

New York Capacity Markets

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Joint Technical Conference

Federal Energy Regulatory Commission

New York State Public Service Commission

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New York, NY

History of the NYISO



New York Power Pool (NYPP)

NYISO

1966
New York Power Pool (NYPP) Created



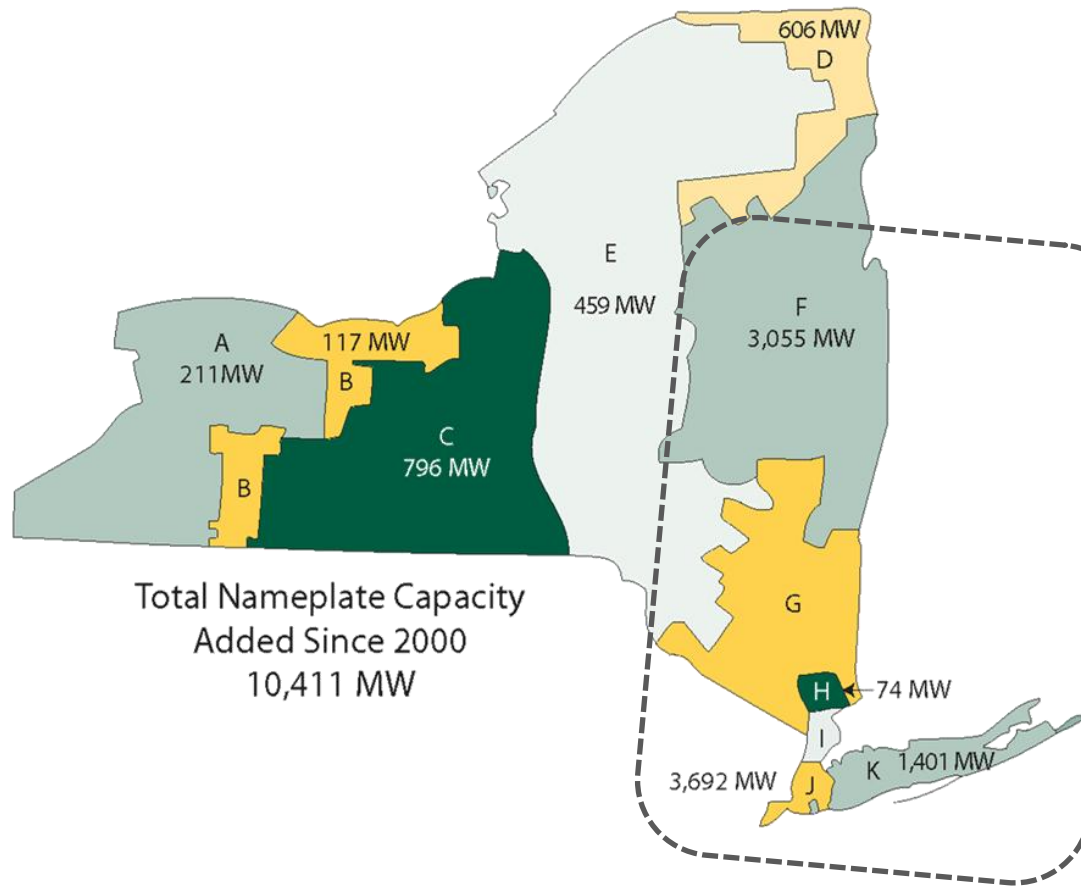
1996
NYS PSC Competitive Opportunities Order

1997
NYPP files NYISO proposal



New Generation

New Generation in New York State: 2000-2013



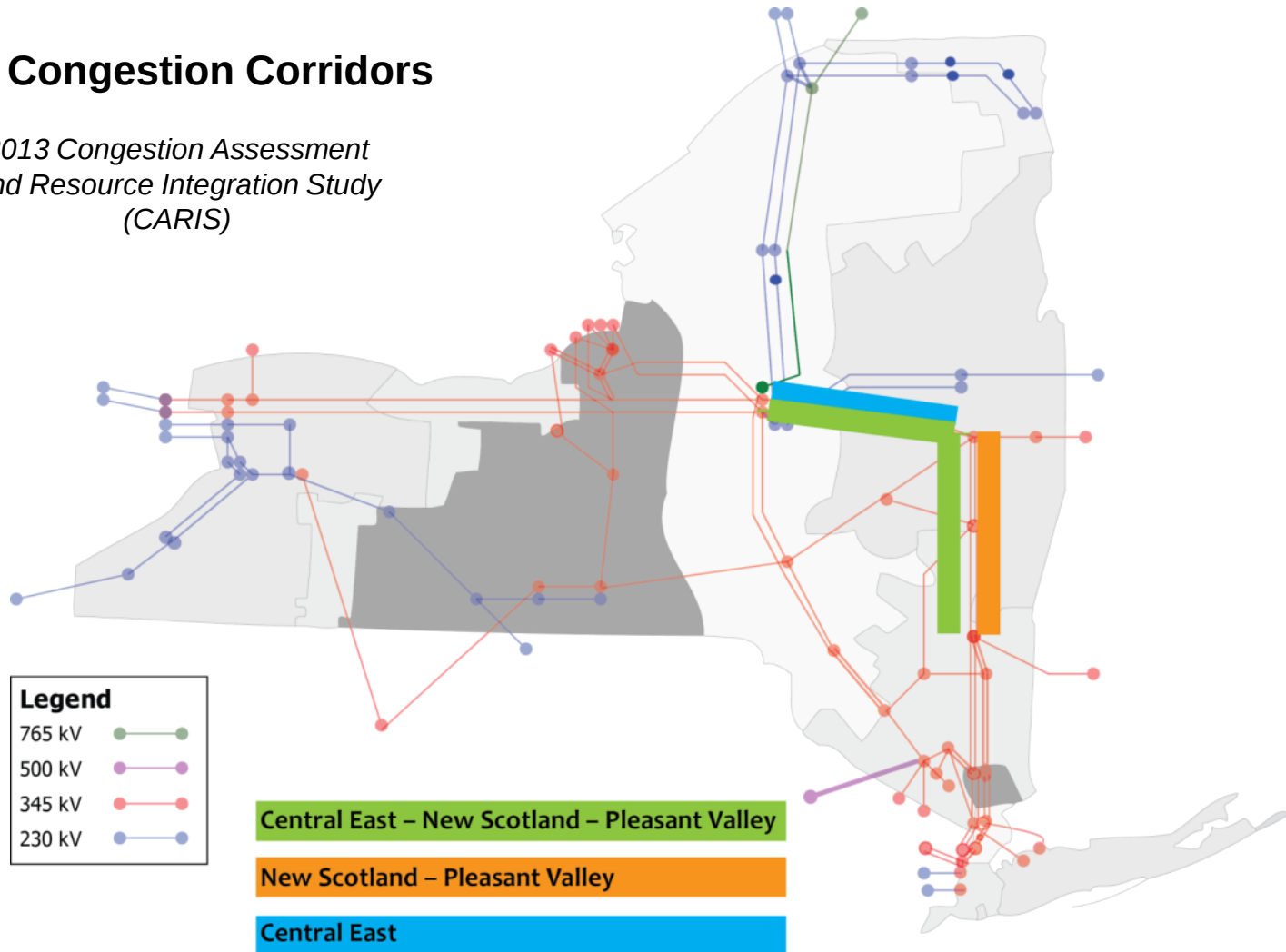
Total Nameplate Capacity
Added Since 2000
10,411 MW

**80% of new
generation
sited
in New York
City, Long
Island &
Hudson
Valley –
*where power
demands are
greatest***

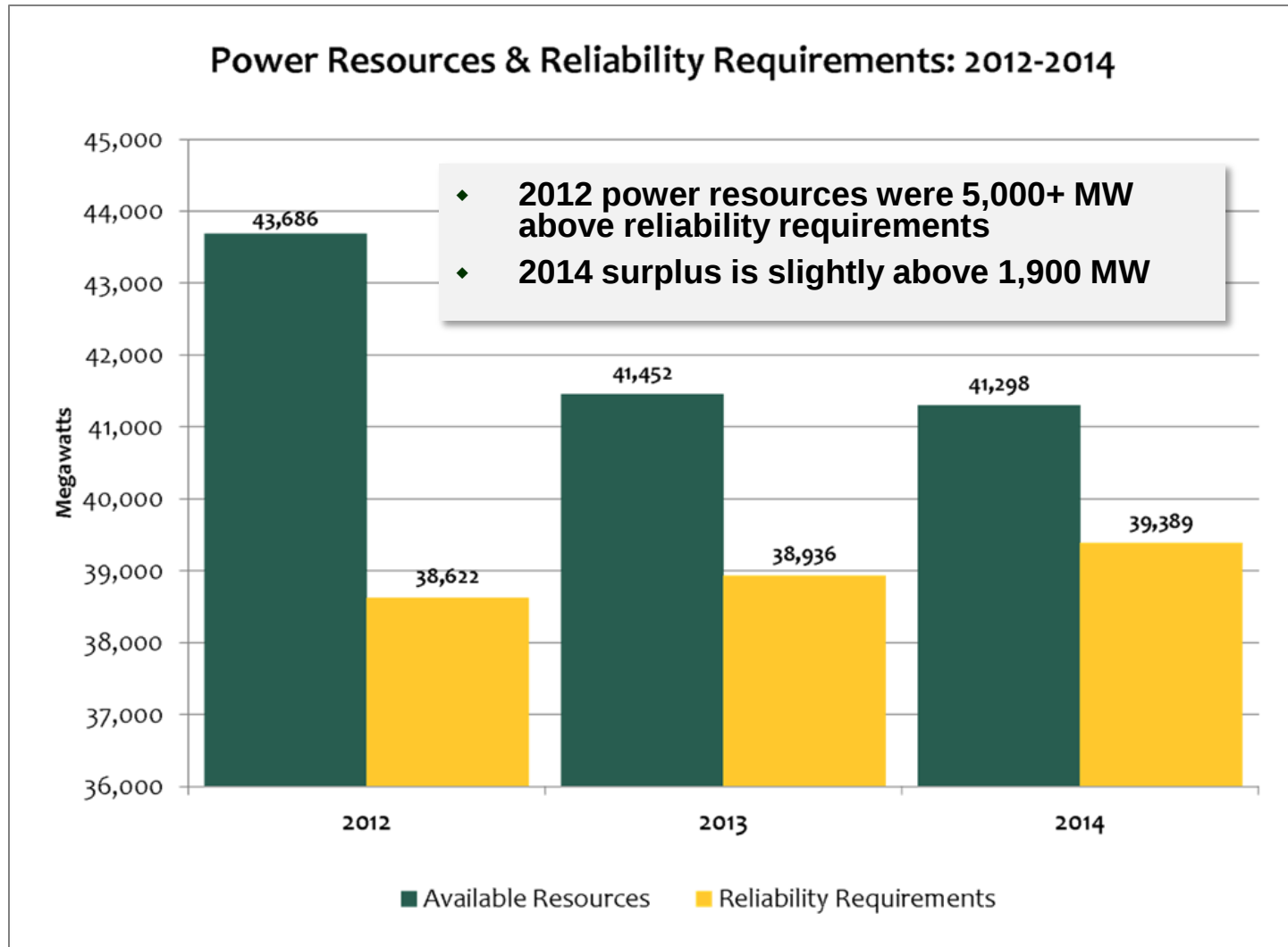
Transmission Congestion

Key Congestion Corridors

*2013 Congestion Assessment
and Resource Integration Study
(CARIS)*



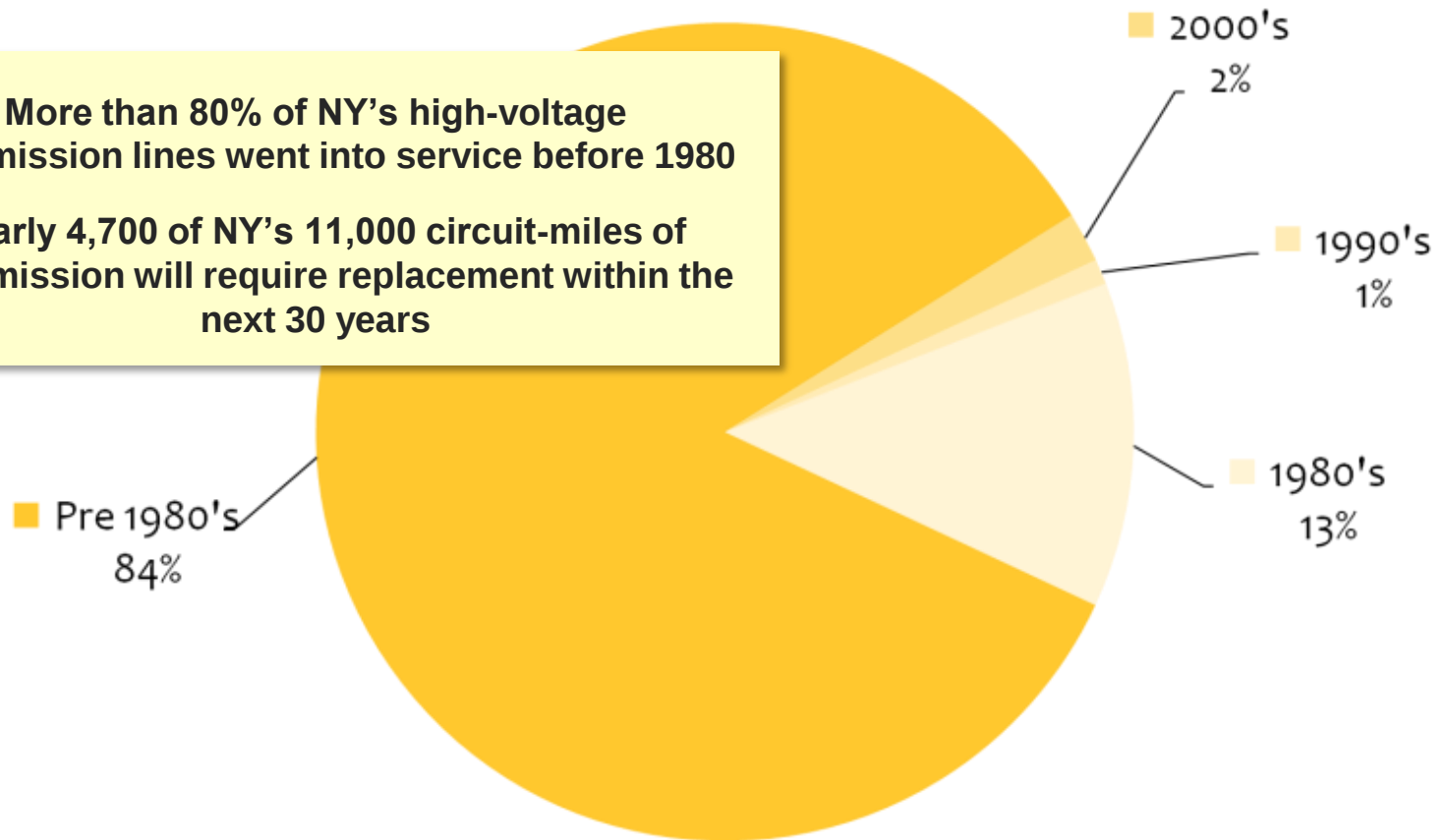
Generation: Narrowing Margins



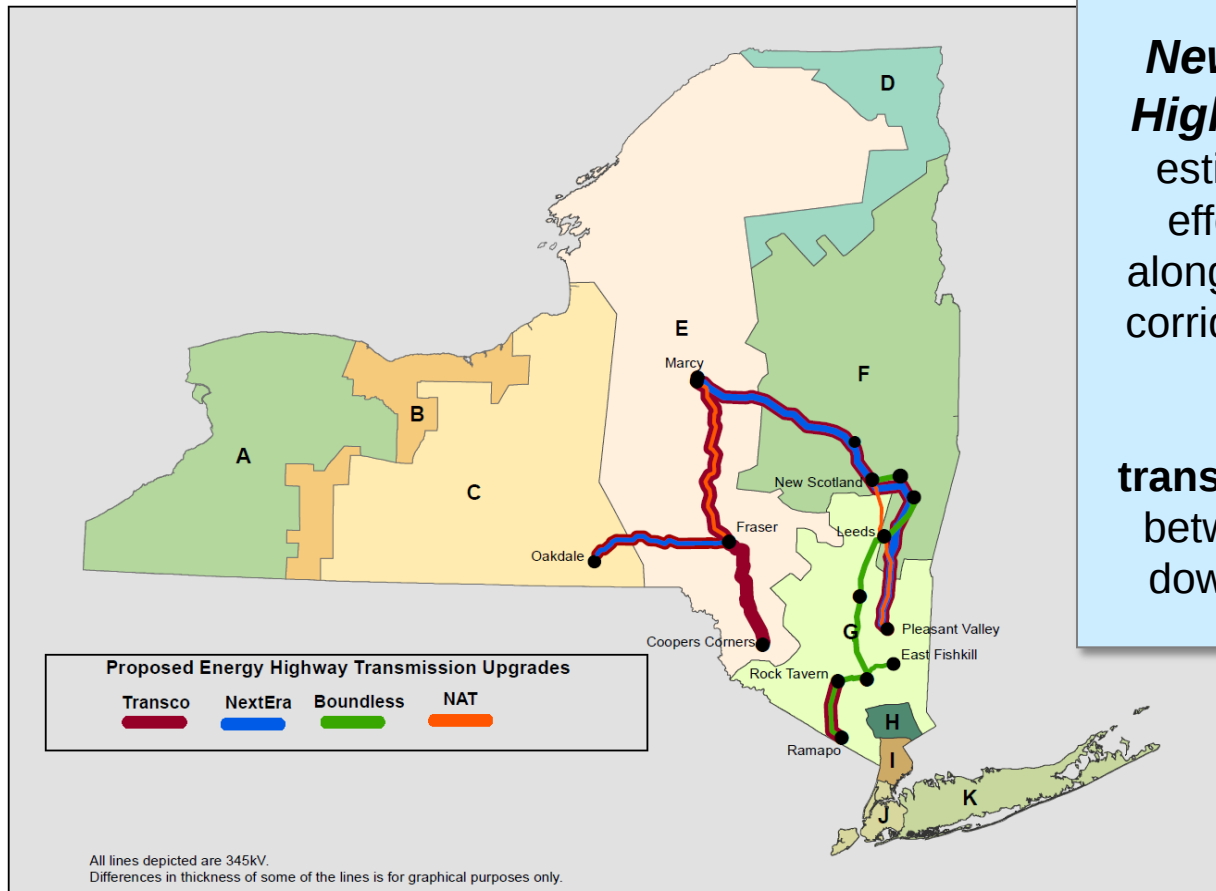
Transmission Infrastructure

More than 80% of NY's high-voltage transmission lines went into service before 1980

Nearly 4,700 of NY's 11,000 circuit-miles of transmission will require replacement within the next 30 years



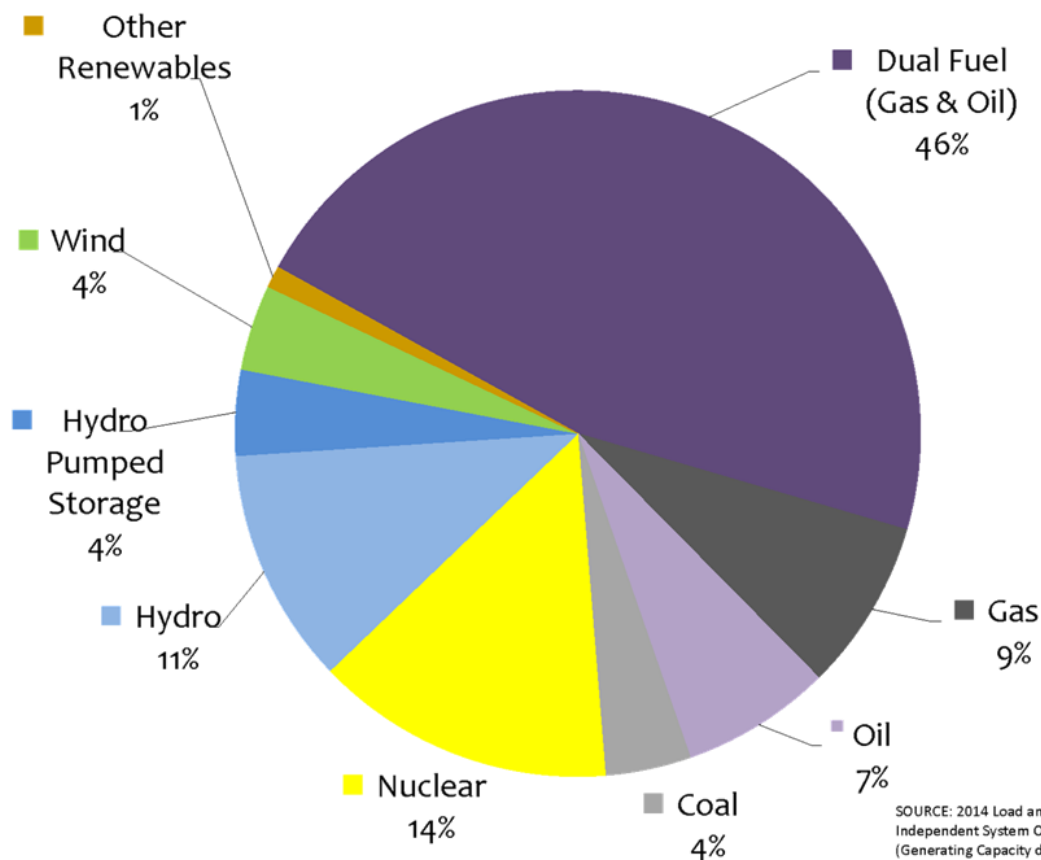
NYS Initiatives: Addressing Congestion



New York Energy Highway Blueprint estimates that cost-effective upgrades along these congested corridors could provide **1,000 MW of additional transmission capacity** between upstate and downstate New York

New York's Fuel Mix

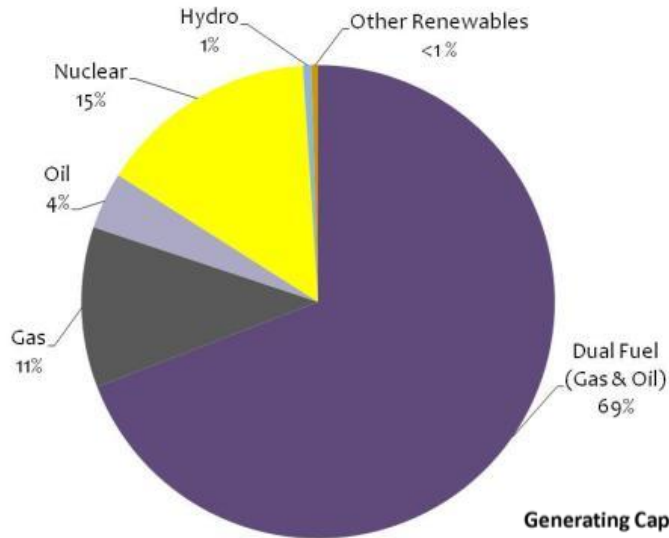
Generating Capacity in New York State by Fuel Source -
Statewide: 2014



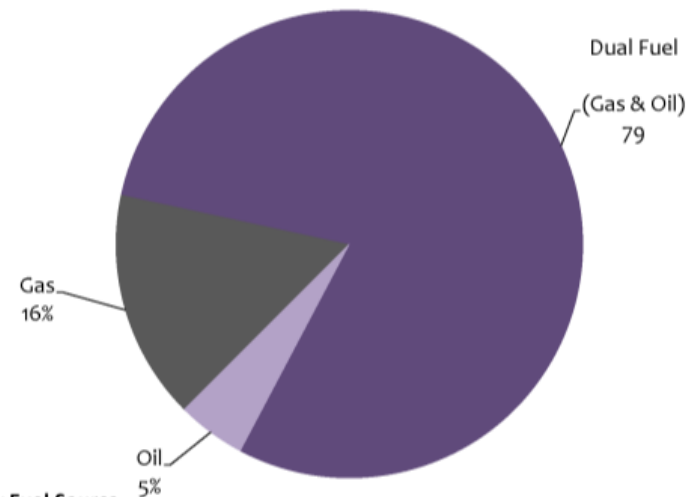
SOURCE: 2014 Load and Capacity Report, New York
Independent System Operator, April 2014
(Generating Capacity displayed is Summer Capacity.)

New York's Fuel Mix

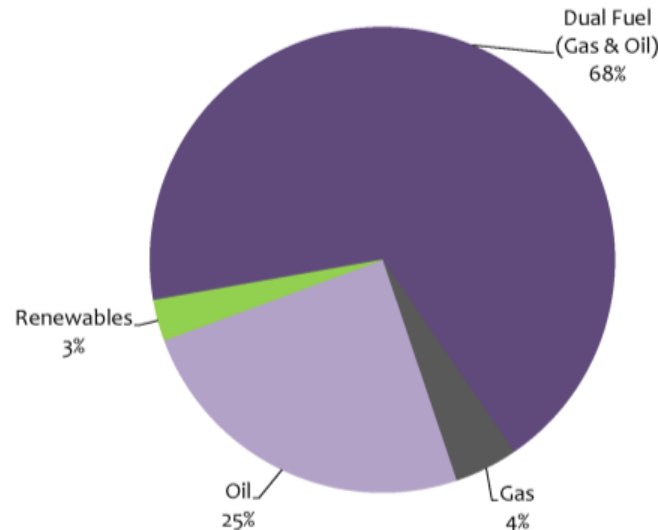
Generating Capacity in New York State by Fuel Source -
Lower Hudson Valley: 2014



Generating Capacity in New York State by Fuel Source -
New York City: 2014



Generating Capacity in New York State by Fuel Source -
Long Island: 2014

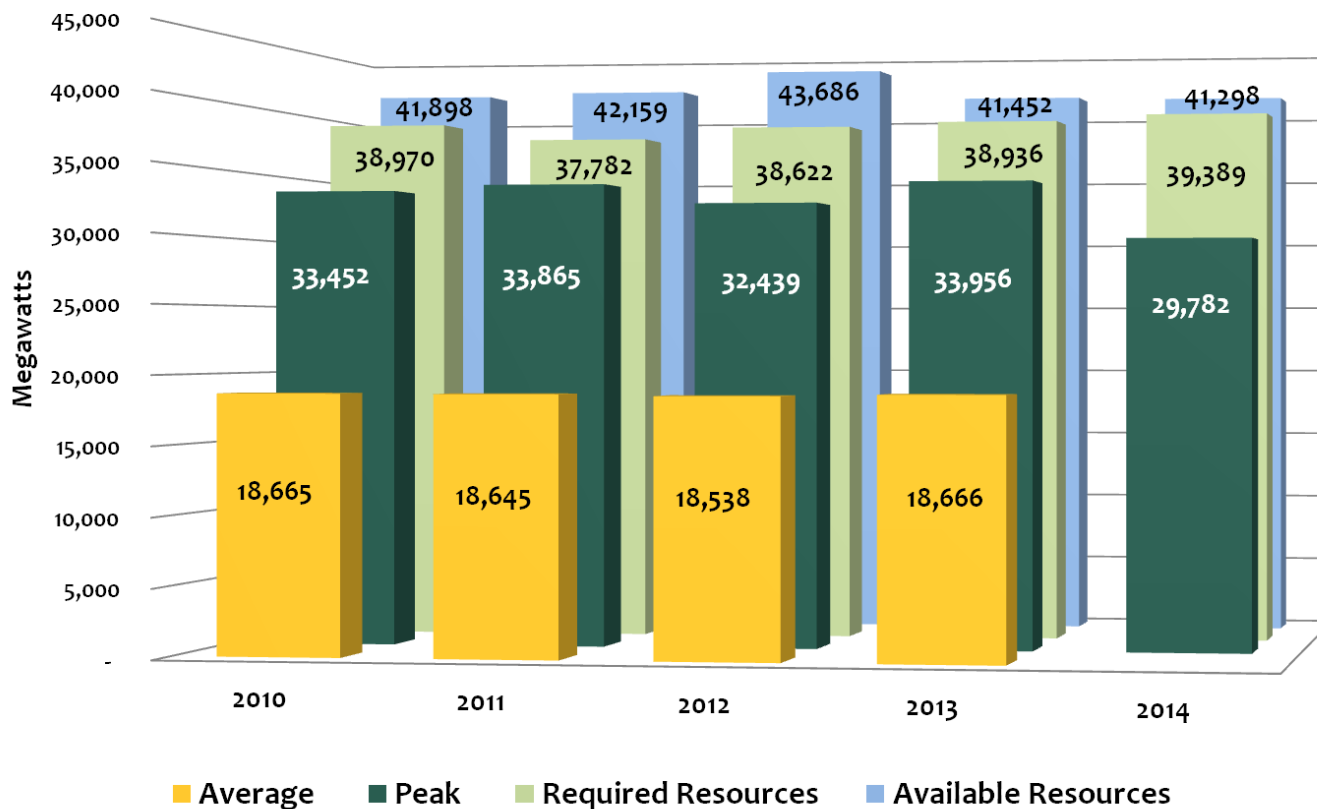


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Capacity: Reliability Objective

The capacity market should maintain resource adequacy by meeting a sufficient reserve requirement above the forecasted peak load



Reserve margins helped to meet the record summer peak load (7/19/13) of 33,956 MW & the record winter peak (1/7/14) of 25,738MW

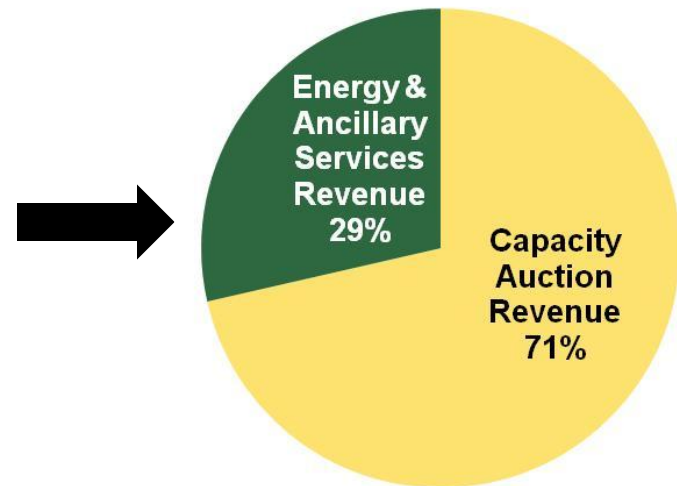
Capacity and Energy Markets

The capacity market should be considered in conjunction with the energy and ancillary services markets to cover the cost of competitive suppliers

NYISO Energy Markets

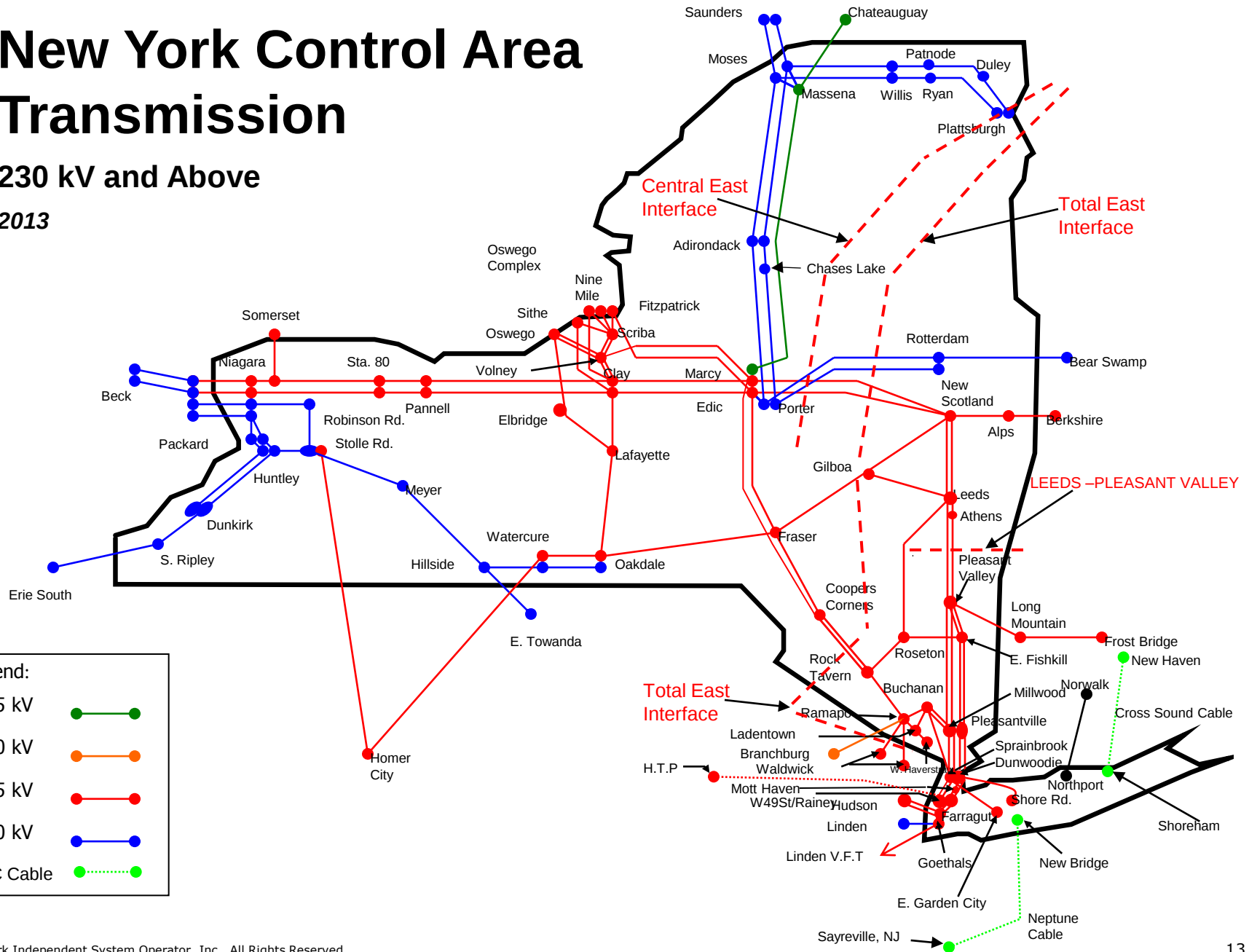
- Two-settlement LBMP market
- Co-optimization of energy, operating reserves and regulation
- Five-minute dispatch and settlement
- Shortage pricing for operating reserves
- Scarcity pricing for demand response activations

NYC Gas Turbine

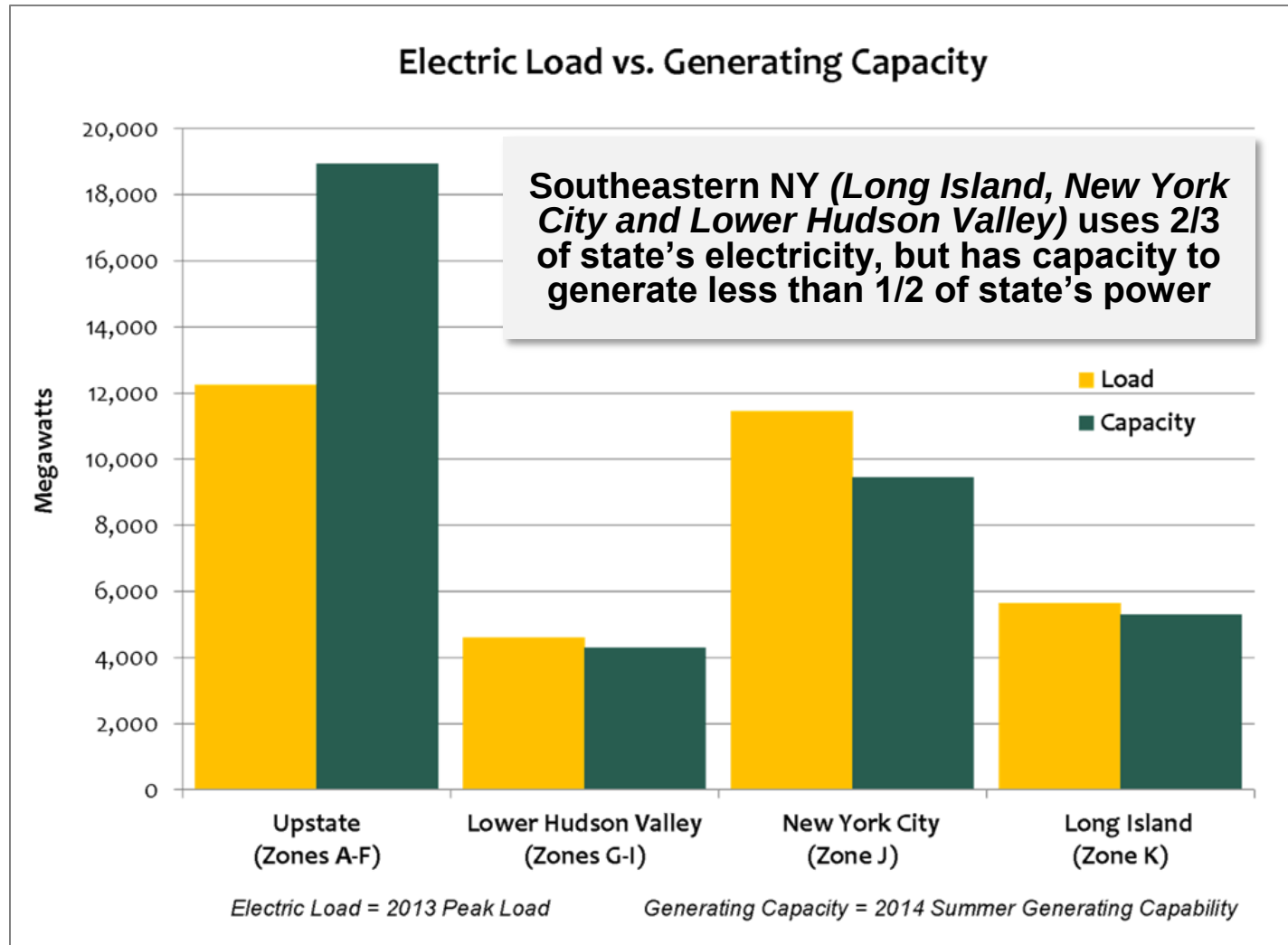


Note: Data approximated from the 2013 State of the Market Report for the New York ISO Markets, Figure 4: Net Revenue and CONE by Location for Various Technologies

2013

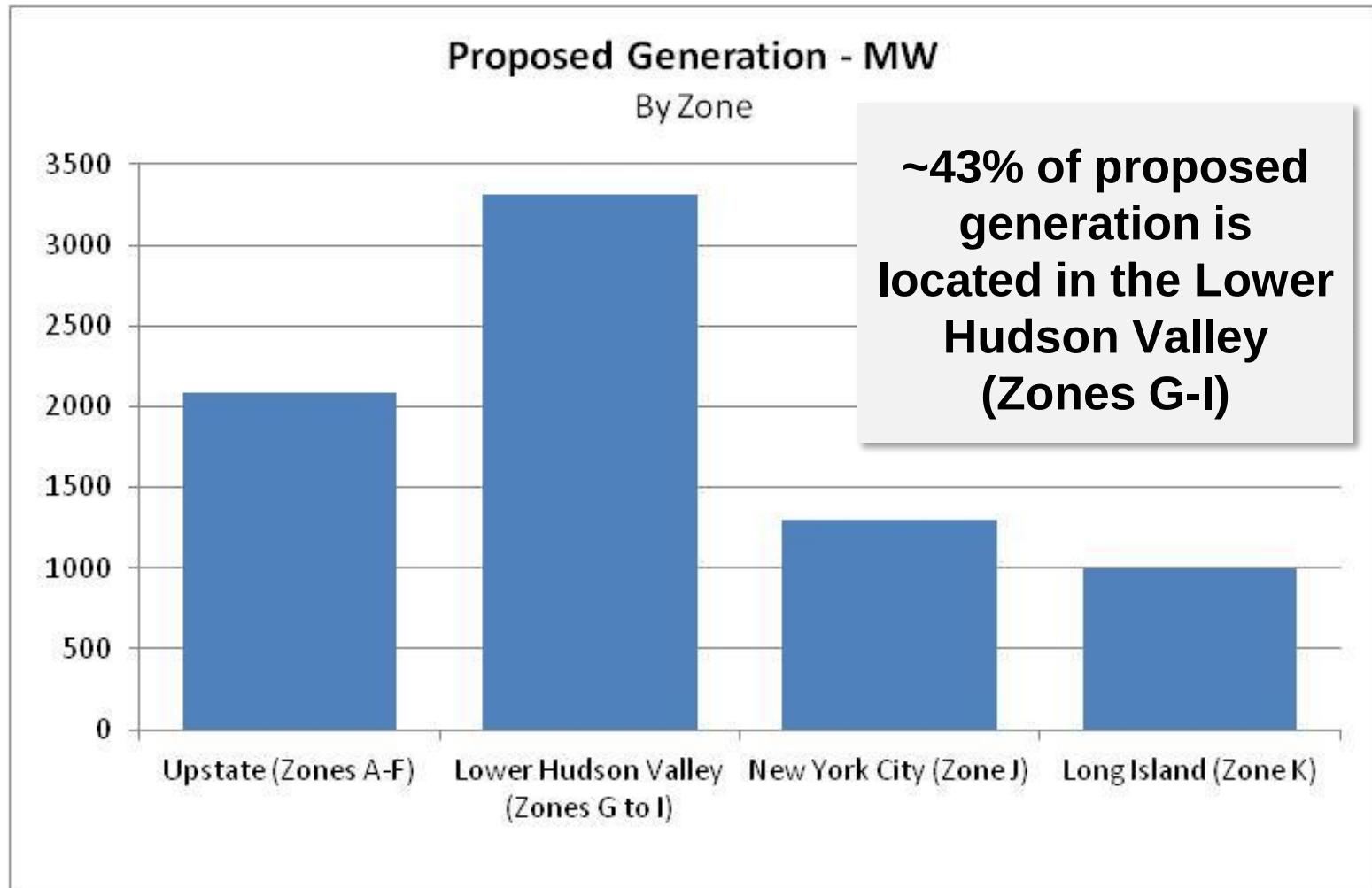


Regional Load & Capacity

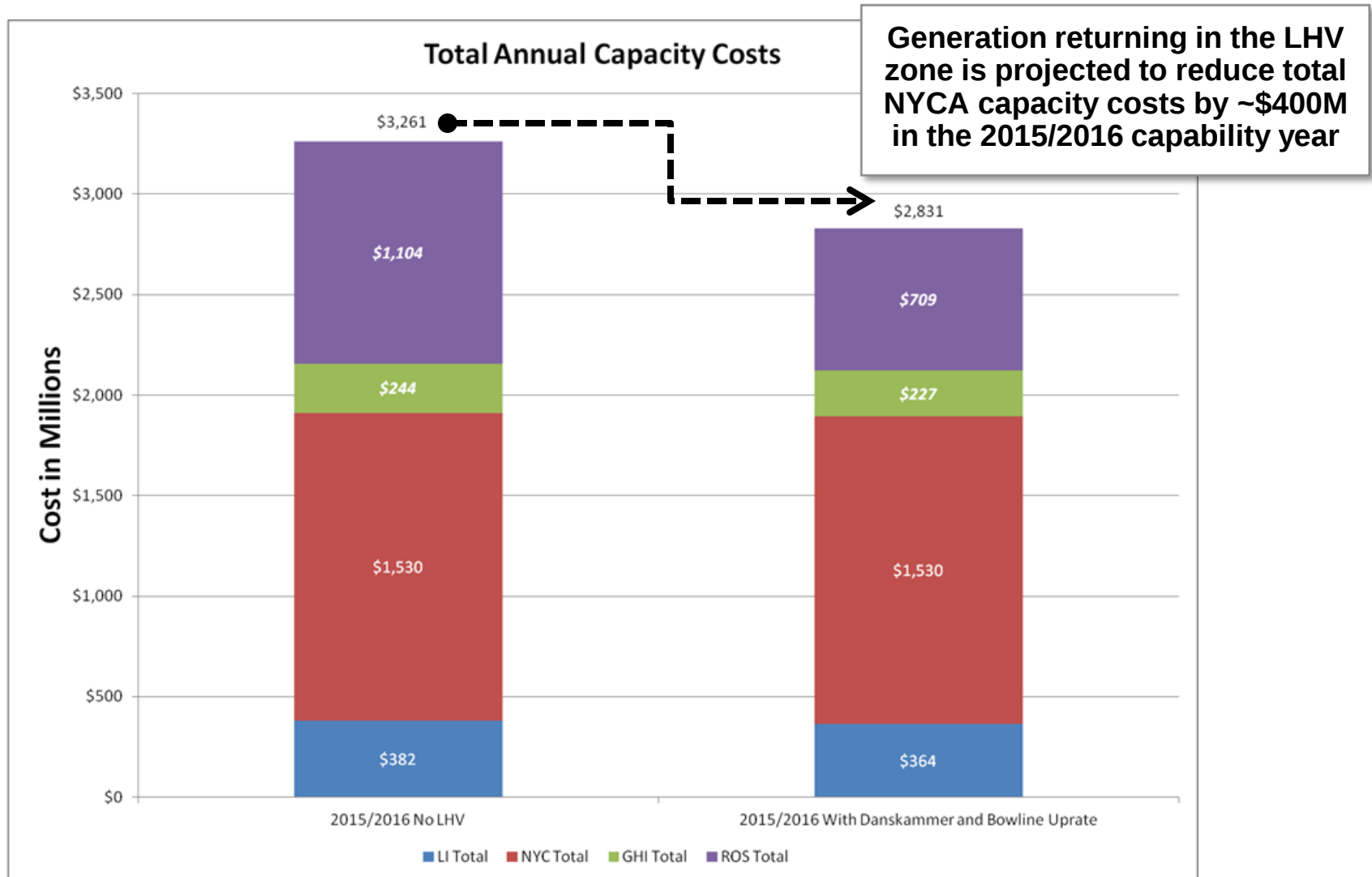


Note: Generating Capacity does not include import capability

Proposed Generation

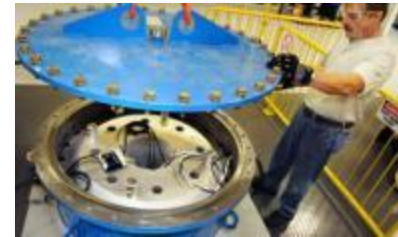


Capacity Cost Projections



Resource Participation

- ◆ The NYISO capacity market allows a variety of resource types to participate and compensates resources based on their performance
- ◆ Wholesale electricity markets evolve with changes in economics, technology and public policy
 - *Market designs have changed to integrate wind power, energy storage, grid-scale solar, and demand response*



2013 Energy Generation

Renewable Resources (3)

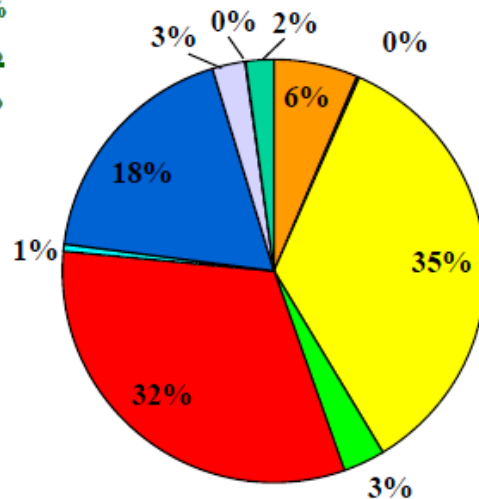
Conventional Hydro 18%

Wind 3%

Solar 0%

Other 2%

Total 23%



Total 2013 = 140,338 GWh

GWh (1)

- GAS - 9,013 (6%)
- OIL - 253 (0%)
- GAS & OIL - 48,830 (35%)
- COAL - 4,494 (3%)
- NUCLEAR - 44,756 (32%)
- PUMPED STORAGE - 766 (1%)
- HYDRO - 25,631 (18%)
- WIND - 3,541 (3%)
- SOLAR - 52 (0%)
- OTHER (2) - 3,003 (2%)

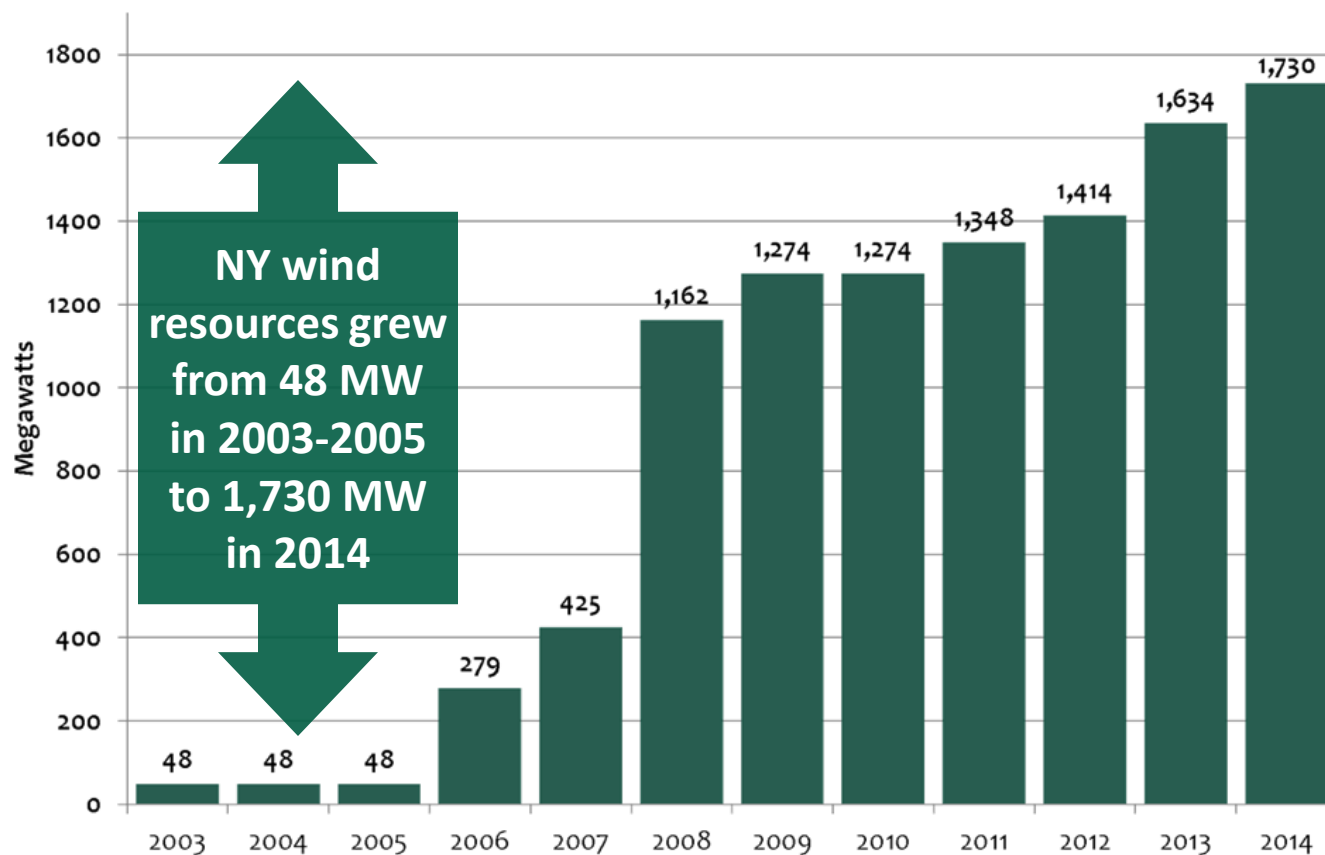
(1) - All values are rounded to the nearest whole GWh.

(2) - Includes Methane, Refuse & Wood.

(3) - Renewable Resources do not necessarily match the NYS Renewable Portfolio Standard (RPS) Definition.

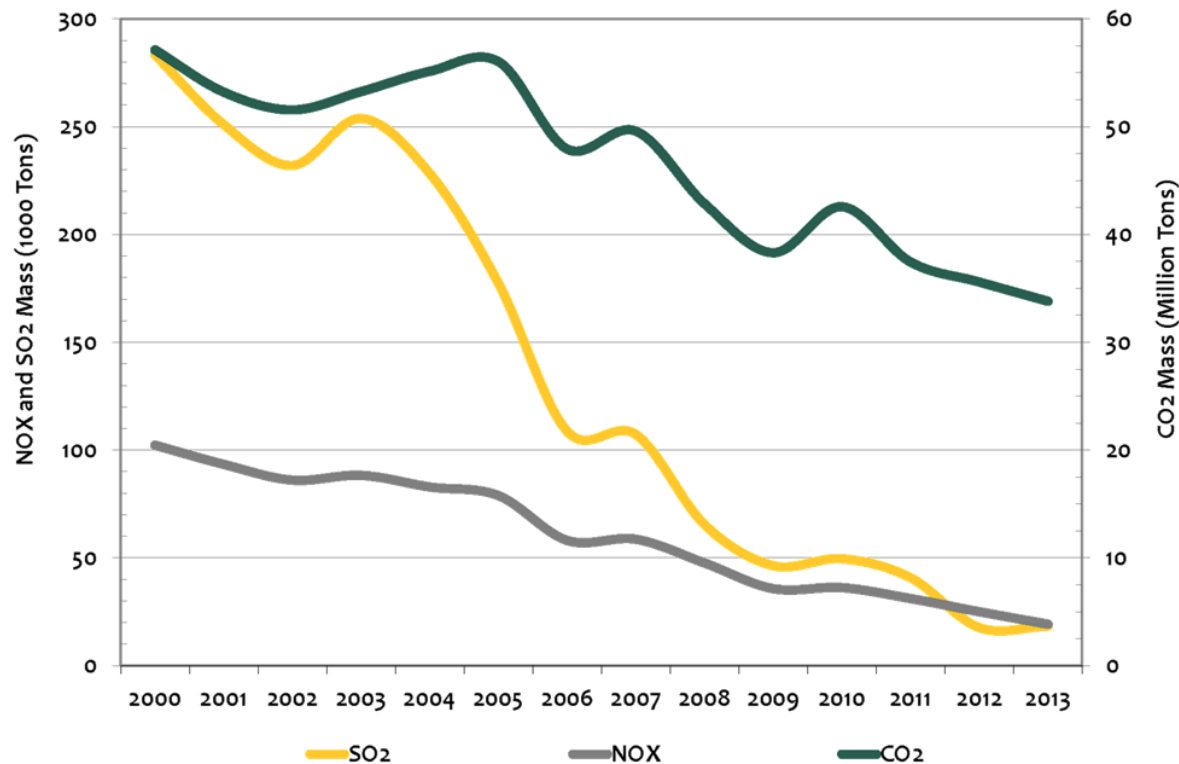
Growing Wind Resources

Wind Generation in New York State:
Nameplate Capacity - 2003-2014



Power Plant Emissions

Emission Rates from Electric Generation in New York State: 2000-2013



From 2000
through
2013...

- ◆ *SO₂ down 94%*
- ◆ *NO_x down 81%*
- ◆ *CO₂ down 41%*

Winter Preparedness

Winter 2013-2014

Measures in Place:

- ♦ Diverse resource mix with significant dual fuel capability
- ♦ Strong market design including: unique hourly bids, increased bids in real-time for fuel costs, timely day-ahead market posting for gas nominations
- ♦ Fuel inventory survey and daily monitoring
- ♦ Gas infrastructure

Winter 2014-2015

Additional Measures:

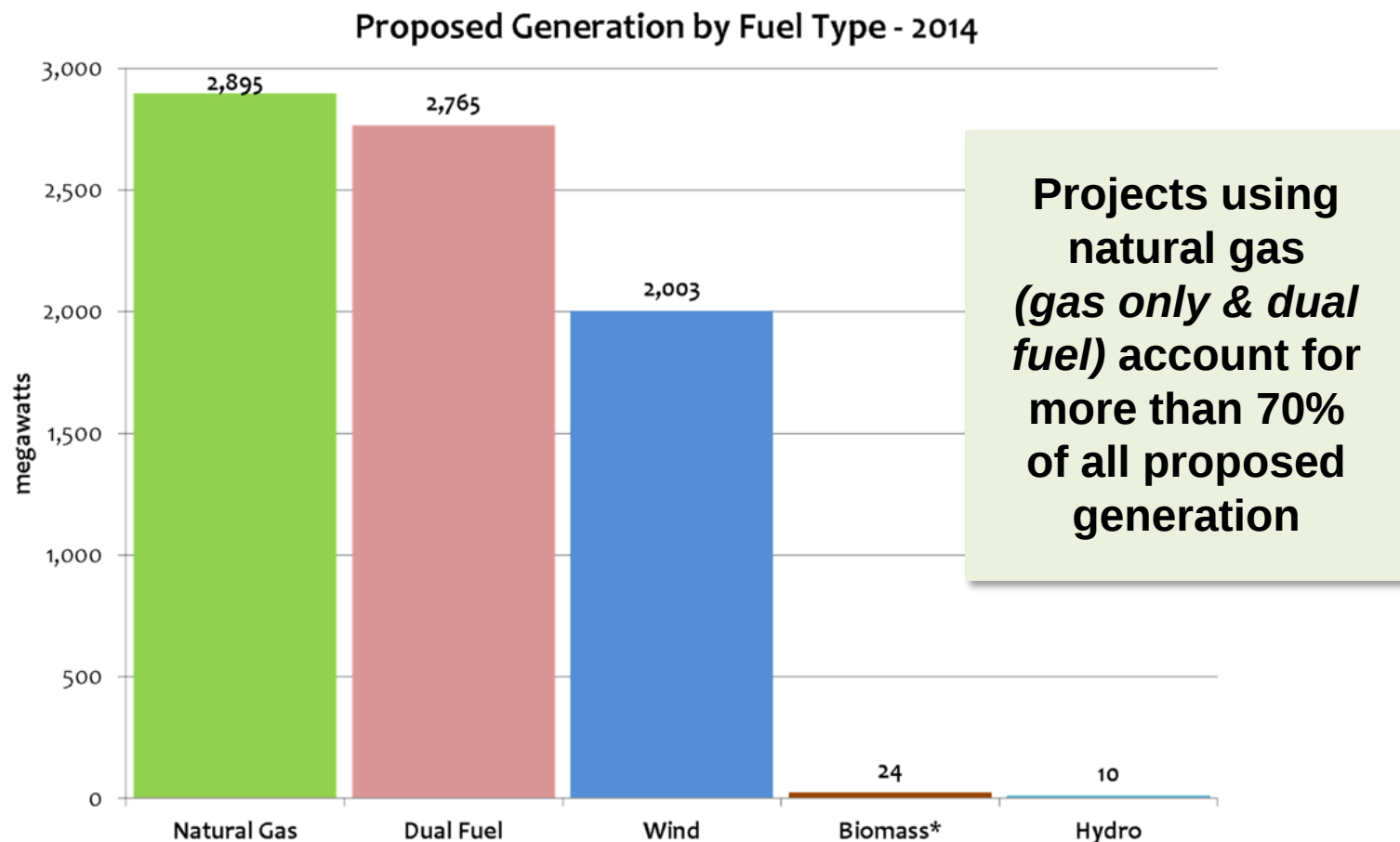
- ♦ Added experienced gas system operator in the control center
- ♦ Increased day-ahead reference level flexibility for fuel costs
- ♦ Generator winter preparedness outreach
- ♦ Expanded fuel survey and emissions survey
- ♦ New gas infrastructure (*Rockaway Lateral*)

Winter 2015-2016 +

Additional Measures:

- ♦ Under consideration – capacity market performance enhancements, comprehensive shortage and scarcity pricing, enhanced gas-electric coordination ...

Looking Forward: Proposed Generation in NYS

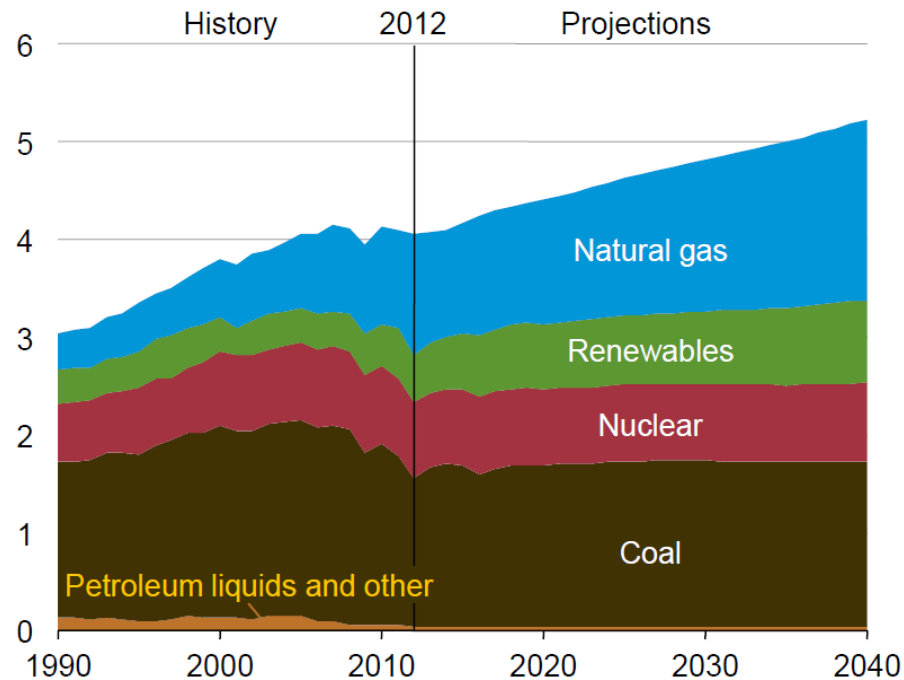


SOURCE: New York Independent System Operator Interconnection Study Queue, March 31, 2014

*includes methane, wood and solid waste

Looking Forward: National Trends

Figure ES-5. Electricity generation by fuel in the Reference case, 1990-2040 (trillion kilowatthours)



Source: EIA Annual Energy Outlook with projections to 2040, April 2014.

Looking Forward:

Fuel Assurance Initiative

- ♦ NYISO is considering improvements to enhance the market signals and to further link compensation with performance in the energy and capacity markets

Fuel Assurance Initiative: Fuel and Performance Incentives

Incent
Intra-day
Operational
Flexibility

Promote
Increased
Resource
Availability
and
Performance

The NYISO's Efforts

Capacity Market

- *Ways to better incent and reflect performance*
- *Possible separate Summer/Winter EFORD*
- ...

Energy Market

- *Comprehensive Shortage Pricing*
- *Comprehensive Scarcity Pricing*
- *RLS Changes*
- ...

Gas-Electric Coordination

- *EMS Visualization of Gas System*
- *Gas Operational Information Sharing*
- *Fuel Availability Self Reporting project*
- ...

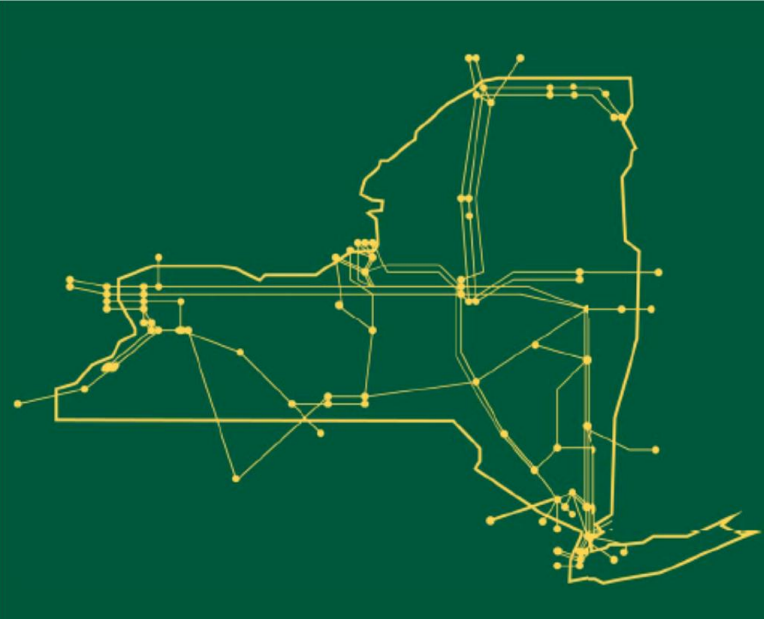
Looking Forward

Other Initiatives:

- ◆ Evaluation of forward capacity markets and the demand curve reset frequency
- ◆ Buyer-side capacity mitigation enhancements
- Measured change



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