



Wholesale Market Options for DER

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Who we are...

Our Mission & Vision



Mission

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



Vision

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



A Powerful Purpose

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

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

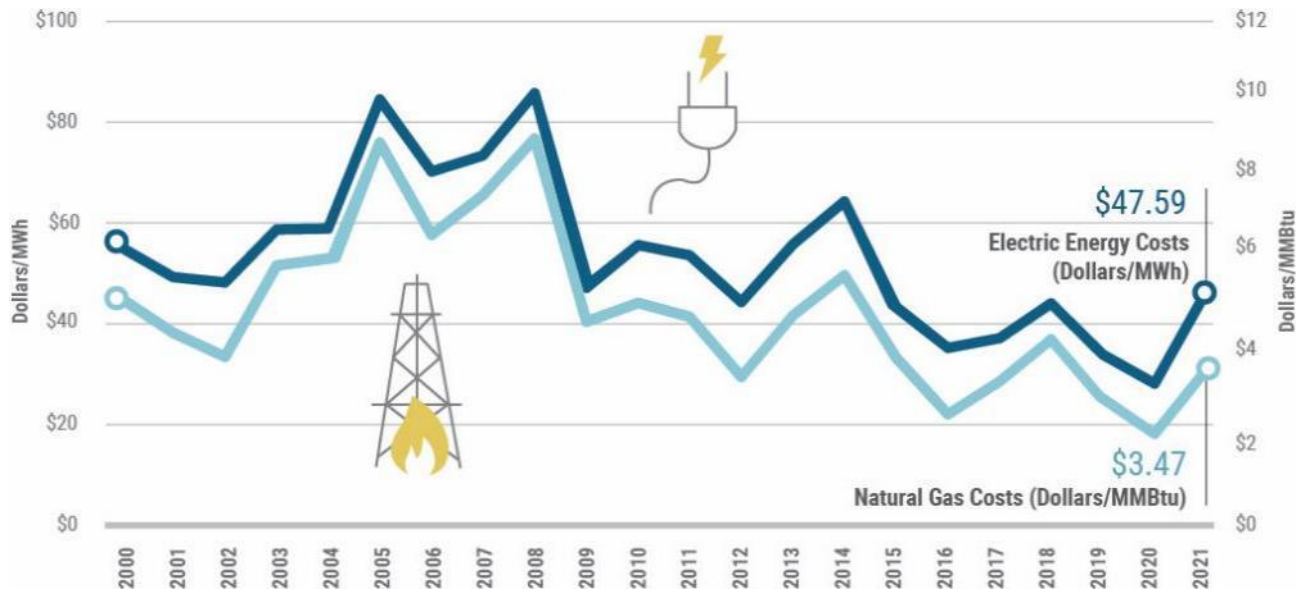


Value for all New Yorkers...

Fuel Costs & Electricity Prices

Natural Gas Costs & Electric Energy Prices: 2000-2021

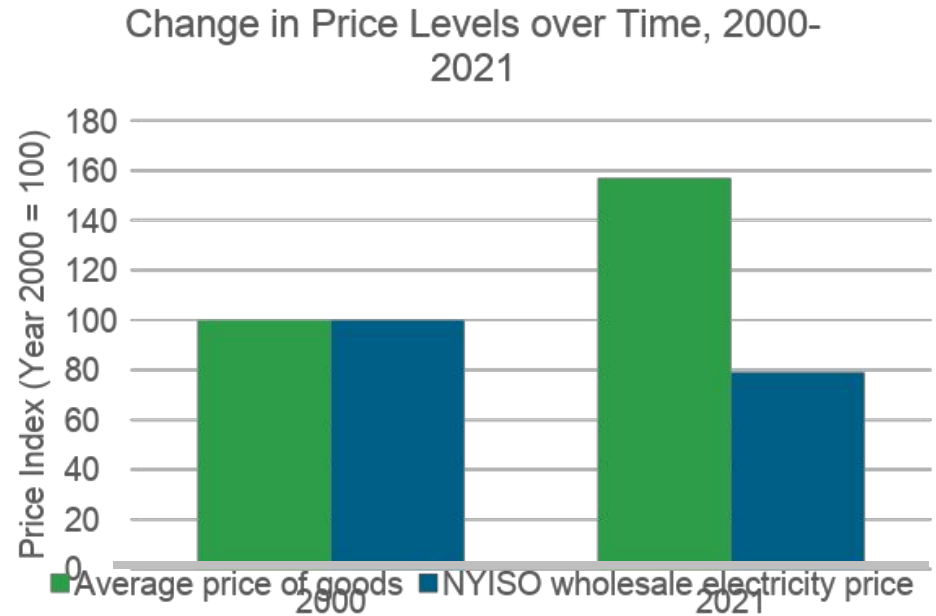
- 2021 average wholesale electric energy price was \$45.79/MWh
- Higher fuel and electricity prices are anticipated in 2022 due to global circumstances



Wholesale electricity markets have contributed to price stability

- Average price of goods increased 57% between 2000 and 2021, while wholesale electricity prices fell.

Data for "Price of average basket of goods" from Federal Reserve Bank of Minneapolis (<https://www.minneapolisfed.org/about-us/monetary-policy/inflation-calculator>)

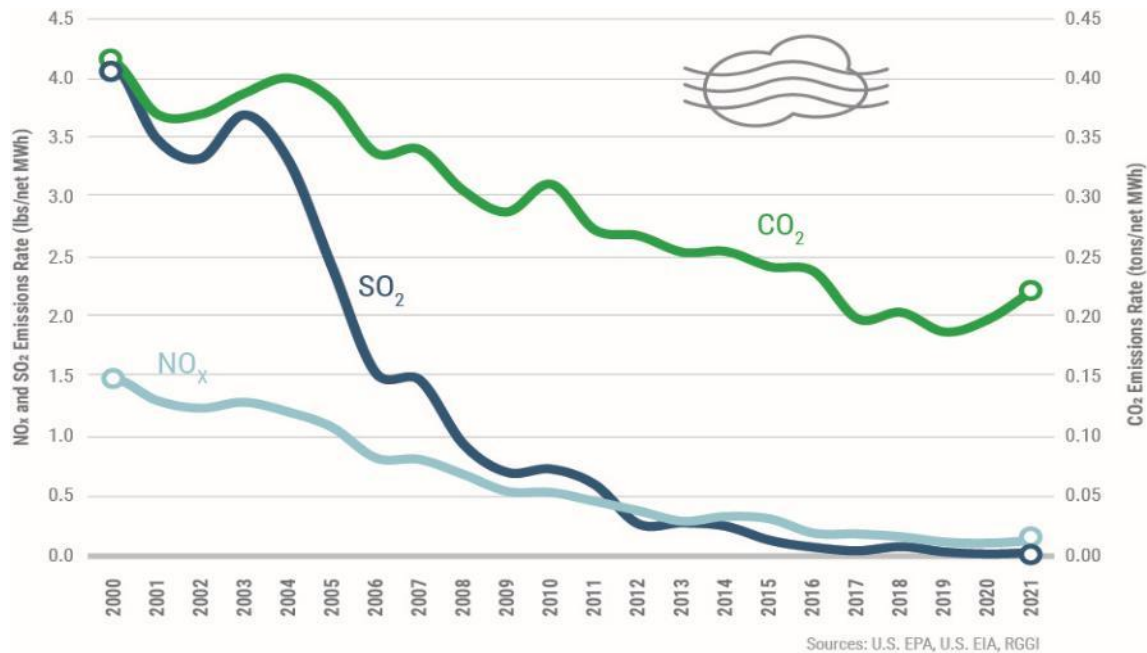


Cleaner Generation

Emissions Rates from Electric Generation in New York: 2000-2021

From 2000 through 2021:

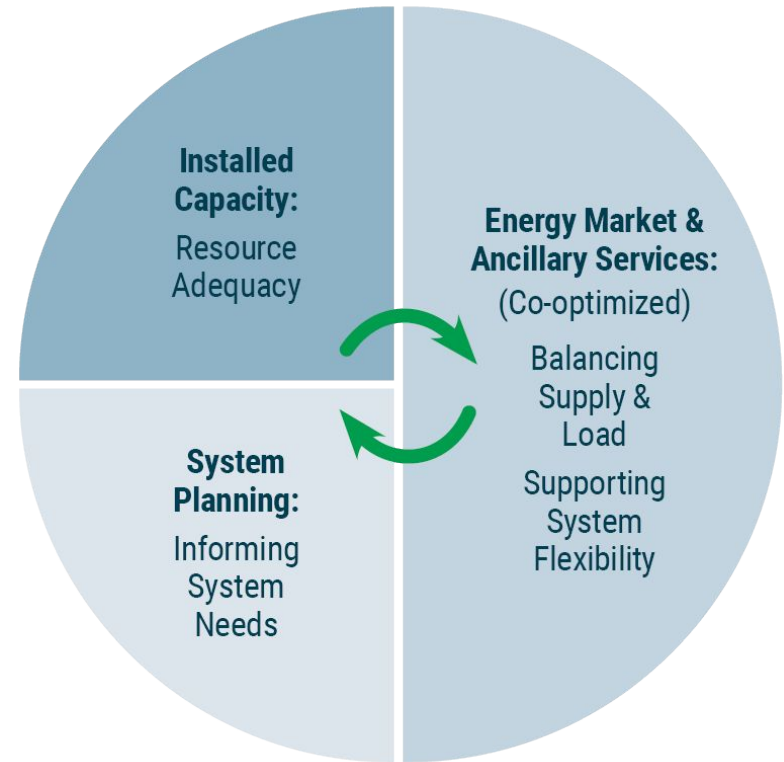
- Sulfur dioxide (SO₂) dropped 99.4%
- Nitrogen oxides (NO_x) dropped 92%
- Carbon dioxide (CO₂) dropped 46%
- 2020 and 2021 CO₂ increased coincident with closure of Indian Point



Market Options for DER

The Role of Markets

- The NYISO supports reliability through three complementary markets for energy, ancillary services, and capacity.
 - Each address's distinct reliability needs through competitive market auctions that benefit New York consumers while reducing costs.
 - Together, energy, ancillary services, and capacity market revenues provide economic signals for new investment, retirement decisions, and participation by demand response providers.



Ancillary Services

- Ancillary services support the transmission of energy from resources to loads and maintain reliable operation of NYS power system
- What are the ancillary services products?
 - Scheduling, system control, and dispatch service
 - Voltage support service
 - Regulation response service
 - Energy imbalance service
 - Operating reserve service
 - Black start service

Installed Capacity (ICAP)

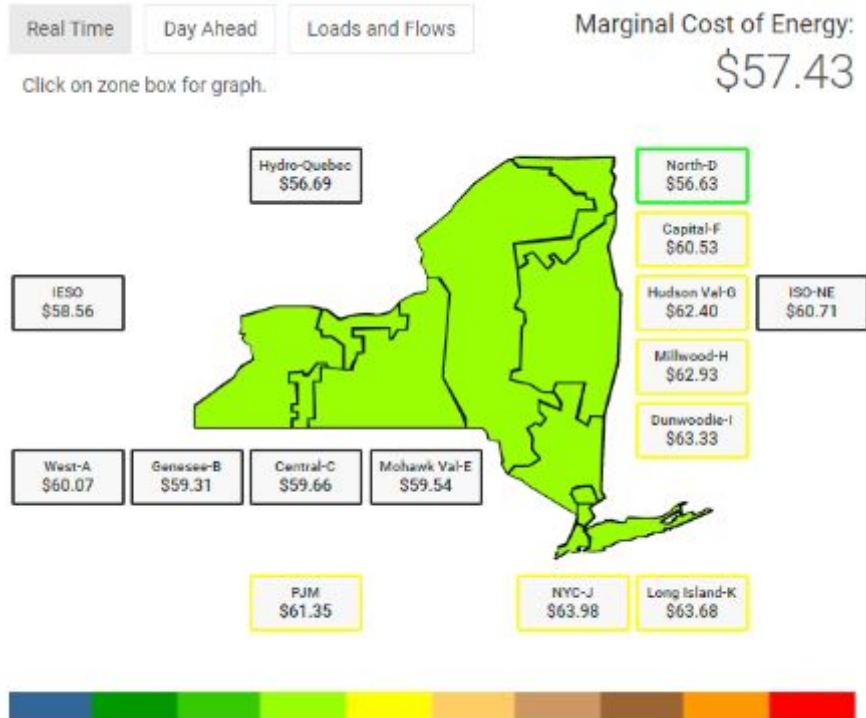
- **Role of Capacity Market**
 - Maintains Resource Adequacy
 - Supports market signals for investment
 - Provides a means for resources to recover a portion of fixed costs
- **Suppliers offer capacity based upon proven ability to supply**
- **Loads procure capacity based upon forecasted peak loads, plus reliability margins, with locational requirements**

Market Options for DER

Dispatchable	Aggregations of DER An aggregation under the responsibility of an aggregator and consists of resources: <ul style="list-style-type: none"> Can qualify to participate in Energy, Ancillary and Capacity market Capable of responding in real-time to NYISO's direction 	Generator Resource Model	Consisting of Only Generators <ul style="list-style-type: none"> Aggregation must consist of one or more Generator DER
		Energy Storage Resource Model	Consisting of Only Energy Storage Resources (ESR) <ul style="list-style-type: none"> Aggregation must consist of one or more ESR DER
		Dispatchable DER Model	Consisting of Only Demand Side Resources (DSR) <ul style="list-style-type: none"> Aggregation must consist of one or more DSR DER No DER in the aggregation can inject into the grid, load reduction only
			Mix of Generators, Energy Storage Resources, and Demand Side Resources <ul style="list-style-type: none"> Aggregation must consist of one or more Resource Types (i.e. Generator, ESR, DSR) Capable of injection and/or load reduction
Individual Resource	<ul style="list-style-type: none"> Can qualify to participate in Energy, Ancillary and Capacity market Capable of Injection Capable of responding in real-time to NYISO's direction 	Generator Model or Energy Storage Resource Model	Individual Generator or Energy Storage Resource Individual Generator or Energy Storage Resource under the responsibility of a Market Participant
		Special Case Resource Model	Special Case Resources (SCR) Individual Demand Side Resources or Small Customer Aggregation under the responsibility of a Responsible Interface Party (RIP) and are resources: <ul style="list-style-type: none"> Qualified to participate in Capacity market
Non-Dispatchable	Non-Dispatchable Aggregation or Individual - Demand Side Resource(s) <ul style="list-style-type: none"> Capable of load reduction Not capable of responding in real-time to NYISO's direction 	Emergency Demand Response Model	Emergency Demand Response Program (EDRP) Individual Demand Side Resources under the responsibility of a Curtailment Service Provider (CSP) and are resources: <ul style="list-style-type: none"> Qualified to provide Energy during reliability events

Participation in the NYISO administered wholesale markets and utility retail programs is permitted with some limitations regarding compensation for same service.

Value of Capacity, Energy & Ancillary Service Markets



- More information on Energy and Ancillary Service Market Clearing Prices (\$/MWh) can be found at:

<https://www.nyiso.com/energy-market-operational-data>

- More information on Capacity Market Clearing Prices (\$/kW-month) can be found at:

Questions?