New York ISO
Independent System Operator

2025 Market Vision

A Report by the
New York Independent System Operator

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Table of Contents

Table of Figures

Introduction

The NYISO administers the nation's leading competitive wholesale electricity markets, which consist of the following:

- **Capacity Market** with strip (seasonal), monthly, and spot auctions that establish regional prices to meet New York's resource adequacy needs;
- **Energy Market** with a day-ahead auction to prepare for the next day's power system operation and a series of real-time auctions that clear every five-minutes and establish locational prices to meet New Yorkers' electricity needs every minute of every day;
- **Ancillary Services Markets**, such as operating reserves and regulation services, that provide needed flexibility and backup options when the unexpected happens and establish prices for those products. Additional ancillary services, such as voltage support and black start, support robust transmission operations or help restore the power system after a complete or partial failure and are compensated through cost-of-service payments; and
- **Transmission Congestion Contracts Market** to help buyers and sellers manage or hedge locational price risk.

These elements of the NYISO wholesale electricity markets work together to support the efficient delivery of reliable electricity to every New Yorker, which also helps to keep the long-term cost of electricity commodities as low as possible.

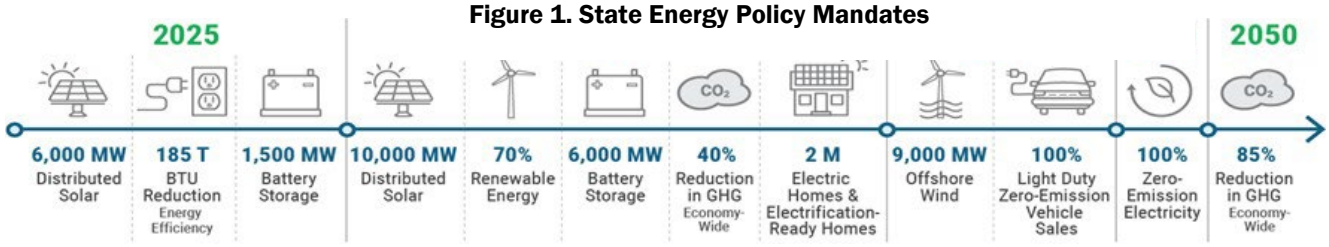
The wholesale electricity market rules benefit from a highly collaborative governance process where potential market rule changes are vetted with stakeholders. The shared governance process is made up of representatives of a broad swath of interests, including utilities, suppliers, public power interests, consumers, and environmental interests, including entities focused on environmental justice concerns. The shared governance process is designed to balance these interests while supporting strong collaboration among stakeholder interests and with the NYISO. This is important because wholesale market rules are extremely complex and modification requires thorough review and vetting. Once changes are supported by our stakeholders, the NYISO's Board of Directors also reviews them. After the NYISO Board of Directors approves potential market rule changes, the NYISO submits proposals for consideration by the wholesale market regulator, the Federal Energy Regulatory Commission (FERC), which must accept the proposed rule changes for them to become effective.

This *Market Vision* report, formerly *Master Plan*, discusses the wholesale electricity market initiatives planned for the next five years. These initiatives will require the commitment and collaboration of NYISO's stakeholders, policymakers, and regulators, to be successful.

A Changing Power System

New York State lawmakers passed the Climate Leadership and Community Protection Act (CLCPA) in 2019. This law bolstered the clean energy commitment of New York already envisioned in the Clean Energy Standard (CES).

Figure 1. State Energy Policy Mandates



State policies are driving the state's supply mix to an electric power system supplied by zero-emitting resources, with an abundance of renewable energy and storage resources. At the same time, public policies are also encouraging many more circuit miles of transmission and distribution, and electrification of many sectors of the economy. Through its comprehensive system planning processes, the NYISO has identified a need for non-emitting resources that possess similar attributes to today's conventional fossil-fueled resources. NYISO refers to these resources as Dispatchable Emissions Free Resources (DEFRs).

All this is leading to a tremendous amount of change to an infrastructure system critical to the health, safety, and welfare of New Yorkers.

This transition needs to be carefully planned and executed, especially since the electrification of other parts of the economy amplifies the need for a reliable and resilient electricity system. It will also be very important that the wholesale electricity markets continue to deliver the least cost electricity available to consumers.

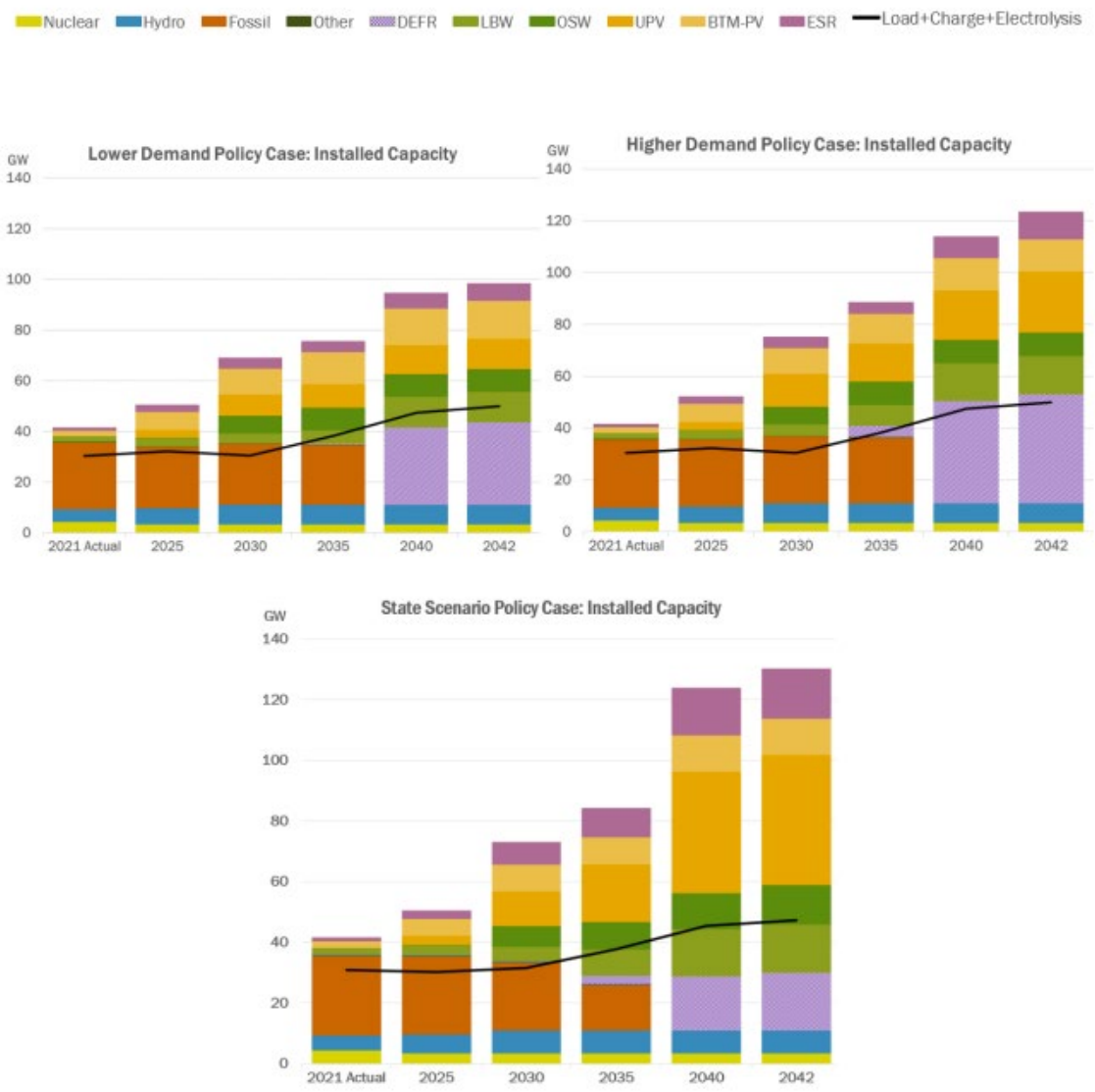
The wholesale electricity market is the platform for such a transition. It is designed to incentivize an orderly transition for economic entry and exit, where new technologies and resources are added before existing resources that we rely on for system reliability retire. The transparent market signals provided by wholesale electricity markets, reflecting the balance between new supply, and retiring resources, can serve to inform market participants, developers, stakeholders, and policymakers as we progress through this transition.

New Challenges

The wholesale electricity market in New York is fundamentally sound and built on a strong foundation of reliability and market principles. However, the operation of the power system will change with the expected addition of over 45 GW of intermittent renewable resources to meet the CLCPA, fueled by wind and solar energy. For context, the current fleet in NY is roughly 41 GW.

Figure 2. Anticipated NYCA Capacity and Generation Changes

Source 2023-2042 System & Resource Outlook[1]



[1] The 2025-2044 System & Resource Outlook is currently underway, which will update this analysis.

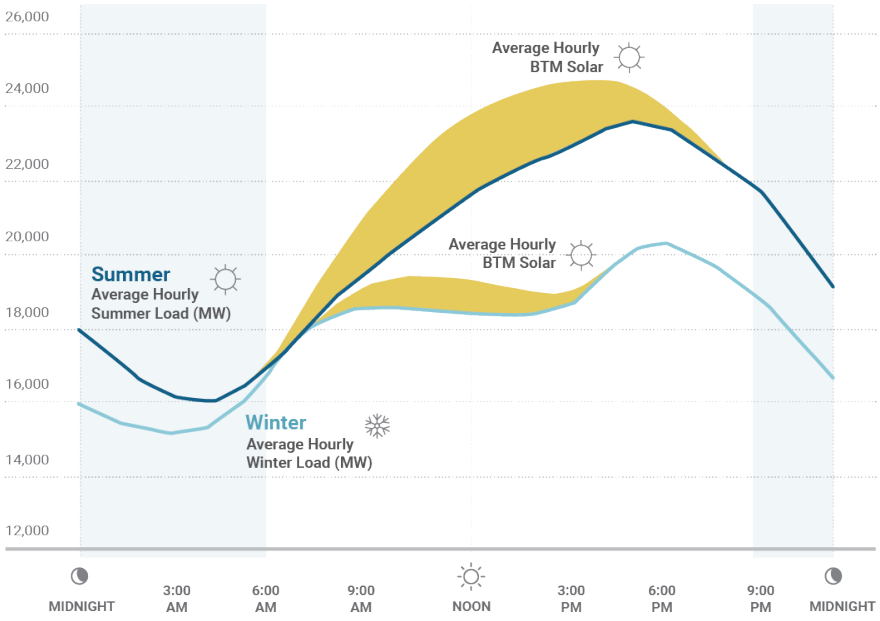
Since renewable resources generally act as low-cost supply, they displace more flexible resources that can come on and off quickly. Unlike conventional baseload resources, such as nuclear and combined cycle generators, output from renewable resources is highly variable since these resources rely on the weather to produce electricity.

About half of the 45 GW of new supply is expected to be solar resources. The output from these resources varies greatly, both daily and across the seasons, with spring being most advantageous for high solar output and winter most limiting.

The CLCPA envisions adding storage resources that can capture the excess output from renewable resources when the power system does not need it and deliver that energy when the output from renewable resources is diminished, and the power system does need it.

The attributes of current storage technologies vary greatly. Some storage resources, such as batteries, have limited duration capabilities (less than 4 hours of stored energy) but can ramp very quickly. Some storage resources may have a few days or a week of stored energy but must be configured ahead of time to either consume or produce energy and are not highly flexible. Other storage resources, such as pumped-hydro storage, have many hours of storage capability (8 to 12 hours) and are flexible in that they can be called on quickly (in less than 10 minutes), ramp quickly, and, in some cases, seamlessly ramp from consuming to producing or vice-versa.

Figure 3. Summer and Winter Behind-the-Meter Solar Performance



The power system is getting more complex, with an abundance of new technologies and resources added to the power system that do not have a long track record of reliable configuration or operation. These resources, known as inverter-based resources, rely on software-based electronics to perform, leading to a higher probability of misconfiguration, mis-operation, or failure of the resource to react to system conditions correctly. The industry is currently grappling with best practices, standards, and operating procedures that would minimize the risk to reliability based on poorly designed or configured technologies. However, there is still much learning to

do before these risks can be meaningfully mitigated.

Lower operating margins are leading to higher power system stress, and aging equipment is more susceptible to failure when operating under stressed conditions. There are also increased challenges with the integration and coordination of smaller resources, many of which are not able to respond to dispatch signals scattered across many different voltage levels (*i.e.*, transmission, sub-transmission, networked distribution, and radial distribution) of the power system.

These changes in resource mix lead to a need for:

- Reliability attributes: A diverse mix of resources with key reliability attributes is needed to address renewable balancing and uncertainty. These attributes include:
  - Dispatchability: Resources that can follow instructions to increase or decrease output on a minute-to-minute basis;
  - Short Notification: Resources that can start quickly (<10 minutes);
  - Zero/Minimal Downtime: Resources that can cycle often with minimal to zero downtime;
  - Fast ramping: Resources that can quickly follow net load to manage ACE on a second-to-second basis; and
  - Energy Secure: Resources that can provide energy for multiple hours and days regardless of weather, storage, or fuel constraints.
- Resilience attributes: The diverse resource mix must support power system strength and stability and minimize operational risk:
  - Resources that can hold their bus voltage regardless of topology or resource commitment;
  - Resources sized to avoid extreme contingency scenarios, where contingency reserves may be expensive or unavailable, and loss of generation does not contribute to Loss of Load Events (LOLE) or Expected Unserved Energy (EUE); and
  - Resources that can support frequency response.

Well-functioning competitive wholesale electricity markets provide signals that incentivize the resource attributes needed to support a reliable and resilient power system. The changes to the power system resource mix are creating new challenges to the reliability and resilience of the power system. New York's wholesale electricity market must adapt to address these challenges and provide signals that support the resources needed to continue to support the reliable delivery of electricity.

Capacity Market

The Capacity Market provides a mechanism to assist with fixed cost recovery, net of energy and ancillary service revenues, for resources eligible to sell capacity. This supports resources needed to ensure a diverse resource mix that can reliably serve all New Yorkers.

Capacity is measured in two ways:

- As installed capacity (ICAP), which measures the nameplate or demonstrated maximum capability of resources; and
- As unforced capacity (UCAP), which measures the reliable capacity available from a resource to serve load. UCAP allows for comparisons of MW of capability across various sources/types of supply, known as fungibility, regardless of resource, technology, or location.

The NYISO supports the work of the New York State Reliability Council (NYSRC), which annually establishes the amount of capacity that must be procured to maintain resource adequacy. These requirements are converted into UCAP terms for use in the Capacity Market clearing process. These requirements are designed to establish the amount of ICAP needed to meet the standard of avoiding voluntary transmission level load shedding from happening more than once every ten years.

Growing Concerns About Winter Reliability

The retirement of certain nuclear and coal facilities has created a much larger reliance on natural gas-fueled generators, especially in southeast New York. Natural gas, most of which is transported into New York via interstate pipelines, continues to be relied upon to provide heat for commercial and residential buildings. At the same time, the existing infrastructure and supply of natural gas in New York has not been expanding to support the growing reliance on natural gas.

These changes place an additional burden on the existing and aging natural gas infrastructure, and it is of growing importance to understand how these shifts are creating risks for natural gas-fueled generators to be available on the coldest days of winter. These impacts are not unique to New York, and neighboring regions, including New England, Quebec, Ontario, and the Mid-Atlantic, are facing similar risks of insufficient or reduced capability of gas-fueled generators during the winter season.

Winter Reliability Capacity Enhancements is a project focused on understanding these emerging winter risks. The effort has proposed to incorporate changes into the Capacity Market structure so that the market properly signals the amount of resources that are needed at different times of the year (seasons). Subject to acceptance by FERC, this project is expected to be implemented starting with the 2027-2028 Capability Year.

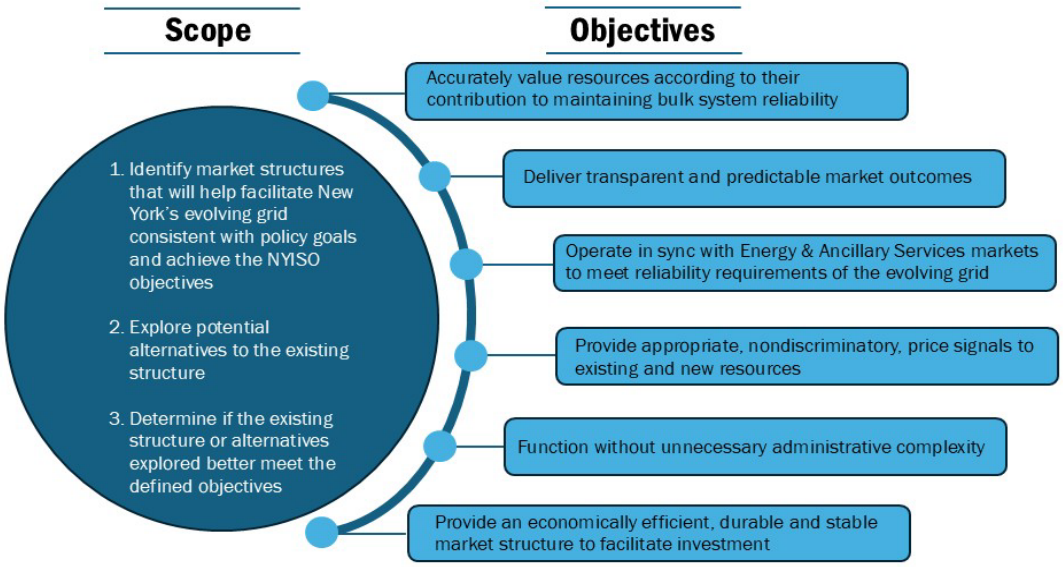
Winter Fuel Capability Study is a project that has focused on better understanding the availability of fuel for fossil-fuel generation during stressed winter conditions. This understanding will better support operational awareness of the impact of winter conditions on fuel availability as well as support efforts to model fuel availability in reliability analysis such as the Installed Reserve Margin ("IRM") study performed each year by the NYSRC. The NYISO plans to continue coordination with the NYSRC regarding the modeling of fuel availability in the IRM study.

Markets that Support the Transition

New York's power system is changing. New transmission investments are being made across the state to improve the ability of renewable generation to supply energy to customers. Conventional resources face more stringent emissions requirements, and in some cases, existing policies are leading to retirements of highly flexible generators. Economic development opportunities are also leading to large investments in new facilities that will support new industries across New York. Many of these new facilities are expected to be large electricity consumers.

To ensure the Capacity Market can continue to provide appropriate price signals while New York's power system is changing, a holistic review of the structure and purpose of the Capacity Market was undertaken in 2025 as part of the ***Capacity Market Structure Review*** (CMSR) project. The review found that pursuing the development of enhancements to the current Capacity Market structure are appropriate to support the dynamic needs of the grid in the next decade.

Figure 4. Capacity Market Structure Review



The CMSR project identified the ***ICAP Demand Curve Reset (DCR) Process and Methodology Improvements*** project as the highest priority project to enhance the Capacity Market. The objective of this project is to develop an alternative set of approach(es) and/or enhancements to setting the ICAP Demand Curves to replace/supplement the current DCR and annual update process. The purpose of any such alternatives/enhancements is to help mitigate unpredictable volatility, improve the transparency and economic efficiency of the ICAP Demand Curves, and provide appropriate price signals to maintain bulk system reliability at an efficient and effective level for consumers.

The next prioritized project from the CMSR is the ***Reliability-Based Attribute Pricing for Transmission Security*** project. Transmission security needs have driven the identification of Near-Term Reliability Needs in New York City and Long Island and have increasingly set the Locality requirements in the Capacity Market. The Reliability-Based Attribute Pricing for Transmission Security project aims to enhance the Capacity Market's ability to reflect and price transmission security. Pricing transmission security explicitly in the Capacity Market may incent investment that supports reliability while delivering transparent and predictable market outcomes.

An additional project prioritized as part of the CMSR project is the ***Improving Capacity Accreditation and Resource Adequacy Modeling*** project. The current complexity and limited visibility into the resource adequacy models may be reducing the transparency and predictability of market outcomes and impacting the ability of the Capacity Market to provide an economically efficient, durable and stable market structure to facilitate investment. This project would explore potential adjustments to marginal capacity accreditation and resource adequacy modeling processes that may improve Capacity Market stability, enhance transparency and predictability, and support more informed decision-making by market participants.

The last project prioritized as part of the CMSR project is the ***Capacity Zone Redesign*** project. The Capacity Market currently establishes market signals through market prices for four capacity regions (capacity zones) of New York. These capacity zones have historically been defined by limitations to deliver electricity from one area to another. While effective in identifying broad reliability needs, the current zonal framework of the Capacity Market may not fully capture emerging transmission constraints, shifting load patterns, and the reliability contributions of distributed and flexible resources. A well-designed zonal structure can help optimize resource entry and exit decisions, ensuring that capacity is procured efficiently and reliably across the NYCA. By refining the capacity zone-setting process, NYISO aims to enhance the overall efficiency and reliability of the Capacity Market, aligning it more closely with evolving system needs. Changes to Capacity Market zones have large consequences that require careful

consideration; however, it is just as important to make sure that Capacity Market price signals remain consistent with locational reliability needs. Additionally, the design of the Capacity Market zones also impacts how resource deliverability analysis should be performed.

The NYISO believes it needs to have a clearer view of potential changes to the current zonal framework of the Capacity Market before it can turn its attention to the ***Deliverability Improvements*** project. This effort will work through the role of the New Capacity Zone (NCZ) study and resource deliverability studies performed in the Class Year (Cluster Study) or Expedited Deliverability Study processes. It is expected that any changes to how Capacity Market zones are defined will require reconsideration of the NCZ and resource deliverability studies.

Other Capacity Efforts

Subject to FERC approval, rules approved by stakeholders as part of the ***Review of Control Area System Resources*** project will be implemented for the 2026-2027 Capability Year to ensure that Control Area System Resources provide comparable reliability benefit and are compensated accordingly when compared to other types of resources.

While significant work is anticipated to be undertaken to evolve the Capacity Market, underlying software systems supporting the administration and operation of the Capacity Market will need to be revised and enhanced to support rapid implementation of the market evolution. The ***ICAP Efficiencies*** project is a major effort to improve the underlying software systems to better support future market changes.

Capacity Market Plan

Figure 5. Capacity Market 5-year Plan[2]

	2025	2026	2027	2028	2029	2030
		Market Vision 2025				
Capacity Market						
Demand Curve Reset	DEP		SD	SC	DEP	
DCR Process & Methodology Improvements	CP	MDC	DEP			
Capacity Improvements to Support Reliability						
Evolving Resource Adequacy Models	Coordinate Improvements with NYSRC					
Winter Fuel Capability Study	SC	Continue Coordination with NYSRC				
Winter Reliability Capacity Enhancements	MDC	DC	DEP			
Capacity Market Structure Review	ID	Continue Based on Findings				
Improving Capacity Accreditation & Resource Modeling		SC	Continue Based on Findings			
Reliability Attribute Based Capacity Pricing			MDC	SDS	DC	DEP
Capacity Zone Redesign				SD	SC	Continue Based on Findings
Deliverability Improvements		DEP		Develop Improvements Consistent with Capacity Zone Redesign		
Improving Market Processes						
Review of Control Area System Resources	MDC	DEP				
System Upgrades to Support Future Markets						
ICAP Efficiencies	DEP	DEP				

Energy Market

The NYISO-administered wholesale Energy Market provides suppliers and consumers with operational signals about power system conditions, typically rewarding resources and consumers that are the most flexible. The Ancillary Services Market procures products necessary to support the reliable operation of the system, including operating reserves and regulations services. These markets simultaneously procure energy, operating reserves, and regulation services, known as co-optimization. This is an extremely efficient way to procure all services at the least possible cost. The wholesale Energy Market also:

- Establishes resource schedules, including fossil fuel-fired generators, energy storage resources such as batteries, hydro, pumped-hydro, nuclear, renewable generators, demand response resources, and distributed energy resources;
- Economically evaluates and schedules market based import, export, and wheel interchange transactions;
- Provides nodal energy price signals, known as Locational-Based Marginal Prices (LBMPs) for resources;

[2] See Appendix – Legend for 5-year Plans for description of milestones.

- Provides zonal energy price signals for consumers (or demand);
- Provides regional price signals for operating reserves;
- Provides State-wide price signals for regulation services; and
- Provides transmission congestion price signals for transmission constraints that limit the flow of lower cost energy.

The Energy Market consists of both a day-ahead and a real-time market, known as a two-settlement market, and settles all services on an hourly basis in the day-ahead market and nominally every five minutes in real-time. This structure incentivizes resources that sell day-ahead to be available in real-time or risk buying out any unfulfilled schedule at real-time prices. It also allows customers to hedge real-time price volatility by purchasing services at day-ahead prices.

The Energy Market reflects expected actual operating conditions and schedules resources to support the reliable delivery of energy to customers for every second of every day. It also supports the coordination of energy purchases and sales between neighboring regions. As the operation of New York's power system becomes more complex with the growing share of intermittent, limited duration, and transmission-constrained resources, the market tools and market products must also evolve to continue to effectively simulate expected actual operating conditions and mitigate new risks to maintain reliability.

Reserve Markets for the Future

The operating characteristics of the power system are evolving with an increase in the share of intermittent renewable and duration-limited resources. Rapid changes in weather conditions could subsequently result in a sudden loss of large amounts of expected energy from these resources, causing uncertainty in predicting how much energy these resources will produce. This uncertainty introduces challenges in maintaining reliability in real-time operations.

In addition to uncertainty in the quantity of generation from intermittent resources, there is also uncertainty in net load (load net of behind the meter resources). This is further exacerbated by the introduction of additional renewable resources, particularly the continuously increasing amounts of behind-the-meter solar resources. New York has approximately 6.5 GW of behind-the-meter solar in operation today. It is critical for system operations that the amount of energy generated matches the amount of energy demanded, so the uncertainty of both quantities compounds reliability concerns.

These challenges will require having resources on standby to provide energy when the availability of the renewable fleet diminishes. This concept of having resources on standby, known as providing operating reserves, has long been a standard in the electric utility industry. However, the timeframes and duration needs of these reserves must be better defined to provide clearer signals on the standby resource

capabilities needed. Previously, the attribute that was most valuable was how quickly a resource could startup; however, with the emergence of new duration-limited resource technologies, how long resources can produce energy is becoming increasingly important to the reliable operation of the grid, and the pricing signals must clearly reflect this value.

The ***Balancing Intermittency*** project is focused on expanding the existing ancillary services products to better account for both resource and net load uncertainty in operations. Future efforts will focus on identifying and developing new ancillary service products to better define the standby resource needs of the system. The addition of new products and expanded use of existing products also suggests that great care should be taken when scheduling resources to provide these services and pricing these products to reflect the value provided to the power system. The ***Balancing Intermittency*** project will also consider these issues.

Although continuing the practice of statically defining these reserve product requirements could maintain reliability as the intermittent renewable resource fleet grows and risks increase, it is anticipated that this approach might be inefficient. Instead of this static definition, the NYISO considered dynamically determining the product requirements based on the expected or actual operation of resources and is working on this concept as part of the ***Dynamic Reserves*** project. As part of this project, reserves requirements will also consider the availability of transmission to better account for transmission constraints and more accurately reflect grid conditions.

Dynamically determining where and how many reserves to procure would improve the efficiency of any new products developed under future phases of the ***Balancing Intermittency*** project. These projects are sequenced to avoid duplication of efforts and to allow for the introduction of this mathematically challenging concept in a measured way before expanding its use to consider the complexities of resource and load uncertainty in addition to other potential use cases.

The ***Balancing Intermittency*** and the ***Dynamic Reserves*** projects will coordinate with future efforts in the ***More Granular Operating Reserves*** project. The ***More Granular Operating Reserves*** project will evaluate and potentially implement local requirements for the quantity of reserves that must be procured in specific load pockets, such as New York City, in order to improve grid reliability and efficiency. These projects, in conjunction are expected to improve the effectiveness and efficiency of the Energy Market and its pricing signals, thereby improving how the Energy Market supports power system operations and reliability through the emerging challenges associated with intermittent and duration-limited resources.

Improving Price Formation

Improving the ability of the Energy Market to better reflect the physical characteristics of the grid will better align pricing and scheduling outcomes with the physical capabilities, and the real-time operational challenges, of the grid. The ***Ambient Adjusted Transmission Line Ratings*** project, which was ordered by FERC, will support more frequent updates to transmission line transfer criteria, allowing for more efficient scheduling of generation and flow of power based on actual system conditions.

Intermittent resources such as renewables are not capable of changing their output in response to dispatch signals, so these technology types are not able to provide standby operating reserves. Therefore, as the share of intermittent resources continues to grow, it is critical to accurately reflect the actual capabilities of the resources that can provide operating reserves and to accurately reflect the value of these products in market signals. The ***Improve Duct Firing Modeling*** project will improve the modeling of available combined-cycle generator capability and may also help with the modeling of hybrid resource aggregations that would make more functional reserves available to the market.

The ***Review of Real-Time Market Structure*** project will assess the existing structure and settlements of the real-time market to determine if changes are needed to maintain the reliable operation of the system in real-time. In addition to reviewing the structure and settlements system, the project will also assess the risks associated with high levels of intermittent renewable and limited-duration resources, such as Energy Storage Resources (ESRs). This project will assess the uncertainties associated with the evolving system, which may be managed through the new, longer look-ahead reserves products in the future ***Balancing Intermittency Phase 2*** project. The ***Review of Real-Time Market Structure*** study will also evaluate if the current structure and optimization horizons of the Real-Time Commitment (RTC) and Real-Time Dispatch (RTD) are designed to best manage the challenges of the future grid.

Financial Instruments to Support Efficient Markets

As the grid continues to evolve, financial instruments will need to be designed and enhanced to continue to allow efficient market outcomes and allow market participants to hedge risk. Enhancements to the Transmission Congestion Contracts (TCC) market will be considered in the ***Time Differentiated TCCs*** project, which seeks to disaggregate the TCC product from its current 24-hour time span to include additional, more granular products covering shorter timeframes. Additionally, the ***Market Purchase Hub Transaction*** project will allow single-sided transactions to or from the market to a Trading Hub.

System Upgrades to Support Future Markets

While significant work is anticipated to support the evolving Energy and Ancillary Services Markets, underlying software systems supporting and operating these markets will need to be revised and

enhanced to support the rapid implementation of the market evolutions. The ***NM Upgrade*** project is a major effort, which will improve the underlying software systems to better support future market changes while continuing to keep the system up to date.

As the grid continues to evolve, system operators will need enhanced tools to support the deployment of limited duration resources, such as energy storage, under a dynamic grid. The ***Advanced Storage Modeling*** project will automate the request for resources to be available during identified portions of the day to meet anticipated reliability needs identified the Capacity Analysis and Commitment Tool.

Energy Market Plan

Figure 6. Energy Market 5-year Plan

	2025	2026	2027	2028	2029	2030
		Market Vision 2025				
Energy Market						
Reserve Markets for the Future						
Balancing Intermittency						
Phase 1 - Modify Existing Product(s) for Uncertainty	DC	DEP				
Phase 2 - New Product(s)				CP	MDC	FR
Dynamic Reserves						
Phase 1 - Transmission Headroom	SDS	DC	DC	DEP		
DR - Review Operating Reserve Cost Recovery	CP	FR	DEP			
Uncertainty Adjsutment Review			ID	SC	Continue Based on Findings	
More Granular Operating Reserves				CP	MDC	FR
Operating Reserve Performance		SDS	DEP			
Improve Price Formation						
Improve Duct Firing Modeling	DC	DEP				
Market for Inertia			ID	Continue Based on Findings		
Review of RT Market Structure		ID	Continue Based on Findings			
Ambient Adjusted Transmission Line Ratings	SC	FR	SDS	DC	TEST	DEP
Financial Instruments						
Time Differentiated TCCs		CP	MDC	Plan Based on Design		
Market Purchase Hub Transactions	MDC	DC	DEP			
System Upgrades to Support Future Markets						
Advanced Storage Modeling	SDS		DC	DEP		
NM Upgrade	DEP		SDS	DC	TEST	DEP

New Resources and Market Participation

Public policies and financial incentives are driving the research and advancement of new technologies. As these new technologies become commercially viable, there is a need to consider their operational characteristics to allow them to be incorporated into the wholesale market as efficiently and effectively as practicable.

Enabling New Resources and Capabilities

New technologies have the potential to diversify the system resource mix, support New York's clean energy and de-carbonization objectives, and make load more dynamic and responsive, providing an opportunity to improve overall system efficiency. Some of these newer resources also depend upon the weather for their fuel. It is imperative to consider investment and innovation in new clean energy technologies with long-duration energy output capabilities that are dispatchable. Integration of new resources will ultimately support New York's clean energy objectives, support compliance with FERC Order Nos. 719, 745, 841, and 2222 as well as other FERC efforts that aim to facilitate the integration of new resources such as hybrid storage resources into the market, and will benefit the market. While some new models may be required to fully integrate new resources, looking for opportunities to enhance existing models first will help integrate new resources while minimizing the operational matrix of market rule sets.

As new assets are developed and built, there is an accompanying desire to couple assets of different technology types to participate as a combined resource in the wholesale markets. This desire provides an opportunity to leverage the complementary characteristics of different technology types such as coupling intermittent, renewable generation with energy storage to reduce the generation volatility. Additionally, state and federal programs and procurement initiatives provide incentives for developers to couple storage and intermittent renewable assets. Recognizing these opportunities for developers and the associated benefits to the wholesale market, the NYISO developed the Co-located Storage Resource (CSR) Model that enables grid-scale wind or solar and energy storage resources to participate as co-located resources behind a single interconnection point.

The NYISO will build on this framework in the ***Hybrid Aggregation Storage Model*** (HSR), which will allow Energy Storage Resources to aggregate with one or more Intermittent Power Resources (Solar, Wind and Landfill gas) and/or Limited Control Run of River Hydro generators that are all co-located behind the same point of interconnection to form a single resource. The resources in this type of aggregation will share a single point identifier (PTID). In addition, the NYISO has updated the CSR model to allow Combustion Turbines (CTs), Landfill gas, and Limited Control Run of River Hydro generators as additional generator types in the model.

Historically, most electricity demand has been considered inelastic or uncontrollable by system operators. However, as deployments of intermittent resource generation increase, so does the opportunity for more flexible demand. Flexible demand will play a role in both balancing intermittent supply from variable energy resources and in providing ancillary services to the NYISO markets. The ***DER Market Enhancements*** project seeks to broaden avenues for market participation by flexible loads by addressing

areas of concern within the Distributed Energy Resource (DER) participation model. Areas of concern include bidding obligations and metering and telemetry requirements. Additionally, lack of commitment parameters, such as start-up and minimum run times have been cited as a challenge to participation for large industrial loads.

Large loads and the co-location of injecting resources with large loads has begun to proliferate in the NYCA. Although the NYISO markets currently feature demand side participation opportunities through various wholesale demand response programs, price responsive load bids in the Day-Ahead Market, and the DER participation model, the emergence of large loads provides a strong use case for price-responsive demand in the real–time markets. The transition to the future grid requires a wholesale market structure that allows for new and existing technologies to compete on equal footing. This includes the capability for wholesale price-responsive demand to play an active role in the wholesale markets, and the integration of a wide array of emerging load-shifting and distributed-resource technologies. The ***Flexible Load Models – Large Loads*** project will look to facilitate load participation, both co-located and stand alone, in the wholesale markets, leveraging the work done for the prior Clean Hydrogen project.

The NYISO's ***FERC Order 2222 Compliance*** is the next step toward animating load in the wholesale markets. This participation model builds upon the NYISO's experience with demand response programs, and it will be key to enabling demand-side technological advancements that may be needed in the near future. By creating additional opportunities for participation of DER in the wholesale market, the NYISO hopes to promote rules universally applicable to small resources desiring to participate in aggregate. This initiative directly supports compliance with FERC Order No. 2222, improving access to wholesale electricity markets for small, distribution-connected assets.

The ***Enhanced Storage Integration*** project will look to better understand how energy storage operates and participates in the NYISO after substantial interconnection of these assets. The project will look to enhance the opportunities for storage to participate and remove or reduce restrictions to facilitate more efficient usage of the resources by updating and enhancing the market rules energy storage resources participating in the market must follow.

New York established a tier 4 renewable energy credit (REC) program designed to support renewable resource development in New York City or support the delivery of renewable energy to New York City. The program selected the Champlain Hudson Power Express transmission project as a receipt of a tier 4 REC contract. Champlain Hudson Power Express is being developed to deliver energy from Quebec to New York City. The ***Integrating Champlain Hudson Power Express*** project has focused on modifications to the interchange scheduling rules to support the operation and open use of the new Champlain Hudson

Power Express high voltage direct current transmission line and will be deployed in 2026.

New Resources Plan

Figure 7. Advancing and Integrating New Resources 5-year Plan

	2025	2026	2027	2028	2029	2030
		Market Vision 2025				
New Resources and Technologies						
Enabling New Resources and Capabilities						
FERC Order 2222 Compliance	SDS	DC	DEP			
Engaging the Demand-Side: Phase 1 - SCR Program Enhancements	DEP					
DER Market Enhancements		MDC	DEP			
Hybrid Aggregation Model		DC	DEP			
Enhanced Storage Integration			SC	MDC	DEP	
Flexible Load Models - Large Loads		CP	MDC	DC	DEP	
Integrating Champlain Hudson Power Express (CHPE)	DC	DEP				
Internal Controllable Lines	SDS					
Storage as Transmission	MDC	Continue Based on Proposal				

Conclusion

A tremendous amount of change is happening in New York's energy system. The plan laid out in this *2025 Market Vision* highlights the breadth of issues that need to be addressed over the next several years. These issues will require the attention and commitment of market participants, policymakers, and regulators to drive successful outcomes that benefit all involved. We must look for solutions to address policy, reliability, and market needs, as New York's power system is nearing a tipping point. Every option must be on the table.

Our history has proven that the best solutions to our challenges have come from engagement and collaboration. The NYISO looks forward to working together with stakeholders, market participants, and policymakers to move these efforts forward and to support New York's vision of transforming the power system. Thank you.

Appendix – Legend for 5-year Plans

ID	**Issue Discovery**	NYISO has facilitated education session(s) for stakeholder knowledge development of problem/issue, conducted stakeholder solicitation of potential solutions to address problem/issue, and summarized findings at a working group meeting for potential ranking and future project identification.
SD	**Study Defined**	The scope of work for the study has been presented to stakeholders, including a discussion on the necessary input(s), assumption(s) and objective(s) of the study.
SC	**Study Complete**	Scope of work to be performed has been completed; results and recommendations have been presented to the appropriate Business Owners and stakeholders.
CP	**Market Concept Proposed**	NYISO has initiated or furthered discussions with stakeholders that explore potential concepts to address opportunities for market efficiency or administration improvements.
MDC	**Market Design Complete**	NYISO has developed with stakeholders a market design such that the proposal can be presented for a vote at the BIC, OC, or MC to define further action on the proposal.
FR	**Functional Requirements**	NYISO has completed documentation of the functional requirements and the Business Owner has approved.
SDS	**Software Design Specification**	The software design document is complete and software development is ready to begin.
DC	**Development Complete**	Development has been completed, packaged and approved by the Supervisor.
DEP	**Deploy**	Required software changes to support commitment have been integrated into the production environment.