2025-2044 System & Resource Outlook (The Outlook)

A Report from the New York Independent System Operator

Draft June 24, 2026

DRAFT – For Discussion Purposes Only

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Executive Summary

New York's evolving power grid will require substantial investment in generation and transmission across a wide range of possible outcomes, with the pace, scale, and composition of that investment shaped by how policy objectives are implemented. The 2025-2044 System & Resource Outlook (the Outlook) finds that futures requiring a zero-emissions grid drive materially higher levels of resource development, while futures that allow limited emissions enable a transition with a broader mix of resources, including repowered and new dispatchable fossil generation. Across all futures, growing demand and anticipated fossil generation retirements increase the need for new resources, placing greater importance on decisions that determine how much capacity is developed, where it is located, and how quickly it can be brought into service.

The Outlook examines how New York's power system may evolve over the next 20 years as demand grows and the resource mix changes. Using a scenario-based approach, it evaluates how differences in demand, resource availability, and transmission capabilities shape future system conditions. The purpose is to provide objective, fact-based planning insights to inform decisions on resource and transmission development.

The New York Independent System Operator's (NYISO) Comprehensive System Planning Process includes forward-looking assessments, evaluations, and plans that are developed and relied upon by the NYISO to reliably serve forecasted New York demand, address transmission needs driven by public policies, and identify economic opportunities for an array of possible future system conditions. This biennial Outlook builds upon the *2025-2034 Comprehensive Reliability Plan*, published in November 2025, which highlighted the reliability challenges that New York is facing as resource retirements accelerate, economic development drives demand growth, and proposed generation project delays undermine confidence in future supply.

Since the publication of the previous 2023–2042 Outlook, several developments have altered expectations for how New York's power system will evolve. Federal actions have scrutinized and delayed construction of offshore wind projects, and the New York State Public Service Commission withdrew the New York City Public Policy Transmission Need based on new challenges surrounding offshore wind development. At the same time, renewable project development has slowed, and recent State analyses have highlighted challenges in achieving CLCPA targets on the current timelines. The NYISO's reliability analysis have also identified emerging immediate reliability needs in New York City and Long Island, reflecting tightening system conditions driven by generator retirements and limited new entry. Together with growing demand and an aging generation fleet, these developments broaden the range of future system conditions considered in the Outlook, which expands from five scenarios in the previous Outlook to 20 scenarios to better reflect variation in demand growth, resource availability, and policy.

By examining these potential futures in the Outlook, the NYISO identified key findings, which are grouped based on the main drivers of the changes to the system, as follows: demand, resources, and transmission.

Key Findings: Demand

- ✓ **Electricity demand growth is outpacing resource additions and increasing the urgency of timely resource and infrastructure development.** Electrification and large loads are increasing both the annual energy and peak load levels, making system conditions more sensitive to when and where new resources are developed.

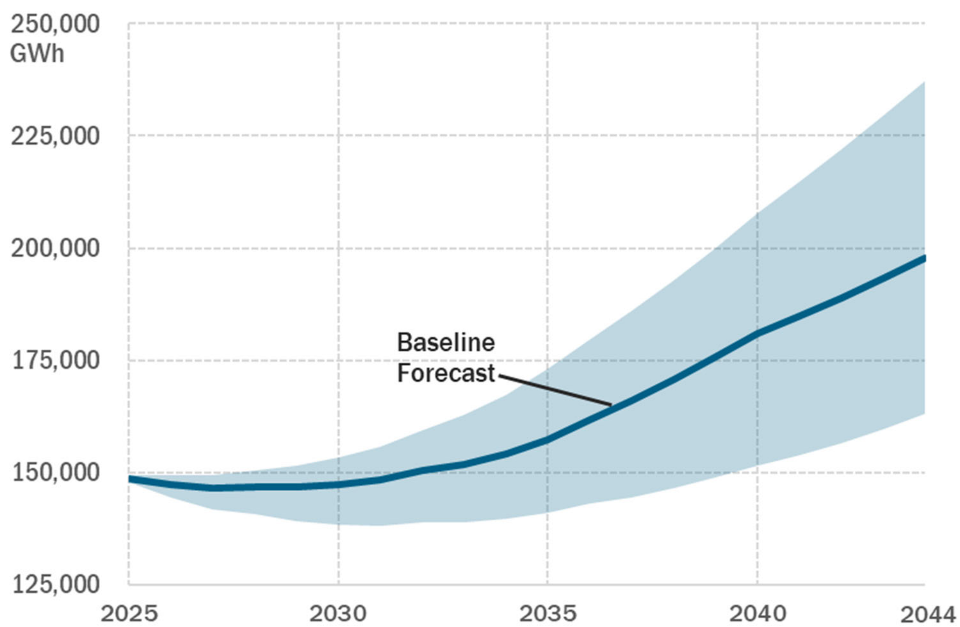
- ✓ **The location and characteristics of large loads materially affect infrastructure needs and system efficiency.** Developing large loads near available generation or existing underutilized transmission capability can reduce congestion and improve resource utilization, while poorly aligned siting increases the need for additional transmission and system reinforcement.

Statewide electricity demand is projected to increase materially, driven by electrification across buildings, transportation, and industry, as well as the emergence of large, concentrated loads from data centers and manufacturing facilities. These trends increase both total energy consumption and peak system requirements, while also shifting demand patterns, including the transition toward a winter-peaking system. Load flexibility and demand side management can reduce the generation capacity buildout needed to meet policy targets and satisfy energy needs.

Demand growth has direct implications for system conditions. As demand increases, planning margins narrow and system conditions become more dependent on the timing and availability of new generation and transmission. Recent NYISO reliability study findings underscore the importance of maintaining adequate resources in downstate regions, where retirements and limited new entry are already tightening conditions. As a result, the system's ability to continue to supply sufficient energy increasingly depends on aligning resource and infrastructure development with evolving demand.

The level and location of demand growth also influence the scale, timing, and geographic distribution of future infrastructure needs. Evaluating a range of demand trajectories provides insight into how quickly system pressures may emerge and where investment in generation and/or transmission may be required. Preserving flexibility in planning decisions is increasingly important as the system evolves under a range of potential demand conditions.

The Outlook evaluates three demand trajectories from the 2025 Gold Book (Baseline, Lower, and Higher), which account for various impacts from energy efficiency and electrification and pair each demand forecast with a corresponding large-load forecast (e.g., Baseline demand with Baseline large loads). Multiple forecasts are assessed in the Outlook to capture uncertainty on the demand side over the next 20 years. The following figure highlights the range of annual energy forecasted for these trajectories, absent the impact of incremental large loads.



Key Findings: Resources

- ✓ **Policy design directly determines the scale and composition of future resource development.** Futures requiring a zero-emissions electric system drive substantially higher levels of installed capacity and a different mix of resources than futures that allow limited emissions, which enable a transition with a broader mix of resources, including repowered and new dispatchable fossil generation. The magnitude of new resources needed to achieve these policies and projected demand is of scale not previously seen and will require significant efforts to site and permit new resources in a timely manner to develop sufficient generation to operate the system.

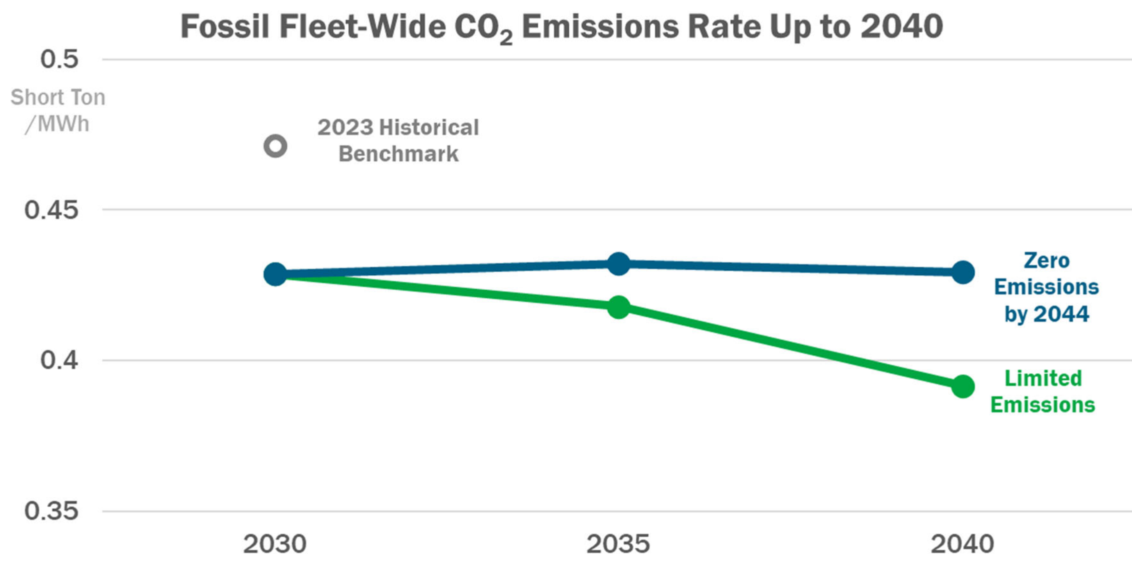
- ✓ **Firm, dispatchable capacity remains essential in all futures to serve demand and provide essential grid services.** Even in highly decarbonized futures, the system requires resources capable of flexibly providing energy and capacity during periods of tightened system conditions and supplying services such as operating reserves, ramping, regulation, and voltage support. New or repowered dispatchable fossil generation can provide these capabilities while lowering emissions intensity relative to the existing fleet. In addition, nuclear can provide significant energy towards a zero-emission electric system due to its operating characteristics, low energy cost, and high capacity factor and supports both energy and capacity needs without associated emissions.

- ✓ **Coordinating resource development with generation retirements is increasingly critical to maintaining sufficient margins.** As the existing fleet retires and demand grows, system reliability becomes more dependent on the timely development of replacement resources. Delays in new resource additions or misalignment with retirement schedules can tighten system conditions, reinforcing the importance of timely resource development with evolving system needs.

Meeting New York's future electricity needs will require substantial investment in new generation capacity, with the scale of development varying significantly based on policy design and demand growth. Futures that include a zero-emissions electric system require upwards of two to three times the levels of new installed capacity and a different combination of resources than exists at scale today. Across all futures evaluated, new resource development spans a wide range, approaching ~105 GW of new resources as compared to ~30-60 GW with less stringent decarbonization policies. This observation reflects the strong influence of policy structure, demand growth, and resource availability on system outcomes. For comparison, less than 15 GW of new resources have been added to the New York system in the last 25 years.

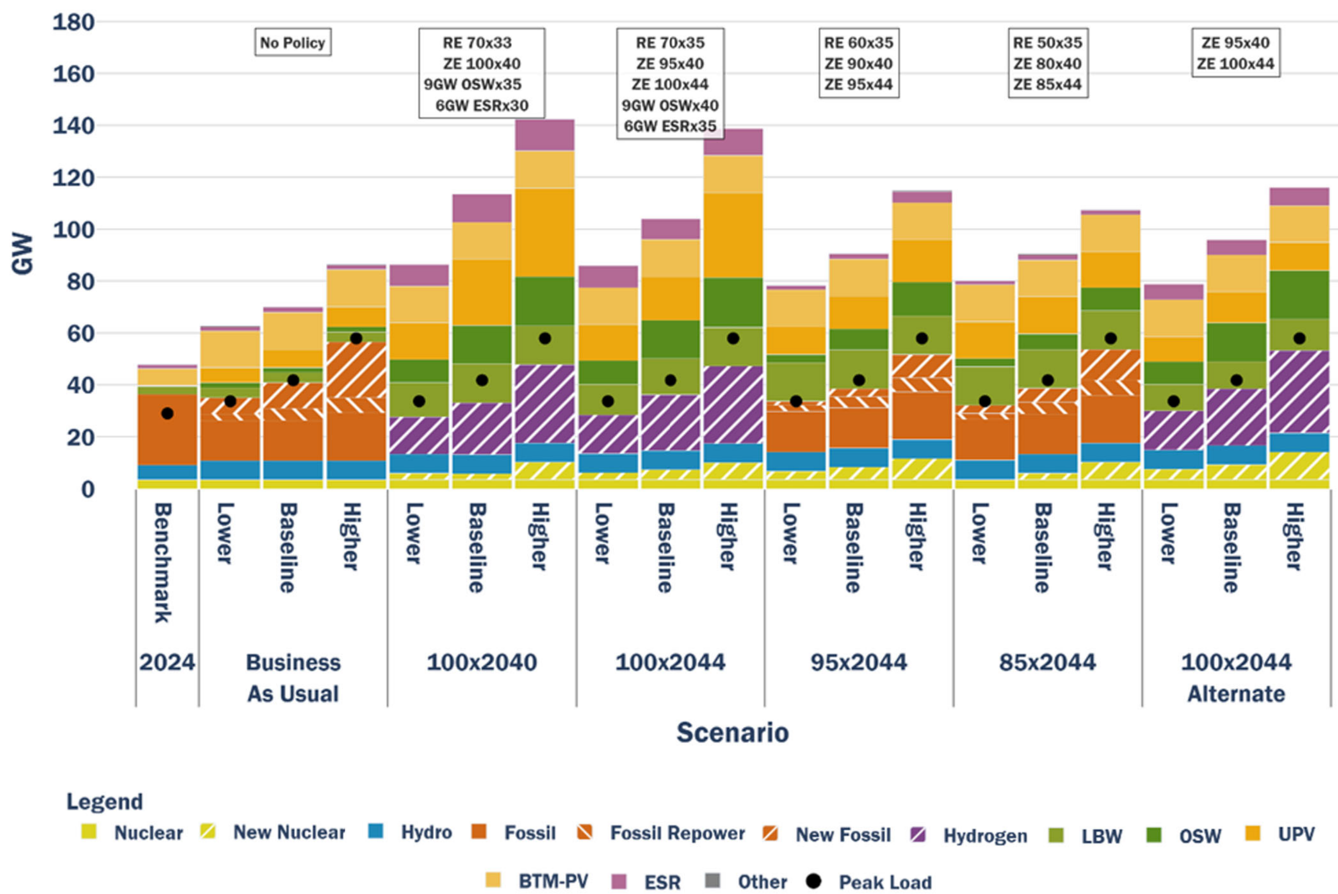
As the resource mix evolves to meet policies, resources contribute differently to the system's needs. In today's grid, fossil generation is the primary resource to provide capacity during peak demand, energy throughout the year, and necessary attributes such as flexibility, ramping, and reserves. In zero-emissions futures, these functions must be replaced by a combination of zero-emissions resources, including renewables, nuclear, and hydrogen-based generation. Renewable resources would provide a large share of zero-emissions energy, but are limited in how much they can be relied upon during peak conditions. Nuclear resources, by contrast, provide both substantial energy production and high firm capacity value, supporting both energy needs and capacity contributions. Hydrogen-based generation, on the other hand is primarily selected to provide firm capacity during peak periods, but is expected to generate energy infrequently due to higher operating costs and associated electrolysis demand. As a result, hydrogen generation is only anticipated to be built in futures when no other resource is allowed to provide the necessary attributes (*i.e.,* zero-emissions future with limited nuclear generation expansion or other firm and flexible zero-emission technology). Notably, the viability, availability, and cost-effectiveness of hydrogen as a fuel source for electricity production is much less certain than the other technologies considered and is the only technology evaluated that is not commercially available today.

In futures that allow limited emissions, fossil resources would run infrequently but continue to provide firm capacity, support system flexibility, and reduce the need for large-scale deployment of alternative dispatchable resource types~~, such as hydrogen~~. In these cases, as the aging fossil fleet is replaced with new, more efficient generation, less emissions (e.g., carbon dioxide, nitrogen oxides, sulfur dioxide) are created for each unit of electricity produced. Adding new and repowered fossil units, in addition to retiring a portion of the existing fossil fleet, leads to reduction in the realized emissions rate of the fleet in aggregate. These more efficient units use less fuel and therefore emit less carbon dioxide (CO_2) per MWh of generation. The figure below highlights the reduction in CO_2 emissions rate for a future with a limited emission allowance compared to a future requiring a zero-emissions electric grid. Lower emissions rates indicate more efficient conversion of fuel to energy with lower pollutant emission. As more aging generation retires and is replaced with more efficient fossil-fueled generation, CO_2 emissions rates continue to decrease. Importantly, new generation brings additional flexibility and reliability attributes along with these reductions in emissions rates. In a zero-emissions future, the existing fossil fleet with higher emissions rates is likely to be retained until shutdown is required by policy.



The transition to a future resource mix is not defined only by what is built but by when it becomes available. As demand grows and existing generation retires, meeting energy needs increasingly depends on new resource development. Delays in new resource additions or misalignment with retirement schedules tighten system conditions, reinforcing the importance of timely development of both new and repowered resources to support the grid transition. To be clear, given the scope and scale of New York's energy policy, alignment cannot be approached asset by asset but rather requires investment at scale.

While all futures require substantial new generation capacity, the magnitude of development differs significantly depending on policy design, with 100% zero-emissions futures requiring materially higher levels of installed capacity, a more segmented resource mix, and reliance on unproven technologies. Notably, hydrogen-based generation is not currently available at commercial scale, and would require significant investment in infrastructure for ~~in~~ fuel production, storage, and transportation, which does not exist today. In zero-emissions futures, the fossil fleet is shut down due to policy and replaced by a combination of zero-emitting resources needed to meet system energy needs, increasing total build requirements. Futures that allow limited emissions enable utilization of existing resources to meet system needs and reduce the need for new resources by two to three times. The figure illustrates how differing futures driven by policy direction translate into distinct system outcomes over the next 20 years.



Key Findings: Transmission

- ✓ **Transmission capability increasingly determines whether new resources can serve load.** The location of generation relative to demand, particularly between upstate resource development and downstate load centers, makes transmission a critical factor in system performance and policy achievement. For example, the exploration of Clean Energy Zones by New York State Department of Public Service (DPS) could significantly impact the scale and location of new resources and the associated transmission expansion. Additionally, the location of large loads relative to available generation or existing transmission capability will materially impact transmission expansion needs.

- ✓ **The Central East interface constraint presents an opportunity for targeted upgrades to improve system efficiency and reduce congestion.** The recent AC Transmission public policy projects have substantially increased transfer capability across this interface. As demand grows and new resources are developed, addressing voltage performance limitations affecting Central East will enhance the utilization of existing infrastructure and support more efficient delivery of energy across the system.

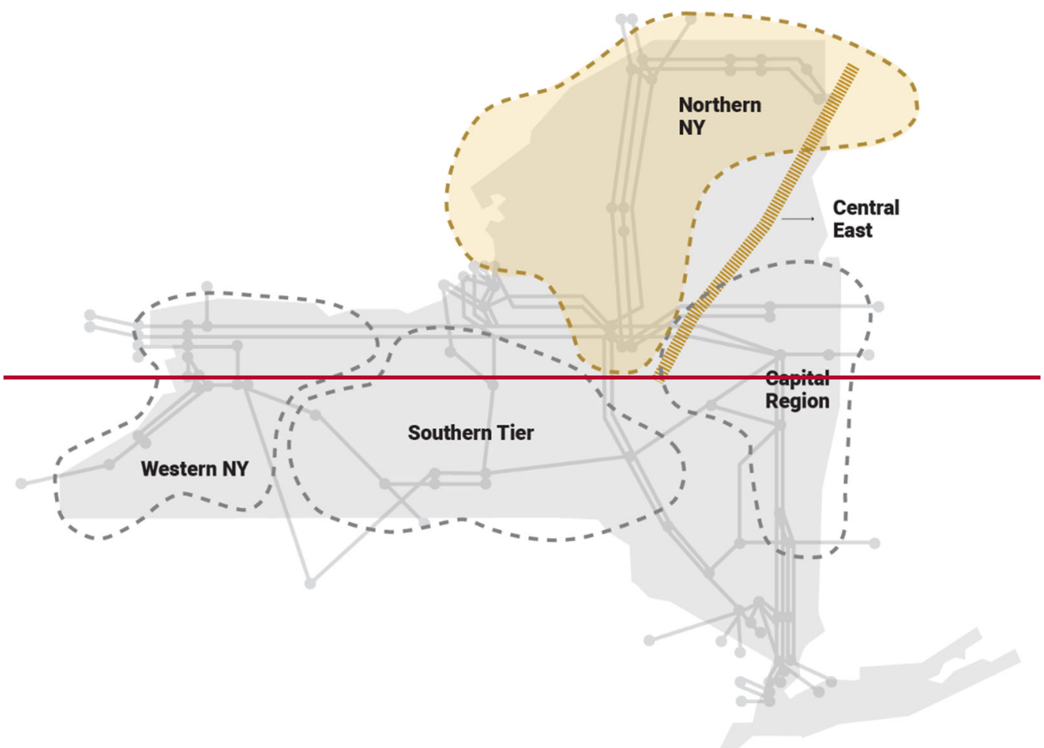
- ✓ **Northern New York represents an additional targeted opportunity for bulk transmission upgrades.** In futures with high renewable targets, Northern New York is a desirable location for new renewable development. With those renewable projects, increased bulk transmission capability will be needed to support energy deliverability from this region.

Transmission development is central to enabling future resource additions to efficiently serve demand. While new generation is often developed where resources are most available, primarily in upstate regions, the highest demand and most constrained load centers remain downstate. As a result, system performance increasingly depends on the ability to transfer energy across the state, making transmission capability a key determinant of efficient system operation.

Recent transmission investments have significantly improved system capability and energy deliverability. Projects procured and constructed through the Public Policy Transmission Planning Process and local transmission upgrades have increased transfer capability and reduced congestion in several areas. These investments have enabled greater access to renewable resources and improved overall system efficiency.

Despite these investments, transmission and interface limitations remain a key constraint as the system evolves. Continued development of upstate resources, combined with growing demand, is expected to increase flows across major interfaces, placing additional pressure on the bulk transmission system. Without further enhancements, these conditions can limit the delivery of energy to load centers and increase the risk of congestion and resource curtailment, as well as increased energy prices.

The Outlook identifies specific areas where targeted transmission enhancements could provide system benefits. In particular, improvements to system voltage performance and dynamic support on key interfaces, especially across Central East, can increase transfer capability and better utilize existing infrastructure. These types of upgrades offer opportunities to improve efficiency and reduce congestion without requiring broad system expansion. In addition, the Outlook identifies that Northern New York exhibits a high likelihood of transmission congestion and renewable curtailment, especially in scenarios with higher renewable penetration in this area due to the estimated lower generation build cost in this area. Areas within the Capital Region also demonstrate a high likelihood of curtailment with increased renewable penetration.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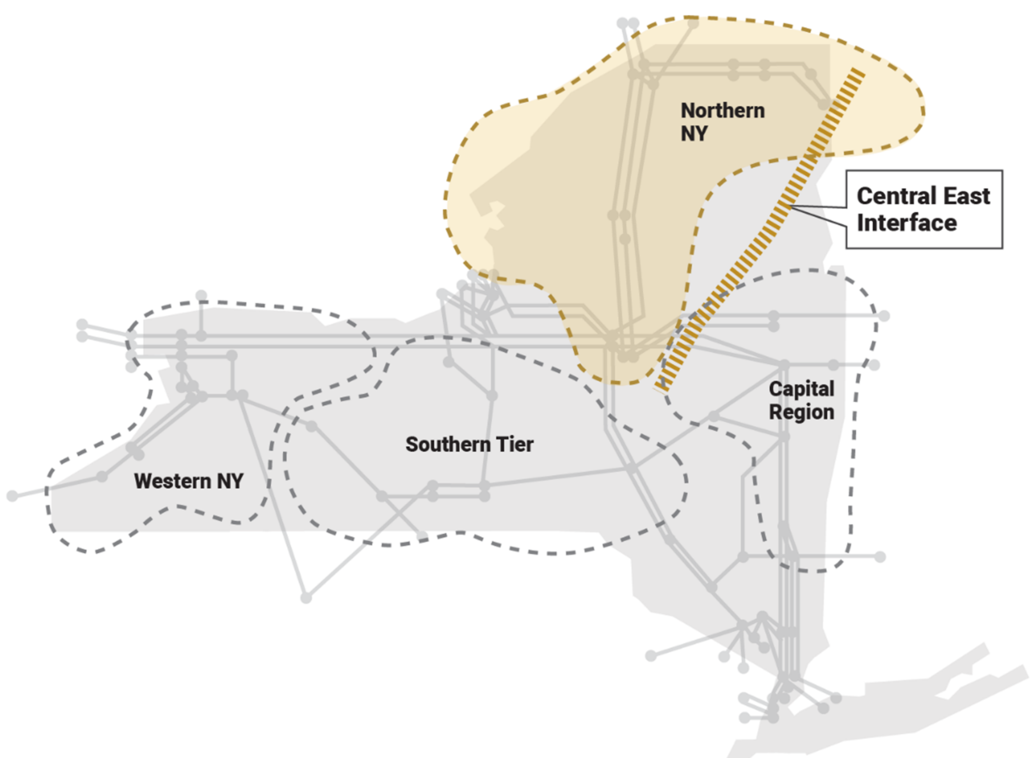
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Principal Recommendations

The NYISO has identified three principal recommendations based on the Outlook findings to address key system needs under a range of future conditions. Consistent with the NYISO's role in providing objective, fact-based planning insights, these recommendations highlight considerations that influence the timing, scale, and location of resource and transmission development. Together, they emphasize actions that can reduce transition risk and support reliable system operations as demand grows and the resource mix evolves.

- ✓ **Establish a viable path for the development of resources capable of providing firm capacity and operational flexibility as the generation mix evolves.** Across all scenarios, the system requires resources that can serve demand during peak conditions and periods of low renewable output. A mix of new resources, including more efficient new and repowered fossil generation, is needed to supplement the system. The timely development of these resources depends on a range of factors including policy, supply chain, and the ability to site and permit the facility, which can materially influence the pace of development and contribute to tightening system conditions. Notably, hydrogen-based generation could provide zero-emissions firm capacity and operational flexibility, but it is not currently available at commercial scale, and would require significant investment in new infrastructure for~~in~~ fuel production, storage, and transportation, which does not exist today. Absent significant progress in the development of new zero-emissions technologies, continued reliance on fossil resources, including repowering and new additions, will be necessary to maintain reliability.

- ✓ **Coordinate the timing of resource additions, repowering opportunities, and retirements to reduce transition risk and avoid tightening system conditions.** Across all futures, a wide range of new capacity is needed depending on policy stringency and demand growth**.** As demand increases and existing generation retires, system conditions become increasingly sensitive to the pace and sequencing of new resource development. Aligning resource entry with expected retirements supports adequate energy and capacity supply and reduces reliance on short-term operational measures.

- ✓ **Increase transfer capability across the Central East interface through targeted dynamic voltage support enhancements.** Consistent with findings in the 2025–2034 Comprehensive Reliability Plan and the prior Outlook, enhancing dynamic voltage support across Central East represents a targeted opportunity to reduce congestion, improve energy deliverability, and better utilize both existing and future generation as system conditions evolve.

- ✓ **Support zero-emissions generation development in Northern New York with bulk transmission upgrades.** If the level of resource development observed in the Outlook is realized in Northern New York due to its natural resource potential and land availability, increased bulk transmission capability will enable energy deliverability from this region.

Next Steps

The Outlook builds on the analyses performed through the NYISO's Comprehensive System Planning Process and provides a foundation for continued study and planning activities. The findings are intended to inform policymakers, investors, and stakeholders as they evaluate options to meet future energy needs under a range of possible system conditions.

The results highlight the importance of aligning resource and transmission development with evolving system needs. As identified in the Outlook, the scale, type, timing, and location of future investments will play a critical role in determining system performance. These considerations will inform upcoming planning activities, including the 2026–2027 cycle of the Public Policy Transmission Planning Process.

In August 2026, the NYISO will open the next Public Policy Transmission Planning cycle, providing stakeholders the opportunity to propose transmission needs driven by public policy requirements. The findings of the Outlook provide a framework for identifying and evaluating those needs, particularly in areas where transmission capability affects the ability of new resources to serve load efficiently.

System & Resource Outlook Overview

The third biennial System & Resource Outlook (the "Outlook") studies how the New York power system may perform and what challenges it could face over a 20-year period from 2025 to 2044. Through a robust study process and use of techno-economic models, numerous future scenarios are examined with each representing a different possible system based on changes in electricity demand, generation mix, and planned transmission projects. Each scenario is compared and contrasted to show a range of possible future outcomes and illustrate how the power system is expected to change over time as it supports the state's evolving energy needs and highlights the resulting transmission challenges and opportunities.

Since the release of the 2023–2042 System & Resource Outlook ("prior Outlook") in July 2024, several developments have introduced new challenges to New York's power system. In January 2025, the U.S. Department of the Interior began scrutinizing and taking actions to pause offshore wind (OSW) leases, including two New York offshore wind projects—Sunrise Wind and Empire Wind. In July 2025, the New York State Public Service Commission (PSC) cancelled the New York City Public Policy Transmission Need based on the new challenges surrounding offshore wind development timelines and the difficulties surrounding offshore development in the near term, which halted NYISO's assessment of proposed transmission solutions. In addition, a number of other proposed transmission projects, such as the approved New York utilities' Phase 1 and Phase 2 local transmission upgrades, are delayed as compared to their original in-service dates. At the same time, renewable project development has slowed and recent New York State Energy Research and Development Authority (NYSERDA) reports have raised concerns about delays in achieving CLCPA targets, including potential delays to the 70x30 target, as well as the cost of full CLCPA implementation. Together, these events highlight the growing challenges facing planners and policymakers as New York continues its transition to a cleaner energy system.

In consideration of these challenges, the scope of the Outlook was expanded from three capacity expansion scenarios in the prior Outlook to 18 scenarios. Like prior studies, the Outlook examines future generation mixes, evaluates projected transmission congestion, and identifies potential transmission investment opportunities over the next 20 years. However, the Outlook considers and highlights the challenges of a broader range of futures, including scenarios that do not fully achieve CLCPA targets. Consistent with NYISO's role of providing objective, fact-based system planning information, the findings are intended to support policymakers, investors, and other stakeholders as they plan for a cleaner grid.

Planning for the power system is a continuous effort that builds on each analysis performed by the NYISO. While the analyses in the Outlook can inform other studies, including reliability studies, the Outlook itself is not a reliability study and does not include assessment of resource adequacy. The scenarios evaluated should not be assumed to meet current or future reliability requirements. Instead, the evolution of the power system, including in response to the findings of the Outlook, to meet energy needs and policy goals will be further assessed in future studies through the NYISO's planning processes.

The Outlook is structured around three groups of scenarios that represent the various futures evaluated in the Outlook. The **Base Case** is a reference future that aligns with the NYISO's Reliability Planning Process assumptions[1] to define the load, generation, and transmission assumptions. The **Contract Case** builds on the Base Case by adding generation projects with financial commitments (e.g., NYSERDA and offshore wind REC contracts) and approved transmission projects, as well as incorporating projected fossil retirements, to evaluate near-term system conditions as renewables come online and aging thermal units exit. The **Policy Case**, which includes eighteen scenarios, reflects relevant state policy targets by modeling pathways to meet (existing or delayed) targets like 70% renewables and 100% zero-emissions electricity and evaluates alternative resource mixes—including potential new nuclear and/or fossil—to assess progress toward policy achievement and resulting system conditions.

Each Outlook scenario reflects a different potential future resource mix. The table below summarizes the key demand, generation, and transmission assumptions the NYISO used to develop each case.

[1] The 2025-2044 Outlook leverages assumptions from the 2024 Reliability Needs Assessment and the 2025 Quarter 3 Short-Term Assessment of Reliability.

Figure 1: 2025-2044 System & Resource Outlook Scenario Assumptions

Assumptions	Base Case	Contract Case	Policy Case
Energy Demand	2025 Gold Book Baseline Forecast	2025 Gold Book Baseline Forecast	2025 Gold Book Baseline, Lower, and Higher demand Forecasts
Generation	2025 Gold Book and consistent with the NYISO's 2025 most recent reliability study assumptions[2]	Consistent with Base Case and includes generation projects contracted under the 2024 Tier 1 REC and 2024 OREC solicitations	Consistent with Contract Case and determined by policies and economics via model to optimize resource additions
Generation Retirements	Consistent with the NYISO's 2025 most recent reliability study assumptions	Consistent with Base Case and aging generation assumptions from the NYISO's 2025-2034 CRP statistical retirement risk model	Consistent with Contract Case and determined by policies and economics via model to optimize generator retirements
Transmission Topology	2025 Gold Book and consistent with the NYISO's 2025 most recent reliability study assumptions	Consistent with Base Case	Consistent with Base Case
New Transmission Projects	Long Island Offshore Wind Public Policy, Champlain Hudson Power Express, Northern NY Priority Transmission, Phase 1 and Phase 2 projects	Consistent with Base Case and Phase 1 and Phase 2 upgrades, Brooklyn Clean Energy Hub	Consistent with Contract Case

The Outlook leverages techno-economic analyses to (1) project possible resource mixes that address New York's public policy goals while serving load; (2) identify regions of New York where renewable or other resources may be unable to generate at their full capability due to transmission constraints; (3) quantify the extent to which these transmission constraints limit delivery of energy; and (4) identify potential opportunities for transmission investment that may provide economic, policy, and/or operational benefits. The Outlook will identify potential opportunities for transmission investment over the next 20 years by pairing long-horizon capacity expansion results with operational transmission analysis in a production cost model.

The capacity expansion portfolios identify resource mixes that satisfy policy and system constraints

[2] Application of inclusion rules identified in Reliability Planning Process Manual, Section 3.2 and NYISO procedures. The 2025-2044 Outlook leverages the 2024 Reliability Needs Assessment and the 2025 Quarter 3 Short-Term Assessment of Reliability.

using a simplified transmission representation. The production cost simulations then test those portfolios on a power flow–based nodal representation of the existing transmission system (with only firm upgrades) to evaluate hour-by-hour operations, system congestion, and energy deliverability. This approach is intentionally not an expanded future transmission network design; instead, it highlights where transmission becomes a limiting factor under future resource portfolios—and where targeted upgrades, if pursued, could reduce congestion, improve deliverability, and enhance system flexibility as New York's demand and policy objectives evolve.

To support more detailed evaluation of transmission performance, the Outlook performs production cost simulations using two diverse Policy Case scenarios. The selected scenarios are designed to bracket a plausible range of future system conditions, reflecting differences in policy ambition and demand growth. These scenarios provide a consistent basis for evaluating how resource portfolios perform under operational constraints and for identifying potential transmission needs and opportunities.

The Outlook examines how New York's power system may evolve over the next 20 years as demand grows and the resource mix changes. Using a scenario-based approach, it evaluates how differences in demand, resource availability, policy implementation, and transmission capabilities shape future system conditions. The purpose is to provide objective, fact-based planning insights to inform decisions on resource and transmission development.

State of the New York Grid

Since New York State enacted the Climate Leadership and Community Protection Act (CLCPA) in 2019, grid planning analyses have increasingly focused on rapid changes in electricity generation, transmission, and demand driven by this policy. The CLCPA established key clean energy targets, including 70% renewable energy by 2030 and a zero-emissions electric grid by 2040. Along with other state economic and clean energy policies, these requirements are driving a rapid evolution of New York's energy system. At the same time, the pace and scale of the transformation envisioned under the CLCPA present significant planning, engineering, and implementation challenges.

Historically, electric grid development in New York—and across much of the United States—has moved incrementally rather than rapidly, particularly for large, system-level changes. Moderate load growth, regulatory approval processes, cost recovery requirements, siting and permitting challenges, and the need to maintain reliable operations have tended to favor gradual evolution over rapid transformation. Even with these constraints, New York has made meaningful progress in recent years through large-scale renewable deployments, transmission investments, and clean energy procurements. However, the scale and timing of the remaining CLCPA milestones require a pace of development that is materially faster than historical norms. As a result, industry stakeholders continue to work toward achieving ambitious state policy objectives while balancing practical investment considerations, technical feasibility, and maintaining system reliability.

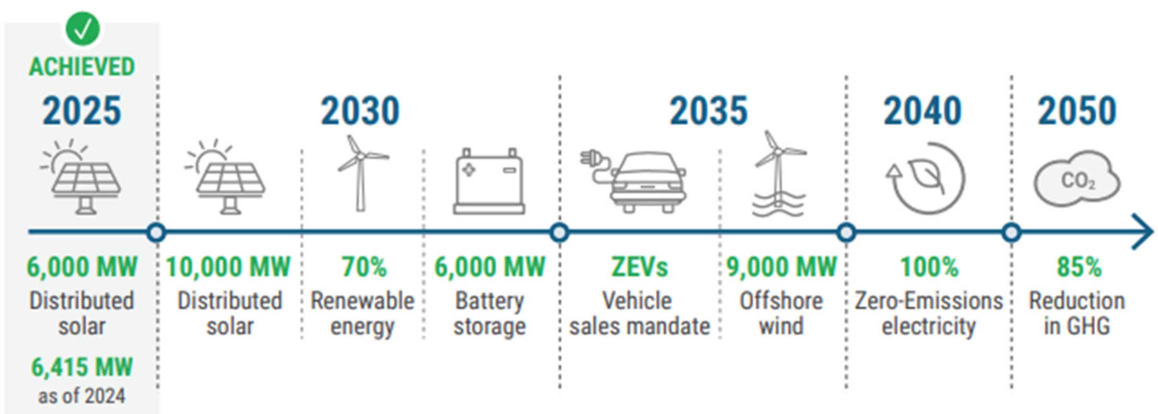
While planners and policymakers have been working diligently within New York State, the achievement of CLCPA goals has also required coordination at the federal level, particularly with respect to the State's objective of developing 9 GW of offshore wind capacity by 2035. Because offshore wind projects are primarily located in federal waters, progress toward these targets depends on federal leasing, environmental review, and permitting processes administered outside of direct state control. These interdependencies were underscored in 2025, when the U.S. Department of the Interior began scrutinizing and taking actions to pause development activity of offshore wind off the east coast due to national security considerations. Around the same time, the PSC cancelled the New York City Public Policy Transmission Need (PPTN), reflecting the new challenges surrounding offshore wind development timelines and the likelihood of offshore development in the near term.

Energy policy within New York State is also continuing to evolve. Following the announced closure of the Indian Point Energy Center in 2017 and its subsequent retirement in 2021, state policy largely moved away from reliance on large, centralized nuclear generation. More recently, however, New York State has announced new initiatives for 5 GW of new advanced nuclear capacity. This policy evolution highlights the State's ongoing efforts to adapt to changing system conditions while advancing decarbonization goals.

Progressing Towards a Cleaner Grid

While New York State has made progress toward several CLCPA policy milestones, such as achieving the target of 6,000 MW of distributed solar by 2025, the most consequential near-term benchmark remains the requirement that 70 percent of statewide electricity consumption be supplied by renewable resources by 2030.

Figure 2: New York State Clean Energy Policies

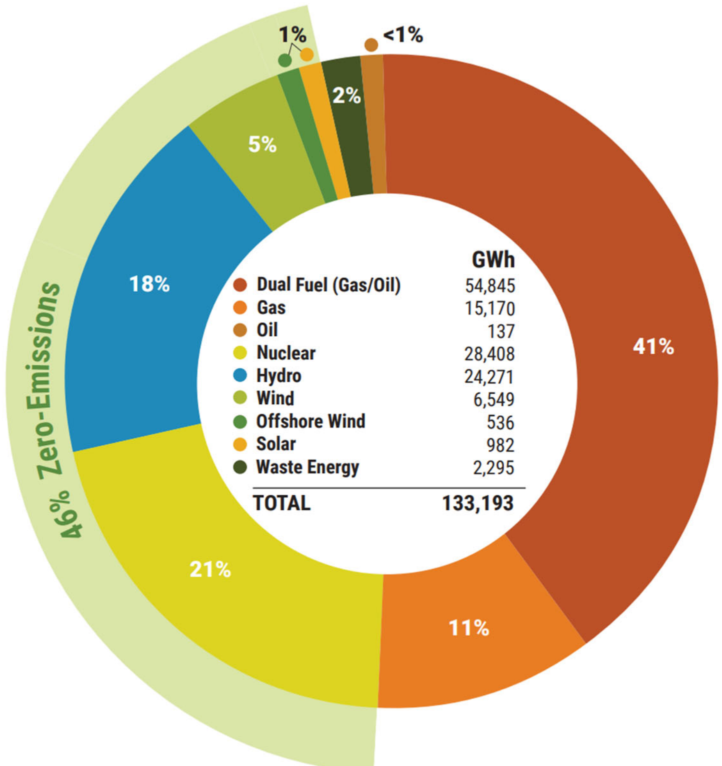


As of 2025, renewable resources such as hydropower, wind, and solar account for approximately 24 percent of New York's electricity generation with the majority attributed to hydro generation.[3] When combined with nuclear resources, which contribute roughly an additional 21 percent of zero-emissions generation, less than half of statewide electricity generation is currently supplied by non-emitting sources. While approximately 1,500 MW nameplate of renewable generation has come into service since 2019, results from the Outlook's Contract and Policy Case show that supplying 70% of the New York demand with renewable resources in 2030 is unattainable over the next three and half years. The 2024 Clean Energy Standard Biennial Review conducted by the New York State Department of Public Service (DPS) and NYSERDA recognized that achievement of the 70 percent target may need to shift into the

[3] *2026 Load & Capacity Data Report*, available at https://www.nyiso.com/documents/20142/2226333/2026-Gold-Book-Public.pdf/.

early 2030s under current conditions, suggesting 2033 as a potentially attainable timeline.[4]

Figure 3: 2025 NYCA Energy Production by Fuel Type



The Pathways Analysis developed for the 2025 New York State Energy Plan also indicates that this level of renewable development is unlikely under current conditions.[5] In the study's core planning scenario, the 70 percent renewable electricity target is not achieved by 2030. The analysis attributes this outcome to a combination of higher renewable capital costs, changes to federal incentives such as the elimination or reduction of Inflation Reduction Act tax credits, the imposition of new trade tariffs, and updates to NYSERDA's large-scale renewable supply curves that reflect more challenging siting, permitting, and interconnection conditions. Collectively, these factors increase both the cost and the difficulty of deploying renewable generation at the pace and scale required by the CLCPA timelines.

Results from the Outlook further reinforce these findings. Even when accounting for high-probability renewable projects that are currently contracted or otherwise financially

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[4] Case 15-E-0302, *Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and A Clean Energy Standard,* Draft Clean Energy Standard Biennial Review (July 1, 2025), *available at* https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7bA0019490-0000-C313-A126-877CFFAA2B0C%7d&DocTitle=CES%20Biennial%20Review%20(With%20Corrections).

[5] *2025 State Energy Plan*, *available at* https://energyplan.ny.gov/Plans/2025-Energy-Plan

committed, the renewable generation levels in the Outlook's Contract Case is only about 40 percent of the energy demand by 2030. This outcome highlights the substantial gap between existing commitments and the scale of development required to meet the 70 percent target set by the CLCPA. Challenges integrating new clean resources are further heightened by global factors, including inflation, tariffs, and supply chain issues. Absent significant changes in project development pace, transmission expansion, market conditions, or policy implementation, the short-term renewable electricity target is increasingly at risk.

The factors presented in the previous sections illustrate the challenges surrounding the pace, sequencing, and composition of future resource and infrastructure development. While the CLCPA establishes clear long-term policy objectives, the timing and realization of specific investments remain subject to regulatory, permitting, market, and logistical constraints. Accordingly, the 2025-2044 System and Resource Outlook evaluates a range of plausible futures, including scenarios that do not explicitly achieve all CLCPA targets on the currently prescribed timelines. Analyzing such scenarios provides valuable insight into system performance, potential challenges to serving energy demand, and transition risks under a range of conditions and supports informed decision-making as New York State navigates an unprecedented period of energy system transformation.

Demand: Evolving Load and System Trends

Statewide electricity demand is expected to increase materially over the next two decades, driven by electrification policies and the emergence of new large loads. This growth increases pressure on both energy supply and peak system conditions, accelerating the need for timely development of generation, transmission, and supporting infrastructure.

Electrification of buildings, transportation, and industrial processes is projected to materially increase electricity consumption, while new large loads—particularly data centers and manufacturing facilities—introduce concentrated, high-density demand. Together, these trends not only increase total electricity needs but also reshape when and where demand occurs on the system.

As the growth in demand outpaces the growth of new generation supply, planning margins narrow and the system becomes increasingly sensitive to the timing and location of new resource and infrastructure development. These demand-driven pressures are occurring alongside broader structural factors that continue to shape system conditions in New York**.** NYISO's reliability planning reports have consistently identified a set of interrelated risk factors affecting both near- and long-term reliability outcomes.[6][7] The advancing age of the existing generation fleet, growing electricity demand from electrification and large loads, and limited development of new dispatchable resources are narrowing planning and operating margins. These trends are further amplified by reliance on imports that may not be available during regional peak events, increasing exposure to extreme weather, and uncertainty surrounding the timing of major transmission and generation projects. As a result, maintaining reliability increasingly depends on careful management of interim conditions while longer-term solutions advance.

Projected Growth in Peak and Energy Demand

Demand growth affects both total energy consumption and peak system conditions, with distinct implications for system planning. Higher energy use increases the overall volume of electricity that must be supplied, while higher peak demand drives the need for firm capacity to maintain reliable operations during stressed system conditions.

To capture this uncertainty, the Outlook considers a range of demand trajectories based on

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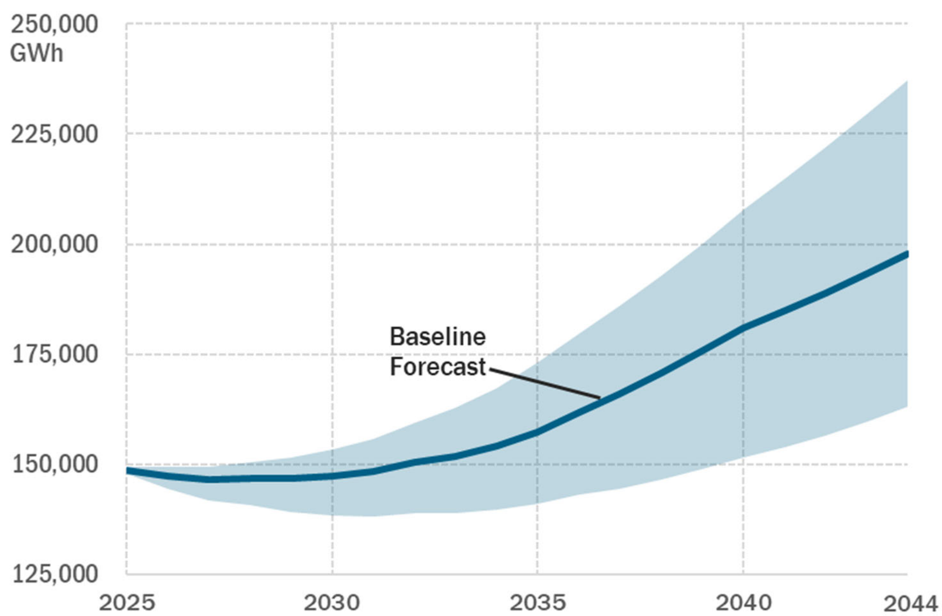
[6] New York Independent System Operator, Inc., *Short-Term Reliability Process Report: 2026-2030 Generator Deactivation Reliability Needs* (2025 Quarter 3 STAR) (April 15, 2026), *available at* https://www.nyiso.com/documents/20142/15930753/2025-Q3-Short-Term-Reliability-Process-Report-Final.pdf/.

[7] New York Independent System Operator, Inc., *Short-Term Assessment of Reliability: 2026 Quarter 1* (April 15, 2026), *available at* https://www.nyiso.com/documents/20142/39103148/2026-Q1-STAR-Report-Final.pdf/.

the *2025 Gold Book*, including Lower, Baseline, and Higher demand forecasts. These trajectories represent materially different futures for both annual energy consumption and peak demand and therefore drive different levels and timing of required infrastructure investment.

As electrification progresses, New York is expected to transition from a summer-peaking system to also a winter-peaking system. This transition to a dual-peaking system underscores the importance of ensuring that future resources and infrastructure can meet demand under summer and winter system conditions. Across all demand trajectories, increases in both energy and peak demand place additional pressure on generation and transmission systems, reinforcing the importance of aligning resource development with evolving system needs.

Figure 4: New York Annual Energy Demand Rises Across Demand Futures



A range of demand forecasts were utilized in the Outlook to assess future system conditions. All forecasts show an increase in demand over the 20-year period.[8]

Growing Large Loads Add to System Demand

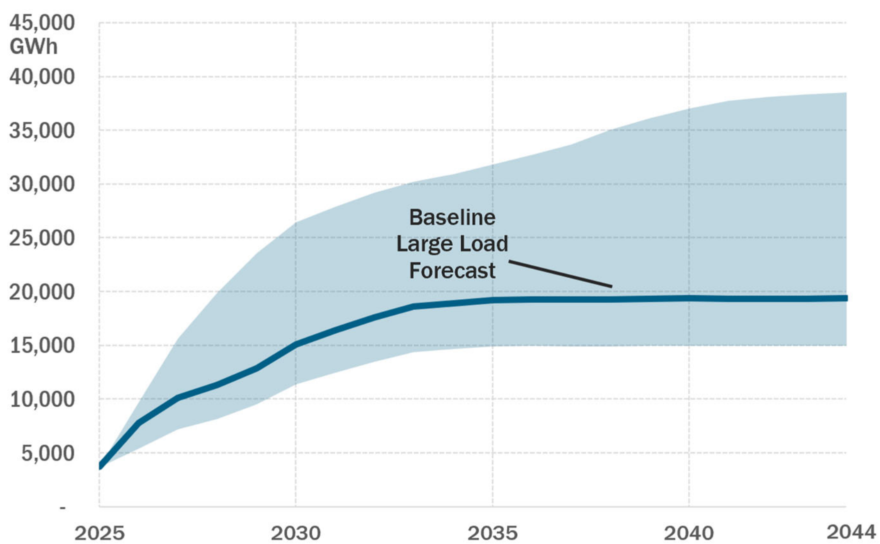
New large loads, such as data centers and manufacturing facilities, are emerging as a significant and distinct driver of future demand. The number of large load interconnection requests in New York has increased substantially in recent years, with projects expected to add up to 5 GW of new load over the Outlook period. These loads differ from traditional demand growth

[8] 2025 Gold Book Baseline, Lower, and Higher demand forecasts, excluding impacts from large loads and net charging load from energy storage resources.

in both scale and concentration. Large loads can introduce significant localized demand, alter regional load profiles, and increase the need for targeted resource and transmission development. Geographically concentrated demand growth may require upgrades to transmission infrastructure and access to nearby or deliverable generation resources.

In the Outlook, forecasted large-load development is paired with each demand trajectory (e.g., the Baseline Demand forecast is paired with large load projects included in the Baseline Demand) to ensure that higher demand scenarios reflect both broader economic growth and increased large-load adoption. As a result, large loads contribute not only to higher total demand but also to more complex planning considerations related to siting, deliverability, and system operations.

Figure 5: Large Loads Emerge as a Significant Source of Load Growth



The assumed interconnection of future large loads aligns with the corresponding demand forecast from the 2025 Gold Book (e.g., the Baseline Demand forecast is paired with the large load projects included in the Baseline Demand forecast). Three unique forecasts are assessed in the Outlook.

Why Demand Uncertainty Matters for Planning

Demand uncertainty is a central driver of long-term system outcomes. Differences in electrification rates, economic growth, and large-load development influence not only how much infrastructure is required but also when and where it must be built.

Higher demand increases both the scale and urgency of required investment in generation, transmission, and supporting infrastructure, while lower demand reduces—but does not eliminate—the need for continued system development. Demand growth is a primary driver of system outcomes, directly influencing how policy requirements, resource availability, and transmission constraints translate into system needs.

Evaluating a range of demand scenarios provides critical insight into how quickly system pressures may emerge and how much flexibility must be preserved in planning decisions. For policymakers and stakeholders, understanding this range of potential outcomes is essential to managing risk and supporting informed decisions during a period of significant system transformation.

These demand trends highlight the increasing importance of ensuring that the future resource mix can meet both growing energy needs and evolving peak system conditions. The next section examines how different scenarios may satisfy these needs under a range of policy and demand assumptions.

Key Takeaways: Demand

- ✓ **Electricity demand in New York is expected to grow materially, driven by electrification and the emergence of large, concentrated loads**, increasing both total energy needs and peak system requirements while contributing to a transition to a dual-peaking system.
- ✓ **Demand growth is occurring alongside broader system pressures—narrowing planning margins and increasing reliance on timely resource and infrastructure development**, with uncertainty in demand levels directly influencing the scale, timing, and location of future investment needs.

Resources: Meeting New York Electric Energy Needs

Meeting New York's future electricity needs will require a significant transformation of the generation fleet, driven by rising demand, evolving policy requirements, and the retirement of existing fossil generation. As conditions evolve, ensuring that sufficient energy and capacity resources are available to serve load becomes increasingly complex. In particular, tradeoffs emerge between the pace, scale, and timing of new resource development, the types of resources available, and the ability of those resources to meet both energy needs and firm capacity requirements across the system.

To explore these dynamics, the Outlook evaluates a range of potential resource pathways that reflect differing assumptions about policy achievement, development pace, and system conditions. These scenarios are not intended to predict a single outcome but rather to illustrate how different combinations of demand, policy, and resource availability can produce materially different system outcomes—and to highlight the implications of those differences for future grid planning.

A summary of many of the key system parameters evaluated, such as energy demand, peak demand, and generation capacity, for each of the Outlook scenarios is detailed below.[9] Resource additions in the Policy Case scenarios represent optimized resource expansion based on the result of the capacity expansion modeling, which is further described in the sections that follow.

[9] For this Outlook, the assumed system parameters for the Base and Contract Cases were finalized by September 1, 2025 and the assumed system parameters for the Policy Case were finalized on October 31, 2025.

Figure 6: Summary of Outlook Scenarios in 2035

Capacity and Peak Load 2035 (MW)				
Generator Type	Base Case	Contract Case	Policy Case: 100x2044-Higher Scenario	Policy Case: 95x2044-Baseline Scenario
Nuclear	3,366	3,366	3,366	3,366
Fossil	26,436	23,415	23,415	25,922
Hydrogen-Powered	-	-	57	-
Hydro	4,216	4,216	4,216	4,216
LBW	3,269	3,907	14,936	12,893
OSW	1,872	1,872	4,673	1,872
UPV	2,546	5,816	30,096	10,086
BTM-PV	12,643	12,643	12,643	12,643
Pumped-Storage	1,410	1,410	1,410	1,410
Battery Storage	400	400	6,371	1,972
Total Capacity	43,516	44,402	88,541	61,737
Summer Peak Load	32,976	32,976	34,918	32,976
Winter Peak Load	28,113	28,113	32,259	28,113

Generation and Energy Demand 2035 (GWh)				
Generator Type	Base Case	Contract Case	Policy Case: 100x2044-Higher Scenario	Policy Case: 95x2044-Baseline Scenario
Nuclear	27,702	27,697	27,147	27,505
Fossil	63,691	59,340	46,182	58,096
Hydrogen-Powered	-	-	-	-
Hydro	26,739	26,703	22,931	25,900
LBW	9,181	10,908	38,566	34,129
OSW	7,682	7,682	20,040	7,682
UPV	4,362	10,574	44,980	18,036
BTM-PV	15,235	15,235	15,235	15,235
Pumped-Storage	(359)	(403)	(500)	(484)
Battery Storage	(26)	(29)	(2,610)	(143)
Annual Energy Demand	176,312	176,331	215,066	177,852
HQ Net Imports	12,048	12,048	12,048	12,048
Net Imports	34,498	31,666	74	3,628
Curtailment	7,193	7,229	26,353	10,647

Figure 7: Summary of Outlook Scenarios in 2044[10]

Capacity and Peak Load 2044 (MW)				
Generator Type	Base Case	Contract Case	Policy Case: 100x2044-Higher Scenario	Policy Case: 95x2044-Baseline Scenario
Nuclear	3,366	3,366	8,366	7,366
Fossil	26,436	17,831	-	21,632
Hydrogen-Powered	-	-	29,953	-
Hydro	4,216	4,216	4,216	4,216
LBW	3,269	3,907	14,907	13,838
OSW	1,872	1,872	19,075	10,197
UPV	2,546	5,816	36,456	14,675
BTM-PV	14,303	14,303	14,303	14,303
Pumped-Storage	1,410	1,410	1,410	1,410
Battery Storage	400	400	10,513	1,047
Total Capacity	43,516	38,818	124,896	74,382
Summer Peak Load	36,096	36,096	40,797	36,096
Winter Peak Load	40,101	40,101	54,152	40,101

Generation and Energy Demand 2044 (GWh)				
Generator Type	Base Case	Contract Case	Policy Case: 100x2044-Higher Scenario	Policy Case: 95x2044-Baseline Scenario
Nuclear	26,741	26,741	64,470	57,822
Fossil	99,102	87,653	-	24,515
Hydrogen-Powered	-	-	5,570	-
Hydro	26,781	26,778	19,707	21,795
LBW	9,197	10,924	36,406	35,968
OSW	7,688	7,688	71,944	42,000
UPV	4,362	10,559	51,632	23,099
BTM-PV	17,589	17,589	17,589	17,589
Pumped-Storage	(516)	(755)	(1,016)	(1,155)
Battery Storage	(24)	(26)	(4,728)	(320)
Annual Energy Demand	216,974	216,985	292,946	220,142
HQ Net Imports	12,082	12,082	12,049	12,049
Net Imports	40,777	45,225	27,975	12,361
Curtailment	7,256	7,280	49,286	22,087

[10] The Outlook production cost model does not enforce specific policy constraints (e.g., renewable generation or zero-emissions percentages) for NYCA generation and allows for economic imports/exports.

System Conditions Tighten Under Current Commitments

Under current resource commitments and anticipated generator retirements, system conditions are projected to tighten over the Outlook horizon. As demand increases and portions of the existing generation fleet retire, available supply becomes more constrained, particularly in downstate load centers—increasing reliance on imports and limited local resources. These system conditions are reflected in the Outlook's Base and Contract Cases, which represent futures with limited resource development beyond existing commitments and fossil generator retirements.

These tightening conditions are most evident during peak system periods, when the availability of resources is most critical. As retirements[11] outpace the addition of new firm capacity, the system becomes increasingly susceptible to constrained conditions as early as the mid-2030s. The frequency and duration of such conditions increase in later years.

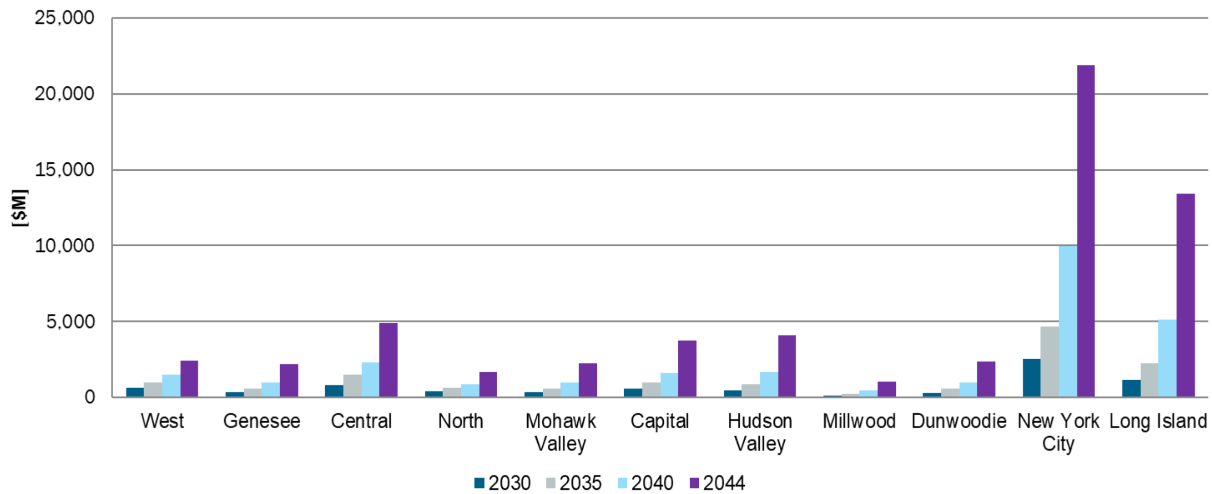
Over time, the nature of system stress evolves—not simply extending into more hours but shifting in response to structural changes in the load profile. As electrification progresses, New York is expected to transition to a dual-peaking system. Under these conditions, system stress is increasingly driven by winter peak demand, introducing operational challenges that differ from historical summer peak conditions. These pressures are particularly acute in downstate regions, where resources are more limited and reliance on imports is higher. These constrained conditions are associated with higher operating costs, reflecting increased congestion and greater reliance on higher-cost resources.

Key Resource Commitment Insight

- ✓ **Current resource commitments alone, even assuming all resources that have been awarded REC contracts come into service, are insufficient to meet future system needs over the Outlook horizon.** Absent additional resource development or transmission expansion, the system becomes increasingly constrained over time, highlighting the importance of aligning new resource additions with retirements and ensuring sufficient energy and capacity resources are available to support operations.

[11] According to the statistical retirement risk model from the 2025–2034 Comprehensive Reliability Plan.

Figure 88: Tightened Supply Conditions Drive Higher Downstate Load Payments



In the Contract Case, higher load payment projections are primarily driven by tightened supply conditions, which worsen through time, increasing reliance on higher-cost downstate generation in New York City and Long Island. Load payment represents the modeled cost of serving electricity demand at simulated locational market prices.

Policy Choices Shape Resource Needs

Policy choices will determine both the scale of new infrastructure and impact how the future grid operates. As New York's power system evolves under rising demand and clean energy requirements, planning must balance three interconnected needs: supplying sufficient energy, maintaining sufficient firm capacity during peak conditions, and ensuring deliverability of that supply to load centers across a constrained transmission network. How clean energy targets are defined—particularly their level, timing, and structure—drives the tradeoffs among build scale, resource mix, and the role of existing resources. This section therefore emphasizes the decision-relevant insights that emerge from the Policy Case analysis through the use of scenarios that illustrate how different policy designs translate into different system needs and outcomes.

Key Policy Scenario Insights

- ✓ **Policy design significantly impacts scale of new resource development.** Across the Outlook scenarios, required new resource development spans a broad range depending on policy stringency and demand growth assumptions. For instance, Outlook scenarios without clean energy targets require approximately ~10–35 GW, scenarios with relaxed or partial zero-emissions scenarios require ~30–60 GW, and scenarios targeting a fully zero-emissions system require substantially higher additions—approaching ~105 GW of new resources by 2044 under higher demand conditions.

- ✓ **Prescribed targets can become highly sensitive to real-world build constraints.** Timing and installation constraints reflected in NYSERDA's Large-Scale Renewables (LSR) Supply Curve limit the pace of renewable deployment available within the study horizon. Under these assumptions, the analysis indicates that the 9 GW offshore wind target by 2035 is not achieved and the 70% renewable energy requirement by 2033 is not achieved in the CLCPA-aligned scenario under Higher Demand conditions.
- ✓ **100% zero-emissions pathways reshape resource roles by separating "energy" from "capacity."** In scenarios that assume achievement of a 100% zero-emissions electric system within the study horizon, large additions of renewables, and, in most cases, nuclear, serve the majority of system energy needs, while hydrogen-fueled generation primarily serve a firm capacity role and would be expected to operate at relatively low utilization due to associated costs. This separation of attributes drives a higher amount of new resource builds.
- ✓ **Policy-relaxed pathways retain fossil generators and reduce the need for large-scale replacement of existing capacity.** Scenarios that do not assume achievement of a 100% zero-emissions electric system retain portions of the existing fossil fleet that operate within defined emissions limits. This reduces the need for new resources by two to three times and eliminates the need for large-scale deployment of hydrogen-powered generation (e.g., upwards of 30 GW) to help satisfy capacity needs.
- ✓ **Nuclear can provide significant energy towards a zero-emissions electric system.** Nuclear provides a comparatively large share of system energy due to assumed operating characteristics, low energy cost, and high capacity factor and offers high firm capacity value that supports both energy and capacity needs without associated emissions.

Policy Scenario Evidence and Context

The Policy Case scenarios provide the analytical foundation for the findings above. By varying decision-relevant policy levers—renewable requirements, zero-emissions requirements, minimum offshore wind levels, and energy storage assumptions, the resulting differences in build scale and resource mix provide insight into the consequence of policy design and demand growth assumptions. Figure 9~~Figure 9~~ summarizes the targets and timelines that were modeled and provides context for interpreting the comparative results. Scenarios are referenced using a naming convention that reflects both the applicable clean energy targets and demand assumptions (e.g., Business As Usual–Baseline, 100x2044 Scenario–Higher, 100x2044 Scenario–Lower).

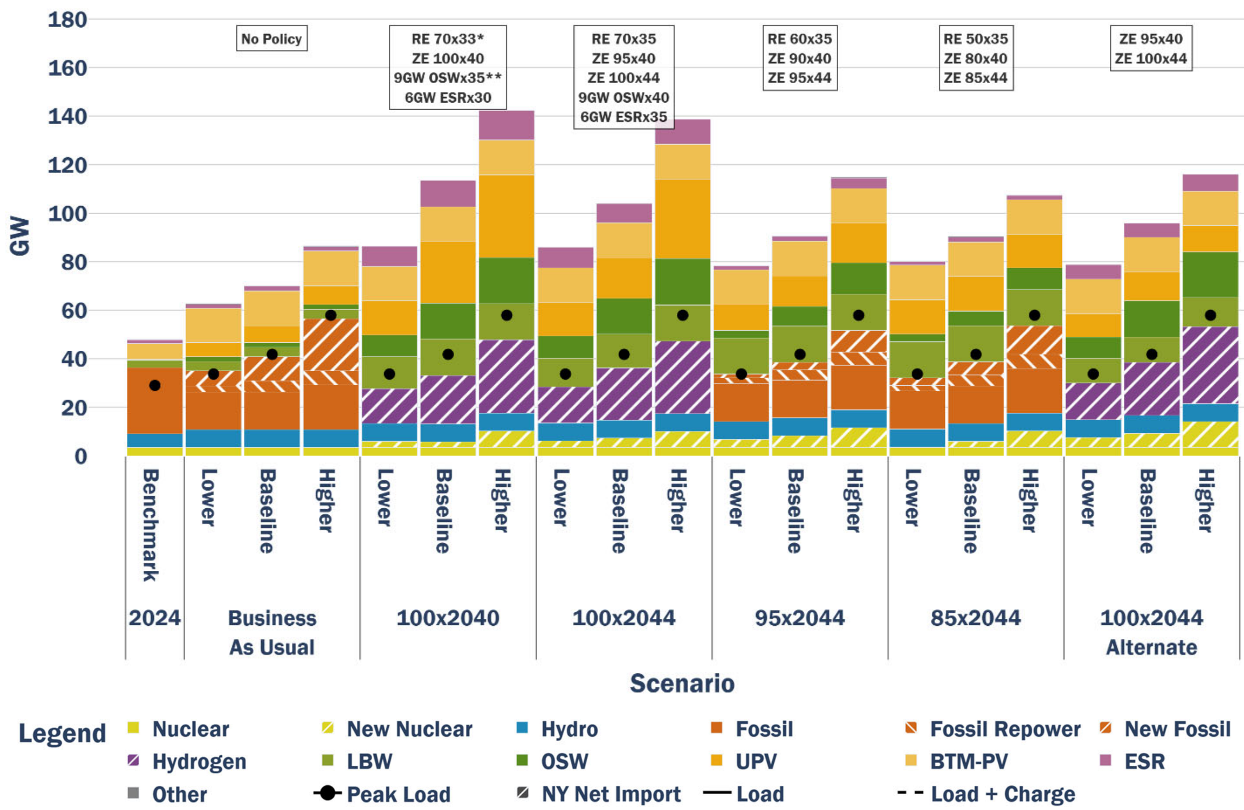
Figure 9~~9~~: Policy Case Assumptions: Capacity and Energy Targets for Scenarios

Assumption		Scenario					
		A	B	C	D	E	F
		Business as usual	100x2040	100x2044	95x2044	85x2044	100x2044 Alternate
Capacity & Energy Policy Targets	BTM-PV Capacity (GW)	6 GW BTM-PV by 2025, and 10GW BTM-PV by 2030					
	ESR Capacity (GW)	No minimum threshold	6 GW ESR by 2030	6 GW ESR by 2035	No minimum threshold		
	OSW Capacity (GW)	No minimum threshold	9 GW OSW by 2035	9 GW OSW by 2040	No minimum threshold		
	Renewable Energy (%)	No minimum threshold	70% Renewable Energy by 2033	70% Renewable Energy by 2035	60% Renewable Energy by 2035	50% Renewable Energy by 2035	No minimum threshold
	Zero-Emission Electricity Target (%)	No minimum threshold	100% Zero-Emission Electricity by 2040	95% Zero-Emission Electricity by 2040, and 100% Zero-Emission by 2044	90% Zero-Emission Electricity by 2040, and 95% Zero-Emission by 2044	80% Zero-Emission Electricity by 2040, and 85% Zero-Emission by 2044	95% Zero-Emission Electricity by 2040, and 100% Zero-Emission by 2044

Assumption	Scenario - Higher	Scenario - Baseline	Scenario - Lower
Peak, Energy, and Large Load Demand Forecast	Consistent with 2025 Gold Book Higher Demand	Consistent with 2025 Gold Book Baseline	Consistent with 2025 Gold Book Lower Demand

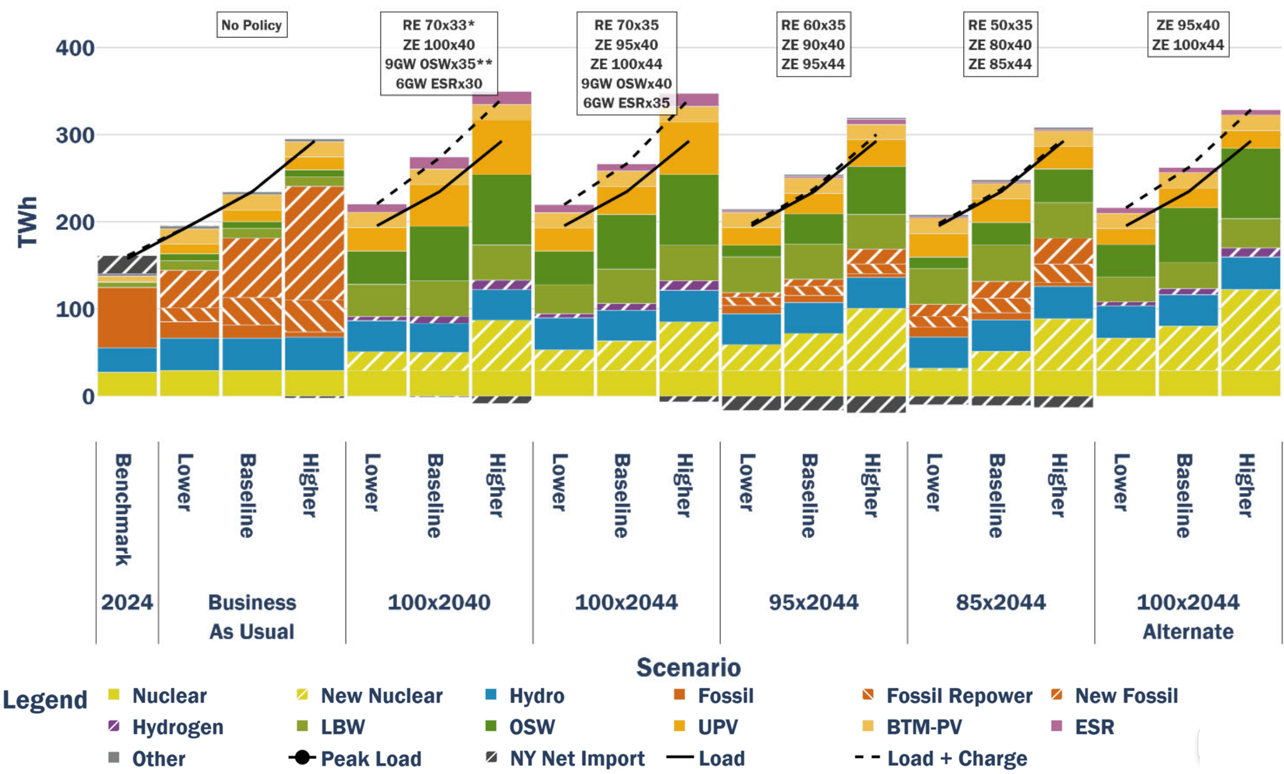
The figures below summarize how variation in policy design and demand growth translates into distinct resource mix trajectories over the next 20 years.

Figure 10~~10~~: 2044 Installed Capacity Mix by Policy Case Scenario[12]



[12] The RE 70x33 constraint is labeled with a "*" to represent that the LSR supply curve assumptions do not allow for sufficient renewable generation to achieve 70x33 in the scenario with the higher demand forecast and assumed transfer limits. The 9 GW OSWx35 constraint is labeled with a "**" to represent that the LSR supply curve assumptions do not allow for sufficient OSW capacity by 2035 to reach the 9 GW minimum threshold.

Figure 1111: 2044 Generation Mix by Policy Case Scenario[13]



A pathway without clean energy targets illustrates the tradeoff between minimizing near-term generation builds and advancing decarbonization goals. The Business-As-Usual scenario serves as a reference for new resources needed to meet projected load growth absent specific CLCPA policies and provides context for how much additional development is associated with progressively more stringent clean energy requirements. In the Business-As-Usual case, resource development is driven primarily by the need to meet projected demand at the lowest cost, rather than by requirements to achieve renewable or zero-emissions targets. As a result, the system relies more heavily on the continued operation and repowering of the existing fossil fleet, with more limited expansion of renewable resources than in policy-constrained scenarios. This produces the lowest new resource installation across the scenarios, but it also results in higher CO_2 emissions over the study horizon (see Figure **13**Figure 13).

Pathways requiring a 100% zero-emissions electric system by the end of the study period fundamentally change both the scale of required investment and the functional role of resources on the system. In these futures, the existing fossil fleet must be fully displaced over time, which

[13] The RE 70x33 constraint is labeled with a "*" to represent that the LSR supply curve assumptions do not allow for sufficient renewable generation to achieve 70x33 in the scenario with the higher demand forecast and assumed transfer limits. The 9 GW OSWx35 constraint is labeled with a "**" to represent that the LSR supply curve assumptions do not allow for sufficient OSW capacity by 2035 to reach the 9 GW minimum threshold.

substantially increases the amount of new zero-emitting capacity needed to serve load. Renewable additions—particularly utility-scale solar, land-based wind, and offshore wind, where available—provide the majority of system energy, while other zero-emissions resources are needed to supply firm capacity and sustain operations during peak system conditions. In most scenarios, nuclear contributes both zero-emissions energy and firm capacity value. At the same time, hydrogen-fueled resources emerge primarily as a firm-capacity solution rather than an energy-producing resource and only in scenarios that achieve 100% zero emissions. These results reflect hydrogen-fueled resources' role in replacing the capacity contribution previously provided by fossil generation. The 100% zero-emissions scenarios—particularly Scenarios 100x2040, 100x2044, and 100x2044 Alternate—illustrate these dynamics most clearly.

Policy scenarios that retain zero-emissions energy targets but relax their stringency or timing show how relatively modest changes in policy design can materially reduce build requirements and broaden the range of potential resource mixes. In these futures, the system is not required to eliminate all emissions within the study horizon, which allows portions of the existing fossil fleet to remain in operation within defined limits. That continued fossil participation—along with repowering and new builds where allowed—preserves system flexibility and reduces the need for large-scale deployment of alternative dispatchable capacity, such as hydrogen, that must otherwise be developed. At the same time, renewable resources continue to expand to serve growing energy needs and support emissions reductions but at lower levels than in scenarios that require a 100% zero-emissions electric system. Scenarios 95x2044 and 85x2044 illustrate this balance most clearly, showing that changes in target timing and stringency can affect not only how much new infrastructure must be built but also which resources remain part of the solution during the transition.

The Outlook shows that hydrogen-powered resources are only selected when the 100% zero-emissions electric system target is required. Scenarios that relax the stringency of the zero-emissions target, even by a small threshold, display a significant difference in the amount of new installed capacity and resource types needed to serve demand and meet policy. In part, this is due to assumptions related to renewable energy and/or electrolysis needed for sufficient hydrogen production.

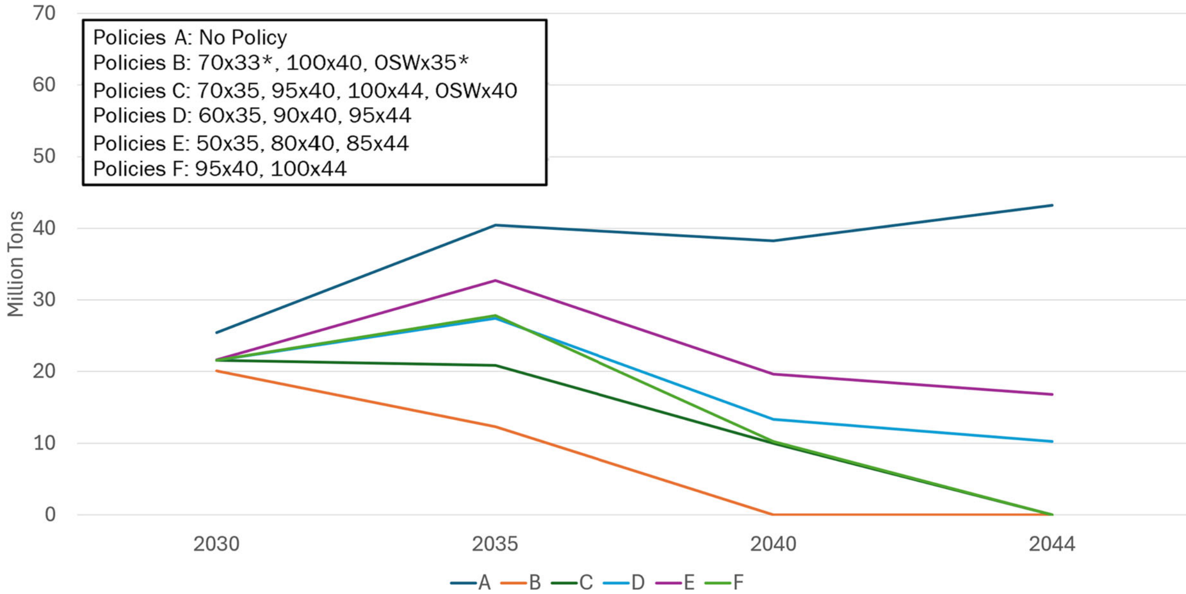
Achievement of the zero-emissions target without a resource-specific or renewable-percentage target results in a meaningfully different resource strategy than those that prescribe how clean energy must be delivered. When policy is defined solely in terms of achieving a 100%

zero-emissions electric system, the resource mix can be developed from a broader set of qualifying zero-emissions options. This allows greater flexibility for the system to balance variable renewables with other zero-emissions resources that provide firm energy and capacity value. Renewable resources would remain a major part of the portfolio, indicating that utility-scale solar and land-based wind are desirable clean energy resources for serving future load. However, other zero-emissions resources—particularly nuclear, and in some cases offshore wind— would be relied on more compared to scenarios that explicitly require a defined renewable share. Scenario 100x2044-Alternate illustrates this distinction and shows that a zero-emissions electric system still requires renewable technology but may be more efficiently achieved through other resource types when the policy objective is framed around emissions outcomes rather than resource-specific targets.

Finally, CO_2 emissions are presented in the figure below and reflect the electricity sector only; they do not account for other emissions (e.g., nitrogen oxides, sulfur dioxide) in the electric sector or emissions changes in other sectors that may occur as electrification increases electricity demand. These results are best interpreted as a planning lens on policy tradeoffs—balancing the timing and scale of investment against the pace of emissions reductions. Increases in emissions, where observed, are primarily driven by load growth during the study horizon before stringent policy targets take effect. The key drivers for the decrease in emissions are (1) policy targets, which require renewable and other zero-emitting resources and (2) higher efficiency fossil generation in scenarios that support less stringent policy targets. Scenarios that impose limitations on emissions (e.g., 100% zero-emissions, 95% zero-emissions) show a reduction in emissions throughout the study period in accordance with their assumed policy targets and resource mix (see Figure 10).

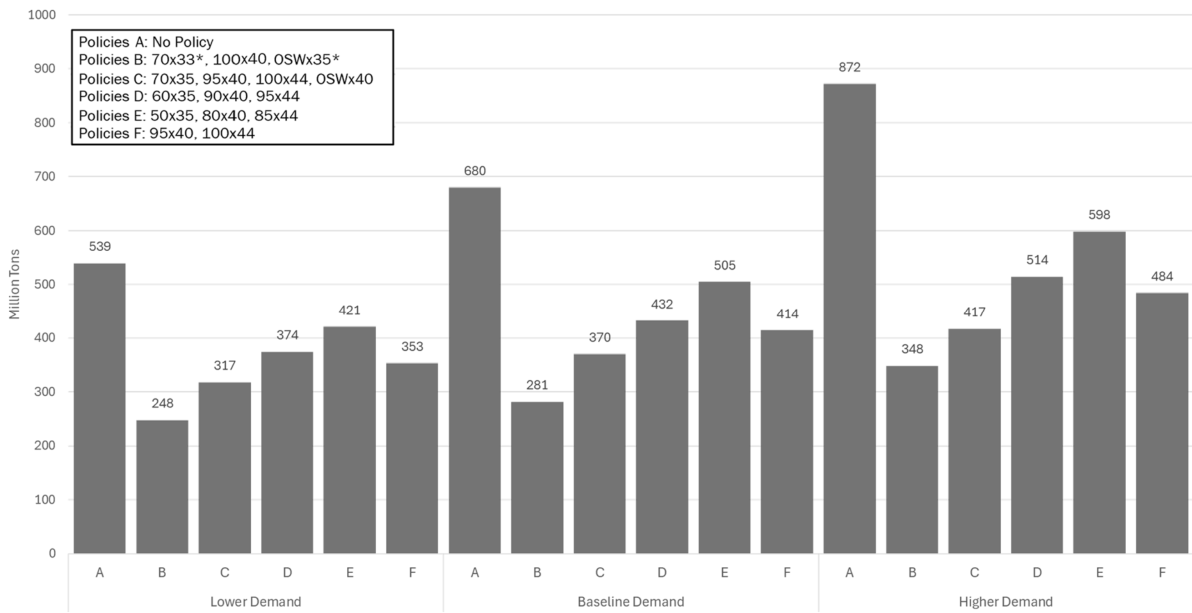
Equivalent emissions outcomes may be achieved with differing resource investment levels. Scenario 100x2044-Alternate achieves similar CO_2 reductions to other 100% zero emissions pathways (e.g., Scenario 100x2044), while allowing a broader set of eligible resources to contribute to system needs. The flexibility offered by removing the intermediate targets reduces reliance on resource-specific mandates and can enable a lower overall generation buildout.

Figure 1212: Clean Energy Targets Drive CO_2 Emissions Outcome (Baseline Demand)



This figure shows annual CO_2 emissions by study year across policy scenarios. The majority of scenarios show an increase in emissions in the near-term, primarily driven by load growth before stringent policy targets take effect. The exception to this is Business-As-Usual scenario, which does not include policy targets to limit electric sector emissions. The 2044 CO_2 results are especially important because they represent the closest modeled approximation of long-term emissions outcomes beyond the study horizon, providing a useful reference for how different policies may shape the electric sector's decarbonization trajectory after 2044.

Figure 1313: 20-Year CO_2 Emissions Totals Vary Materially by Policy Design



This figure shows 20-year total NYCA CO_2 emission estimates by scenario from the capacity expansion model for the 2025 through 2044 horizon. For scenarios that enforce decarbonization policies, the majority of benefits from emissions reduction will occur beyond the Outlook's study period.

Where Resources Are Built Matters

Where resources are built matters as much as how much is built. Statewide totals indicate the overall scale of future resource development, but they do not show whether that capacity is located where it can serve load, satisfy regional capacity requirements, or reduce transmission constraints. In New York, this distinction is especially important because renewable resource potential is primarily concentrated upstate, while the highest and most constrained load centers remain downstate.

As a result, the geographic distribution of new resources has direct implications for deliverability and the need for additional transmission investment. Resource location influences whether energy can move efficiently from where it is generated to where it is needed, whether firm capacity is available in the areas where local capacity requirements apply, and how much stress is placed on major bulk transmission interfaces.[14] In practical terms, two resource

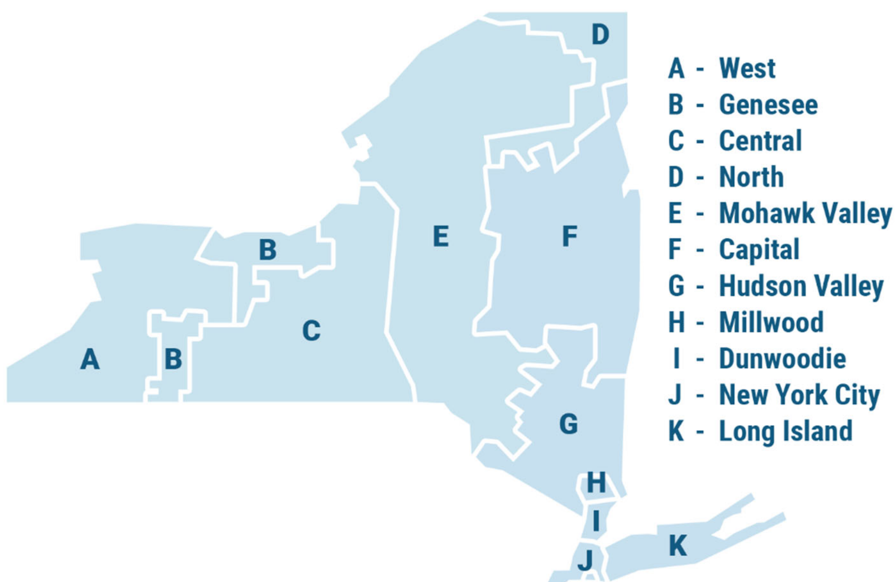
[14] The exploration of Clean Energy Zones by DPS could significantly impact the scale and location of new resources and the associated transmission expansion. *See* Case No. 15-E-0302, *Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Energy Program and a Clean Energy Standard*, Clean Energy Zones White Paper Program (May 15, 2026), *available at* https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B60142D9E-0000-C21E-8138-66C3829A7938%7D&DocTitle=%20Clean%20Energy%20Zones%20White%20Paper%20%20Program.

portfolios with similar statewide totals can produce materially different system outcomes depending on where those resources are built.

This section focuses on the key locational planning insights that emerge from the Policy Case analysis. Rather than treating zonal outcomes as site-specific forecasts, the discussion uses them as planning signals to illustrate how resource availability, capacity requirements, and transmission constraints interact to shape where different types of resources are most likely to provide system value.

The New York Control Area (NYCA) is divided into 11 geographic load zones, spanning from western New York (Zone A) to Long Island (Zone K). These zones provide the locational framework used throughout this section. Figure 14~~Figure 14~~ shows the NYISO load zones for reference and provides context for the zonal results discussed below.

Figure 14~~14~~: NYISO Load Zone Map



Key Zonal Planning Insights

- ✓ **Downstate capacity requirements continue to shape where firm resources are needed.** Because the highest and most constrained load centers remain in downstate New York, locational capacity requirements continue to drive firm and dispatchable resources near those areas. Even in futures with substantial upstate renewable development, additional firm capacity is often needed closer to load centers to satisfy capacity requirements that cannot be met through statewide totals alone.

- ✓ **Resource availability assumptions create a persistent tension between where clean energy is most developable and where it is most needed.** Land-based wind and utility-scale solar are more available in upstate zones, while demand remains concentrated downstate. This creates a recurring planning challenge. The system may have strong opportunities to add clean energy where development potential is greatest, but it still requires transmission capability and additional downstate resources to ensure that energy and capacity can serve load.

- ✓ **Strict energy policy milestone requirements increase the importance of pursuing resource development based on geographic variation.** In futures that enforce 100% zero-emissions electric system and displacement of the fossil fleet, the locational roles of resources become more distinct. Energy-serving resources tend to concentrate where renewable potential is strongest, while firm-capacity resources~~, such as hydrogen,~~ are increasingly driven toward load centers and constrained localities. As a result, stricter policy targets do not simply increase total build requirements—they also increase the importance of where different resource types are sited.

- ✓ **Demand growth amplifies the differences of locational resource build across the system.** Higher demand increases not only the total quantity of new resources needed but also the amount of zonal development required to satisfy both statewide energy needs and local capacity requirements. Under lower demand assumptions, similar geographic patterns persist, but the scale of development is reduced. This highlights that demand growth affects both how much is built and how strongly locational constraints shape the outcome.

- ✓ **Zonal results should be interpreted as planning signals, not site-specific forecasts.** The locational outcomes presented in this section identify where different types of resources provide system value under the modeled assumptions for resource availability, transmission constraints, and capacity requirements. They are not predictions of exact project siting or development outcomes. Rather, they provide a planning framework for understanding how policy choices, demand growth, and transmission limitations may interact to shape future regional needs.

Zonal Planning Evidence and Context

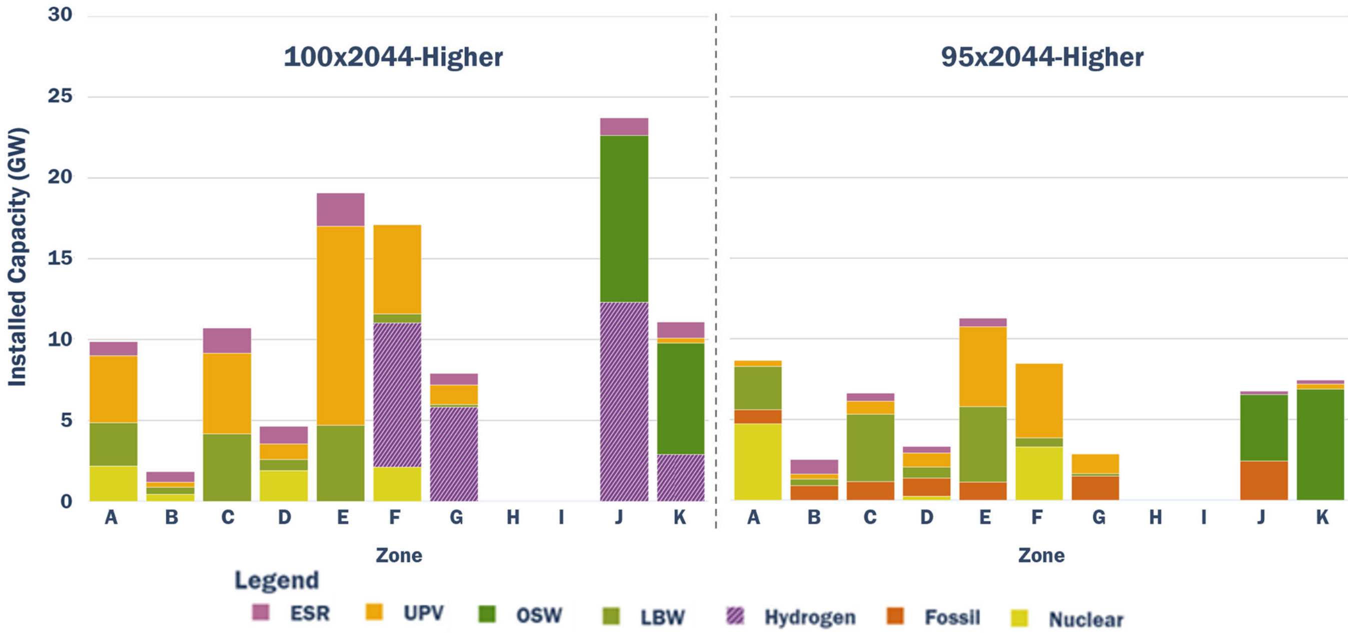
The zonal results in this section reflect the combined influence of three core factors: resource availability, capacity requirements, and transmission deliverability. Together, these factors determine not only which resources are selected across the system but also where those resources provide the greatest value under different policy and demand conditions. The discussion below uses the Policy Case scenarios to illustrate how those locational drivers interact and why similar statewide totals can translate into materially different regional outcomes.

Resource availability assumptions are a primary driver of these patterns. Renewable development potential is informed by NYSERDA's Large-Scale Renewables (LSR) Supply Curve. This generally results in greater availability of land-based wind and utility-scale solar in upstate zones, where land availability and development potential are higher. Offshore wind, by contrast, is assumed to be available to the Long Island and New York City areas. Other candidate resources have broader geographic availability. Battery storage and hydrogen-fueled resources may be developed across all NYCA zones. Nuclear development is assumed to be available in Zones A through F, and fossil resources—including limited repowering and new builds where allowed—may be selected across all zones, subject to available sites.

Capacity requirements are equally important in shaping locational outcomes. At the statewide level, a minimum firm capacity requirement requires firm capacity in excess of peak demand as a proxy for the NYISO's ICAP market's Installed Reserve Margin. In addition, minimum firm capacities are imposed for the localities —including Zones G–J, Zone J (New York City), and Zone K (Long Island)—to ensure that firm capacity is located in load-dense areas where transmission constraints can limit energy imports. As a result, even when substantial renewable development occurs upstate, additional firm and dispatchable resources are often selected in or near downstate zones to satisfy local capacity needs that cannot be met through statewide capacity alone.

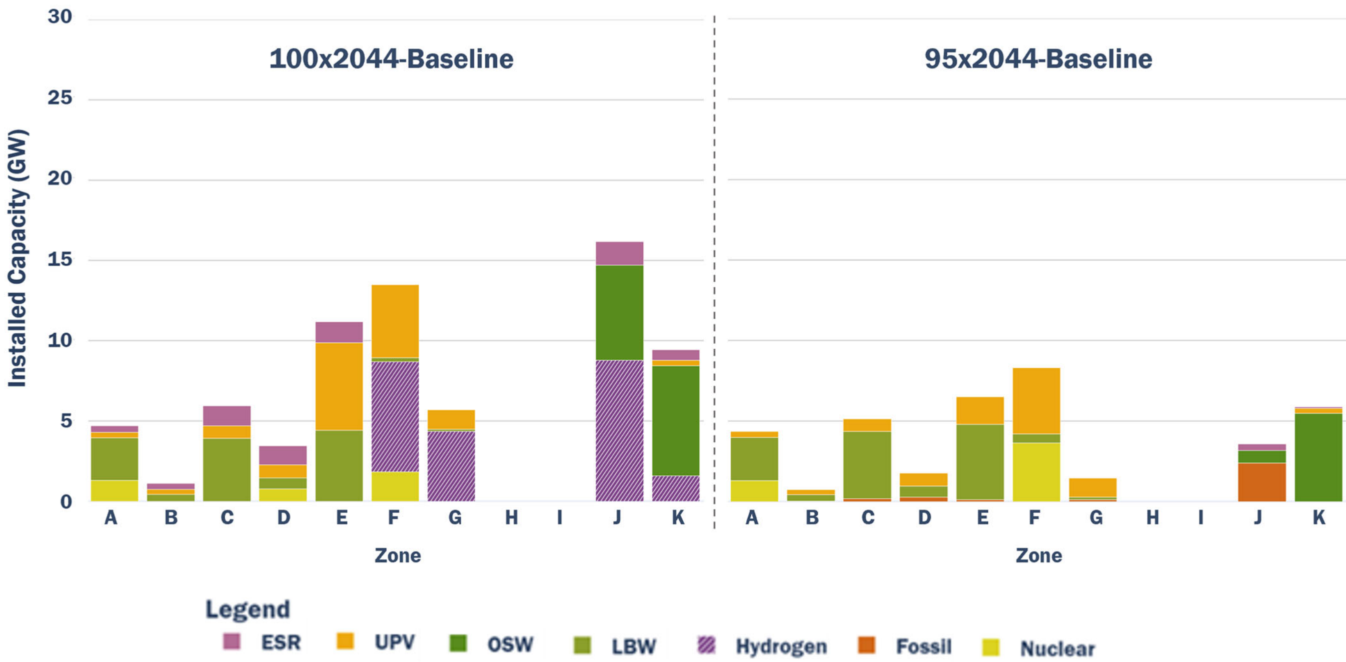
Within those availability and capacity constraints, economics determine the least-cost combination of resources capable of satisfying policy targets and serving load. The figures that follow illustrate how these competing drivers shape zonal outcomes under different policy scenarios and demand conditions. In particular, the comparison between Scenario 100x2044 and Scenario 95x2044 shows how a 100% zero-emissions scenario and a more flexible policy scenario produce different locational patterns of resource build, while the comparison between Higher and Baseline demand conditions shows how load growth changes the scale of zonal development required.

Figure 15: Total Zonal Capacity Additions – Scenario 100x2044-Higher vs Scenario 95x2044-Higher



In scenarios with high demand and ambitious policies, significant investment in new resources is required. As demonstrated in the figures above, more capacity is needed in futures that require zero-emissions generation (left figure) because an overhaul of the existing generation fleet would be needed.

Figure 16: Total Zonal Capacity Additions – Scenario 100x2044-Baseline vs Scenario 95x2044-Baseline



The resource profile in each scenario is similar to Figure 15~~Figure 15~~ above, highlighting the trends in resource types that could be needed to achieve different policy targets. Notably, the magnitude of total capacity is lower than the Higher Demand forecast, demonstrating the impact of peak and energy needs on resource requirements.

In 100% zero-emissions scenarios, locational resource needs become more differentiated across the state. Renewable resources would provide a large portion of zero-emissions energy and concentrate where development potential is strongest, particularly in upstate areas and offshore locations. But renewable resources are limited in how much they can be relied upon during peak conditions, and cannot on their own satisfy statewide and local capacity requirements. As a result, the need for firm, dispatchable capacity becomes more pronounced in constrained load centers. This is especially observed in downstate areas where locational capacity requirements are enforced. This pattern is illustrated most clearly in Scenario 100x2044–Higher, where the transition away from fossil generation increases the need to separate energy-serving resources from capacity-serving resources, both geographically and functionally.

More flexible policy scenarios produce a less sharply differentiated locational outcome. In futures that allow limited emissions, fossil resources operate infrequently but continue to provide firm capacity, support system flexibility, and reduce the need for large-scale deployment of alternative dispatchable resource types, such as hydrogen, in constrained areas. This contrast is illustrated by Scenario 95x2044, which shows that allowing some dispatchable fossil capability does not simply reduce total build requirements—it also changes where new generation must be developed.

The contrast between these scenarios is also evident in the overall scale of zonal development required. Under the higher-demand 100% zero-emissions scenario, total new capacity additions reach approximately 105 GW, reflecting the scale of investment needed to replace the existing fossil fleet while meeting both energy needs and local capacity requirements. By comparison, the more flexible policy scenarios require approximately 30-60 GW of new capacity. In the Outlook, this contrast is illustrated by comparing Scenario 100x2044–Higher and Scenario 95x2044–Baseline.

The zonal results also suggest system value in siting new nuclear capacity in Zone F. This reflects both the assumed availability of nuclear development options in upstate zones and the interaction with major bulk transmission constraints, such as Central East. From a planning perspective, Zone F represents a location that is electrically closer to downstate load centers than more western upstate zones, while still remaining outside the most constrained downstate areas. The repeated appearance of nuclear in this area across the Policy Case results signals the value of placing firm, zero-emissions generation where it can better support downstate needs without being as limited by west-to-east transmission constraints.

More broadly, the zonal patterns point to a recurring planning principle. Within areas where development is feasible, resources provide greater system value when they are located electrically closer to major load centers. This is particularly important in a system where renewable development potential is primarily concentrated upstate while demand and firm capacity requirements remain concentrated downstate. Offshore wind generation's proximity to downstate load gives it value beyond its energy contribution because it can reduce reliance on constrained bulk transmission paths from upstate to downstate and provide firm capacity downstate. At the same time, those deliverability advantages must be weighed against its comparatively higher cost and the practical challenges of development.

These zonal outcomes should not be interpreted as forecasts of exact project siting. They indicate where different resources provide system value under the assumed constraints. Actual development will also depend on permitting, siting, regulatory approval, and commercial feasibility. Offshore wind development depends heavily on federal processes outside direct state control, while new nuclear development involves long lead times and substantial licensing requirements. These practical considerations may ultimately affect whether the locational patterns identified here can be realized and whether they should be considered alongside the planning insights from the analysis.

The comparison between Baseline (Figure 16~~Figure 16~~) and Higher demand (Figure 15~~Figure 15~~) conditions reinforces that load growth changes the scale of locational development more than the underlying pattern. Under Baseline demand, the overall magnitude of new zonal capacity additions is lower across both policy scenarios, but the same broad locational tendencies remain. Energy-serving resources continue to concentrate where development potential is strongest, while firm-capacity needs remain near constrained load centers. In the Outlook, this is illustrated by comparing Scenario 100x2044–Baseline and Scenario 95x2044–Baseline with their Higher Demand counterparts. This suggests that demand growth does not fundamentally change the geography of system needs, but it does intensify the amount of regional investment required to meet them.

Key Variables That Could Change The Path Forward

As New York's power system evolves, future outcomes will depend not only on policy ambition and demand growth but also on the availability and characteristics of key resources that underpin the transition. While the Outlook evaluates a range of scenarios, several variables stand out as having a particularly strong influence on system conditions, investment requirements, and achieving policy objectives. These variables can materially shift the composition of the resource mix. In many cases, modest changes in these assumptions can lead to substantially different outcomes. Sensitivity analysis is conducted on Scenario 100x2044-Higher and Scenario 95x2044-Baseline, as these scenarios were selected for further evaluation in the 2025–2044 System & Resource Outlook (more context for this selection in a following section).

Key Sensitivity Insights

- ✓ **New Offshore Wind Availability – Renewable energy percentage policy frameworks are highly sensitive to the availability of offshore wind as a new resource.** In the absence of new offshore wind projects, limited alternative renewable options force the system toward significant solar build, reducing resource diversity and increasing pressure on siting, transmission, and deliverability. Achieving renewable energy targets in New York will be extremely challenging without additional offshore wind infrastructure.

- ✓ **New Nuclear Availability and Siting – Nuclear availability and siting materially influence both the scale and location of future development.** Constraints on new nuclear project development increase overall resource build requirements and concentrate development in other resources, while siting limitations can heighten reliance on transmission to deliver energy to load centers.

New Offshore Wind Availability

Offshore wind availability is a critical driver of system outcomes under renewable energy percentage policy frameworks. When new offshore wind projects are unavailable beyond existing and currently contracted capacity (less than 2 GW), the system is limited to a narrower set of options—primarily upstate utility-scale solar—to meet renewable energy percentage requirements.[15] This dynamic reduces resource diversity and increases pressure on siting, transmission, and deliverability, particularly in downstate regions where local resource siting options are constrained.

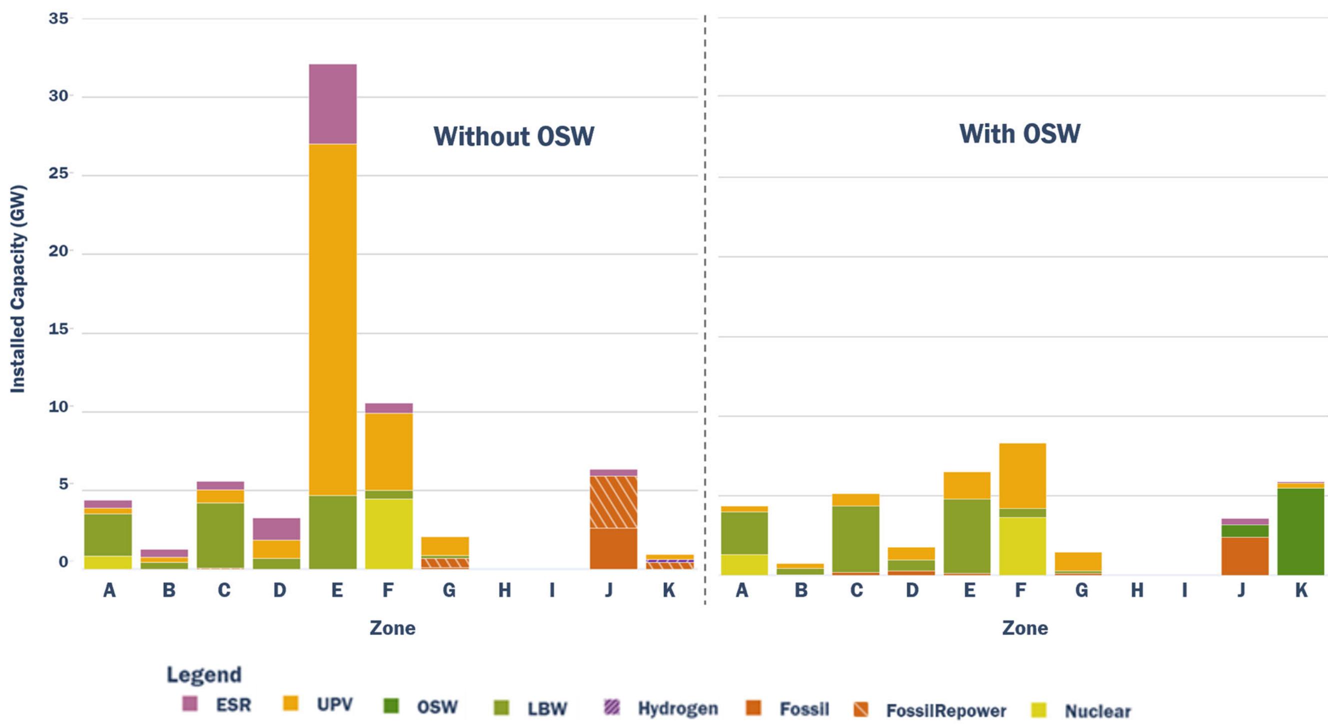
This outcome reflects the structure of renewable energy percentage policy requirements rather than an economic preference for specific resources. Because only qualifying renewable resources can contribute toward renewable energy percentage targets, zero-emissions resources, such as nuclear, are not able to substitute for offshore wind within this policy framework. As a result, resource expansion is driven toward the remaining eligible renewable options (e.g., utility-scale solar and land-based wind), even if other resources could have provided operational and/or capacity value.

The absence of offshore wind as an expansion option highlights the importance of resource diversity in achieving clean energy policy objectives. Without access to new offshore wind, the system becomes increasingly reliant on a concentrated set of renewable resources, which may introduce additional challenges related to land availability, transmission constraints, declining capacity value, and system flexibility. This would also place additional strain on the supply chain for renewable resource development, due to the magnitude of resources that would be needed to meet renewable energy targets. These insights are particularly important to consider in light of recent challenges (*e.g.,* federal leasing, environmental review, and permitting processes) affecting offshore wind development in east coast states.

[15] The potential for new land-based wind is more limited than new utility-scale solar according to LSR supply curve assumptions.

These findings underscore that renewable energy percentage policy targets are highly sensitive to the availability of specific resources. Constraints on offshore wind development can materially change the composition of the resource mix, the magnitude of new resources needed, and the feasibility of meeting policy objectives. These findings should be interpreted as illustrating how policy design influences resource flexibility, rather than suggesting that any single resource is required to achieve decarbonization objectives.

Figure 1717: Capacity Additions Show High Concentration of Upstate Solar Without Offshore Wind



Scenario 95x2044-Baseline shows that 30 GW of clean energy resources would be needed to offset 6 GW of offshore wind capacity in scenarios with high achievement of decarbonization and a high renewable energy percent target.

New Nuclear Availability and Siting

Nuclear availability and siting flexibility are key drivers of both the scale of resource development and geographic distribution. Recent State policy direction—including initiatives to explore up to 5 GW of advanced nuclear development—and the New York Power Authority's Request for Information ("NYPA RFI") on potential new nuclear host sites[16] highlight both the opportunity for nuclear expansion and the practical constraints on where development may

[16] NYPA Press Release (here).

occur. These factors directly shape how nuclear resources can contribute to future system needs.

Limits on new nuclear capacity and siting increase both the scale and concentration of alternative resource development. When nuclear deployment is constrained—specifically, by an overall 5 GW capacity limit across the NYCA and is restricted to Zones A, B, C, and E[17]—the system must rely more heavily on a broader mix of resources to meet both energy and capacity needs. This increases the total amount of new resource capacity needed and shifts development toward greater reliance on renewables, storage, and other dispatchable generation. The Policy Case scenarios show that absent these limitations, upwards of 8 GW of new nuclear was selected to be added to supply zero-emissions energy and offset the need for as much total new resource capacity.[18] Additionally, scenario results show a preference towards new nuclear downstream of transmission constraints (e.g., Zone F or further downstate) when nuclear deployment is not specifically limited to Zones A, B, C, and E.

Siting constraints have direct implications for transmission needs and system efficiency. Concentrating nuclear development in a limited number of eligible locations, as reflected in current siting interest through the NYPA RFI, can increase reliance on transmission to deliver energy to load centers and may reinforce congestion patterns. Greater flexibility in siting enables more balanced system outcomes by allowing firm, zero-emissions capacity to be located closer to load centers.

Nuclear can provide both energy production and firm capacity value, reducing the need for separate resources to meet these roles. As a result, constraints on nuclear development increase the need for multiple resource types to perform these roles separately, often requiring greater overall capacity additions.

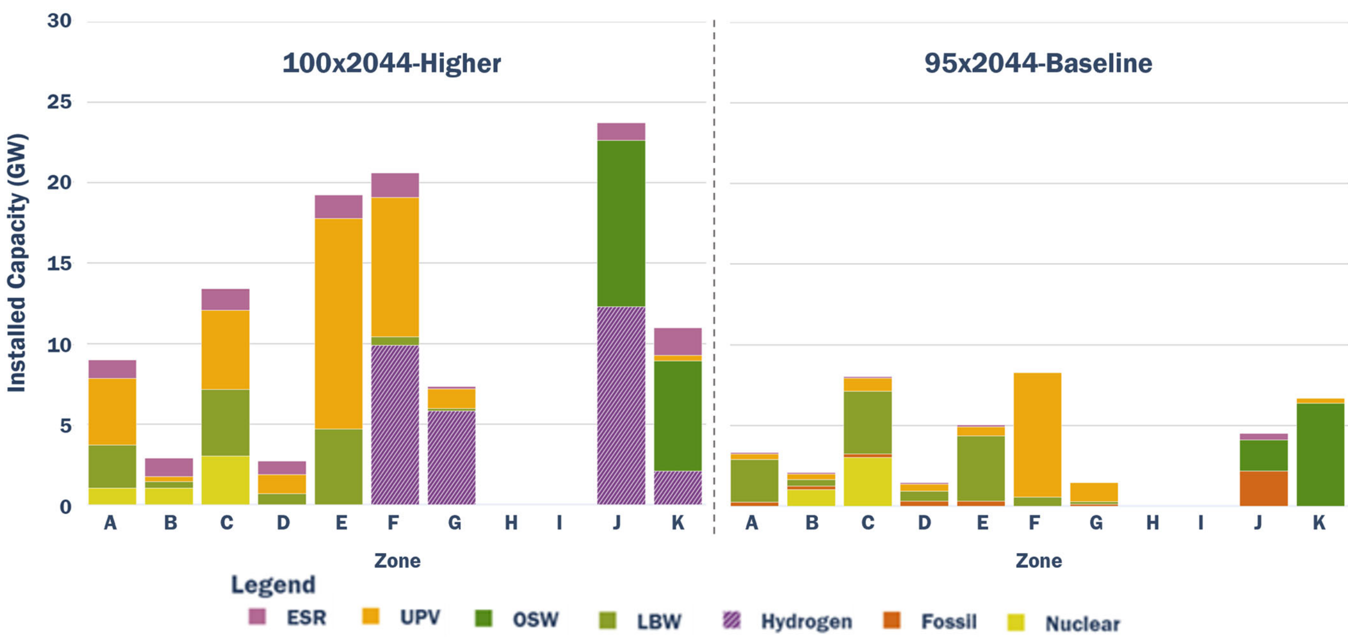
These findings highlight that assumptions about nuclear development—both in scale and siting—can materially influence resource portfolios and transmission requirements. While recent policy signals and stakeholder engagement identify a limited set of potential host locations, the extent to which nuclear development reflects large, traditional units versus more modular or flexible generation could significantly expand or constrain siting opportunities. Greater flexibility in how nuclear generation is deployed may enable a broader geographic distribution of firm, zero-emissions capacity, improving system balance and reducing reliance on concentrated infrastructure and better utilizing existing transmission. Conversely, more restrictive deployment

[17] Additional results with alternative variations to zonal restrictions are available in Appendix H: Capacity Expansion Model Results.

[18] This range is representative of most of the Outlook scenarios. One scenario, 100x2044 Alternate-Higher demand selected nearly 11 GW of new nuclear. See Appendix H: Capacity Expansion Model Results for additional detail.

of new nuclear may reinforce existing siting patterns and an associated increase in transmission needs. As a result, greater clarity around nuclear generation and siting feasibility will be important in shaping balanced and achievable system outcomes.

Figure 18: Nuclear Build Shows Greater Zonal Concentration with Restrictions Applied[19]



Energy Interchange with Hydro-Québec

To meet renewable and zero-emissions policies, New York is relying upon imports from Hydro-Québec to provide clean energy. The Champlain Hudson Power Express (CHPE) HVDC line was placed in service in May 2026 and is contracted to supply clean energy to New York. Given the recent in-service date, there is not sufficient data to predict the extent to which this new transmission line may be utilized, including the availability of generation in Hydro-Québec. If Hydro-Québec is unable to provide energy to New York above the CHPE contract minimum or if availability is reduced, New York may need to rely more heavily on internal generation and other interregional ties to maintain reliability and meet policy objectives.

An additional consideration is the evolving pattern of interchange at New York's northern border with Hydro-Québec. While the Outlook's reference assumptions reflect historical conditions that generally resulted in net imports into the NYCA, recent operating experience has

[19] Sensitivity analysis is conducted on the 100x2044-Higher and 95x2044-Baseline scenarios, as these scenarios were selected for further evaluation in the 2025–2044 System & Resource Outlook. New nuclear development is assumed to be restricted to Zones A, B, C, and E and a NYCA wide limit of 5 GW is imposed.

shown periods of net exports from the NYCA to Hydro-Québec at Chateaugay. This trend may indicate that interchange at the northern border could differ from historical expectations under some future conditions and highlights the importance of considering how changing external flow conditions could affect NYCA system operations. Further discussion of sensitivities related to Hydro-Québec interchange is included in Appendix K: Production Cost Model Sensitivities and Appendix L: Capacity Expansion Model Sensitivities.

The Transitional Role of Existing and Repowered Fossil Resources

As New York's power system evolves toward a cleaner energy mix, fossil generation continues to play a role in supporting system flexibility during the transition, particularly during periods of high demand, limited renewable output, or constrained system conditions. The extent of this role is shaped by policy design, the timing of generator retirements, and the availability and costs associated with alternative dispatchable and zero-emissions resources.

Key Fossil and Repower Insights

- ✓ **The role of fossil generation is primarily determined by policy design and emissions constraints.** In scenarios that do not require full decarbonization within the study horizon, existing and repowered fossil resources can remain part of the system, providing dispatchable flexibility and firm capacity. In 100% zero-emissions scenarios, this generation and its grid services must be replaced by alternative dispatchable resources, such as hydrogen.

- ✓ **Repowering can serve as a transitional pathway to maintain system flexibility.** Replacing aging fossil generation with more efficient dispatchable generation at existing sites enables continued access to dispatchable capacity while improving operational performance and reducing emissions intensity relative to the existing fleet. Delaying replacement generation increases reliance on emergency measures, reduces system flexibility, and could result in retaining resources with higher emissions rates until shutdown is required by policy.

- ✓ **Fossil resources can serve a capacity and flexibility role beyond just an energy role.** As renewable penetration increases, fossil generation is more frequently used to support system needs during periods of low renewable output or peak demand, in addition to being a primary source of energy supply.

- ✓ **Constraining fossil availability increases reliance on alternative dispatchable resources and expands overall infrastructure needs.** When fossil resources are phased out more rapidly, the system must rely more heavily on other firm capacity options—such as hydrogen— which may operate at relatively low utilization (~5% annual capacity factor) but provide capacity under peak system conditions.

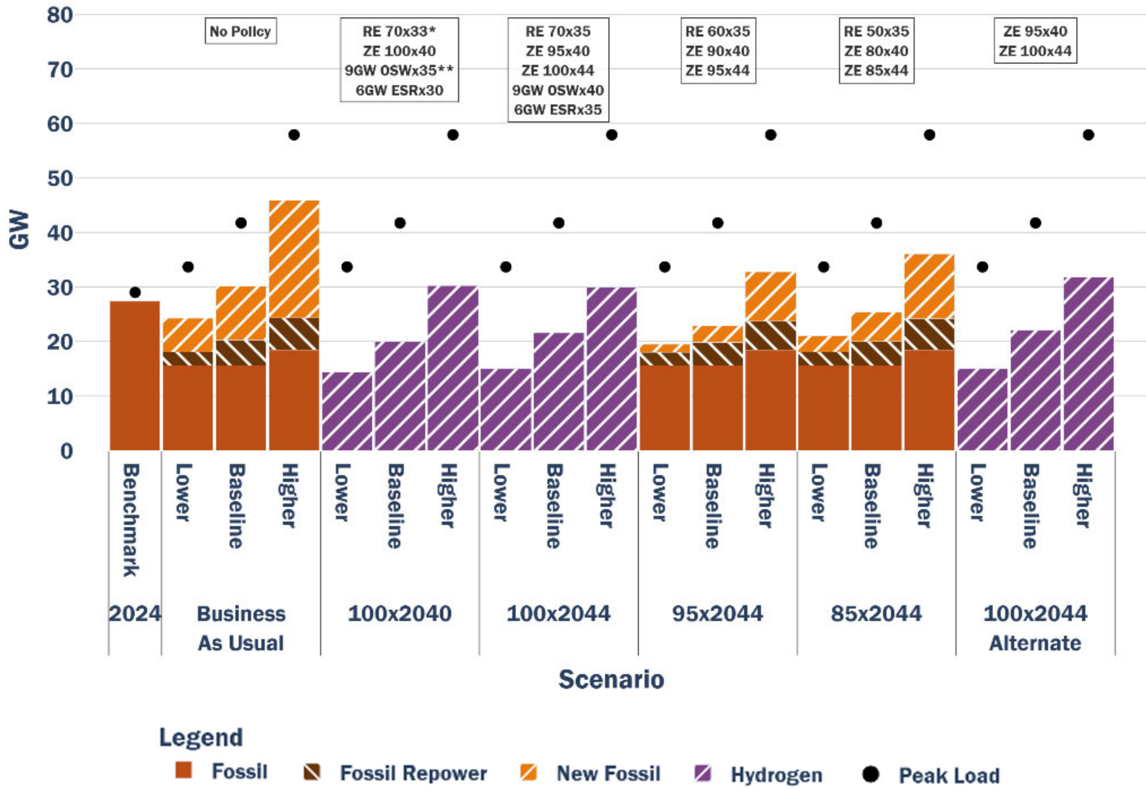
These dynamics reflect the interaction between policy objectives and system needs. In scenarios without strict emissions constraints, continued operation and repowering of fossil resources provides a cost-effective means of meeting demand while preserving system flexibility. In more stringent policy scenarios, fossil generation is displaced, and the system must transition to alternative sources of dispatchable generation~~, such as hydrogen~~.

Repowering outcomes also highlight the practical importance of infrastructure reuse. Developing new capacity at existing sites may reduce permitting challenges and lead times relative to greenfield development, supporting a more orderly transition as the resource mix evolves. At the same time, these outcomes should be interpreted as planning signals rather than indications of permitting feasibility or policy recommendations, as actual development will depend on regulatory, environmental, and market considerations.

Figure 19~~19~~: Fossil Capacity Supports System Needs Through 2035 in All Scenarios

This figure reports existing, repowered, and new fossil capacity from the capacity expansion model in 2035 across all scenarios. Much of the fossil fleet is optimally retained through this model year to meet energy and capacity needs and no hydrogen is selected.

Figure 2020: By 2044, Fossil and Hydrogen Capacity Depends on Policy Stringency



This figure reports existing, repowered, new fossil, and new hydrogen from the capacity expansion model in 2044. In scenarios enforcing a 100% zero-emissions electric system, the fossil fleet must be replaced by alternative zero-emissions resources, e.g., hydrogen. In scenarios with less than 100% zero-emissions requirements, a significant portion of the existing fossil fleet is retained and repowered and new fossil generation is built to meet energy and capacity needs.

Figure 21~~21~~: By 2044, Fossil Utilization Depends on Policy, Hydrogen Utilization is Low

This figure reports the annual capacity factor of existing, new, and repowered fossil in the Outlook's policy scenarios. Due to their higher efficiencies, new and repowered fossil operate at a higher capacity factor than existing resources, reducing the fossil fleet emissions rate if fossil energy is supplied. Across scenarios, hydrogen operates at a low capacity factor (e.g., below 5%) in 2044.

Scenarios Selected for Further Investigation

To support more detailed system analysis in the 2025-2044 System & Resource Outlook, a subset of the Policy Case capacity expansion scenarios are advanced for further evaluation using production cost simulations. Scenario 100x2044–Higher Demand and Scenario 95x2044–Baseline Demand were identified for this purpose, as together they bracket a plausible range of future conditions while highlighting key tradeoffs related to policy ambition.

Scenario 100x2044–Higher represents a future closely aligned with CLCPA objectives,[20] achieving a 100% zero-emissions electric system alongside higher levels of electrification-driven demand. This scenario reflects a system that relies heavily on zero-emissions and dispatchable resources and provides insight into the scale of resource development, operational challenges,

[20] Policy targets enforced in the 100x2044 scenario assume some delays in target years for select policies. See Figure 9~~Figure 9~~ for additional detail.

and transmission needs under a policy-driven, high-load growth future.

Scenario 95x2044–Baseline represents a pathway with more relaxed clean energy targets and baseline demand growth. This scenario reflects more limited electrification and a broader mix of resources, providing a counterpoint to Scenario 100x2044–Higher and illustrating how relaxed policy targets affects system outcomes.

Sensitivity assumptions that are applied to both scenarios reflect recent policy signals related to nuclear development, including a statewide limit of 5 GW of new nuclear capacity and restrictions on siting to Zones A, B, C, and E. These assumptions, based on stakeholder feedback, are intended to reflect a more realistic range of development outcomes and are carried forward into the production cost analysis.

Together, Scenario 100x2044–Higher and Scenario 95x2044–Baseline provide a balanced and policy-relevant foundation for production cost analysis in the Outlook, enabling comparison across differing assumptions related to decarbonization policy, electrification-driven demand growth, and resource deployment. These scenarios, in combination with the Base and Contract Cases, will inform transmission investment opportunities under a range of future system outcomes over the next 20 years.

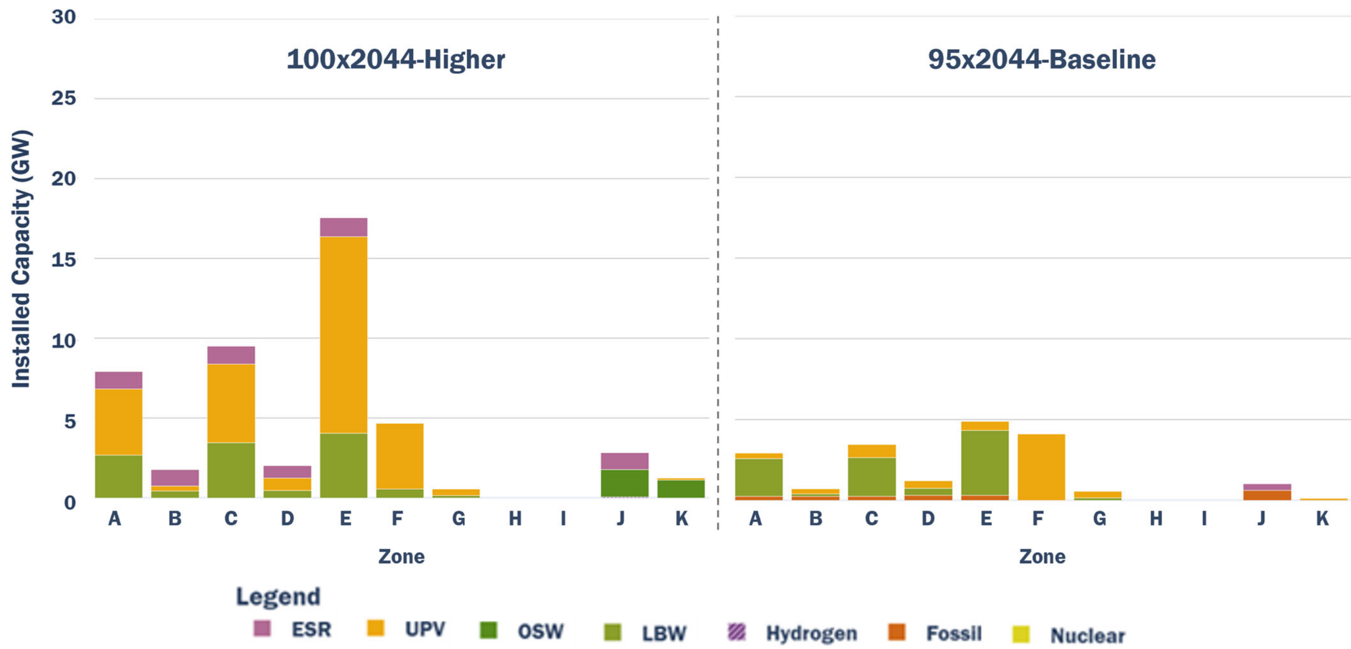
Transmission: Challenges & Opportunities

As New York's power system evolves, transmission becomes a defining factor in whether future resources can efficiently meet demand and policy objectives. While prior sections describe what resources may be built and where they are likely to be located, this section evaluates whether the existing transmission system can deliver that energy to load—and what happens when it is constrained.

Across Outlook scenarios, increasing reliance on upstate generation, combined with development of large loads upstate and growing demand in downstate load centers, places pressure on both local transmission networks and key bulk transmission interfaces. Using results from production cost modeling for the Base Case, Contract Case, 95x2044-Baseline, and 100x2044-Higher Policy Case scenarios, the Outlook analyzed where transmission constraints may emerge; how they may impact system operations; and where targeted transmission investments may improve energy deliverability and reduce congestion.

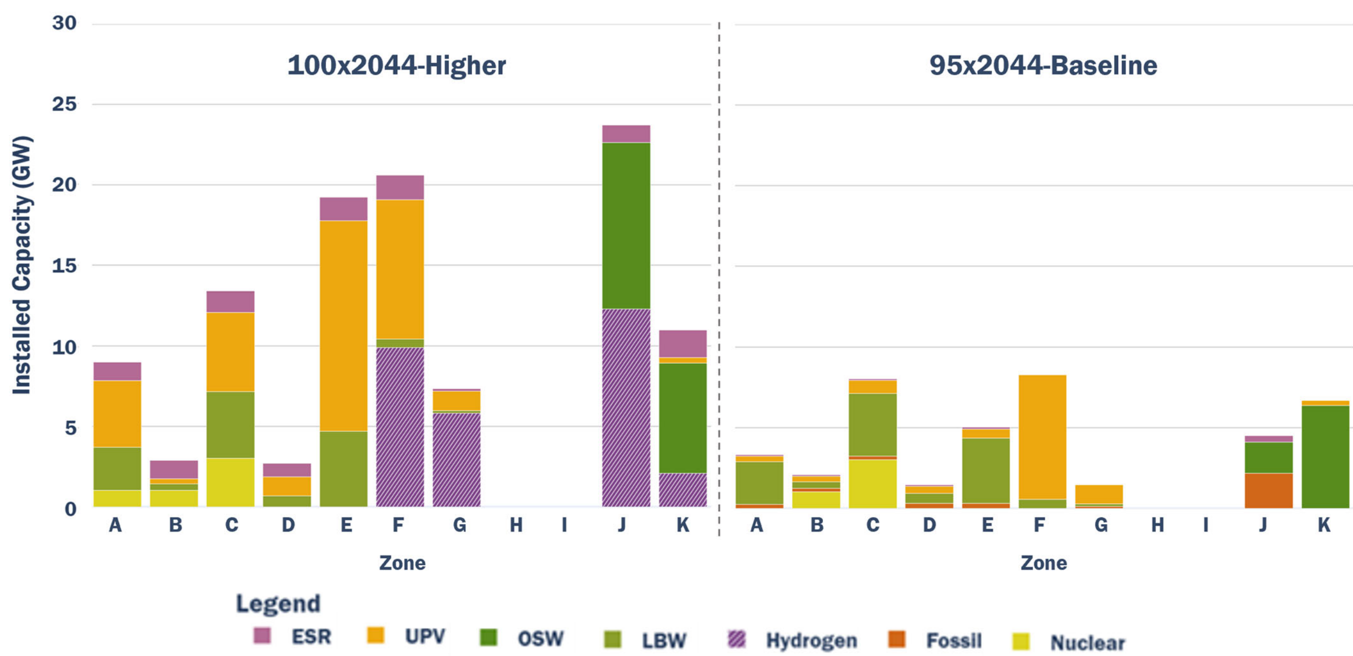
To provide context for the transmission analysis that follows, the figures below illustrate the range of resource portfolios evaluated in the production cost simulations for year 2035. These portfolios reflect the capacity expansion results discussed in the previous section and show how different policy and demand assumptions translate into the resources available to serve the system.

Figure 22~~22~~: 2035 Resource Additions Evaluated in Transmission Analysis



The 100x2044-Higher and 95x2044 scenarios add approximately 45 GW and 15 GW of new resources, respectively, by 2035. This figure does not include existing resources that remain on the system by this model year.

Figure 23~~23~~: 2044 Resource Additions Evaluated in Transmission Analysis



105 GW and 40 GW of new resources are added by 2044 respectively for the 100x2044-Higher and 95x2044 scenarios. This figure does not include existing resources that remain on the system by this model year.

Curtailment Risk in Key Generation Pockets

Renewable generation development tends to concentrate in locations where natural resource potential, land availability, and policy incentives align. As renewable generation grows in these areas in New York, the ability to deliver the energy generated becomes increasingly dependent on localized transmission conditions. Across scenarios, transmission constraints do not affect individual generators in isolation—they tend to emerge across clusters of resources that share common electrical paths, shaping where and when energy can be delivered to the broader system.

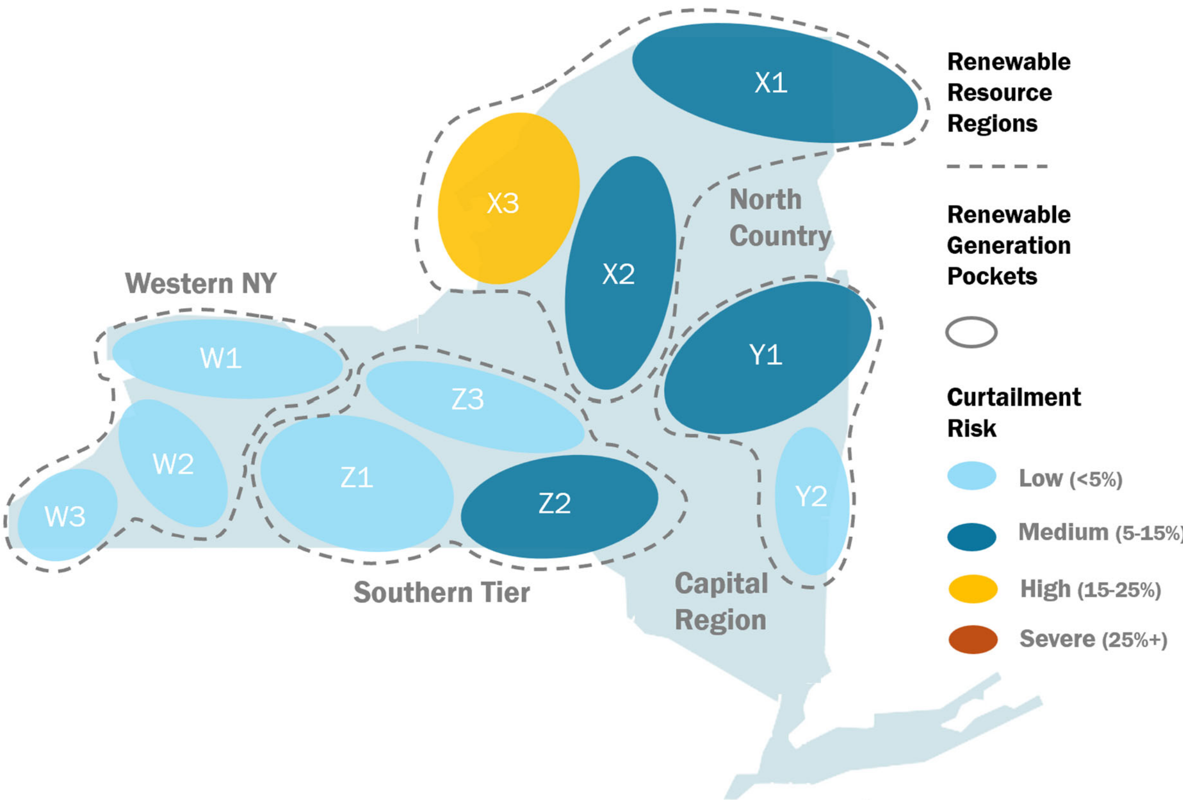
To evaluate these dynamics, this section uses a generation pocket framework that groups resources based on shared transmission dependencies. By examining curtailment at the pocket level, the analysis identifies where curtailment and congestion risks are concentrated; how it varies across futures; and where local transmission limitations may create early signals of broader system needs.

Curtailment risk varies across generation pockets and reflects both the scale and composition of resource development, as well as the degree to which output coincides during periods of limited transfer capability. To provide a consistent basis for comparison, renewable curtailment[21] is measured as the share of energy that cannot be delivered due to transmission constraints and is categorized using three thresholds: Low Risk (below 5%), Medium Risk (5% to less than 15%), High Risk (15%-25%), and Severe Risk (25% or greater).

Detailed descriptions of the individual pockets, including the transmission facilities and resources included in each grouping, are provided in Appendix J: Renewable Generation Pockets.

[21] Curtailment values are inclusive of intermittent renewable resources and reduced dispatch of hydro resources.

Figure 2424: Renewable Generation Pocket Curtailment Across Outlook Scenarios in 2035



In the Outlook, renewable pocket analysis was conducted for year 2035 to highlight potential resource buildout and transmission congestion in the next 10 years. Curtailment results for 2035 show that energy deliverability challenges emerge as renewable capacity increases across scenarios, while curtailment levels are limited under current resource commitments. The Contract Case exhibits low levels of renewable curtailment, reflecting both the relatively modest amount of new renewable capacity and the contribution of assumed transmission and distribution upgrades, such as the New York Transmission Owners Phase 2 projects, aimed at enabling renewable integration. Any potential acceleration of renewable generation commitments or delays in planned transmission upgrades could increase curtailment in nearby pockets.

By contrast, the Policy Case scenarios—where significantly more renewable capacity is developed to meet demand and policy targets—show the emergence of localized deliverability constraints and increased renewable curtailment. Higher curtailment levels are highly correlated with more aggressive clean energy policies, where greater renewable build requirements increase the frequency of coincident output and exceed local transmission capability in certain areas.

Curtailment is concentrated in a limited number of generation pockets rather than spread uniformly across the system. Relative to the other regions, Western New York (Pocket W) does not show as high of curtailment levels, reflecting differences in resource mix (*i.e.,* lower overall scale relative to other zones), system topology (*i.e.,* less concentration of resources at single points of interconnection), and available export capability.

In the Policy Case scenarios, pockets X (X1 through X3), Y1, and Z2 exhibit the highest average curtailment across cases, indicating areas where renewable development and local transmission capability may not be well aligned. Within that set of pockets, X3, Y1, and Z2 emerge as showing the highest curtailment risk, driven by high renewable penetration in these locations, with X3 showing as "severe" risk in the 100x2044 scenario. Meanwhile pockets X1 and X2 stand out for persistent congestion on local transmission elements, with X2 containing some of the highest number of congested hours across scenarios. The entirety of pocket X (Northern New York) exhibits high risk of transmission congestion and renewable curtailment, especially with increased renewable penetration. However, as discussed later in this report, local congestion can signal broader bulk transmission needs.

Across the NYCA, curtailment in 2035 follows the trends highlighted in the pockets. In the Contract Case, curtailment is minimal with less than 1% total renewable energy curtailed. In the Policy Case scenarios, curtailment throughout the state increases significantly, ranging from approximately 4% to 14% of renewable energy curtailment between scenarios.

Figure **24**~~Figure 24~~ and Figure **26**~~Figure 26~~ translate these results into tabular and geographic form for ease of interpretation. Together, they show that local pocket limitations can serve as an early indicator of where transmission constraints may intensify. As local export limitations are mitigated, curtailment risk can shift from individual pockets to broader bulk transmission interfaces. Additional discussion of bulk constraints and their impacts is presented in a later section.

Figure 2525: Renewable Capacity by Pocket

Pocket	Capacity (MW)		
	Contract Case	95x2044 - Baseline	100x2044 - Higher
W1	1,369	2,189	3,405
W2	593	1,187	3,103
W3	583	955	1,706
X1	2,098	2,474	2,718
X2	779	1,349	6,017
X3	895	2,044	7,376
Y1	622	3,430	2,980
Y2	230	588	1,220
Z1	1,391	2,100	3,553
Z2	398	1,268	1,801
Z3	302	785	2,467

Figure 2626: Renewable Generation Pocket Curtailment Risk Increases by 2035

% Curtailment by Pocket								
Pocket	Contract		95x2044 - Baseline		100x2044 - Higher		Average	
	Curtailment %	Risk	Curtailment %	Risk	Curtailment %	Risk	Curtailment %	Risk
W1	0%	Low	0%	Low	6%	Med	2%	Low
W2	0%	Low	4%	Low	3%	Low	2%	Low
W3	0%	Low	1%	Low	3%	Low	1%	Low
X1	0%	Low	4%	Low	21%	High	8%	Med
X2	0%	Low	3%	Low	20%	High	7%	Med
X3	0%	Low	5%	Med	47%	Severe	18%	High
Y1	0%	Low	12%	Med	11%	Med	8%	Med
Y2	1%	Low	0%	Low	0%	Low	1%	Low
Z1	0%	Low	4%	Low	6%	Med	3%	Low
Z2	0%	Low	14%	Med	6%	Med	7%	Med
Z3	0%	Low	0%	Low	5%	Med	2%	Low

This figure provides the average pocket-level curtailment results used to develop the geographic summary shown in Figure 24Figure 24. NYCA wide renewable curtailment ranges from less than 1% in the Contract Case to 4-14% in the Policy Case scenarios.

Key Generation Pocket Curtailment Insights

- ✓ **Pocket-level curtailment increases materially in Policy Case futures relative to current commitments.** Under the Contract Case, renewable curtailment remains limited, but higher renewable buildout in Policy Case scenarios increases the likelihood that local transmission capability becomes binding during periods of high output.

- ✓ **Curtailment risk is not uniform across the system and is concentrated in a limited number of generation pockets.** Pockets with significant renewable build and limited export capability exhibit the highest risk, while others remain relatively unaffected under the same system conditions. The entire Northern New York region (pockets X1 through X3) exhibits the highest likelihood of transmission congestion and renewable curtailment, especially in scenarios with higher renewable penetration in this area. The Capital Region (pocket Y1) also demonstrates a high likelihood of curtailment with increased renewable penetration.
- ✓ **Persistent curtailment in certain pockets signals structural local transmission limitations.** Where elevated curtailment appears across multiple scenarios, results suggest that local export constraints—rather than only differences in the resource portfolio scale—are a primary driver of energy deliverability risk**.**
- ✓ **Pocket-level results provide an early indicator of where transmission needs may emerge.** The exploration of Clean Energy Zones should take into account the transmission expansion opportunities identified in the Outlook. As local limitations are addressed, curtailment risk may shift from individual pockets to broader bulk interfaces, linking local deliverability challenges to system-wide transmission planning.

Policy and Demand Drive Divergence in Generation Pocket Outcomes

The prior section presents aggregate pocket-level curtailment results across Outlook scenarios. This section shifts the focus to how those results diverge between two Policy Case futures: Scenario 95x2044-Baseline demand and Scenario 100x2044-Higher demand. Together, these scenarios bracket a meaningful range of possible transmission outcomes. While the modeling framework does not allow the effects of specific policies and demand forecasts to be isolated independently, the contrast between these futures highlights how differences in overall build scale associated with both factors can materially change where curtailment risk emerges and how significant that risk becomes across generation pockets. This divergence reflects not only differences in total scale of new resources but also differences in the mix and geographic concentration of renewable additions across pockets.

Key Scenario-Based Pocket Insights

- ✓ **Generation pocket curtailment outcomes diverge materially across the two Policy Case futures.** Scenario 100x2044-Higher shows broader and more pronounced curtailment risk across pockets, while Scenario 95x2044-Baseline exhibits a narrower and less severe pattern of pocket-level risk.
- ✓ **Differences in total generation build scale are a key driver of this divergence.** The higher build 100x2044-Higher future places more renewable generation behind constrained local transmission paths, increasing the frequency and magnitude of curtailment in pockets where export capability is limited.
- ✓ **The comparison highlights a range of potential transmission needs rather than a single forecast.** Because policy ambition and demand growth both vary in these scenarios, the results should be interpreted as bounding outcomes that illustrate how combined changes in resource buildout can alter local deliverability pressures across the system.

The divergence in results shown in the figures below reflects the two futures with materially different system conditions. Scenario 95x2044-Baseline represents a more moderate resource buildout, in which lower overall resource additions result in a smaller volume of renewable generation exposed to local transmission limitations. By contrast, Scenario 100x2044-Higher reflects a substantially larger resource buildout associated with both higher demand and a more stringent zero-emissions target. In that future, more generation is concentrated behind constrained interfaces and within renewable-rich areas, increasing the likelihood that local transmission capability becomes binding during periods of high output.

Because each scenario varies both policy targets and demand assumptions, the analysis cannot attribute the observed differences in pocket outcomes to either driver independently. Instead, the results are best understood as a planning range that illustrates how combined changes in policy and demand can materially affect local curtailment risk and, in turn, the scale and location of potential transmission needs. These pocket-level comparisons complement the aggregate results from the prior section by showing that conclusions drawn from similar statewide results can mask important differences in where transmission limitations become binding and which pockets may warrant greater attention under alternative future conditions.

Figure 2727: Renewable Generation Pocket Curtailment in 2035 – 100x2044-Higher Demand

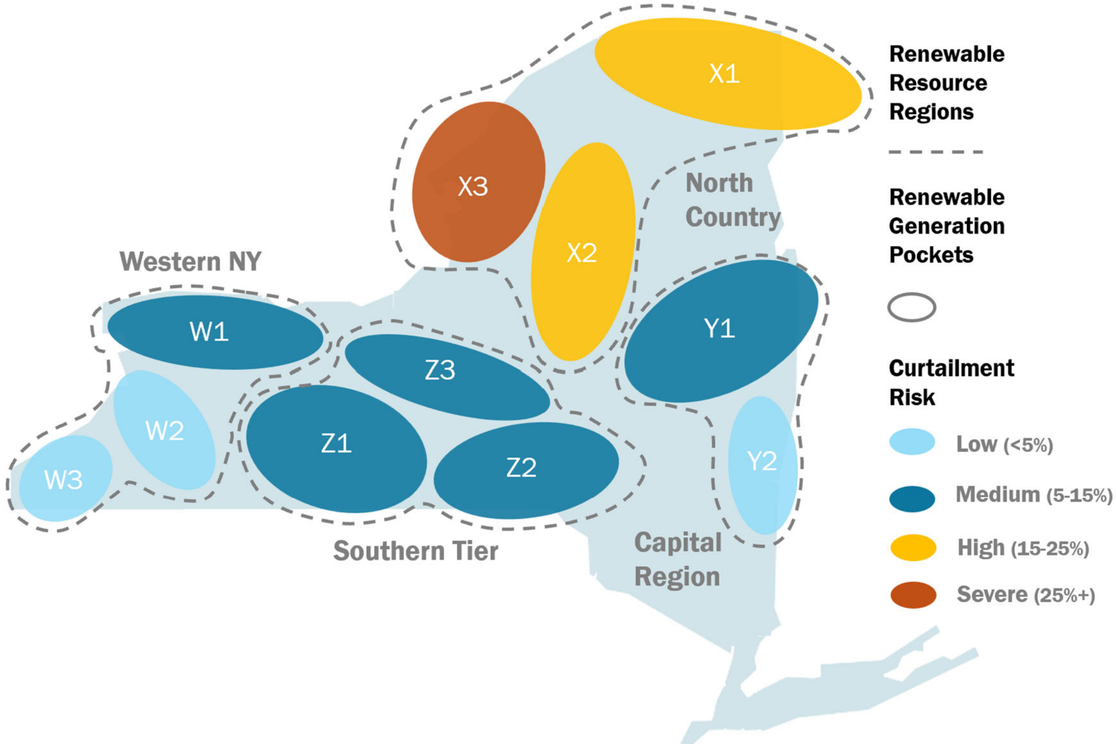
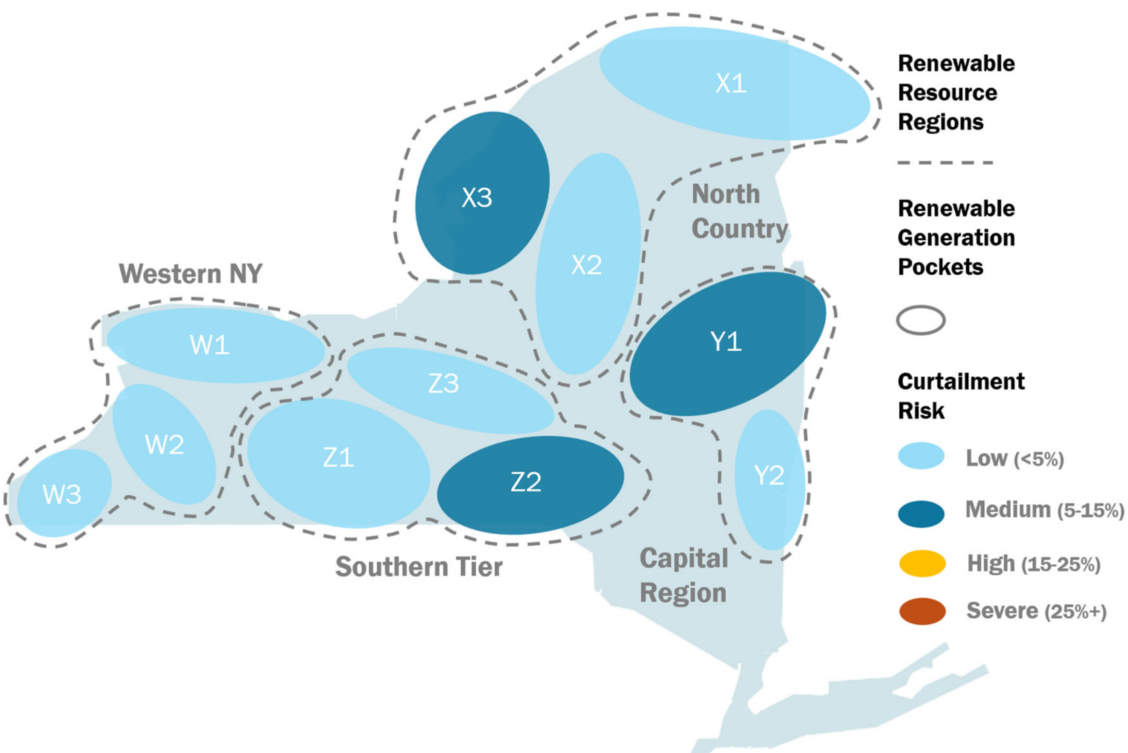


Figure 2828: Renewable Generation Pocket Curtailment in 2035 – 95x2044-Baseline Demand



Central East Drives Bulk Transmission Congestion

Across Outlook scenarios, transmission congestion is concentrated on specific bulk interfaces—but most prominently on the Central East interface, which continues to emerge as the dominant constraint on system energy deliverability.

As local transmission limitations are addressed, bulk transmission constraints become the next critical barrier to delivering energy from where it is generated to where it is needed. In New York, this dynamic is driven by the geographic and electrical distance between upstate renewable development and downstate load, making a small number of bulk interfaces central to system performance.

Key Bulk Transmission Insights

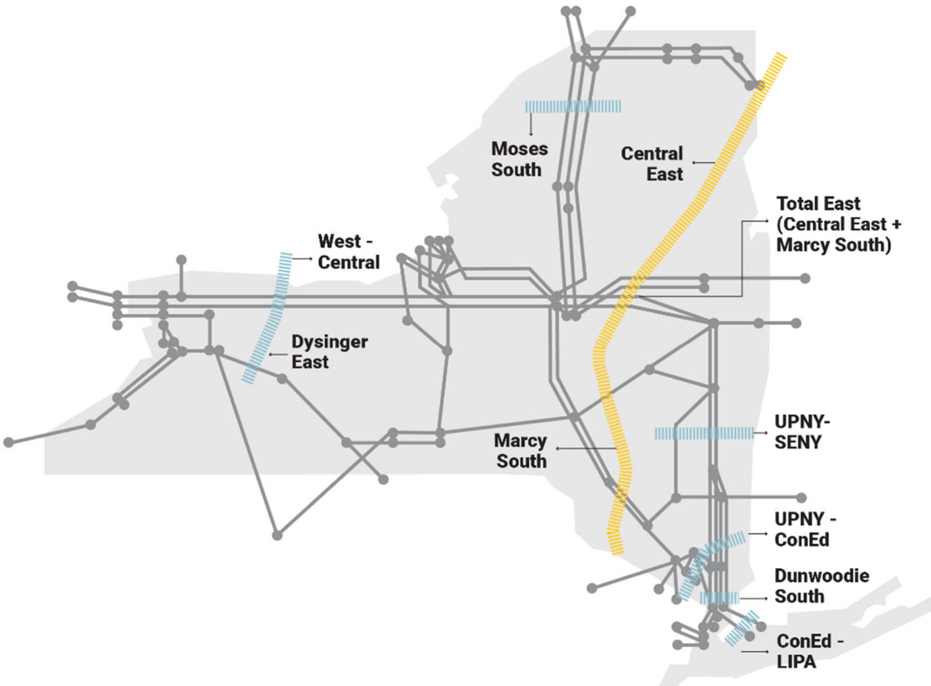
- ✓ **Central East remains a persistent and significant constraint across Outlook scenarios, consistently limiting energy deliverability from upstate to downstate regions.** Annual demand congestion on Central East increases significantly relative to current conditions, reaching approximately $2–5 billion in 2035 compared to roughly $325 million in 2025.[22]

- ✓ **Congestion on Central East contributes to sustained zonal separation in prices**, particularly between western and northern zones (Zones A–E) and eastern and downstate zones (Zones F–K), reflecting constrained transfer capability across the interface.

- ✓ **Central East congestion is likely to remain a key challenge,** given continued reliance on this interface under a wide range of resource buildout and demand conditions. Enhancing dynamic voltage support across Central East represents a targeted opportunity to reduce congestion, improve energy deliverability, and better utilize both existing and future generation as system conditions evolve.

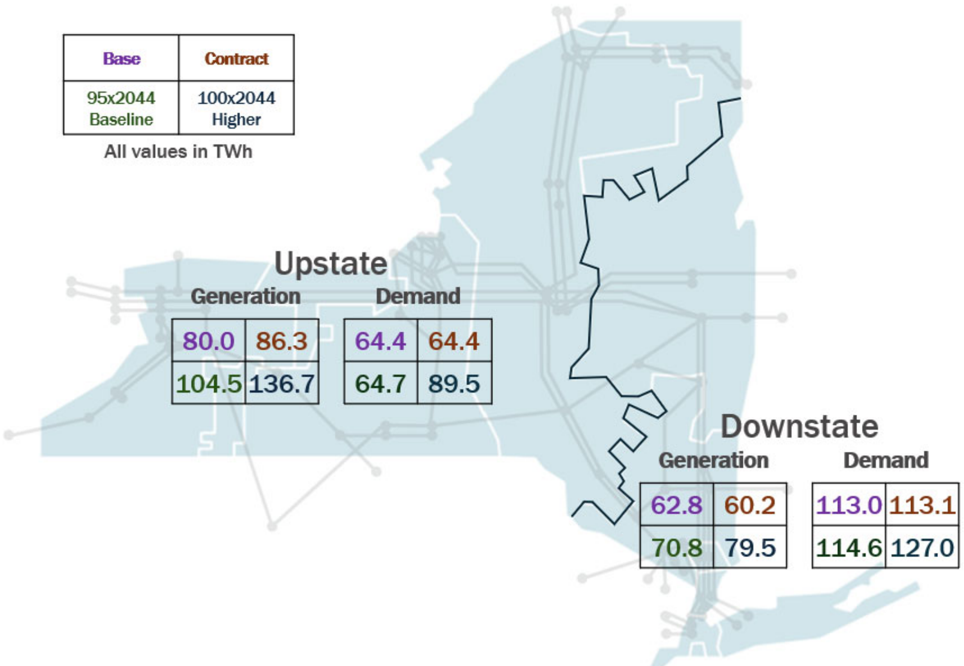
[22] For purposes of the Outlook, demand congestion is calculated as the product of shadow price, zonal shift factor, and load.

Figure ~~29~~29: Central East Congestion Drives Curtailment Risk from Bulk Transmission



The Central East interface is a key bulk transmission corridor that facilitates the transfer of energy from western and northern upstate New York toward southeast New York, including the Hudson Valley and downstate load centers. Because a large share of future renewable and nuclear development is expected to be located upstream of this interface, Central East continues to play a central role in determining system deliverability. As illustrated in Figure 30~~Figure 30~~, much of the projected generation across scenarios is concentrated in upstate regions, reinforcing the system's reliance on this interface to deliver energy to downstate load centers.

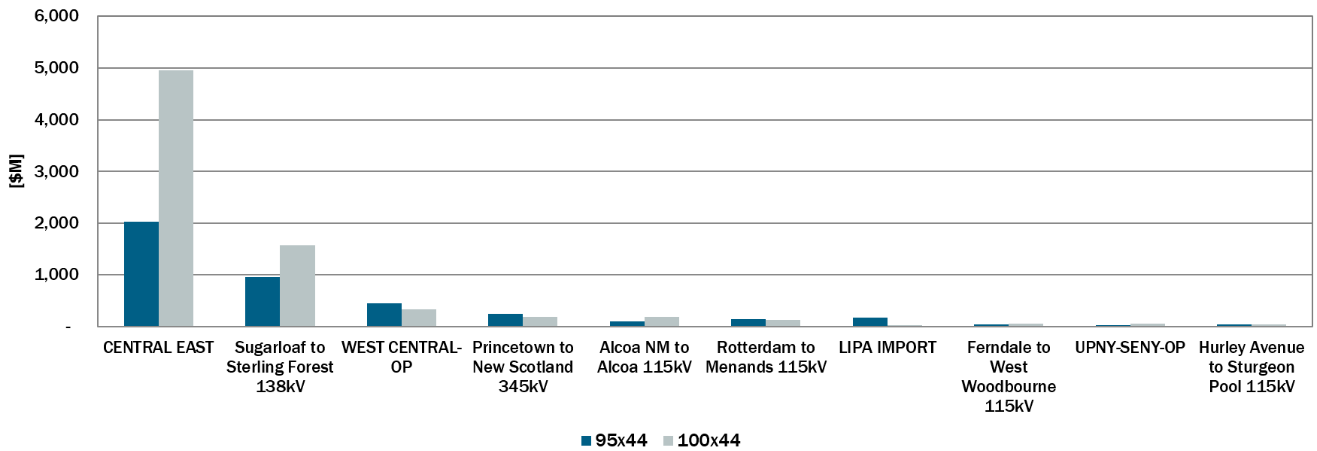
Figure 3030: Upstate Generation Concentration Increases Reliance on Central East (2035)



Results from the Outlook indicate that this constraint persists across the modeled futures. Demand congestion, a measure of the economic impact of transmission limitations, reflects the extent to which lower-cost energy cannot reach load and results in higher marginal costs paid by load. The demand congestion also drives increases in LBMPs downstream of constraints. The increase in congestion patterns for Central East shown in the Outlook scenarios is directionally consistent with historical experience, where multi-year congestion on the Central East interface (e.g., 2021–2025) has demonstrated its role as a recurring economic bottleneck.[23] The increase in demand congestion from approximately $141 million under 2024 benchmark[24] conditions to $2–5 billion dollars in 2035 under future scenarios, as shown in Figure 31Figure 31, highlights the growing importance of Central East as a limiting factor on efficient system operation.

[23] See Appendix F: Historic Transmission Performance for additional detail.
[24] See Appendix A: Production Cost Model Benchmark for additional detail.

Figure ~~31~~31: Central East is the Leading Driver of Annual Demand Congestion in 2035



While other transmission constraints show notable levels of demand congestion as shown here, Central East is driving the most significant economic impact.

As demonstrated in the previous 2023-2042 Outlook, voltage performance and dynamic reactive support needs can become binding considerations for the Central East interface. Dynamic reactive support through nearby generation and devices currently sustain the interface capability. As this generation retires and flows across the interface increase, more support will be needed. Without it the interface capability will be degraded and more severely limits the efficient flow of power from the upstate region.

Local Congestion Can Signal Broader Bulk Transmission Needs

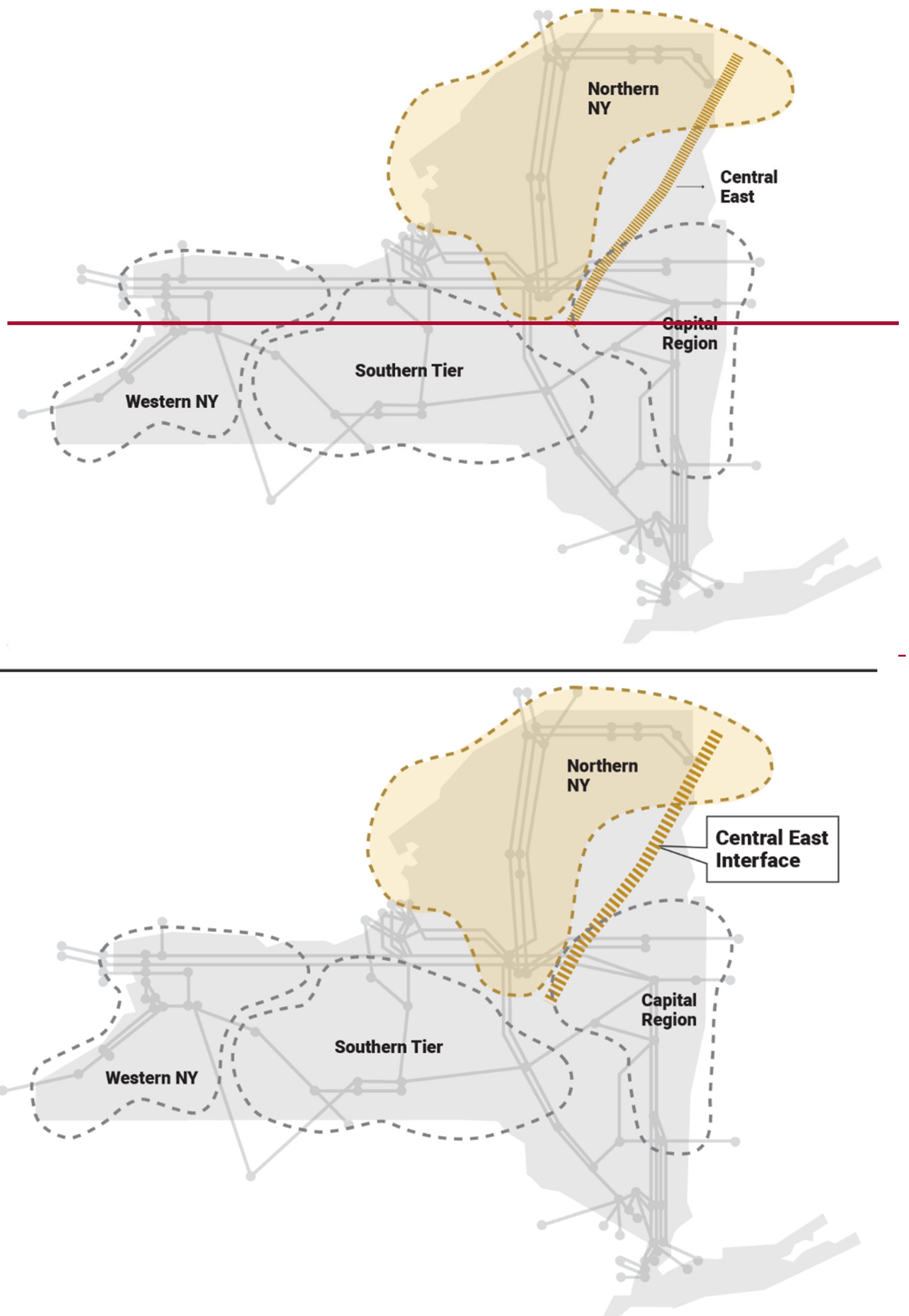
Local congestion and bulk transmission congestion should not be viewed as separate planning challenges. In a system where resource development is concentrated in specific upstate areas and load is predominantly concentrated downstate and at discrete locations throughout the state from large loads, local export constraints and bulk transfer constraints often represent different components of the same energy deliverability challenge. A lower-voltage limitation may constrain first, but that does not mean the broader bulk system has sufficient capability to absorb additional transfers once the local issue is relieved.

Considering local and bulk constraints together is important because transmission needs can otherwise be understated or mischaracterized. Some localized upgrades may unlock substantial resource deliverability and reduce curtailment, but they may also shift congestion onto major bulk interfaces that then become the next limiting factor. From a planning perspective, this means that local congestion can provide an early indication of broader transmission needs and that the highest-value solutions may require looking beyond a single facility, voltage level, or geographic area.

The Outlook's lower-voltage relaxation sensitivities illustrate this relationship. When lower-voltage transmission limits were relaxed in the 2035 cases, total New York demand congestion declined materially and renewable curtailment fell, indicating that local transmission limitations can be an important near-term barrier to deliverability. However, the demand congestion did not simply disappear. Instead, it shifted toward major bulk interfaces and higher-voltage facilities, including Central East and other upstate-to-downstate interfaces. This pattern shows that some local constraints are binding ahead of broader bulk constraints, and that addressing them can reveal additional transfer needs on the wider system. This provides a directional indicator that local and bulk constraints may interact in a similar way when higher levels of resource development place more energy behind constrained transmission paths. Detailed descriptions of this analysis are provided in Appendix F: Projected Transmission Performance.

This broader pattern is also directionally consistent with the generation pocket results. Several of the higher-risk pockets are located in high-renewable upstate areas where local export capability is limited. For pockets in the northern part of the state, such as Pocket X, local congestion may not be purely a local issue. Because these areas are electrically upstream of major bulk transfer paths, relieving local limitations could increase reliance on downstream bulk interfaces, such as Central East. The results suggest that some local congestion patterns may reflect a combination of local and broader bulk transmission needs.

Figure 32~~32~~: Illustrative Relationship Between Upstream Generation Pockets and Central East



This figure shows that several renewable generation pockets are located electrically upstream of Central East, providing directional context for how local congestion in these areas could interact with *downstream bulk constraints. The Outlook did not explicitly test individual pocket congestion transfer to Central East, so this figure should be interpreted as planning context rather than direct modeled evidence of causation.*

Key Local and Bulk Relationship Insights

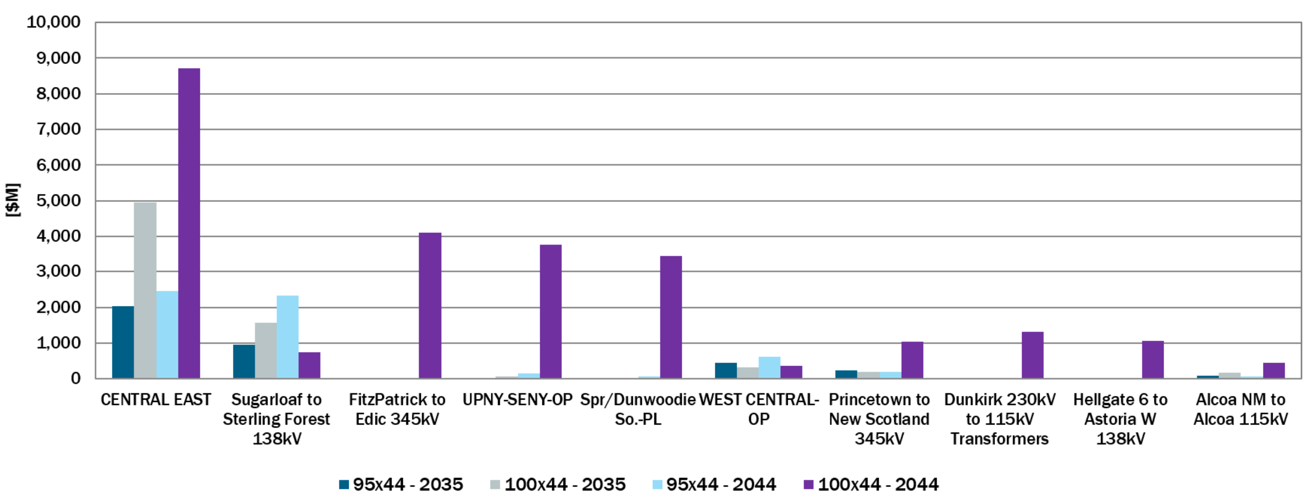
- ✓ **Local congestion can indicate broader bulk transmission needs, rather than indicating a purely local problem.** Where lower-voltage constraints limit exports from renewable-rich areas, relieving those local limitations can reveal or intensify congestion on major bulk interfaces that carry energy toward load centers—e.g., Central East.
- ✓ **Targeted local upgrades can materially improve renewable deliverability, but they do not eliminate the need to improve downstream transfer capability.** The value of relieving local constraints depends in part on whether the bulk system can then move additional energy to where it is needed. Looking at local and bulk constraints together improves transmission planning prioritization

Transmission Needs Persist Into the Long Term

Transmission constraints do not fade as the Outlook moves from 2035 to 2044. If anything, the 2044 results show that the same fundamental geographic challenge becomes more consequential over time. Scenario results show that new resources continue to be selected in upstate areas, primarily due to lower costs and larger geographic locations, while the highest and most constrained demand remains downstate. As that imbalance widens, the ability to move energy efficiently across the transmission system becomes an increasingly important determinant of system performance.

The long-term results also show that transmission needs are not driven by any single resource alone. Rather, they reflect the interaction of resource mix, demand growth, and the existing transmission topology. In the more moderate 95x2044-Baseline policy future, key bulk constraints remain material but less challenging than policy futures that have higher demand growth or require a 100% zero emissions electric system. In the 100x2044-Higher future, additional generation and higher demand place substantially more stress on the same bulk interfaces while also causing other constraints to emerge more prominently. This divergence underscores that transmission needs persist into the long term, but their magnitude depends heavily on the broader system conditions that develop around them.

Figure ~~33~~33: Demand Congestion Worsens by 2044 and is Dependent on Resources and Demand



Key Long-Term Transmission Insights

- ✓ **Transmission needs remain material through 2044 as the upstate generation versus downstate load mismatch persists—and in some futures becomes more pronounced.** Continued growth in upstream generation increases reliance on major transmission paths to serve constrained downstate regions, reinforcing the importance of bulk transmission in long-term system performance.

- ✓ **Central East remains the dominant bulk constraint in the long term, but higher-stress futures also cause other transmission constraints, such as UPNY-SENY and Sprainbrook-Dunwoodie, to emerge more prominently.** This indicates that persistent bulk needs do not disappear over time and that more aggressive resource and demand assumptions can broaden the set of limiting facilities beyond the system's primary bottlenecks.

- ✓ **Long-term transmission outcomes depend not only on how much downstate generation is added but also on how flexible that resource mix is in practice.** In the higher-stress future, offshore wind contributes significant downstate energy but remains non-dispatchable, while hydrogen appears more suited to peak and capacity needs than regular energy service. By contrast, the more moderate future retains dispatchable fossil resources and a smaller offshore wind build, resulting in a more firm and flexible downstate supply mix with a reduced reliance on bulk transfers.

The 2044 results show that the core transmission challenge identified in the mid-term remains in place over the longer horizon. New generation supply continues to increase to serve growing load, but much of that energy remains concentrated in upstate regions while demand growth remains strongest in downstate areas. This reinforces reliance on the bulk transmission system to move energy across the state and extends the same upstate-to-downstate energy deliverability pressures identified in 2035. In this sense, the long-term results do not tell a different transmission story. They show that the same structural issue persists with greater consequences when more energy is placed behind constrained interfaces.

The contrast between the two 2044 Policy Case scenarios is particularly instructive. In both futures, Central East remains a major driver of demand congestion, indicating that it continues to limit efficient energy transfers from upstate toward downstate load. However, the 100x2044-Higher scenario shows a much sharper increase in demand congestion on Central East, along with more prominent demand congestion on several other transmission constraints, than the 95x2044-Baseline scenario. This divergence suggests that long-term transmission needs are highly sensitive to the surrounding system conditions. More aggressive resource development and higher demand do not simply scale existing congestion upward. They can intensify reliance on key bulk interfaces while also causing additional constraints to become materially more important.

The 100x2044-Higher results also suggest that these congestion outcomes are influenced by the characteristics of the downstate resource mix available to serve demand. While hydrogen capacity is present in that future, its economics and the additional electrolysis-related load make it less suited to serve regular energy demand outside of peak or stressed conditions. In addition, much of the operating generation in New York City and Long Island in the 100x2044-Higher future is offshore wind due to policy targets and limited resource options downstate. Offshore wind provides valuable clean energy but is intermittent and non-dispatchable, which requires additional resource types to provide generation downstate. As a result, the downstate resource mix (offshore wind, hydrogen capacity, and batteries) relies on imports from neighboring regions as well as transfers from upstate resources, which can further intensify demand congestion on major bulk interfaces.

Comparatively, scenarios that support a broader resource mix and allow for limited emissions preserve essential operating characteristics such as dispatchability at a lower operating cost. The 95x2044-Baseline scenario reflects a more balanced downstate resource mix. Because that scenario retains portions of the fossil fleet, it preserves dispatchable resources that can still be used to serve energy demand when needed, rather than relying as heavily on resources that are primarily capacity-serving or non-dispatchable. Offshore wind still contributes meaningfully but at a smaller scale than in the 100x2044-Higher future due to resource options downstate. Together, those characteristics suggest a system that remains better able to balance local supply with demand in downstate regions, which helps moderate the need for transfers across major bulk interfaces.

New Nuclear Impacts Transmission Depending on Broader System Conditions

New nuclear does not appear to create a single, uniform transmission outcome. Its transmission impacts depend on where it is sited, what other resources are built around it, and how much demand the broader system must serve. In that sense, nuclear should not be viewed in isolation as either a transmission solution or a transmission problem. Instead, its value and its transmission consequences depend on the broader system conditions in which it is deployed.

This is particularly important in the Outlook because the difference between the 95x2044-Baseline and 100x2044-Higher scenarios suggests that broader system conditions shape whether nuclear additions are accompanied with relatively moderate transmission impacts or whether they coincide with much more severe demand congestion (as shown in Figure 33Figure 33) and price separation. The transmission system's response to new nuclear generation is shown to be dependent on the surrounding resource mix and demand at least as much it does on the presence of nuclear itself.

Key Transmission Insights Related to New Nuclear

- ✓ **Siting matters.** Siting a new nuclear plant requires coordination engaging federal, state, community, and industry partners. The Outlook focuses the investigation on the bulk transmission system necessary to deliver the generated energy to the consumers. Strictly from transmission perspective, nuclear located electrically closer to load can reduce the overall electrical infrastructure needs, while nuclear concentrated behind constrained interfaces may still rely heavily on bulk transmission expansion to deliver its energy.

- ✓ **The contrast between the two 2044 Policy Case scenarios suggests that broader resource and demand conditions can matter as much as nuclear itself.** The 100% zero-emissions scenario shows much more severe demand congestion and wider price separation than the other 2044 policy scenario, indicating that transmission outcomes depend on the full system configuration around nuclear development.

The Outlook's resource and transmission results point to siting as a central driver of how nuclear affects the transmission system. Earlier results show that restricting nuclear development to a limited set of zones increases its zonal concentration, while broader siting flexibility can improve system balance by allowing firm, zero-emissions capacity to be placed closer to major load centers. This matters because the system's transmission challenge is fundamentally geographic—much of the future generation build remains upstate, while the most constrained demand remains downstate. In that context, nuclear generation that is sited closer to load can help reduce reliance on long-distance transfers, whereas nuclear generation located behind already-constrained bulk paths may still depend on interfaces, such as Central East, to deliver its energy efficiently.

The results from the 2044 policy scenarios reinforce that point; additional details are provided in Appendix G: Production Cost Model Results. In the 100% zero-emissions scenario, nuclear additions coincide with increased demand congestion on Central East and other transmission elements, but the broader results suggest this outcome is tied to the surrounding system conditions rather than nuclear capacity alone. The 100x2044-Higher future places more generation on the system, assumes higher demand, and produces much higher bulk demand congestion and wider upstate-to-downstate price separation than the 95x2044-Baseline future. This contrast indicates that nuclear generation's transmission impacts should be interpreted in the context of the broader portfolio it is part of. In some futures, nuclear may support system balance and reduce the need for other resource additions. In others, its benefits may be partly limited by the same bulk constraints that affect the wider system. From a planning perspective, this means nuclear and transmission must be evaluated together with particular attention to siting, competing resource builds, and demand growth.

Interregional Flows Affect System Flexibility and Risk

Interregional transmission connections play an important role in supporting system operations by enabling the exchange of energy with neighboring regions and helping balance supply and demand under varying system conditions. As New York's power system evolves, however, the assurance of these interregional flows becomes more uncertain.

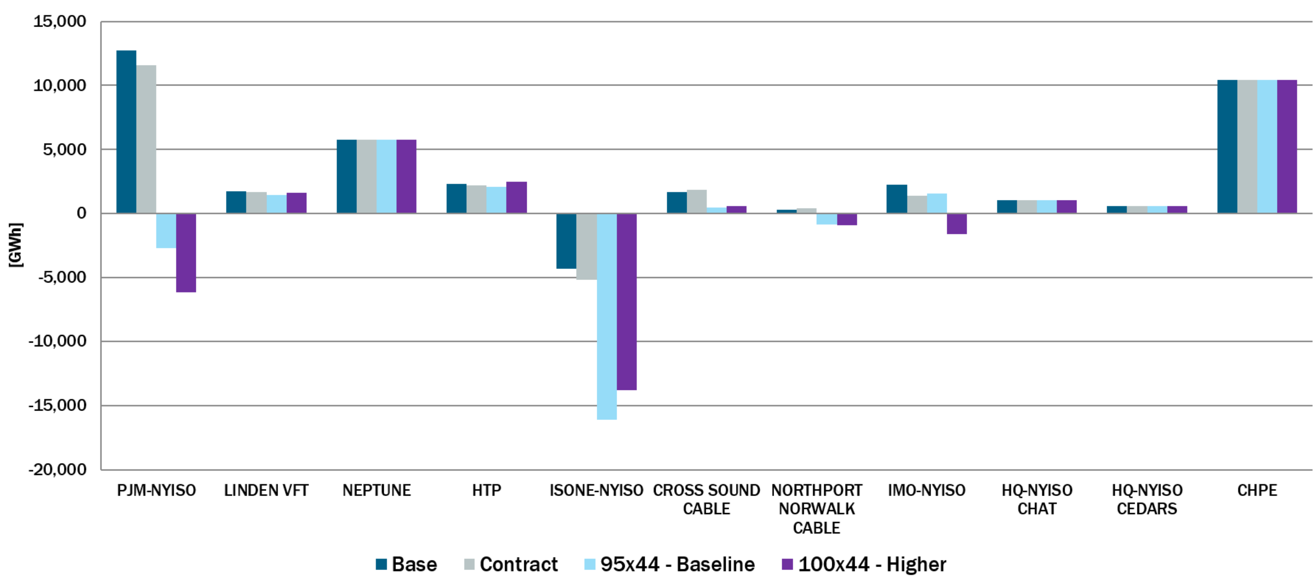
Key Interregional Insights

- ✓ **Interregional flows provide system flexibility, but their availability may be limited during peak conditions,** as neighboring regions experience similar demand patterns and weather-dependent generation.
- ✓ **The availability and direction of flows—particularly with Hydro-Québec via Champlain Hudson Power Express (CHPE)—introduce additional variability and uncertainty,** depending on contractual conditions, seasonal demand, and external system needs.

New York has strong interregional transmission connections with neighboring power systems, including ISO-NE, PJM, IESO, and Hydro-Québec, which have historically supported the reliable and economic exchange of electric energy. New York has typically been a net importer of energy from Hydro-Québec, IESO, and PJM, while net exports to ISO-NE tend to occur on an annual basis. These interconnections play a critical role in balancing regional supply and demand and in supporting energy needs during stressed system conditions, such as during the 2025 summer heat wave in New York.

As each interconnected system independently pursues its own decarbonization policies, the availability and direction of interregional flows are expected to evolve. Based on current system conditions, there is likely to be a reduction in net interchange with neighboring systems and an increased reliance on NYCA generation due to increased load projected, evolving load patterns, and reduced reserve margins across New York and its neighboring regions. Over the longer term, as neighboring systems approach higher levels of clean energy adoption, the availability of surplus energy for interregional exchange will increasingly depend on the mix and dispatchability of resources adopted across regions. The following figure shows projected annual net imports (positive) and exports (negative) across Outlook scenarios. Generally, the Outlook scenarios show a shift in trends and an overall decrease in net imports throughout the 20-year study period. This trend is particularly notable in scenarios with higher decarbonization targets.

Figure 3434: New York May Have Opportunities to Export Low-Cost Clean Energy (2035)



Within this evolving interregional context, the CHPE transmission project introduces additional considerations for interchange between New York and Hydro-Québec. While CHPE is expected to provide a firm contractual supply of clean energy to New York, there is no current data on the extent to which this new transmission line may be utilized, including the availability of generation in Hydro-Québec during peak seasonal demand conditions. These factors are particularly relevant in winter and summer peak periods when both New York and Hydro-Québec may face heightened system demands.

If Hydro-Québec is unable to provide energy to New York above the CHPE contract minimum—

or if availability is reduced during peak conditions—New York may need to rely more heavily on internal generation and other interregional ties to maintain reliability and meet policy objectives. Conversely, scenarios in which Hydro-Québec requires additional power from upstate New York to help supply energy downstate could result in sustained exports from Northern New York, placing additional demands on in-state generation and transmission resources.

The Outlook's sensitivity analyses explore these bounding conditions to better understand how alternative assumptions about the Hydro-Québec interchange affect resource selection, transmission utilization, and policy achievement. These sensitivities highlight that assumptions regarding the availability, direction, and firmness of interregional flows can materially influence system outcomes. Results for these sensitivities are available in Appendix K: Production Cost Model Sensitivities and Appendix L: Capacity Expansion Model Sensitivities.

Conclusions and Recommended Transmission Opportunities

Key Transmission Insights

- ✓ **Central East congestion is likely to remain a key challenge,** given continued reliance on this interface under a wide range of resource buildout and demand conditions. Enhancing dynamic voltage support across Central East represents a targeted opportunity to reduce congestion, improve energy deliverability, and better utilize both existing and future generation as system conditions evolve. This recommendation is consistent with findings in the 2025–2034 Comprehensive Reliability Plan and the prior Outlook.

- ✓ **Curtailment risk is not uniform across the system and is concentrated in a limited subset of generation pockets, notably Northern New York.** Pockets with significant renewable build and limited export capability exhibit the highest risk, while others remain relatively unaffected under the same system conditions. Northern New York exhibits the highest likelihood of transmission congestion and renewable curtailment, especially in scenarios with higher renewable penetration in this area. Areas within the Capital Region also demonstrate a high likelihood of curtailment with increased renewable penetration.

- ✓ **Policy design directly impacts the scale of transmission development required.** Repowered and existing fossil-fueled units, if permitted to continue operating beyond the 2040 zero-emission requirement, could materially reduce the need for significant additional zero-emission generating capacity, as well as the associated transmission expansion required to support such capacity. Newly developed nuclear units, if successfully sited and constructed, may nevertheless require transmission expansion, but the transmission expansion need will depend on the location and scale of deployment and the prevailing demand and resource mix at the time of installation.

Next Steps

The Outlook builds on the analyses performed through the NYISO's Comprehensive System Planning Process and provides a foundation for continued study and planning activities. The findings are intended to inform policymakers, investors, and stakeholders as they evaluate options to meet future energy needs under a range of possible system conditions.

The results highlight the importance of aligning resource and transmission development with evolving system needs. As identified in the Outlook, the scale, type, timing, and location of future investments will play a critical role in determining system performance. These considerations will inform upcoming planning activities, including the 2026–2027 cycle of the Public Policy Transmission Planning Process.

In August 2026, the NYISO will open the next Public Policy Transmission Planning cycle, providing stakeholders the opportunity to propose transmission needs driven by public policy requirements. The findings of the Outlook provide a framework for identifying and evaluating those needs, particularly in areas where transmission capability affects the ability of new resources to serve load efficiently.

Principal Recommendations

The NYISO has identified three principal recommendations based on the Outlook findings to address key system needs under a range of future conditions. Consistent with the NYISO's role in providing objective, fact-based planning insights, these recommendations highlight considerations that influence the timing, scale, and location of resource and transmission development. Together, they emphasize actions that can reduce transition risk and support reliable system operations as demand grows and the resource mix evolves.

- ✓ **Establish a viable path for the development of resources capable of providing firm capacity and operational flexibility as the generation mix evolves.** Across all scenarios, the system requires resources that can serve demand during peak conditions and periods of low renewable output. A mix of new resources, including more efficient new and repowered fossil generation, is needed to supplement the system. The timely development of these resources depends on a range of factors including policy, supply chain, and the ability to site and permit the facility, which can materially influence the pace of development and contribute to tightening system conditions. Notably, hydrogen-based generation could provide zero-emissions firm capacity and operational flexibility, but it is not currently available at commercial scale, and would require significant investment in new infrastructure for fuel production, storage, and transportation, which does not exist today. Absent significant progress in the development of new technologies, continued reliance on fossil resources, including repowering and new additions, will be necessary to maintain reliability.
- ✓ **Coordinate the timing of resource additions, repowering opportunities, and retirements to reduce transition risk and avoid tightening system conditions.** Across

all futures, a wide range of new capacity is needed depending on policy stringency and demand growth**.** As demand increases and existing generation retires, system conditions become increasingly sensitive to the pace and sequencing of new resource development. Aligning resource entry with expected retirements supports adequate energy and capacity supply and reduces reliance on short-term operational measures.

- ✓ **Increase transfer capability across the Central East interface through targeted dynamic voltage support enhancements.** Consistent with findings in the 2025–2034 Comprehensive Reliability Plan and the prior Outlook, enhancing dynamic voltage support across Central East represents a targeted opportunity to reduce congestion, improve energy deliverability, and better utilize both existing and future generation as system conditions evolve.

- ✓ **Support zero-emissions generation development in Northern New York with bulk transmission upgrades.** If the level of resource development observed in the Outlook is realized in Northern New York due to its natural resource potential and land availability, increased bulk transmission capability will enable energy deliverability from this region.