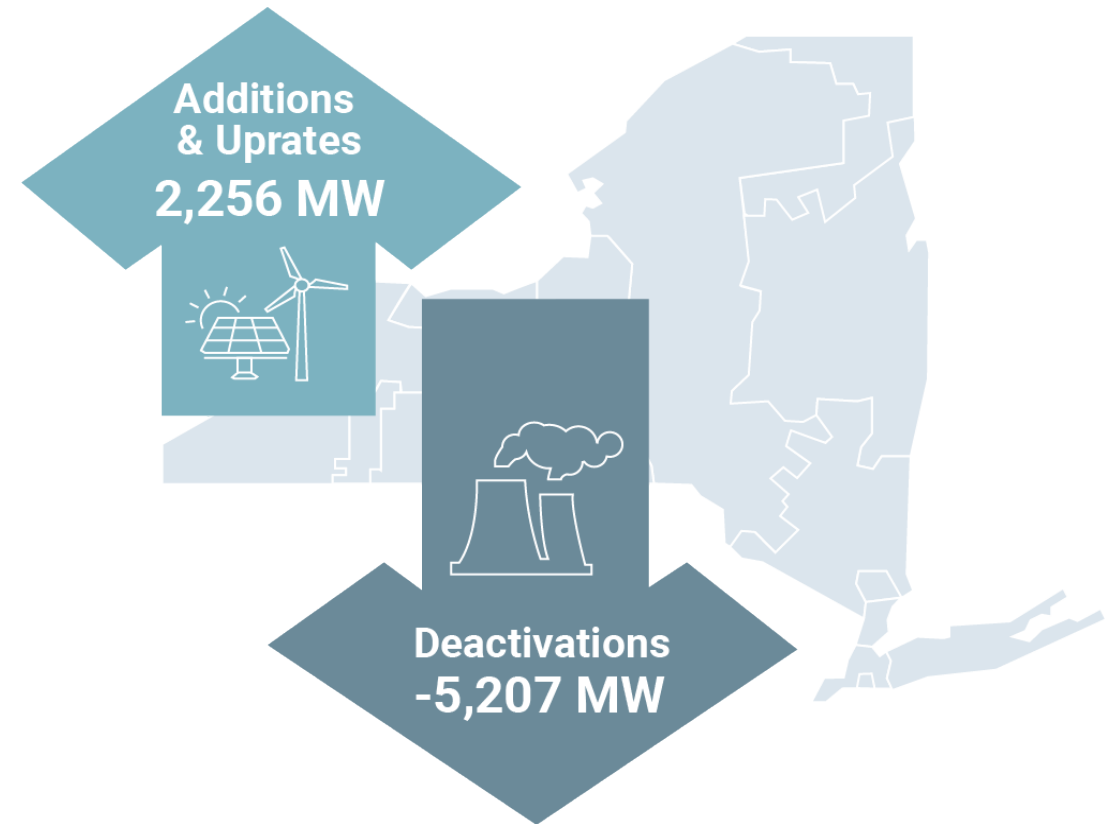
Transmission Planning and Construction

The NYISO's planning process is supporting an unprecedented expansion of the transmission system in support of CLCPA goals.



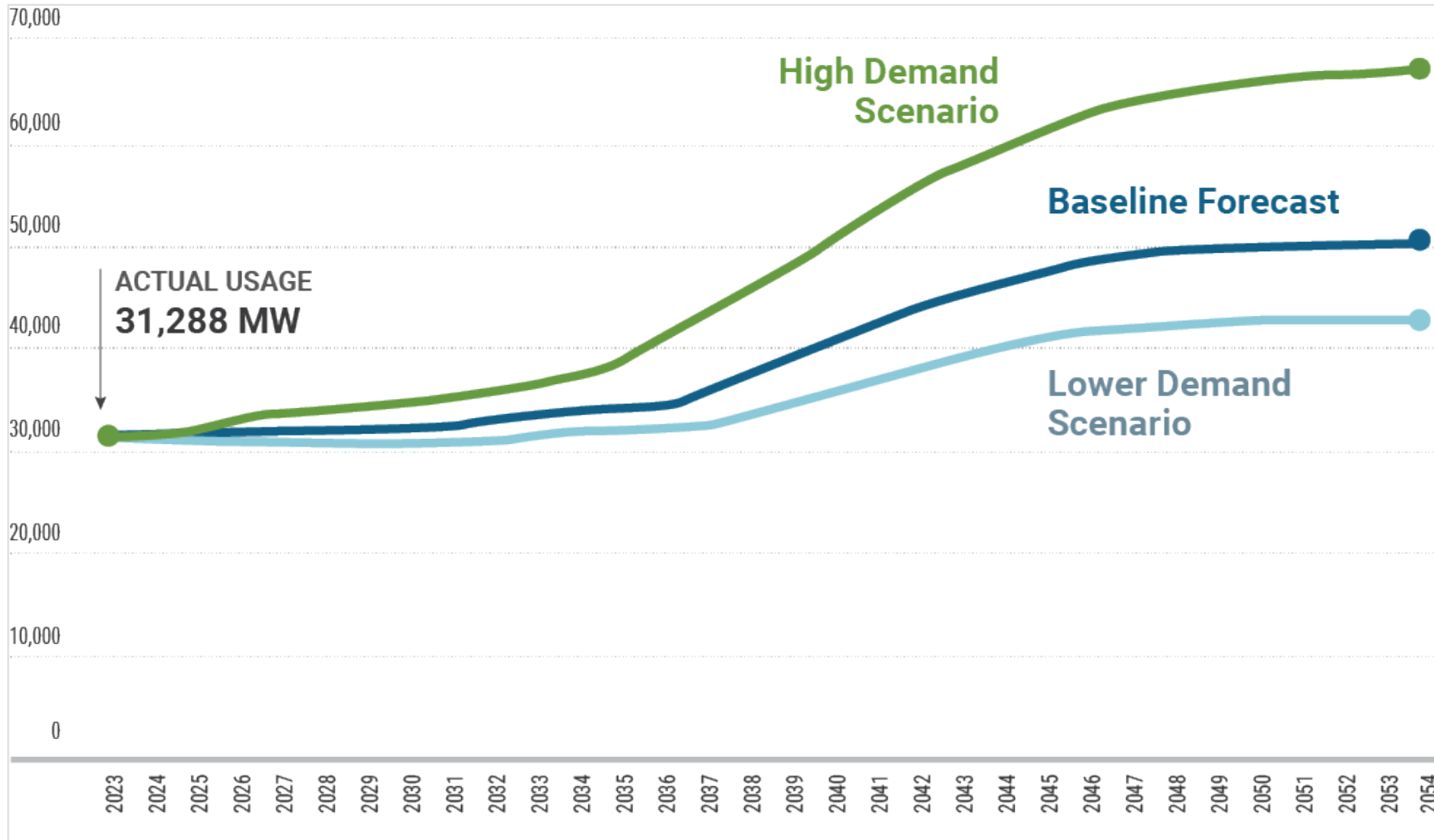
Changing Supply Mix

- Growing imbalance between generator deactivations and additions is contributing to shrinking reliability margins
 - Deactivating resources tend to be dispatchable and located downstate
 - Generator additions are largely renewable resources located upstate
 - New resources do not provide the same reliability services as exiting resources
- Since the CLCPA was approved in 2019, interconnection requests have quadrupled
- NYISO and stakeholders working to enhance process efficiency while maintaining reliability benefits



Actual & Forecast Peak Demand (MW)

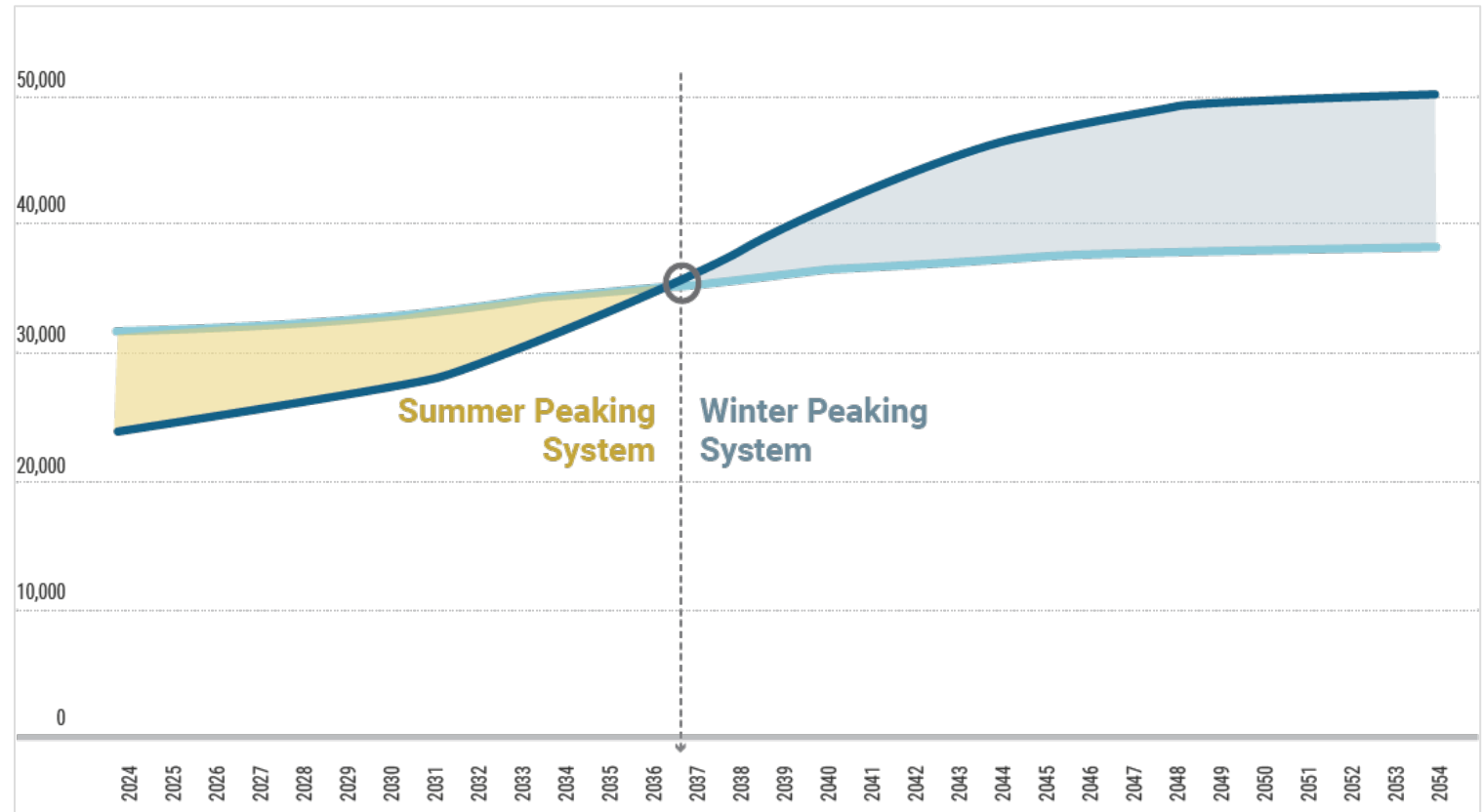
Electric Energy Demand Forecast in New York State: 2023-2054



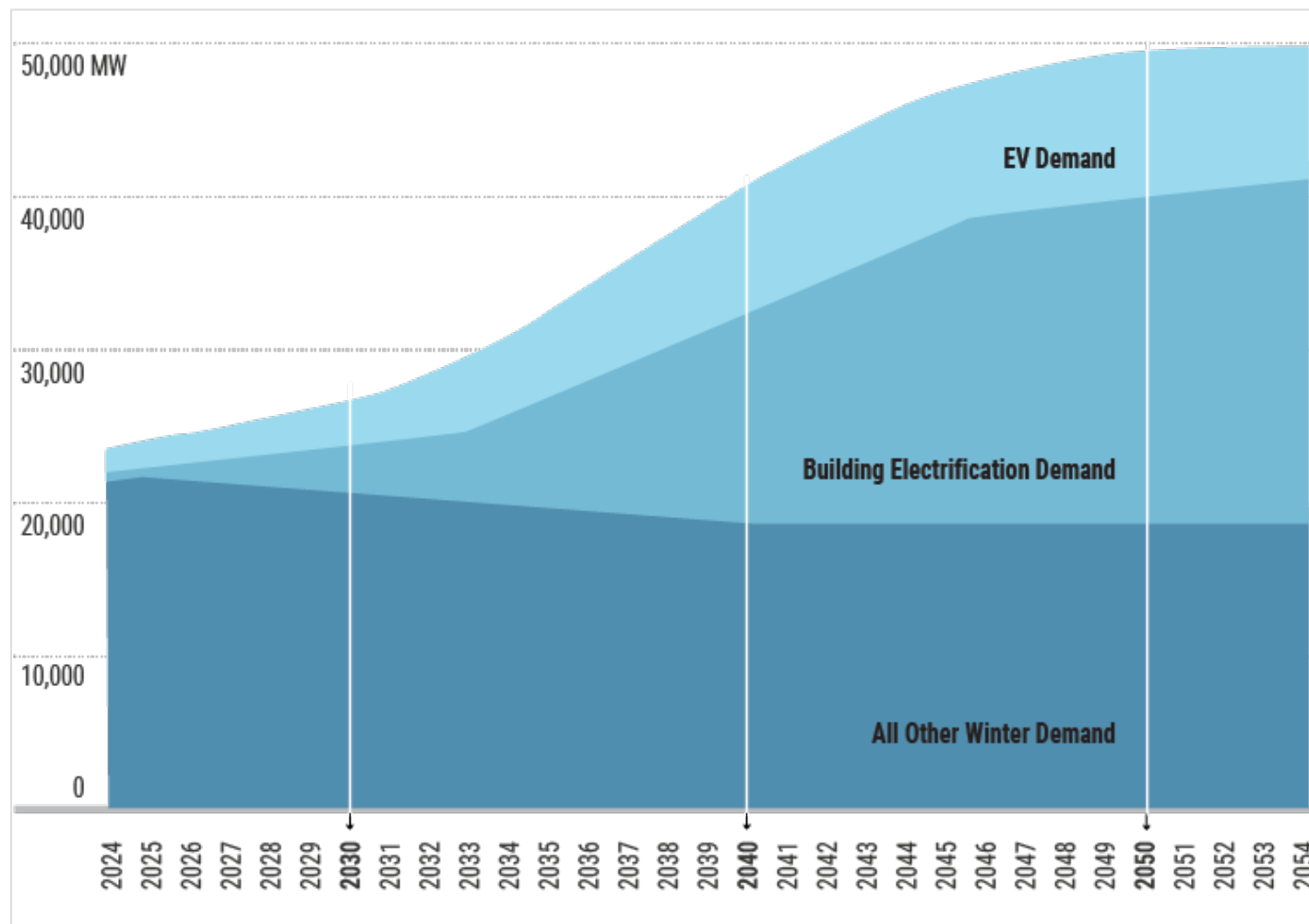
Demand Trends: Peak Demand Forecast

- The NYISO winter and summer peak load forecasts suggest that electrification will drive a shift in NY from a summer-peaking system to a winter-peaking system.
- The timing and degree of this shift will be influenced by EV and heat pump technology adoption.

Electric Summer & Winter Peak Demand (MW): 2024-2054



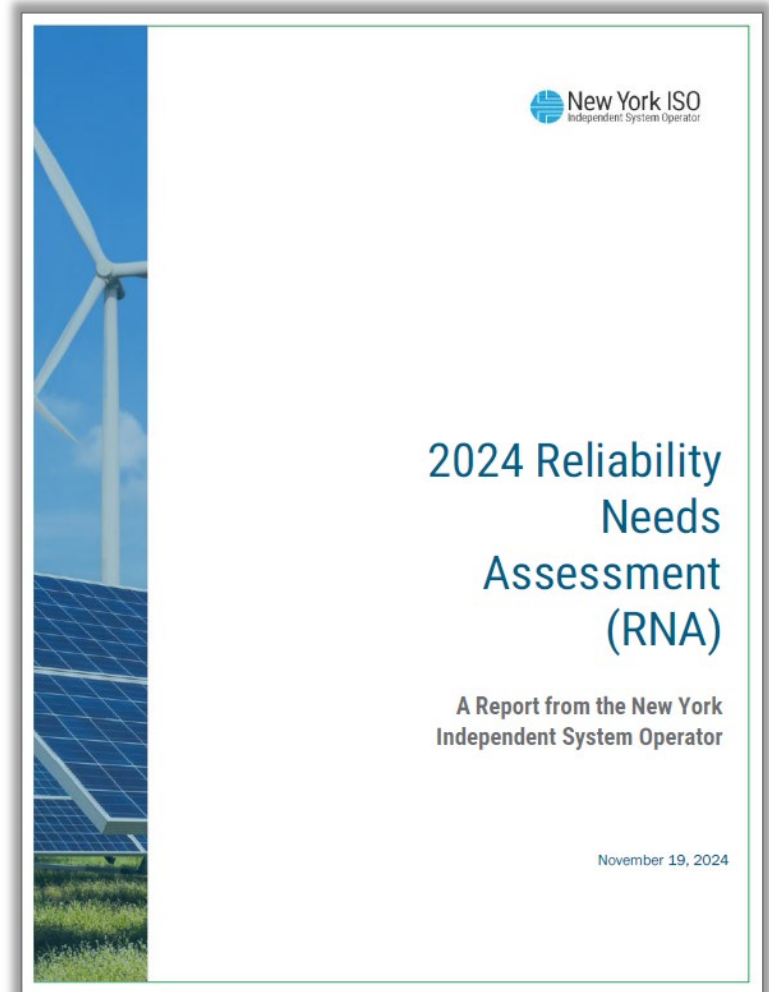
Expected Impact of Electrification on Statewide Winter Peak Demand (MW)



Reliability Needs Assessment (RNA)

2024 RNA

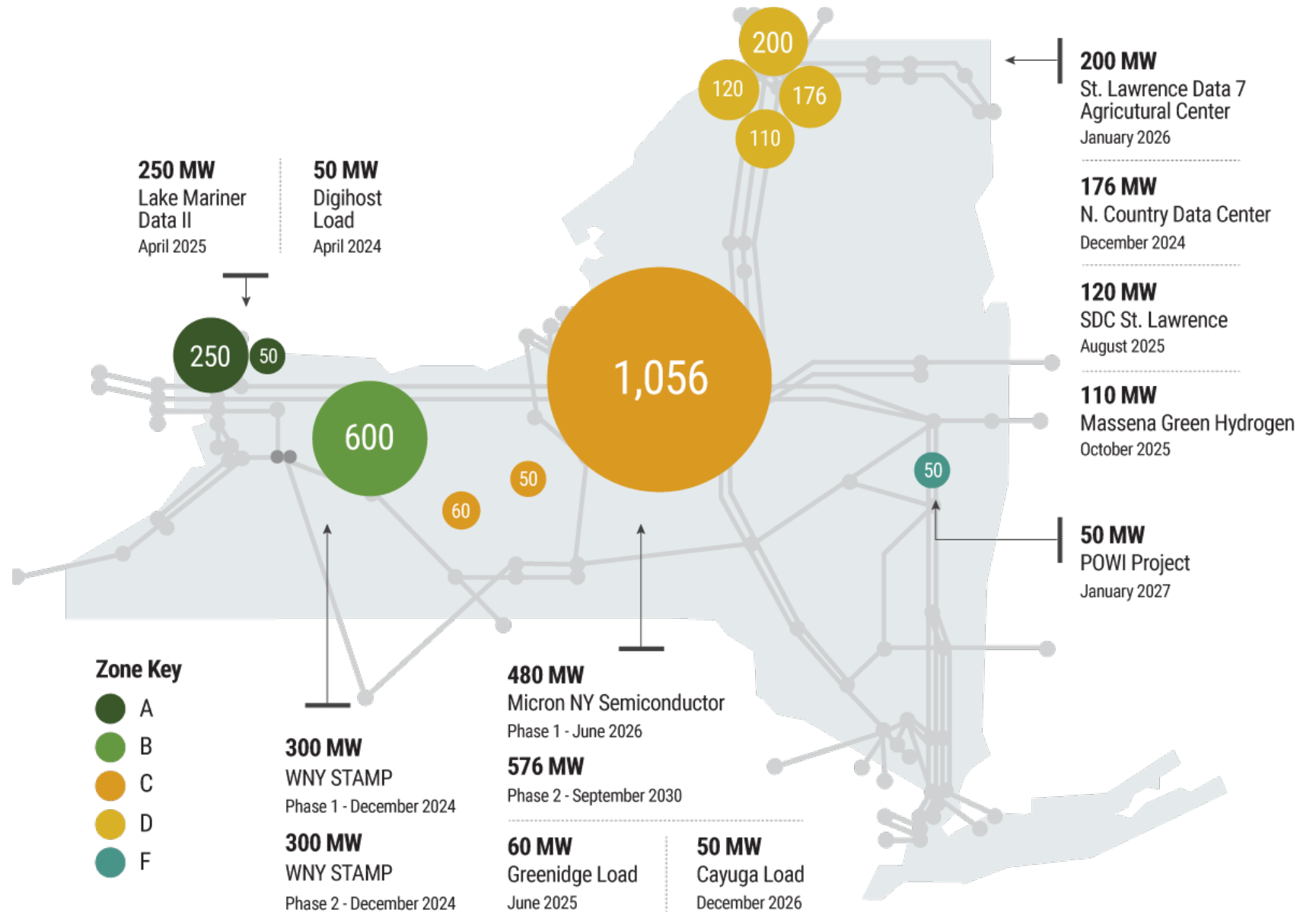
- **The 2024 RNA evaluates grid reliability from 2028 to 2034 and closely evaluates risk factors, such as:**
 - Winter system conditions considering potential gas unavailability
 - Large industrial and other energy-intensive loads
 - Anticipated generator deactivations that could potentially lead to deficiencies in reliable electric service over the planning horizon.
- **The RNA identified an actionable reliability need driven by planned generator retirements outpacing new supply and growing demand**



RNA Key Winter Assumptions

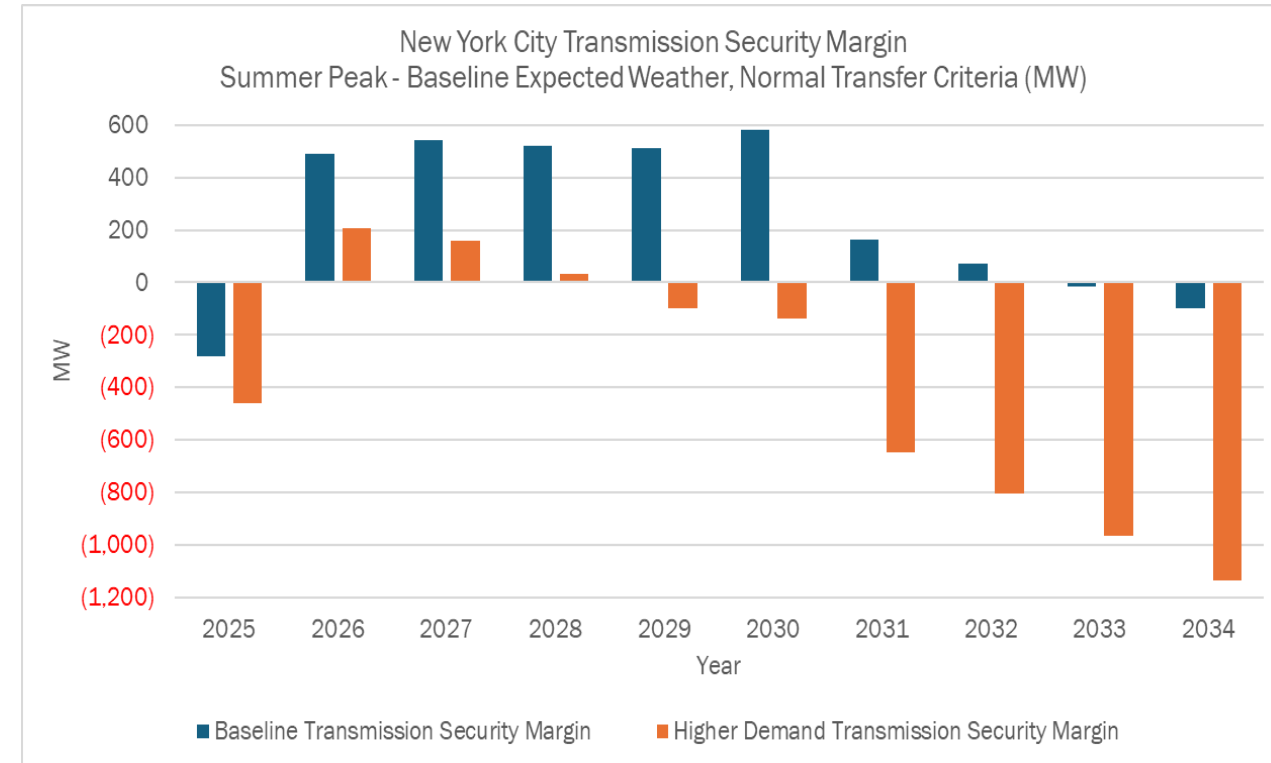
- **RNA was the first NYISO planning study to model the new NYSRC reliability rule accounting for the unavailability of generating units due to gas shortages**
 - Approximately 6,400 MW of non-firm gas generation assumed unavailable during winter peak demand conditions
- **Hydro-Québec imports from the Chateauguay and Champlain Hudson Power Express (CHPE) HVDC lines are modeled at 0 MW during winter peak conditions**

New Large Load Projects in New York State



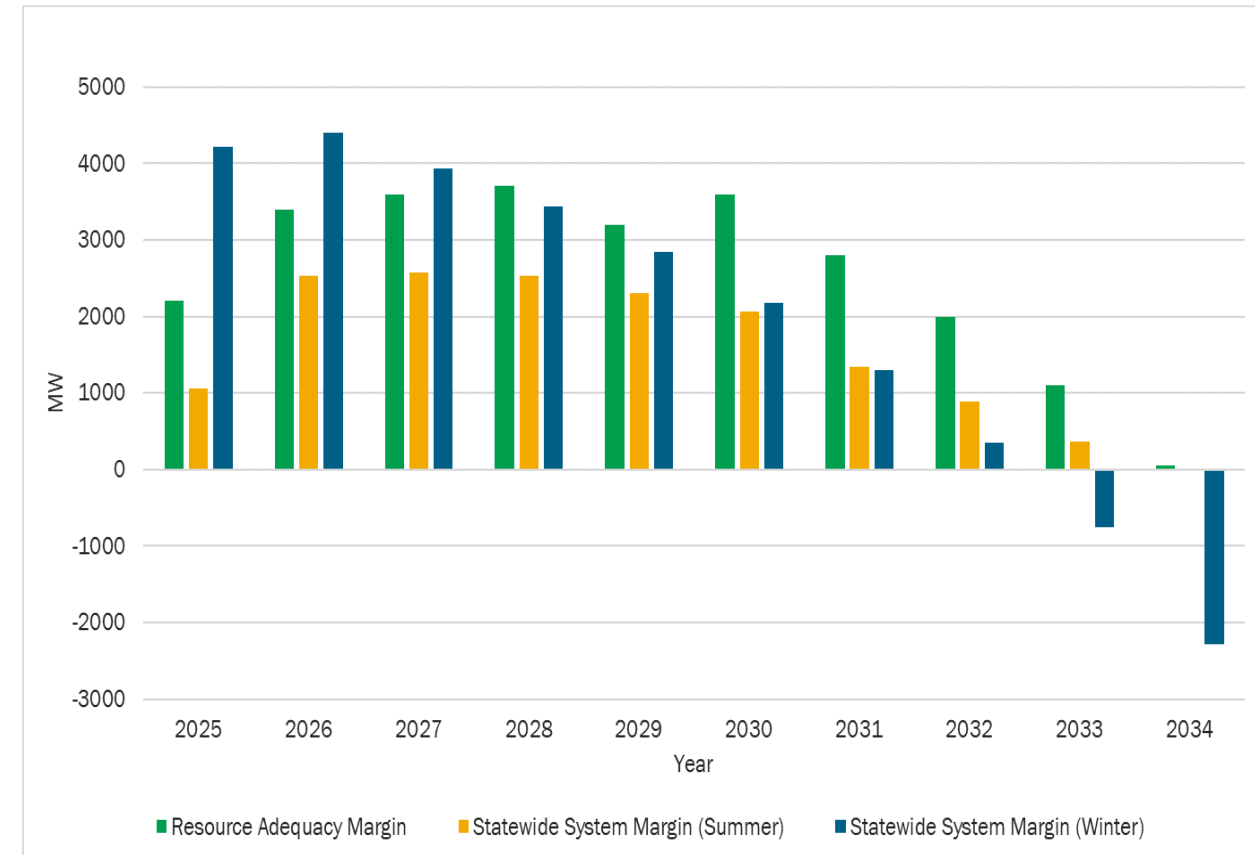
New York City Reliability Need

- **The 2024 RNA finds a Reliability Need beginning in summer 2033 within New York City primarily driven by a combination of forecasted increases in peak demand and the assumed retirement of the NYPA small gas plants.**
 - Deficiency of 17 MW for 1 hour in summer 2033, growing to 97 MW for 3 hours in summer 2034 on the peak day during expected weather conditions.



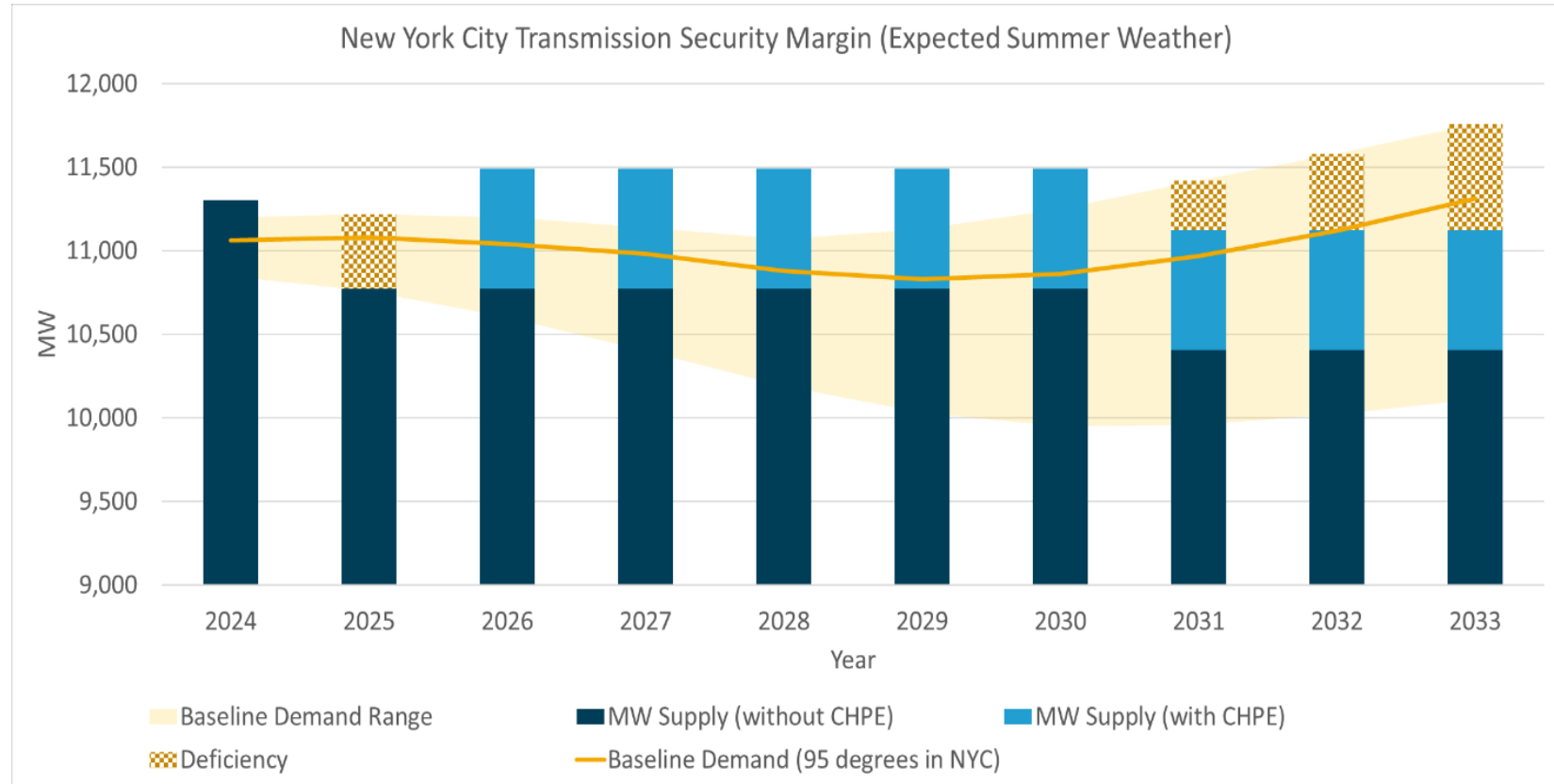
Narrowing Statewide Reliability Margins

- The resource adequacy margin is healthy today, but reduces to a very small margin of approximately 50 MW by 2034
 - Accounts for emergency operating procedures
 - Measured based on compliance with the Loss of Load Expectation (LOLE)
- Statewide system margin for normal operations becomes negative by the end of the planning horizon due to increasing demand, planned generator retirements, and unavailability of non-firm gas in winter peak conditions
- Negative system margins are not, on their own, a violation of reliability criteria but are a leading indicator of the inability of the system to securely meet system load under normal operations



Impact of NYPA Small Plant Phase-Out

- New York City will have a transmission security deficiency starting in 2031 should NYPA's small gas plants (517 MW) retire in December 2030 without replacement resources.
- The deficiency worsens to over 600 MW by 2033 when considering the higher range of the forecast and would be far worse without the CHPE project in service.



2025-2034 Comprehensive Reliability Plan (CRP)

■ Resolving the NYC Reliability Need

- In early 2025, NYISO will consider system updates to determine if the Reliability Need still exists
- If the Reliability Need still exists, NYISO will solicit for solutions and assess the viability and sufficiency of proposed solutions
- If there are not sufficient market-based solutions, NYISO will rank regulated solutions for Board of Directors' consideration

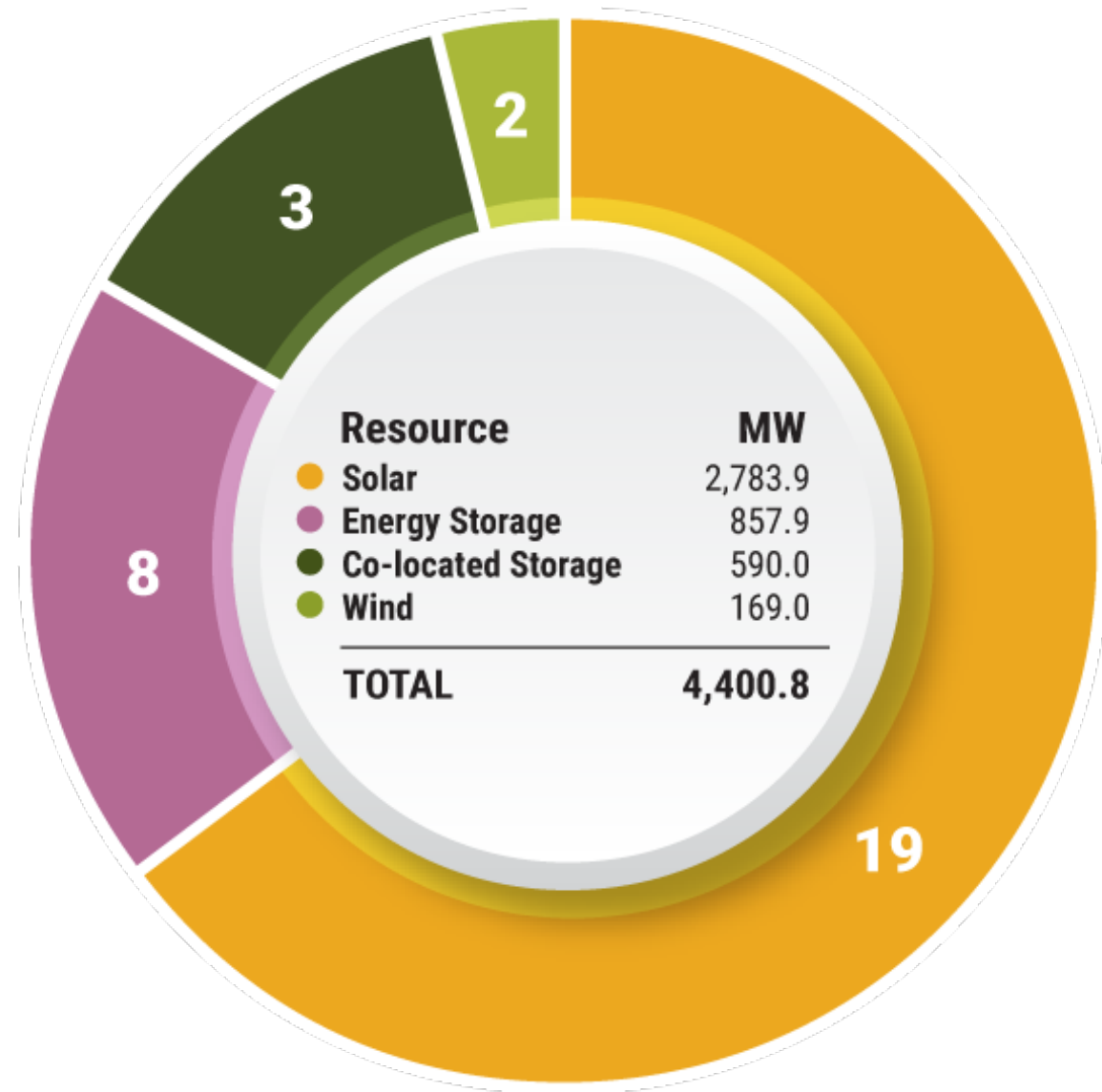
■ The CRP will continue to investigate key system trends, which the RNA acknowledges have a high level of uncertainty:

- Monitor large load development and operating characteristics
- Lack of sufficient resources in power flow cases is new concern
- Monitor impact of the interconnection process (Class Year 23) and upcoming NYSERDA large-scale renewable, offshore wind, and storage procurement efforts
- Consideration of market rules and behaviors of Special Case Resources, Distributed Energy Resources, capacity accreditation, and winter fuel risks in planning assumptions

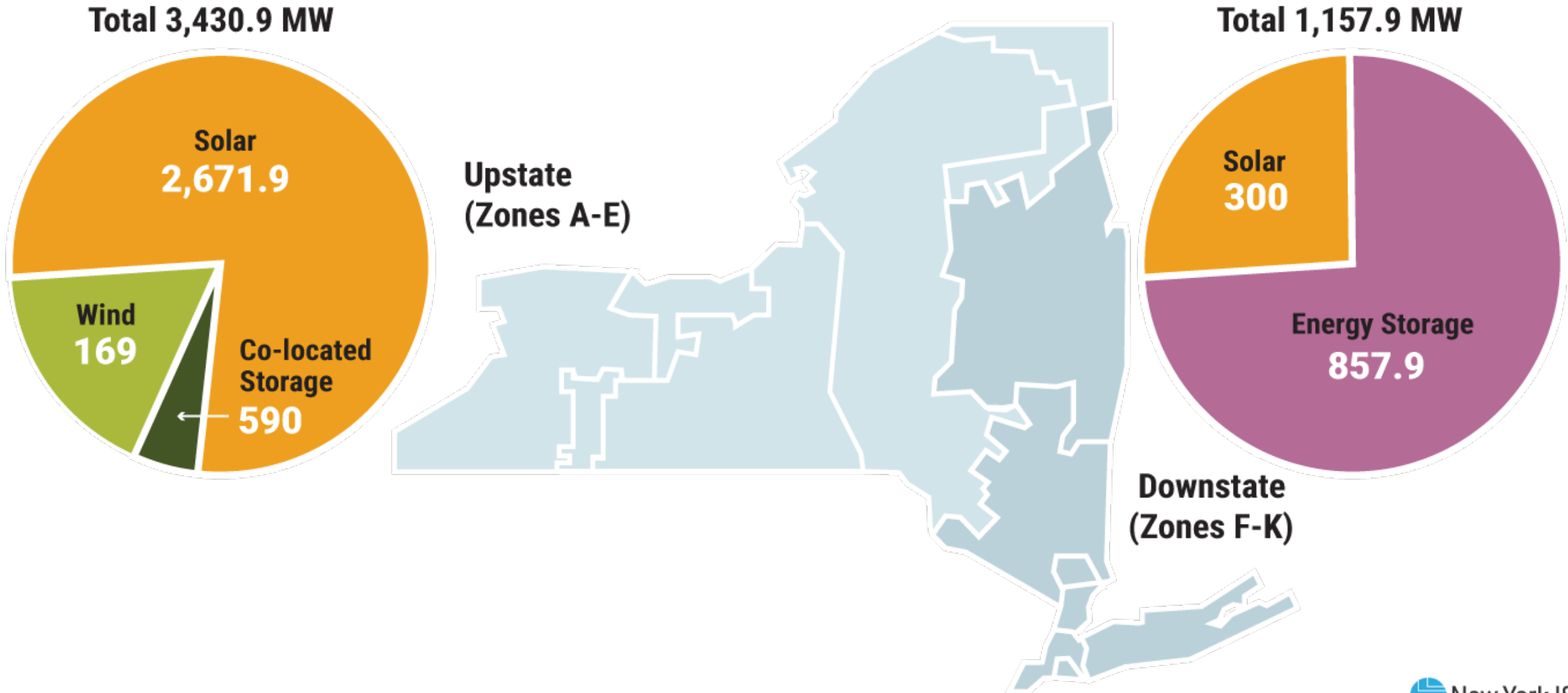
Interconnecting New Resources

Class Year 2023

- 32 generation projects representing 4,400.8 MW of capacity
- Plus, Clean Path NY HVDC transmission facility to deliver 1,300 MW from upstate to New York City



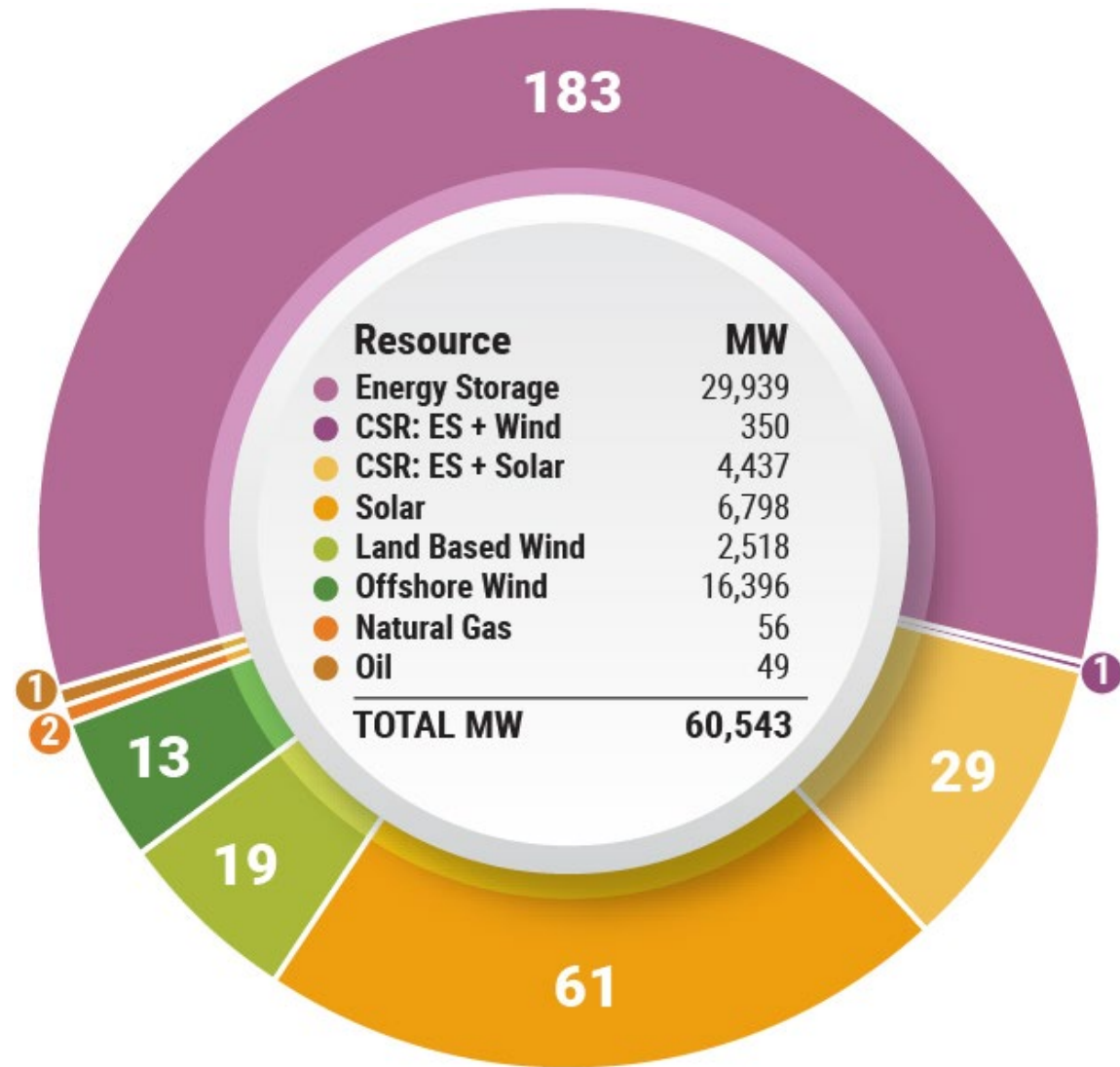
Class Year 2023 – Supply Resources by Region



Cluster Study Project Mix

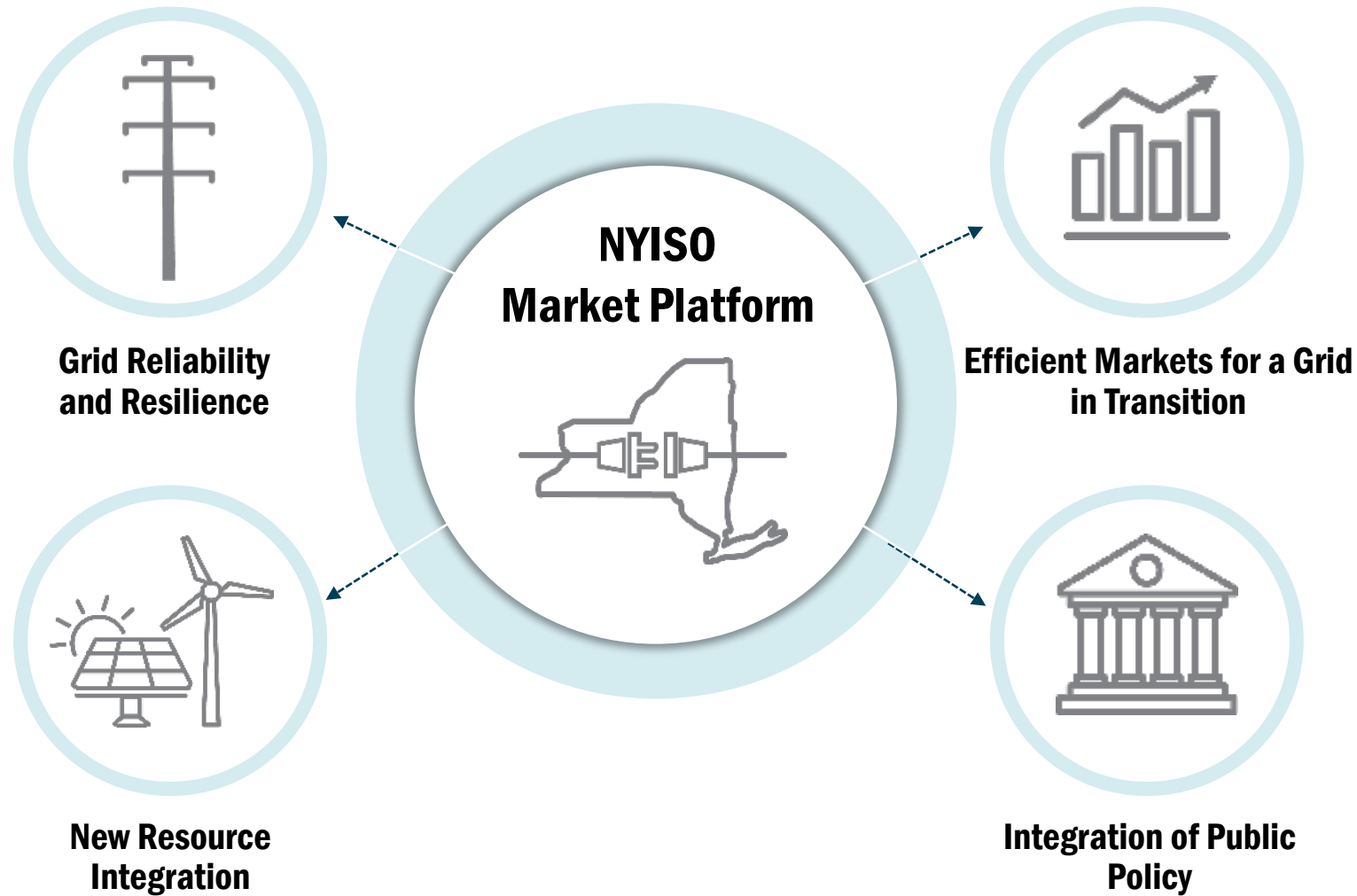
As of December 10, 2024

- New Transition Cluster Study launched August 1, 2024
- Currently 309 proposals representing 60,543 MW of capacity



Wholesale Markets Supporting Reliability & The Grid In Transition

Enhancing Wholesale Electricity Markets to Meet Changing Needs



Role of Energy and Capacity Markets

Energy and Ancillary Services Market

- Aligned to the physics of the power system operations
- Prices for real-time energy and ancillary service needs aligned with reliability
- Provides infra-marginal and shortage pricing revenues for recovering investment costs

Role of the Capacity Market

- Procures enough Capacity to meet System Planning Criterion related to load losses
- Provides fixed cost recovery for investments
- Acts as a call option on future energy and as a hedge on extreme volatility that energy-only markets are susceptible to

NYISO is taking a comprehensive approach to Energy, Ancillary, and Capacity Market enhancements to attract and retain resources with the reliability characteristics the grid of the future will need.

Challenges and Drivers

- Public policies are shaping investment on the grid, particularly the CLCPA
- Competitive markets are channeling investment to support these goals while maintaining reliability at the lowest possible cost



Variability

- Renewable resource output variability, net load variability, and net load forecasting challenges

Unpredictability

- DERs and Storage potentially responding to needs outside of wholesale market (retail programs, on-site customer needs)

Retirement of Flexible Resources

- NYS DEC Peaker Rule and NYPA requirement to retire more conventional generators by 2030

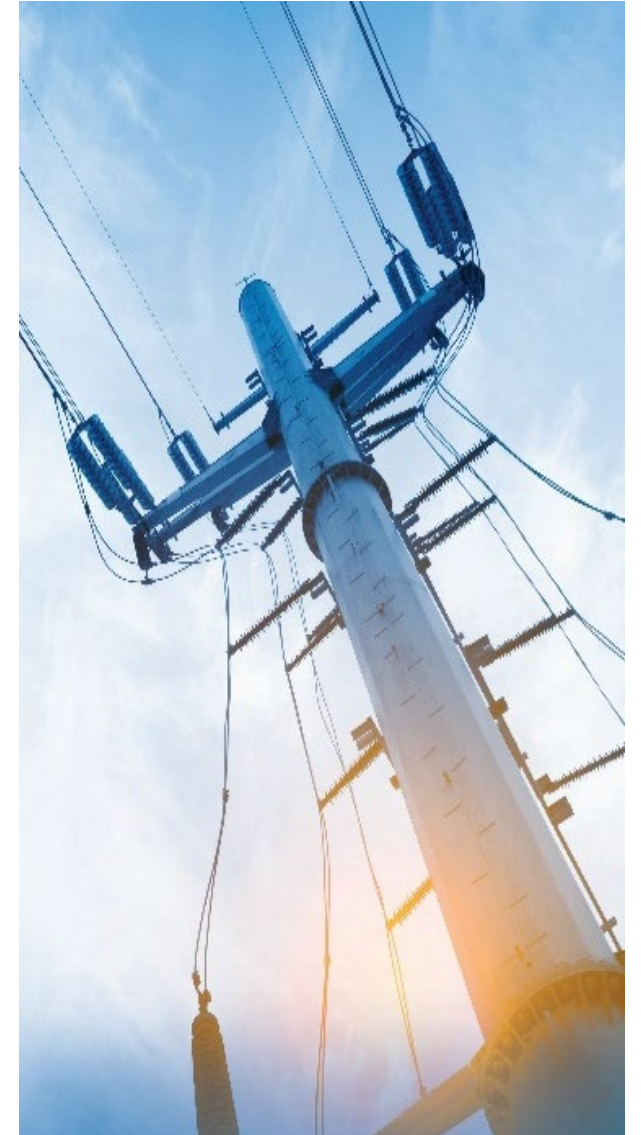
Clean Technologies are Limited

- New resources do not have the same availability and energy availability as the existing fleet

Wholesale Electricity Markets

To meet the complex needs of managing the energy grid, we operate multiple wholesale competitive electricity markets that work together to achieve a reliable and efficient system.

- Each of the NYISO-administered markets are interdependent and facilitate a different piece of the reliability puzzle.
- **Capacity Market:** secures commitments from supply resources to be available to meet seasonal and annual resource adequacy requirements.
- **Energy Market:** secures electricity production to meet demand in real-time.
- **Ancillary Services Market:** secures flexibility services from suppliers to maintain balance in response to changing conditions on the electrical grid.

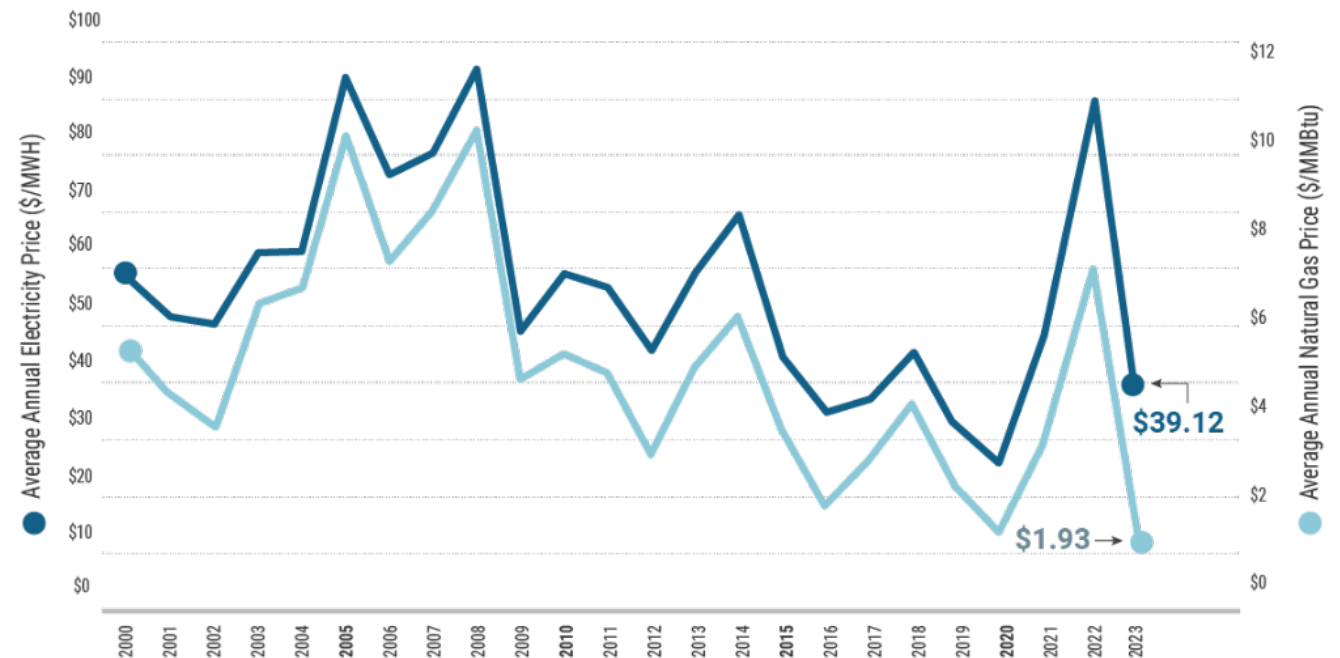


Energy & Ancillary Services Market Design

Design Efforts

- Engaging the Demand Side
- Balancing Intermittency
- Dynamic Reserves
- Improved Duct-Firing Modeling
- Internal Controllable Lines
- Champlain-Hudson Power Express
- Advanced Storage Modeling
- Operating Reserves Performance
- FERC Order 2222 Compliance

Avg Annual Natural Gas and Wholesale Electricity Prices in New York: 2000-2023

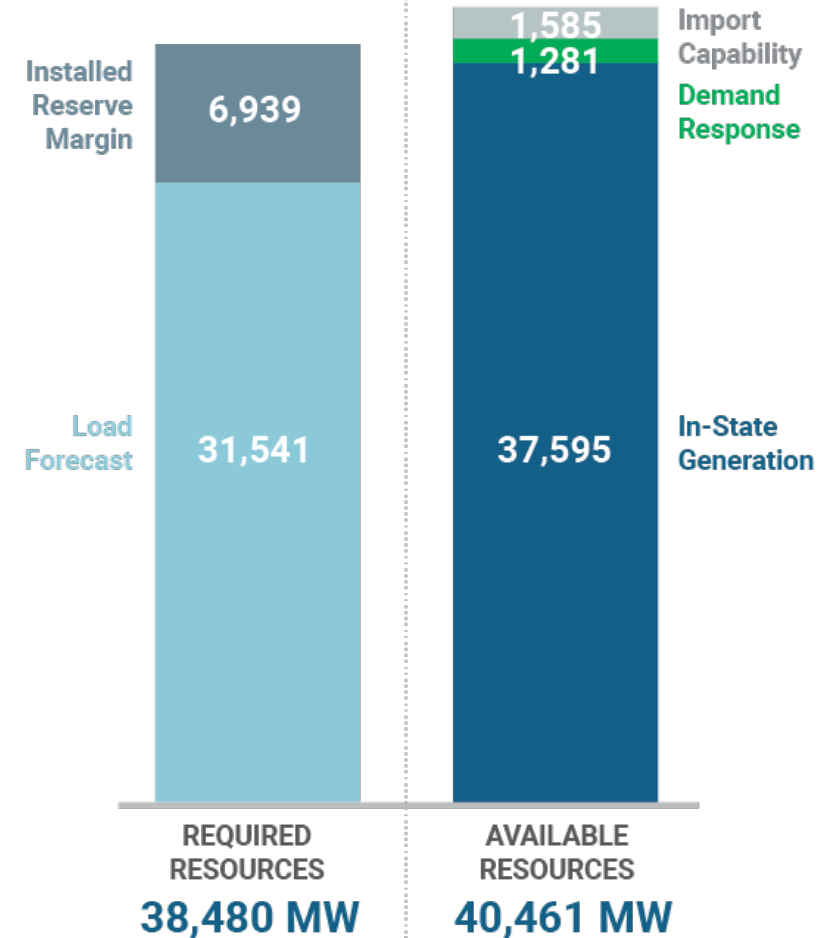


Capacity Market Design

Design Efforts

- Capacity Accreditation
- Modeling Improvements for Capacity Accreditation
- Winter Reliability Capacity Enhancements
- Engaging the Demand Side
- Internal Controllable Lines
- Champlain-Hudson Power Express
- Valuing Transmission Security
- Demand Curve Reset
- Locational Capacity Requirements Optimization

Statewide Resource Availability: Summer 2024



Questions?



Department
of Public Service

Zero Emissions by 2040 and Other Public Service Commission Proceeding Updates

Jessica Waldorf, Chief of Staff & Director of Policy Implementation
December 12, 2024

Zero Emissions by 2040 Proceeding

- Proceeding focused on exploring what technologies will be necessary to achieve a zero-emissions grid that is safe and reliable
- DPS Staff proposal released November 2024 that provides definitions for the “statewide electrical demand system” and “zero emissions”
 - **Statewide electrical demand system** – will clarify that imports from out of state generation resources (with a fossil fuel or hydrogen fuel source, consistent with DEC’s Statewide GHG Inventory) and behind-the-meter resources that are interconnected to bulk power system or retail utility’s distribution system are included
 - **Zero emissions** – recommends the Commission:
 - Limit emissions included in the 2040 standard to GHGs only (not co-pollutants)
 - Count emissions from operation of generation facilities and from the production of fuel consumed by those facilities
 - Find that the state is complying with the 2040 standard with respect to imports so long as New York’s net imports (i.e., emissions-adjusted imports - emissions-adjusted exports) of electricity are clean
- Next step will be recommendation to the Public Service Commission (PSC) for adoption of definitions and characterization of potential reliability gap
- Future designation of resource categories as compliant with 2040 standard
- More information can be found in **Case 15-E-0302**

Policy Focused Grid Planning Proceedings

Coordinated Grid Planning Process

Case 20-E-0197

- Integrated resource planning approach to identify transmission and distribution (T&D) needed to meet CLCPA targets
- 3-year planning cycle
- Coordinated with NYISO System Resource Outlook

Proactive Planning for Electrification

Case 24-E-0364

- Identify and develop granular or local T&D upgrades needed to meet electrification targets
- New, bottoms-up load forecasting approach
- New York investor-owned utilities & DPS have begun to study frameworks & identify needs

Grid of the Future

Case 24-E-0165

- Develop & maintain a plan that encourages investment in flexible resources to reduce costs and improve system reliability

Coordinated Grid Planning Process

- Energy Policy Planning Advisory Council (EPPAC) – stakeholder advisory group
- 3-year repeating cycle. PSC directed joint utilities to propose 2-year cycle in 2024
- **Stages of the CGPP:**
 - **Stage 1** – collect data, develop capacity expansion model, select three scenarios for analysis, 10 sensitivities, produce initial capacity expansion results
 - **Stage 2** – build power flow and short circuit models
 - **Stage 3** – local area studies and solutions development
 - **Stage 4** – scrutinize solutions to identify interactions and conflicts
 - **Stage 5** – least cost assessment, with limits and local transmission upgrades added to the capacity expansion model
 - **Stage 6** – least cost plan report, including recommendations for cost effective investment

Proactive Planning for Electrification

- Launched by the PSC in August 2024
- Focused on developing a comprehensive grid infrastructure planning framework to support electrification of transportation and buildings
- Directed utilities to design a framework for a comprehensive planning study
- Directed utilities to submit two filings, one including the study framework and one proposing urgent grid needs

Grid of the Future

- Aimed at identifying opportunities to leverage the demand flexibility of various resources to meet the state's clean energy goals
- Primary focus on distribution sited flexible resources, avoided bulk infrastructure and operation costs

Objectives

Develop & maintain a plan that encourages investment in flexible resources to:

- Reduce infrastructure & operational costs
- Improve system reliability
- Increased customer benefits & bill savings

Deliverables

- Grid Flexibility Study, January 31, 2025
- First New York Grid of the Future Plan, February 28, 2025
- Second New York Grid of the Future Plan, December 31, 2025

Supplemental Study:
*Reliability of the Transmission and
Distribution System*
&
Explore Evolution of Electricity Markets



Energy Law Section 6-108

- *...the board shall undertake a study of the overall reliability of the state's electric transmission and distribution system...*

At a minimum, the study is to include an assessment of:

- (A) *the current and projected reliability of the electric power system over the term of the planning period, with specific focus on transmission systems and distribution systems within the State. The assessment shall examine: (i) investment in infrastructure, including capital improvements, expansions, and maintenance; and (ii) workforce use.*
- (B) *the potential impact of the following on distribution system reliability and on each factor enumerated in paragraph (a) of this subdivision: (i) distributed electric generation, especially generation, using renewable or innovative energy resources; (ii) energy conservation and efficiency; (iii) load control and peak-saving measures; (iv) corporate reorganization of electric utilities; (v) performance ratemaking, multi-year rate agreements, and other departures from traditional regulatory mechanisms; and (vi) large-scale industrial development.*
- (C) *the potential impact of the following on transmission system reliability: (i) each factor enumerated in paragraph (b) of this subdivision; (ii) changes in protocols for electricity dispatched through the Bulk System Operator or its successor or successors; (iii) accommodation of proposed new electric generation facilities or repowering or life extension of existing facilities; and (iv) the market-driven nature of decisions to build, size, and locate such facilities.*



Overall Outline

- A. Introduction
- B. Transmission System Reliability
- C. Distribution System Reliability
- D. Investment and Expenditure Issues
- E. Environmental Regulations
- F. Energy Policy Initiatives (EXAMPLES ON NEXT SLIDE)
- G. Future Transmission and Distribution Reliability Issues
- H. Key Findings and Recommendations



F: Policy Initiatives

1. State and Regional Policy (possible examples....)
 1. Clean Energy Standard (CES)
 2. Climate Leadership and Community Protection Act (CLCPA)
 3. NYSERDA Tier 4 Contracting
 4. Zero by 2040 Proceeding
2. Federal Policy (possible examples...)
 1. EPA Carbon Limits
 2. Inflation Reduction Act
 3. FERC Order 1920 (Transmission Planning)
 4. FERC Order 2023 (Interconnection Reform)
 5. FERC Order 1977 (Federal Permitting Backstop Authority) and National Interest Transmission Corridor Designations (NIETCs)
3. Support for existing and new technologies
 1. Nuclear Power
 2. Offshore Wind
 3. Energy Storage
4. Public Policy Effect on Load
 1. Energy Efficiency
 2. Localized Large Load Growth
 3. Other Load Variation Mechanisms
5. Demand Response Programs
 1. NYISO Demand Response Programs & Engaging the Demand Side Initiative
 2. Distribution-Level Demand Response Programs
 3. Electric Utility Restructuring and Regulation
6. Departures from Traditional Regulatory Ratemaking Mechanisms



Contractors & Advisory Board

- *The board may contract with an independent and competitively selected contractor to undertake the study.*



- *The board and any contractors it may retain shall consult with entities that have resources and expertise to assist in such study...*
 - NYSERDA is managing this supplemental study with contractors E3 and GE Vernova
 - An advisory board for the study includes: NY Independent System Operator (NYISO), NYSERDA, Department of Public Service, Department of Environmental Conservation, Department of State, NY Power Authority (NYPA), Long Island Power Authority (LIPA), Con Edison/O&R, NYSEG/RG&E, Central Hudson, National Grid, and NYS Reliability Council.

Explore Evolution of Electricity Markets

- Enhance participation by flexible demand-side resources to ensure that incentives are adequate for the participation of clean flexible resources
- Improve capacity market signals for resources needed to meet state clean energy targets while maintaining reliability
- Create potential new ancillary service products or to improve current ancillary service market signals for resources needed to meet state clean energy targets while maintaining reliability
- Review system planning processes to see if changes are needed to better inform market structures and outcomes
- Pursue opportunities for energy storage to participate as a transmission resource



Board Discussion

Other Business

Next Steps

**Draft Scope
(Complete)**

Final Scope

**Draft State
Energy Plan**

**Final State
Energy Plan**

Draft Scope

- Public comment due December 16th, 2024
- Comment submission portal is available on the State Energy Plan website at energyplan.ny.gov

Final Scope

- Expected early 2025

Draft Plan

- Public hearings (at least 3 upstate, 3 downstate)
- Public comment period (anticipated summer 2025)

To stay informed, sign up for State Energy Plan email updates at energyplan.ny.gov/Subscribe-To-Energy-Plan-Updates

**Thank you for your participation in
this meeting of the
State Energy Planning Board**

For more information, please visit the
State Energy Plan website:

energyplan.ny.gov