

New York Market Opportunities

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Workshop on Microgrid Technology and Applications

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The Roles of the NYISO



Reliable operation of the bulk electricity grid

- *Managing the flow of power over 11,000 circuit-miles of transmission lines from more than 350 generating units*



Administration of open and competitive wholesale electricity markets

- *Bringing together buyers and sellers of energy and related products and services*



Planning for New York's energy future

- *Assessing needs over a 10-year horizon and evaluating projects proposed to meet those needs*



Advancing the technological infrastructure of the electric system

- *Developing and deploying information technology and tools to make the grid smarter*

Topics

- ◆ **Markets for Demand Response Products**
- ◆ **How the NYISO Uses Demand Response Today**
- ◆ **Evolving Integration of Demand Response**
- ◆ **Challenges**
- ◆ **NYISO Distributed Energy Resource Study and Workshop**

Markets for Demand Response Products

◆ Energy Markets

- *Schedule and dispatch resources, including price-sensitive demand, economically to meet customer demand 24 hours per day, 365 days per year*

◆ Reserves & Regulation Market

- *Keep sufficient resources, including responsive demand, available in ten or thirty minutes to maintain reliable operation*
- *Provide regulation services comparable to generators*

◆ Capacity Market

- *Assure enough resources, including demand that can be responsive, to assure resource adequacy*

How NYISO Uses Demand Response Today

◆ To Maintain Reliability

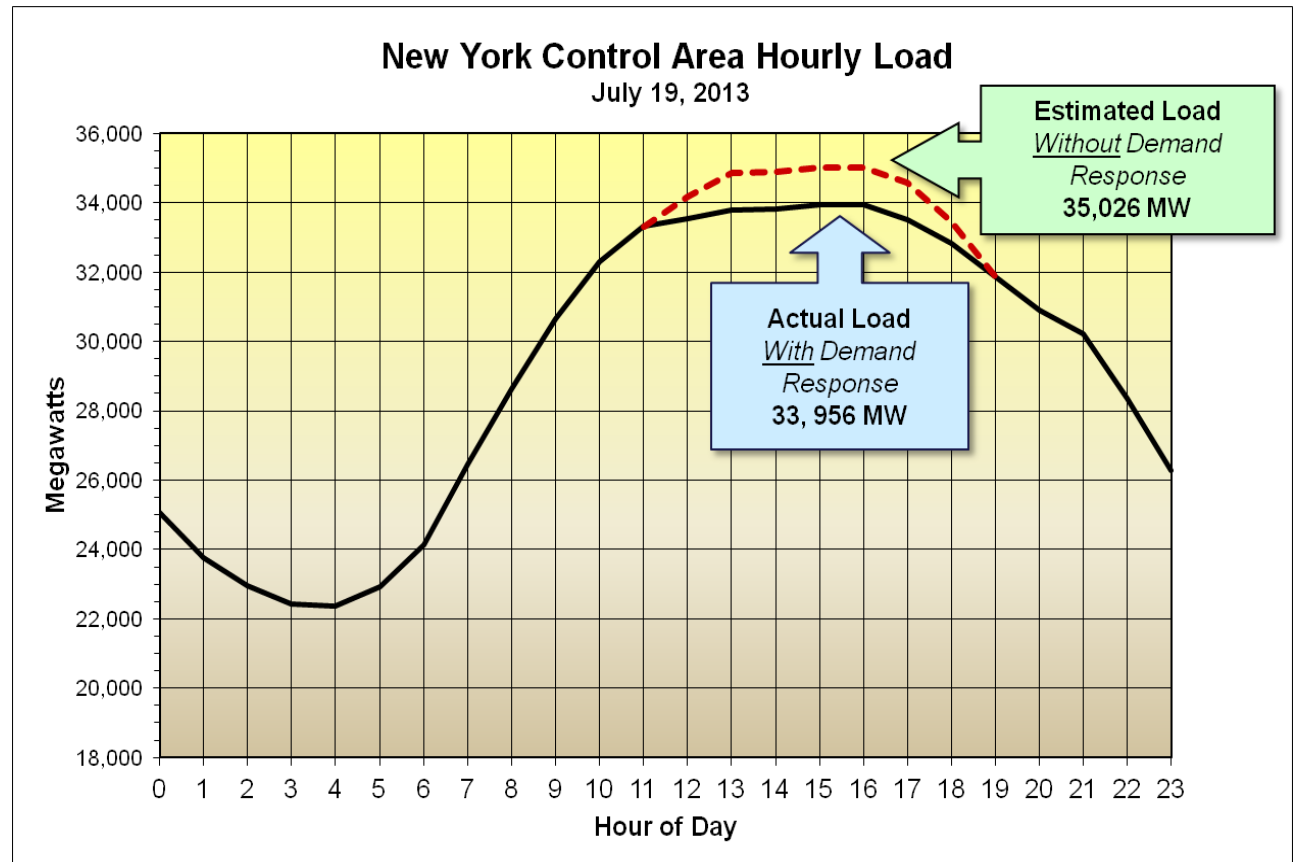
- *The NYISO directs Demand Side Resources to reduce load for a discrete period of time under emergency conditions on the grid*

◆ To Enhance Market Efficiency

- *Demand Side Resources compete economically with other supply resources to provide energy or operating reserves and regulation service*
 - **For real-time services, requires continuous two-way communication between the NYISO and demand-side resource**

Demand Response for Reliability

- ◆ During July 15-19 heat wave, a new, record peak load (33,956 MW) was set on July 19
- ◆ NYISO deployed DR in the downstate region every day of the heat wave
- ◆ NYISO deployed DR statewide on July 18-19 – providing an estimated 1,000+ MW of peak shaving



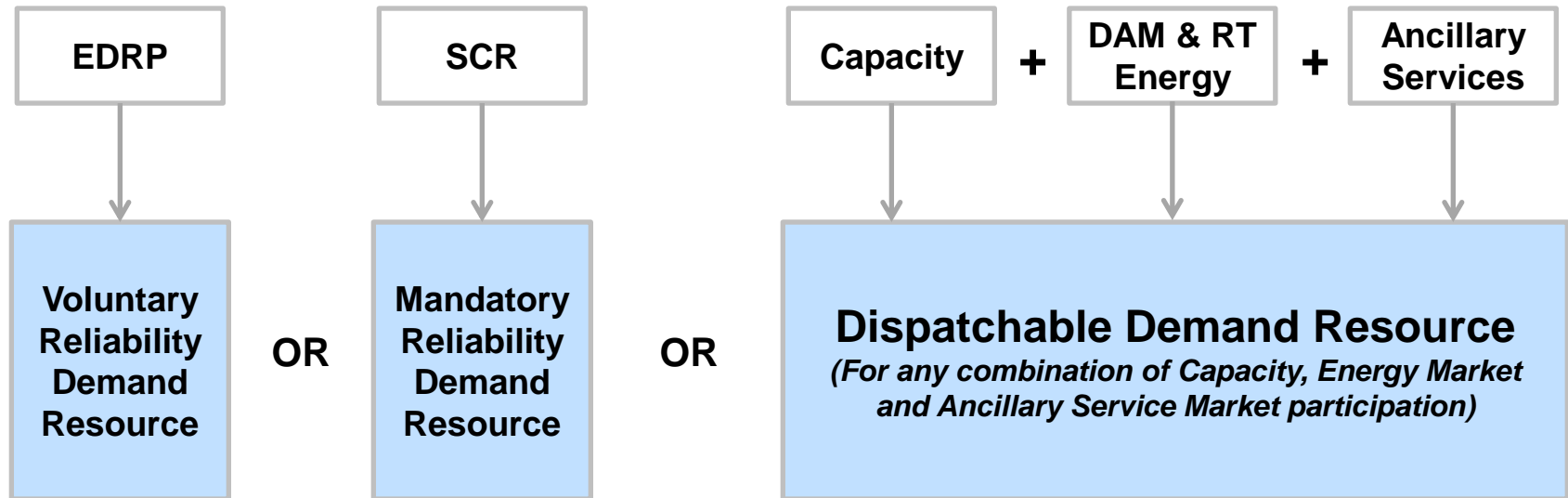
ENROLLMENT & DEPLOYMENT HISTORY

Summer	Registered Resources (# & MW)	Events	Average Hourly Response	Energy Payments	Average payment per MWh
2001	292 712 MW	23 hours Downstate 18 hours Upstate	361.2 MW	\$4.2 Million	\$502
2002	1,711 1,591 MW	22 hours Downstate 10 hours Upstate	319.5 MW	\$3.3 Million	\$500
2003	1,419 1,531 MW	22 hours Statewide (2003 NE blackout)	635.3 MW	\$7.2 Million	\$537
2004	2,030 1,570 MW	No events	N/A	N/A	N/A
2005	2,356 1,605 MW	4 hours East and Downstate	207.5 MW	\$0.8 Million	\$976
2006	2,575 1,720 MW	35 hours Downstate 5 hours Upstate	357.8 MW	\$8.5 Million	\$678
2007	2,705 1,802 MW	20 hours Downstate in TDRP events only	10.91 MW	\$0.11 Million	\$500
2008	3,711 2,108 MW	No events	N/A	N/A	N/A
2009	4,067 2,384 MW	No events	N/A	N/A	N/A
2010	4,386 2,498 MW	31 hours Downstate: 19 hours TDRP, plus 12 hours ICAP/SCR & EDRP	1.85 MW (TDRP) 178.1 MW (ICAP/SCR & EDRP Energy)	\$1.09 Million	\$500
2011	5,807 2,173 MW	11 hours Downstate 5 hours Upstate	7/21/11: 414.2 MW 7/22/11: 1065.2 MW	\$3.8 Million	\$500
2012	5,032 1,888.2 MW	39 hours Downstate: including 9 hours TDRP, 30 hours ICAP/SCR & EDRP, 20 hours Upstate ICAP/SCR & EDRP	3.6 MW (TDRP) 1195.8 MW (June 21, 2012 Statewide ICAP/SCR & EDRP)	\$5.9 Million	\$514

Evolving Integration of Demand Response

- ◆ NYISO DR programs have been developed incrementally over time to provide specific market products -- Program rules restrict joint participation in multiple markets
- ◆ Dispatchable DR
 - *Will provide flexibility for demand response resources to offer and be scheduled in energy and ancillary services markets, as qualified, and participate as a capacity resource*
 - *Will provide NYISO with the ability to use demand response resources participating in its real-time markets via resource-specific dispatch instructions*

Dispatchable DR Concept



Program participation is mutually exclusive

A demand response resource may enroll as a Dispatchable DR or as one of the types of Reliability DR

Challenges

- ◆ **Baseline Methodology**
- ◆ **Measurement & Verification**
- ◆ **Duration of Load reduction obligation increasing**
- ◆ **Visibility and control of behind-the-meter supply sources for real-time services**

NYISO Distributed Energy Resource (DER) Study

- ◆ **Emphasis on data gathering**
- ◆ **The report will identify factual information about DERs and will not make recommendations on market design or policy**
- ◆ **The NYISO's intention is to use the final report as a predicate to discussing with its stakeholders potential new market rules and business practices for the treatment of DERs**

Distributed Energy Resource Study and Workshop

- ◆ **Key areas of interest to the NYISO**
 - *Behind-the-Meter Applications and Customer Motivations*
 - *State of DERs*
 - *Retail Rates, Regulations and Incentives*
 - *Analysis of ISO/RTO Treatment of DERs*
- ◆ **Workshop date**
 - *December 13, 2013 – NYISO Corporate Center - Rensselaer*
- ◆ **Format**
 - *Panel discussions arranged around the key components of the study effort*

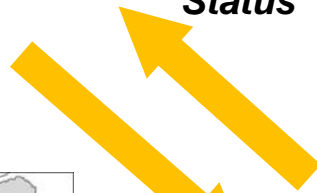
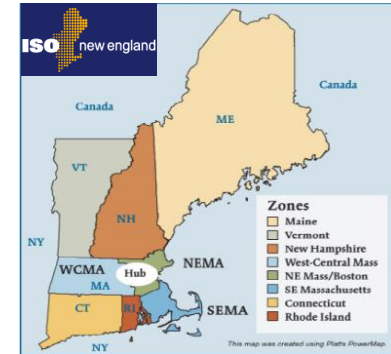
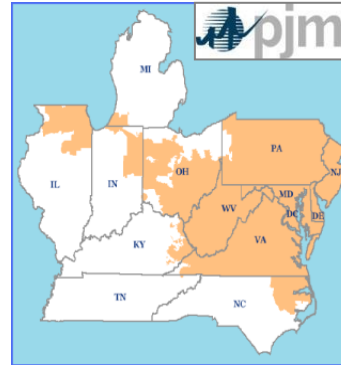
Markets & System Operations 2017 - Broader

Broader Regional Markets, Gas-Electric Coordination, Smart Grid – System Visualization & Security

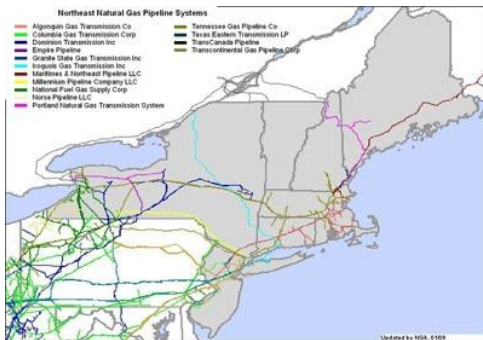
Gas Distribution Companies



Electric System Status



Coordinate Operations & Practices



Gas Pipelines

Operational Flow Orders

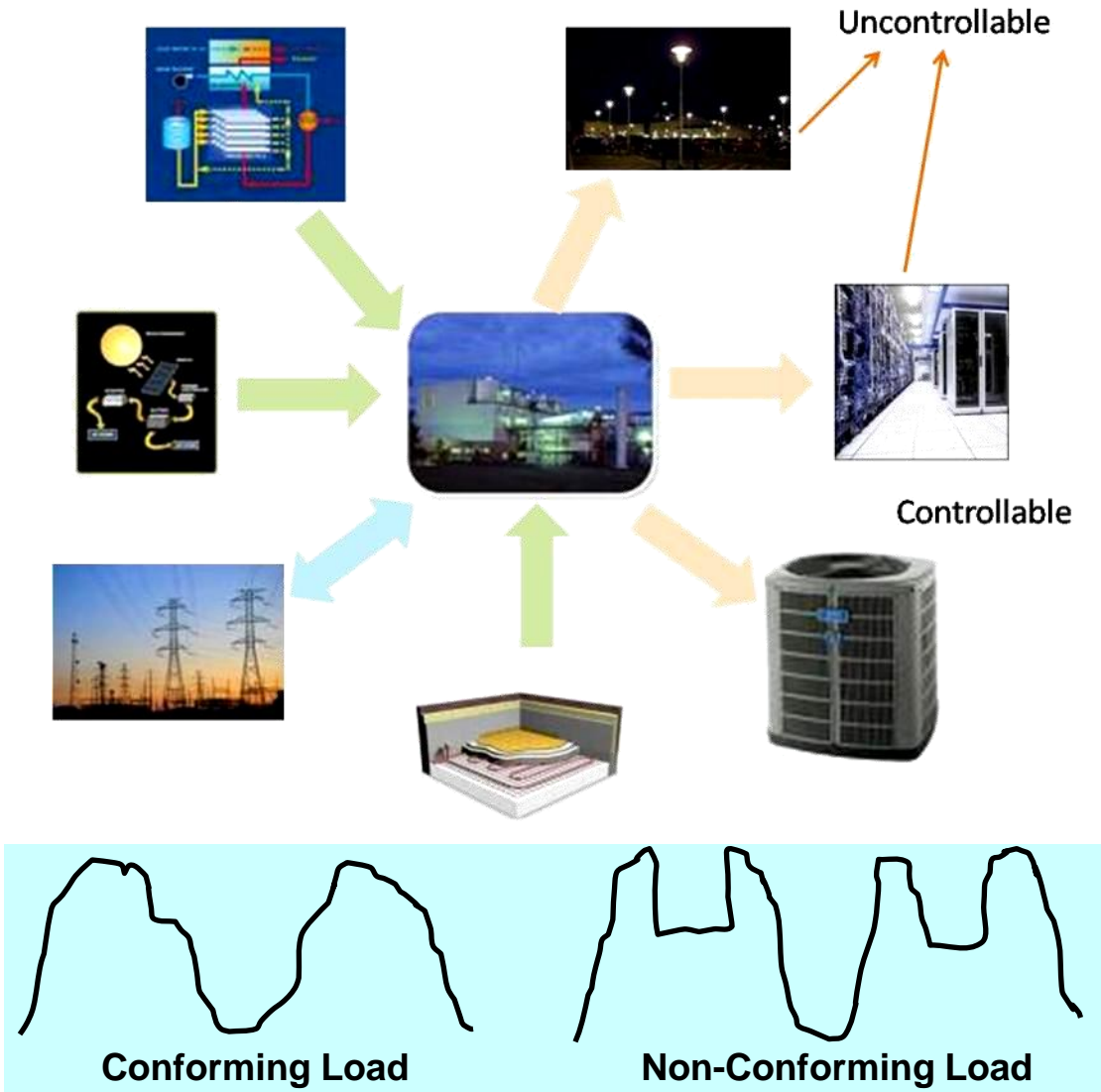


NYISO Control Center



PMU Data

Demand - Smarter



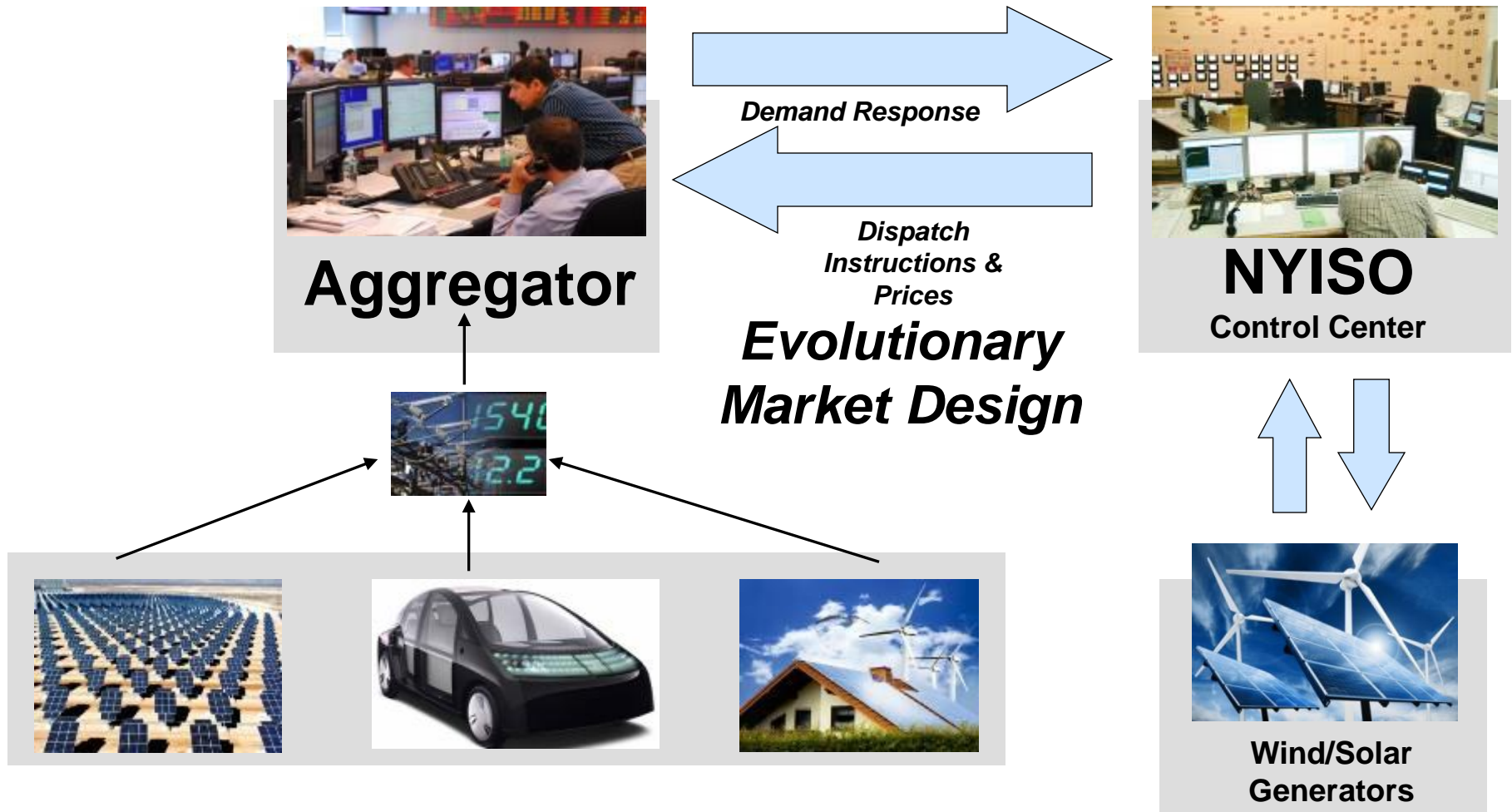
Characteristics

- ◆ On-site generation
 - Fuel cell
 - PV cells
- ◆ Storage
 - Thermal storage
- ◆ Participates in DR Programs
- ◆ Price Sensitive

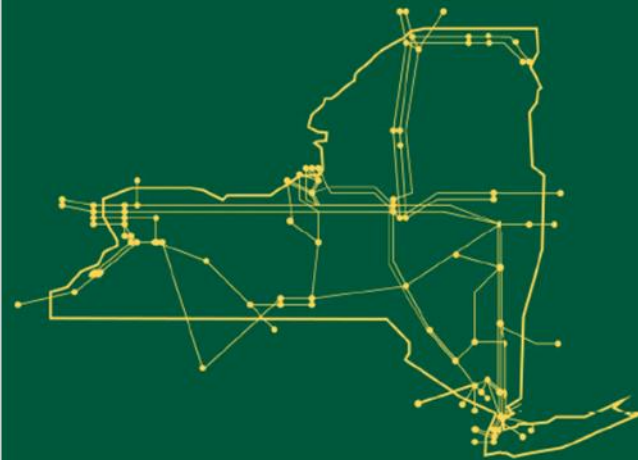
Challenges

- ◆ Load Forecasting
- ◆ Price-driven grid instability

Markets & System Operations 2017 - Deeper DR, PV, PEV aggregation and Wind/Solar integration



The New York Independent System Operator (NYISO) is a not-for-profit corporation responsible for operating the state's bulk electricity grid, administering New York's competitive wholesale electricity markets, conducting comprehensive long-term planning for the state's electric power system, and advancing the technological infrastructure of the electric system serving the Empire State.



www.nyiso.com