

Reliability and a Greener Grid

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New York Energy Forum

September 12, 2019, New York, NY



The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefit to consumers by:

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

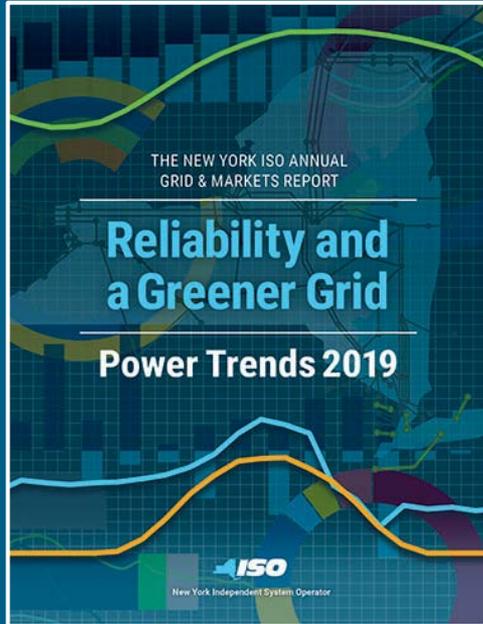


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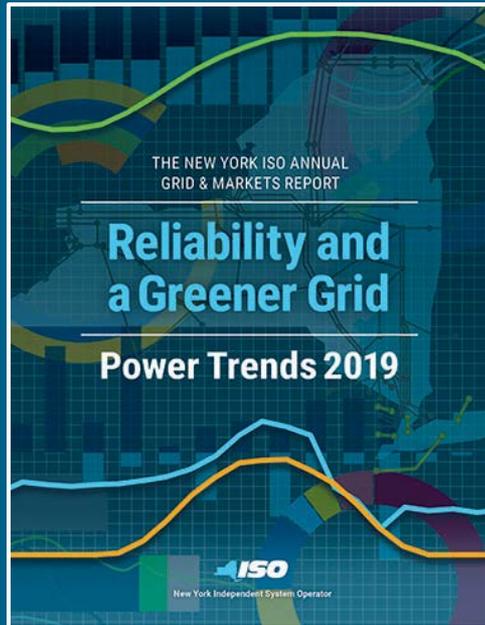
Power Trends 2019: Reliability and a Greener Grid provides information and analysis on current and emerging trends that are working to transform the power grid and wholesale electricity markets.

Key Challenges:

- **Aggressive public policy** goals focused on shifting patterns of demand for electricity serve to influence how investors, policymakers, and consumers view electricity production, transmission, and consumption
- Complicating achievement of these goals is the fact that these changes must be pursued in the context of a bulk power system that operates to **the strictest reliability rules in the nation**
- Underlying all NYISO processes has been the belief that open, competitive markets for wholesale electricity result in the most efficient allocation of resources and **serve New Yorkers best by minimizing the costs and investment risk**



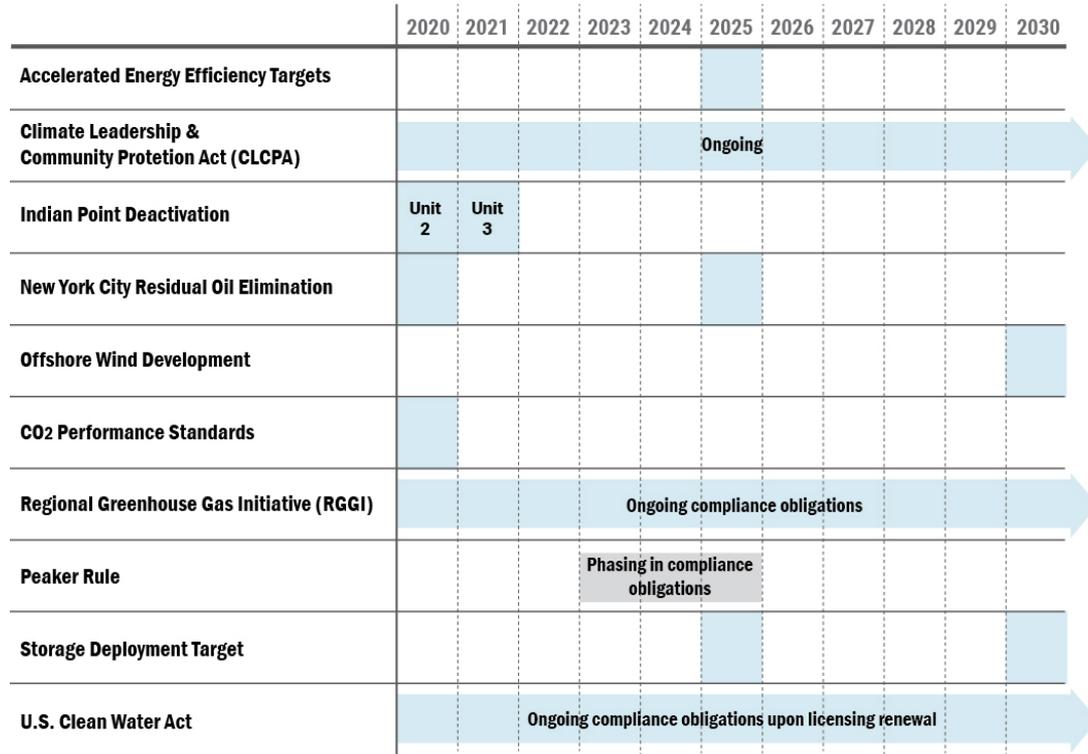
Power Trends 2019: Reliability and a Greener Grid



Key Trends:

- **New technologies**, such as storage and solar, are beginning to enter the wholesale markets. Distributed Energy Resources (DERs) are changing how energy is produced and consumed. New wind projects, including offshore projects, are being proposed
- **Public policies** aimed at reducing emissions and expanding the use of renewable power resources
- **Infrastructure** expansion and market enhancement are necessary to support achievement of public policy goals efficiently and reliably
- **Economic influences** led by low natural gas prices and changing consumption forecasts
- **Bolstering grid resilience** through effective operations, market design features, and planning

Public Policy Initiatives Timeline



The NYISO works with policymakers to assess policies and identify potential impacts on reliability

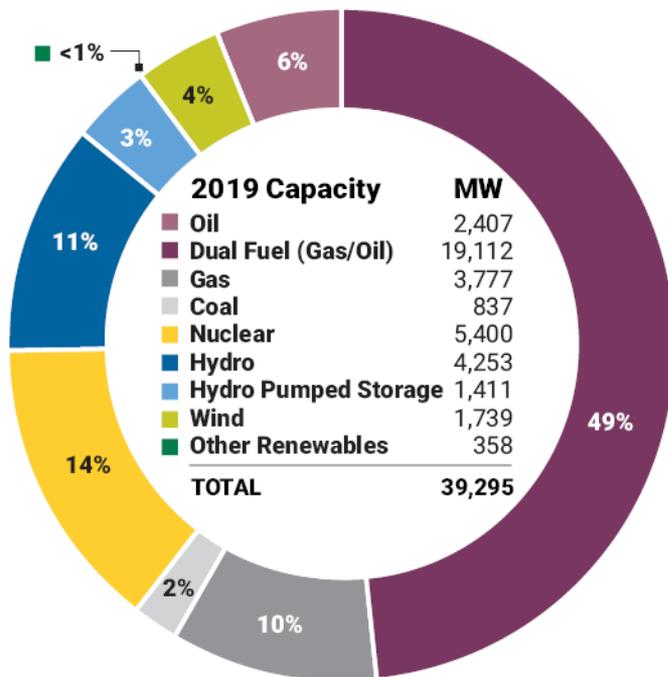
- Federal, state, and local public policies cumulatively may require considerable investment to refurbish, replace, or repower NY's existing power plants

New York's Leadership on Clean Energy

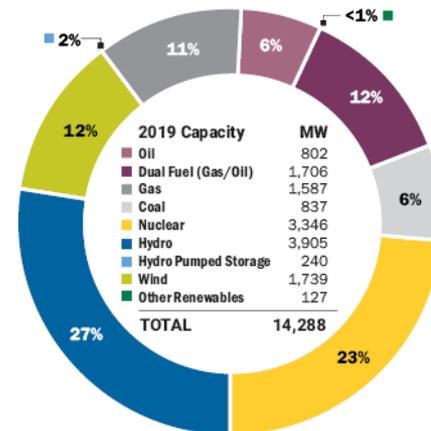
- **Governor Cuomo's Green New Deal and the Climate Leadership and Community Protection Act (CLCPA)**
 - Greenhouse gas emissions across all sectors reduced by 40% in 2030 and 85% in 2050
 - 70 x 30: 70% of electricity from renewable resources by 2030
 - In 2018, 26% of energy came from renewables
 - 100 x 40: statewide electrical system will be zero emissions by 2040
 - 6,000 MW of distributed solar by 2025
 - 1,600 MW of distributed solar is currently installed
 - 3,000 MW of energy storage by 2030
 - 44 MW of advanced energy storage is currently installed
 - 9,000 MW Offshore Wind by 2035

Fuel Mix – Generating Capacity

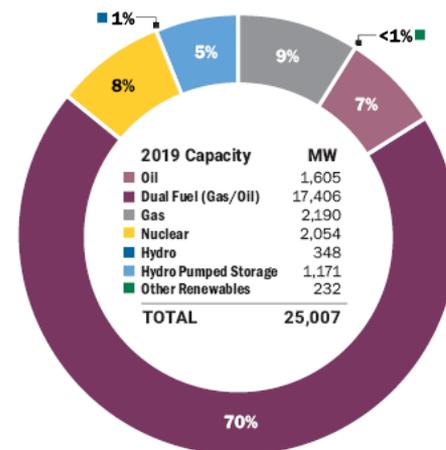
New York
Statewide
Generating
Capacity
by Fuel
Source:
2019



Upstate
(zones A-E)
Generating
Capacity by
Fuel Source:
2019

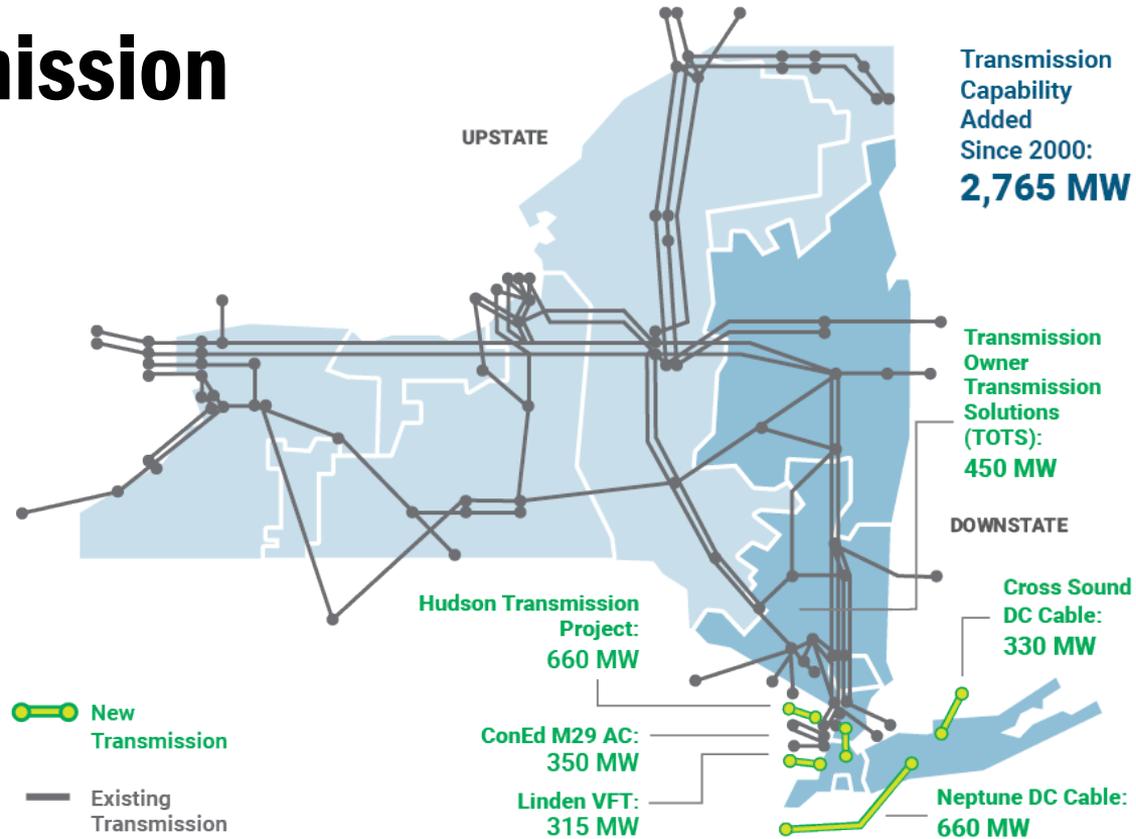


Downstate
(zones F-K)
Generating
Capacity by
Fuel Source:
2019



New Transmission

New Transmission
in New York State:
2000-2018



Role of Transmission in Accommodating Public Policy

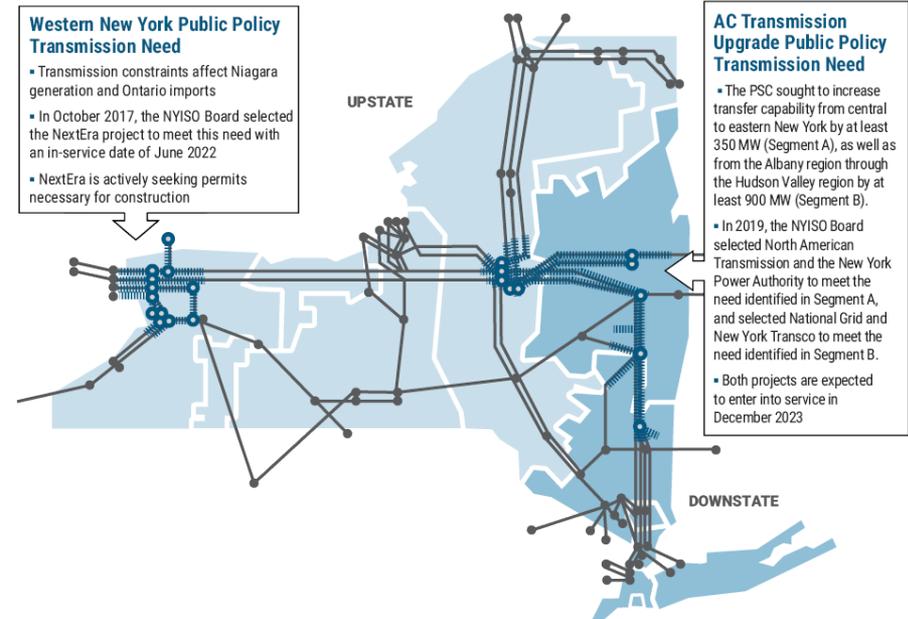
Public Policy Needs Transmission Planning

■ Process

- NYS PSC identifies public policy needs
- NYISO studies competing projects (transmission, et. al.) to meet the needs

■ Identified Public Policy Needs

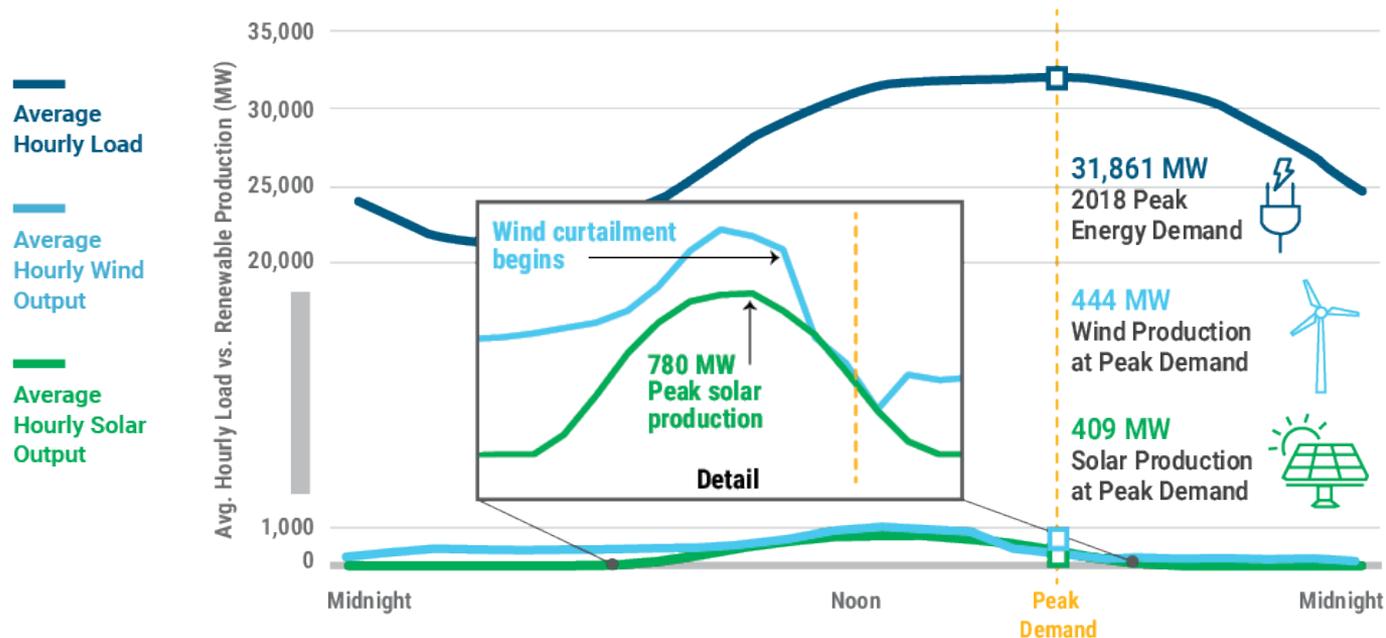
- Western New York Transmission Congestion
 - PSC identified need / NYISO to solicit and evaluate proposals to relieve transmission congestion in WNY
 - Supports hydro “unbottling” and increased operational flexibility
- AC Transmission
 - PSC identified need to replace & upgrade transmission within existing rights-of-way
 - 156 miles of high-voltage lines along 2 primary segments



Using markets continues to support reliability in New York

Renewable Resources at Peak Load

Intermittent Resource Contribution to Load on 2018 Peak Demand Day (August 29)



Markets for a Grid in Transition

Resource Flexibility

- Is the quality of **bending** easily without **breaking**.
- Today, markets incent flexibility through Products, Pricing, and Settlements.
- Focusing on the integration of DERs and Energy Storage, More Frequent Interchange Scheduling, and Price Formation.

Grid Resilience

- Includes: (1) the capacity to recover quickly from difficulties, and (2) the ability to anticipate, absorb, and adapt to the impacts of disruptive events.
- Focusing on ways that markets can incent investments that will support grid resilience.



Markets for a Grid in Transition

- The NYISO is pursuing a number of market design improvements to support electric reliability as the grid continues to transition due to public policy and technology advancements.
- Enhancements currently planned include:
 - Carbon Pricing
 - More Granular Operating Reserves
 - NYC 10-minute and 30-minute reserve products
 - Southeastern NY Load Pocket reserve products
 - Reserves for Resource Flexibility
 - Improving Ancillary Services Shortage Pricing
 - Aligning capacity value with reliability value
 - Integrating Energy Storage and DERs

Questions?