



The NYISO Interconnection Process

Maintaining Reliability
for a Grid in Transition

Introduction

State and federal clean energy policies are driving an historic transition of the existing electric generating fleet in New York, including a dramatic increase in the development of clean energy projects.

Mandates under the state's Climate Leadership and Community Protection Act (CLCPA) require 70% renewable energy by 2030 and an emissions-free electric system by 2040. The Inflation Reduction Act, signed into law by President Biden in August 2022, makes \$370 billion available in tax credits and incentives to speed the country's transition to clean energy technology – the most aggressive climate related action ever taken by Congress.

The increase in investment in large scale renewable generating facilities and new clean energy technology is also driving a transition of the transmission system – the backbone of our electric infrastructure. Integrating a high volume of new facilities onto the transmission system can have major implications for reliability and the flow of power across the state.

The process for bringing a renewable project from a concept to commercial operation is complex and multifaceted. The process of performing necessary interconnection studies is only one of many factors that determine whether resources ultimately become operational. Among the many factors that determine commercial viability are project design, location, property acquisition, financing, community acceptance, and permitting. In addition to the interconnection process administered by the New York Independent System Operator (NYISO), other entities play a significant role, including local utilities where the projects will interconnect to the grid, regulators, local communities, the project developers, and their investors. The interconnection process is a key factor and milestone for generation development but not the sole element that determines the viability or success of a project.

We discuss below the mechanics and requirements of the interconnection process, as well as steps the NYISO is taking to meet the challenges associated with the recent influx of proposals driven largely by the CLCPA.

The NYISO's current efforts to **identify and implement efficiencies in the process **without sacrificing reliability** of the electric system is a major priority.**



Maintaining Reliability

The interconnection process ensures “open access” to the transmission grid for new supply resources seeking to enter operation and is an essential element in maintaining the performance and reliability characteristics of the electric system on behalf of customers.

Studying the impacts of each new proposed facility is a major responsibility, requiring expertise and careful analysis to determine if upgrades are necessary to maintain the reliability and safety of the electric system. **The process is coordinated by the NYISO but requires significant involvement by electric utilities and the developers themselves. Each party has an important role to play, and success of the process depends on coordination and timely delivery of information by all participants.**

The NYISO focuses on balancing the demands of open access to the electric system with preserving grid reliability and doing so at the most efficient cost to consumers. The NYISO processes have been recognized to be among the most flexible in the nation. While the process offers flexibility to developers who may be considering multiple project designs for a specific project, each individual proposal must be evaluated equally to determine implications for grid reliability and any necessary system upgrades. The process strives to strike a balance between the timely execution of the studies, and the flexibility that developers desire as they optimize project design.

Interconnecting to the Grid

Within the NYISO Interconnection Process, all proposed new generation and transmission projects must enter an “interconnection queue,” where the proposals undergo a series of studies and detailed analysis that serve two key functions on behalf of customers:

- Determinations of whether adding a new resource creates reliability issues on the system; and
- If the project does impact system reliability, determine what system upgrades are necessary to interconnect the project while maintaining system reliability, and the costs of those upgrades.

Under the process, the costs of equipment and upgrades required to connect projects are assigned to project developers, and in some cases, the local utility, not consumers. **The interconnection process is required to identify the lowest cost solution to solve the reliability need.** The allocation of upgrade costs identified through the process are not subject to negotiation, providing an important element of certainty for developers. This cost certainty is a highly regarded aspect of the New York process.



There are three types of interconnection requests that the NYISO analyzes. These include:

- Generator additions intended to increase the amount of supply available to the grid;
- Transmission projects intended to provide consumers greater access to supply across the grid, and
- Certain substantial load interconnections, such as manufacturing facilities, data centers, or other large loads that will add significant demand to the grid

The NYISO interconnection process for generators generally involves up to three successive engineering studies:

Optional Feasibility Study – evaluation of the configuration and local system impacts to inform developers of potential issues with the point of interconnection.

System Impact Study – a single project study to evaluate the impact of the proposed project on the existing electric system, including changes to the way power flows across the system and impacts protection systems. This study also determines whether the project triggers the need for any system upgrades.

Facilities Study – evaluates the cumulative impact of a group of projects that have completed similar milestones known as the “Class Year.” This part of the process also identifies specific least-cost system upgrades and assigns binding cost allocations that each developer must accept or reject.

Together these studies provide increasingly detailed information to developers as their projects mature through the development process. The specific studies that must be conducted to enable the final interconnection depends on the type of project proposal.

Large generator interconnection requests that involve adding more than 20 MW of new capacity to the grid generally undergo the most extensive suite of studies and analysis, including the final study – or Class Year study.

Smaller generation facilities, those 20 MW or less, can bypass some study stages, and typically can bypass a Class Year study, but still may require analysis through an individual Facilities Study to identify the projects’ impact on reliability and identify necessary upgrades to address those issues.

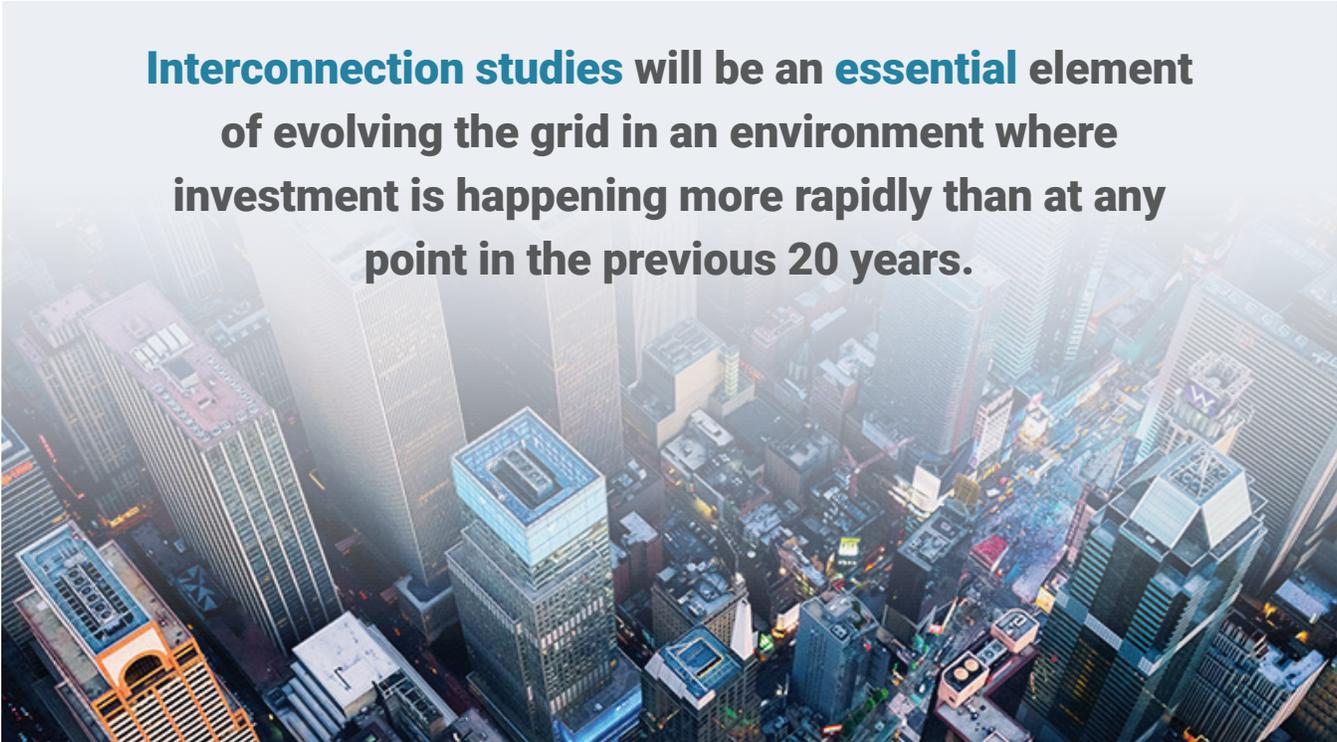
Importantly, when studying the interconnection of new generating resources, each project is studied individually before eventually being grouped into a “Class Year” of other projects that are expected to move through the stages of the process on a similar schedule. Studies of individual projects enables developers to make design changes as developers learn about the possible impacts associated with their proposal. Developers choosing to remain in the queue based on the results of feasibility and/or system impact studies enter a “Class Year” where detailed analysis identifies precisely the reliability impact the group of projects have on the grid. The NYISO then assesses the cost to each developer of upgrades necessary to mitigate the impact on reliability of the system.

If at the conclusion of the process one or more developers decline to accept these costs, the NYISO must remove the projects and perform another round of reliability studies. The NYISO will also reassess necessary upgrades and cost information for the remaining developers. When all remaining developers accept their costs and provide the required security, the Class Year Study is complete.

Proposed load interconnections, or significant new sources of demand on the grid, are not subject to the same process as new sources of generation. For load requests, the NYISO conducts a System Impact Study that provides information on possible upgrades and costs required of the new interconnection. Similarly, interconnection requests for new transmission lines or upgrades to existing transmission elements are also addressed through the NYISO-led System Impact Studies.

The NYISO has historically enjoyed a positive track record of reliably integrating resources in support of a cleaner grid. Nevertheless, the interconnection process must continue to evolve to meet new demands. State policies are accelerating expansion of the grid, with more interconnection requests coming from smaller facilities which also must be examined thoroughly to avoid introducing threats to reliability. The NYISO must assess the reliability implications of every project in accordance with mandatory reliability standards imposed by the North American Electric Reliability Corporation, the Northeast Power Coordinating Council, and the New York State Reliability Council. Together, these entities, along with regulatory oversight by the Federal Energy Regulatory Commission and the New York State Public Service Commission, provide strict rules and standards that support reliability of the electric system for consumers.

The NYISO recognizes that the interconnection processes must continue to evolve to address a greater volume of requests. The interconnection studies must be performed on a timely basis without sacrificing critical analysis needed to support grid reliability.



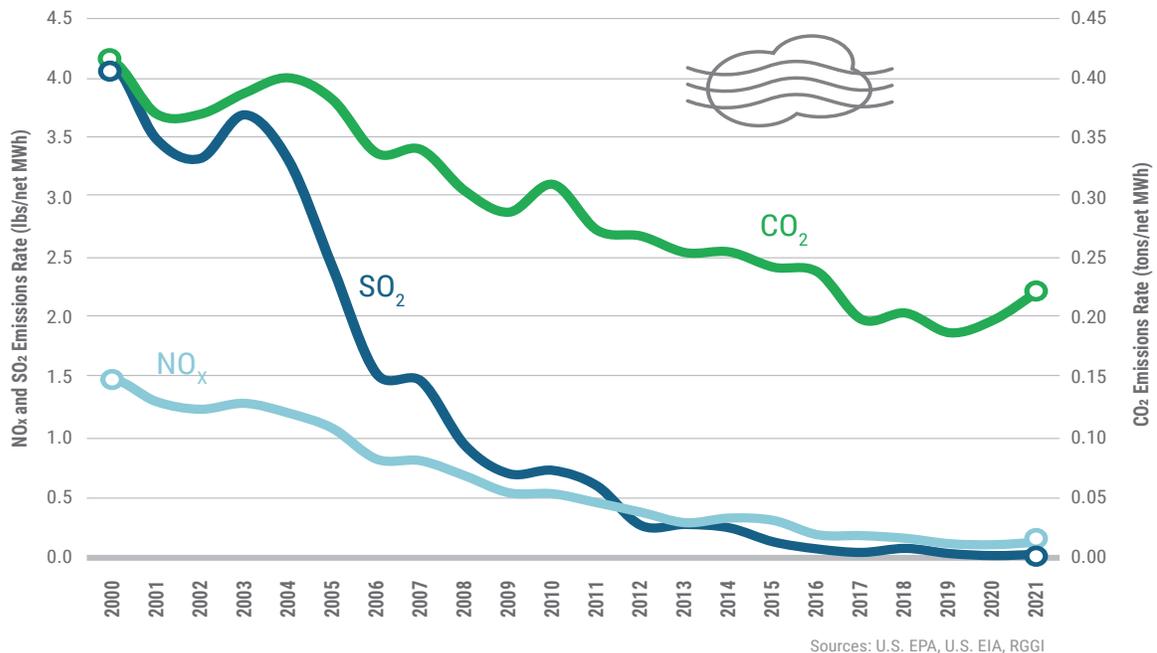
Interconnection studies will be an essential element of evolving the grid in an environment where investment is happening more rapidly than at any point in the previous 20 years.



Evolving the Interconnection Process

The NYISO interconnection study process has successfully guided the reliable addition of new resources over the past 20 years, facilitating the nearly 13,000 MW of new generating capacity that in turn encouraged more than 11,000 MW of older, less efficient generating capacity to exit the system.

» Emissions Rates from Electric Generation in NY 1999-2001



This shift in resources supplying the grid has led to environmental improvements, as the newer resources displaced generation from older, often coal or oil-fired facilities. The interconnection process has been critical to reliably shifting the fuel mix towards cleaner resources even prior to the state’s adoption of the CLCPA.

In New York, the CLCPA and other state policies are promoting the growth of clean and renewable energy resources like wind power, solar photovoltaics, and battery storage. Since the passage of the CLCPA, developers have responded with an unprecedented increase in the number of projects seeking to interconnect to the bulk power system. Today, there are roughly 475 active projects underway in the interconnection queue as compared to roughly 120 active projects in 2018.

475

active projects in the interconnection queue today.



To facilitate this growing interest in investment, in 2019 the NYISO worked with stakeholders to implement a comprehensive redesign of the interconnection study process. **These changes introduced greater flexibility, reduced requirements for projects to reach some permitting milestones, and expedited study options for developers seeking to obtain the necessary information to move their projects forward.**

These enhancements were applied for the first time to the Class Year 2019. At the time, that group of projects was the largest Class Year in the NYISO history. The vast majority of the Class Year 2019 projects were renewable generation and energy storage technology.

The enhanced flexibility for projects to enter the Class Year phase of the Interconnection Processes does not come without challenges or costs. The decision of developers to exit a Class Year suggests that the flexibility afforded to developers to enter this process has attracted projects that may be less advanced in the development or design phase.

As noted above, there exist multiple risks and uncertainties outside the scope of the NYISO interconnection processes, including the status of siting and other regulatory matters, investment risks, and supply-chain concerns. These factors can result in developers electing to defer or drop out of a Class Year, even after Class Year studies have been completed and interconnection costs have been allocated among Class Year projects. The Class Year process requires a great deal of time and resources by all parties. While flexibility may benefit some developers, it may create inefficiencies for other projects more committed to development. Going forward, the NYISO and its stakeholders must weigh the benefits of this flexibility against the additional resources, time, and study costs incurred by developers, impacted utilities, and the NYISO.

Additional Action the NYISO is Taking to Address Interconnection Challenges

Despite recent enhancements and success in accelerating the Class Year process, the substantial influx of new projects in the interconnection queue means that additional reforms are needed.

Through a 2022 project initiative, the NYISO has been developing additional reforms to the interconnection process. The NYISO took steps to improve two key areas: System Reliability Impact Study (SRIS) timelines, and improved transparency of project progress and status for all interested parties in the SRIS process.

Specifically, after a careful process review, the NYISO eliminated certain elements of the SRIS process that were duplicative or unnecessary. The NYISO implemented these revisions for 35 projects already in the interconnection queue to expedite the current process for each and will apply these new rules to all projects going forward, creating a permanent process enhancement. Additionally, the NYISO developed enhancements to the interconnection portal application to provide more detailed and timely information regarding the status of each project.

In November 2022, the NYISO announced additional steps to engage stakeholders in interconnection process improvements. The challenge is clear: while interconnection processes have been improved, the number of active projects in the NYISO Interconnection Queue over the last three years has tripled.



A wide range of additional efforts are underway to further streamline the process, balancing flexibility considerations and offering expedited study results, all while preserving our unwavering focus on maintaining grid reliability.

Other study refinement efforts are underway to expedite the process to include developing new study report templates to significantly shorten System Impact Study reports and improving the management of “material modification requests” from developers seeking to change elements of their project in between study stages. The NYISO saw a significant increase in these material modification requests in 2022, often times from developers of wind projects seeking to change the wind turbines being analyzed in their request. This is another example of flexibility that may appeal to certain developers but can slow the overall process. The NYISO will work with stakeholders to balance the examination of material modifications against the need to deliver timely findings.

The NYISO is responding to the growing demands on our team driven by the volume of initial interconnection studies and revisions to those requests. NYISO engineers and technical staff will continue to work closely with developers and utility engineers and staff to support the highly technical work that must be done. The volume of interconnection agreements and the legal support needed to ensure compliance with legal and regulatory obligations has grown as well. With strong stakeholder support, the NYISO has invested significantly in the human resources needed for the growing needs of interconnection processes.

Conclusion

Achieving the grid of the future envisioned by policymakers requires an unprecedented investment in new generation capacity resources as well as transmission expansion that must be studied closely to maintain reliability. Ultimately, the interconnection process represents an important element in realizing the future grid envisioned by state policymakers where clean resources are integrated to support policy goals without affecting the reliability of service to consumers. **It is essential that the interconnection processes, designed to identify and address reliability impacts to the grid, also continue to evolve without sacrificing the integrity of the process that supports the reliability of the system and the health and safety of all consumers.**

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