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

1965
Northeast Blackout

1970
NYPP Control Center begins operation

1996
FERC Orders 888 & 889

Dec. 1999
NYISO begins operation

Dec. 2013
New control center begins grid operations

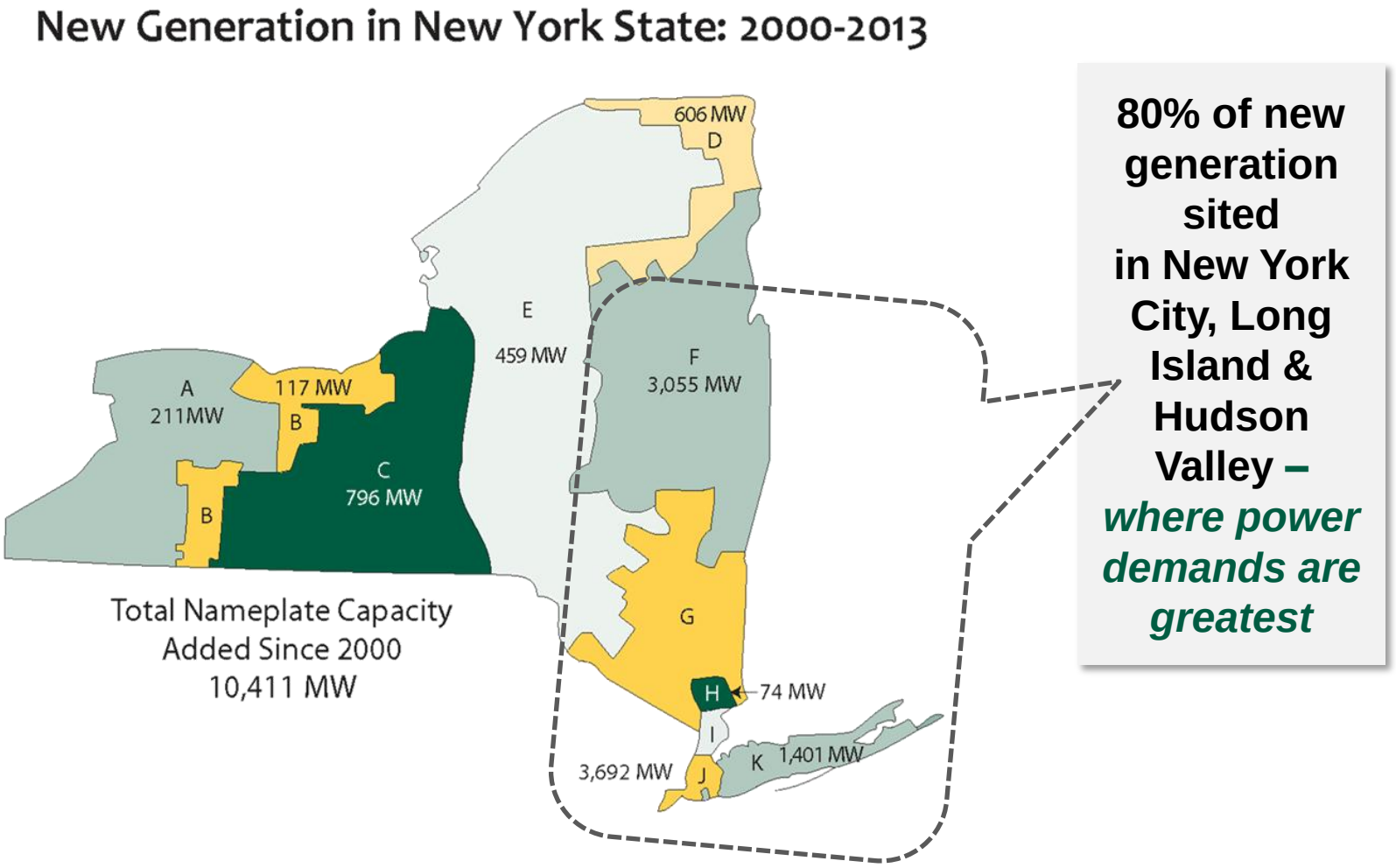
New York Power Pool (NYPP) → **NYISO**

1966
New York Power Pool (NYPP) Created

1996
NYS PSC Competitive Opportunities Order

1997
NYPP files NYISO proposal

New Generation

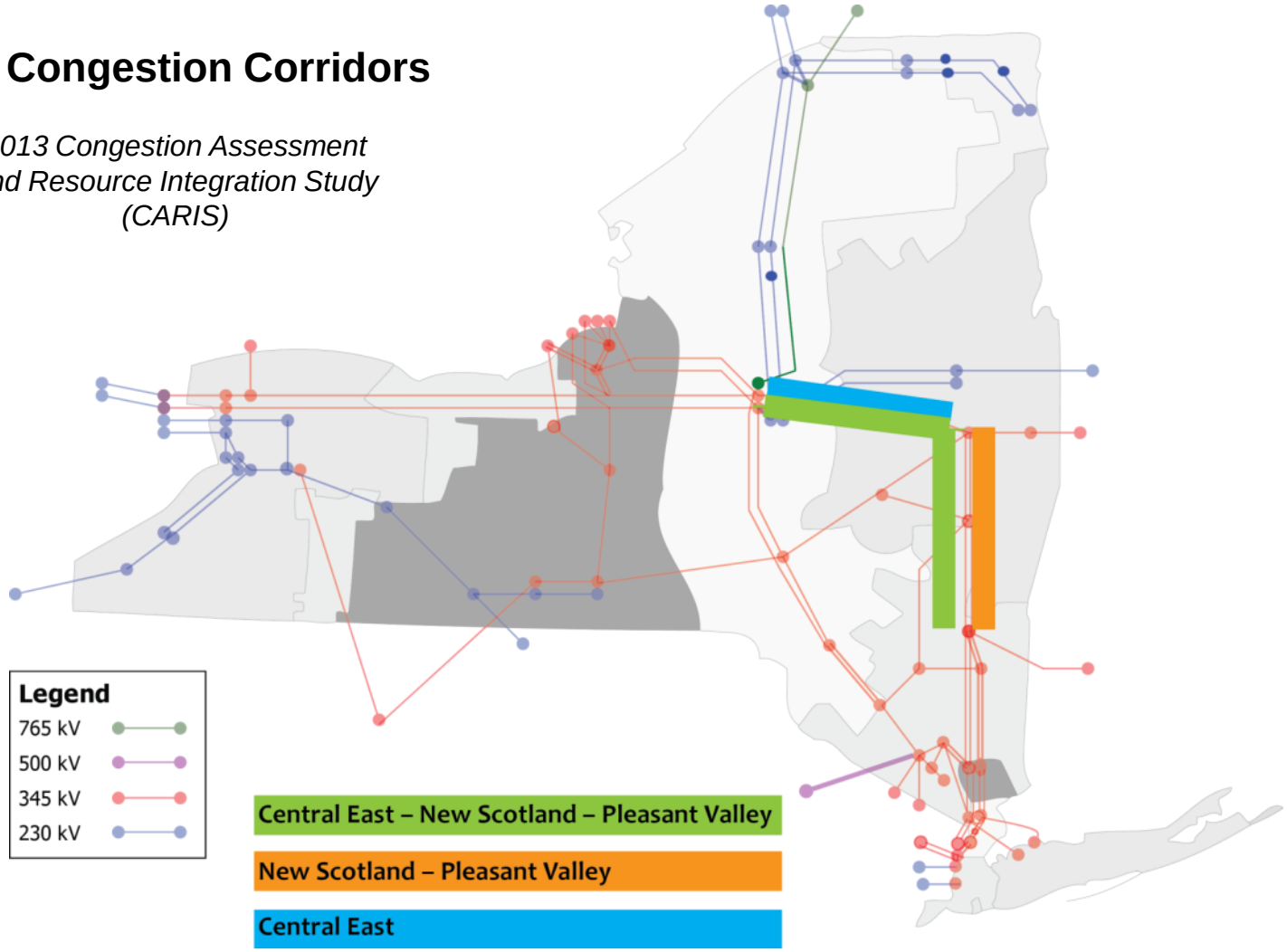


80% of new generation sited in New York City, Long Island & Hudson Valley – *where power demands are greatest*

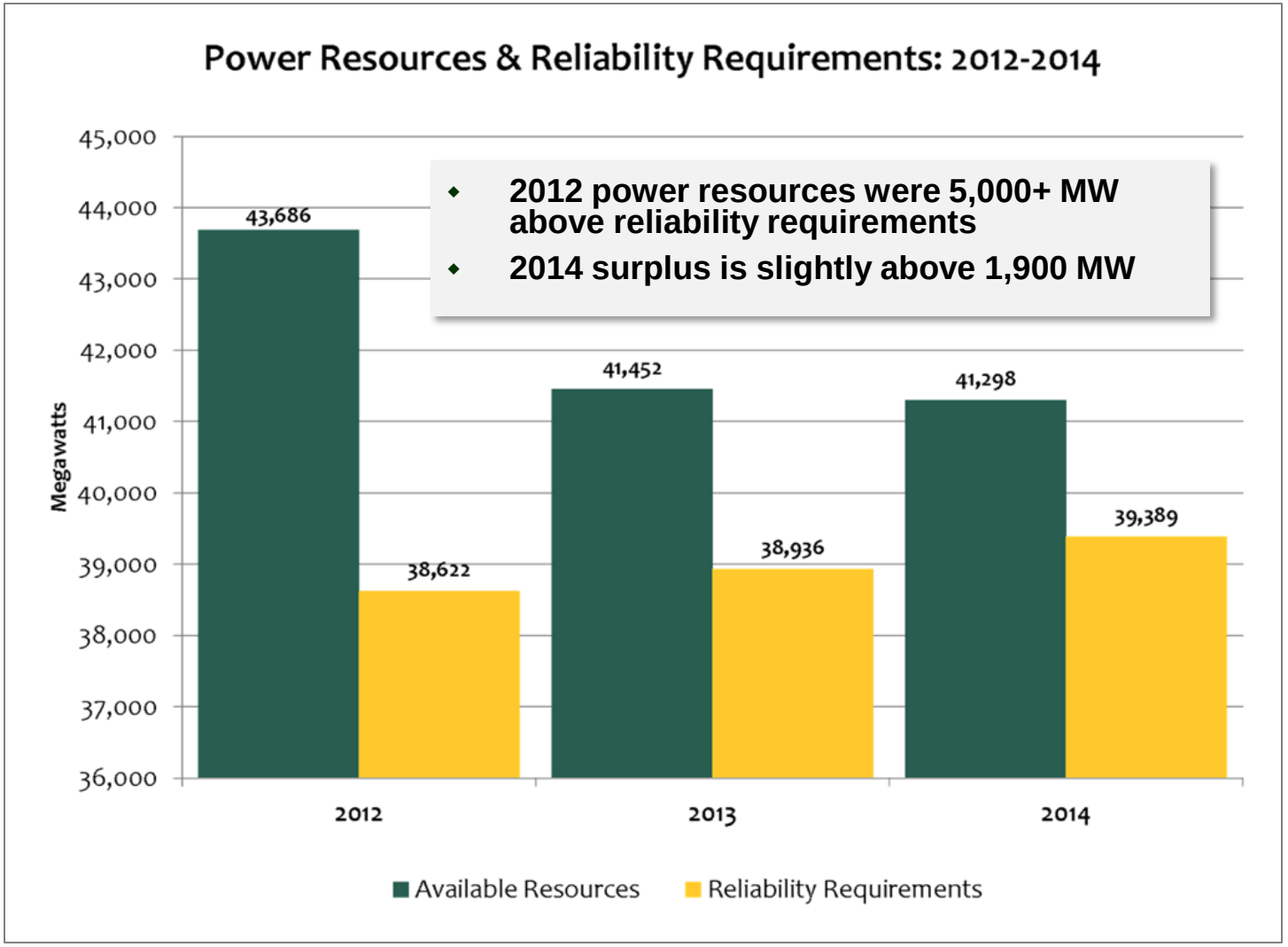
Transmission Congestion

Key Congestion Corridors

2013 Congestion Assessment and Resource Integration Study (CARIS)



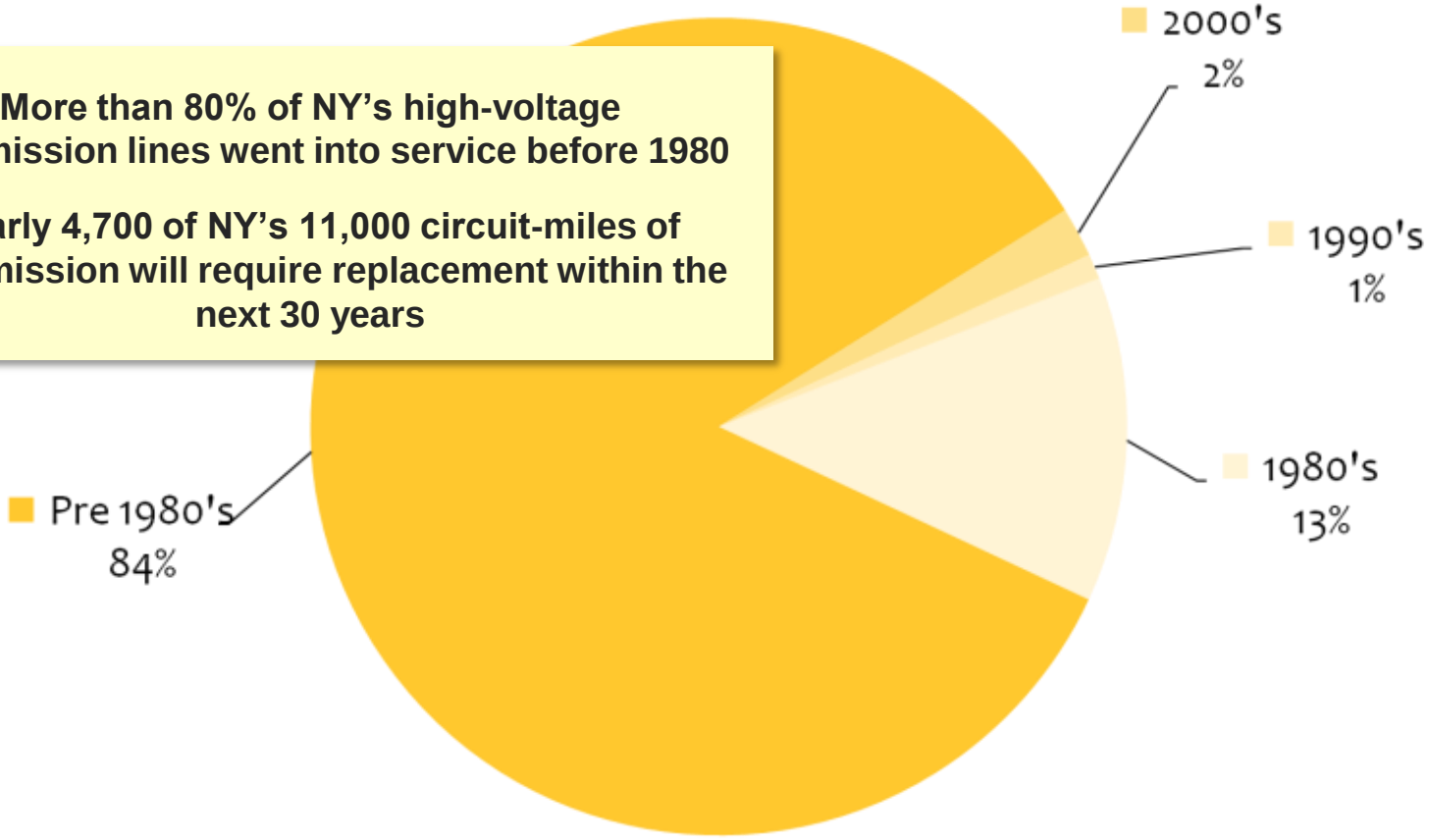
Generation: Narrowing Margins



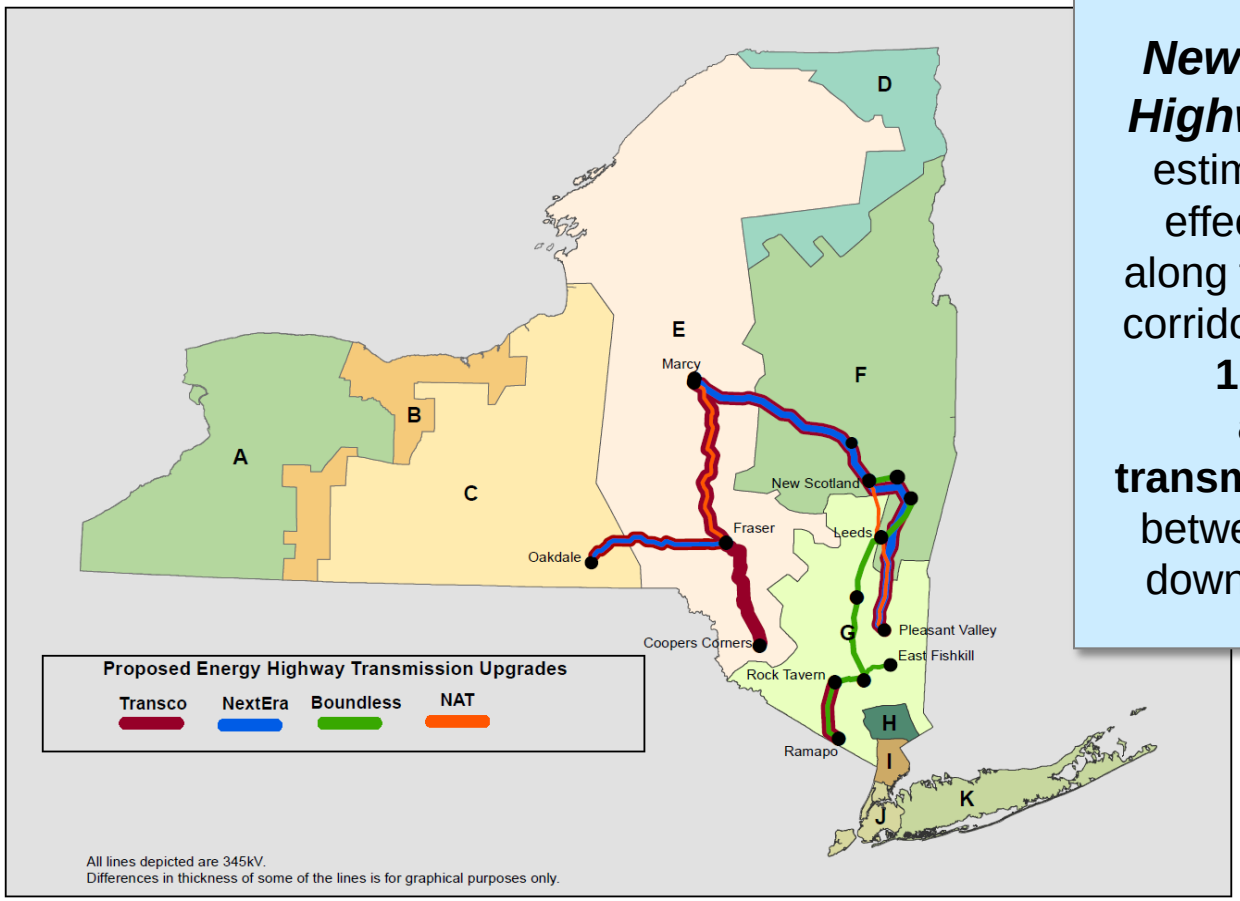
Transmission Infrastructure

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

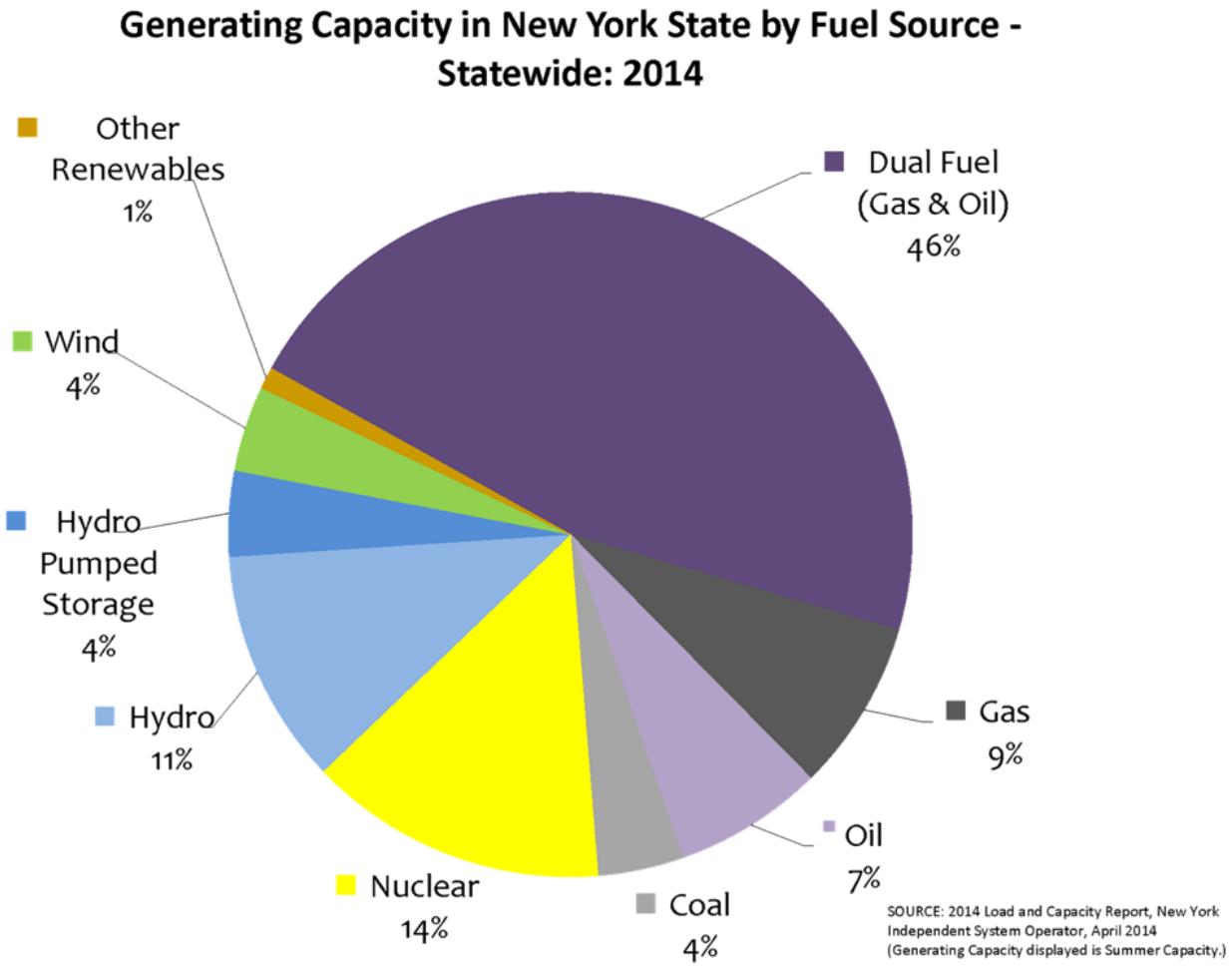


NYS Initiatives:
Addressing Congestion

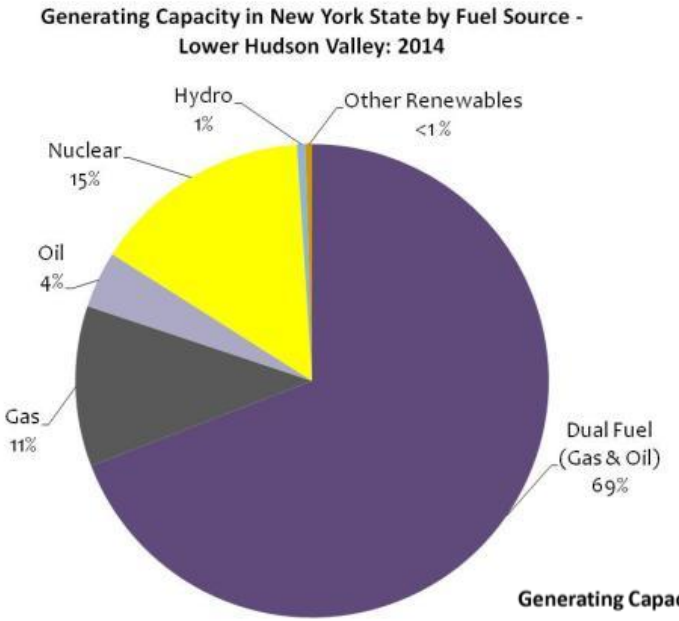


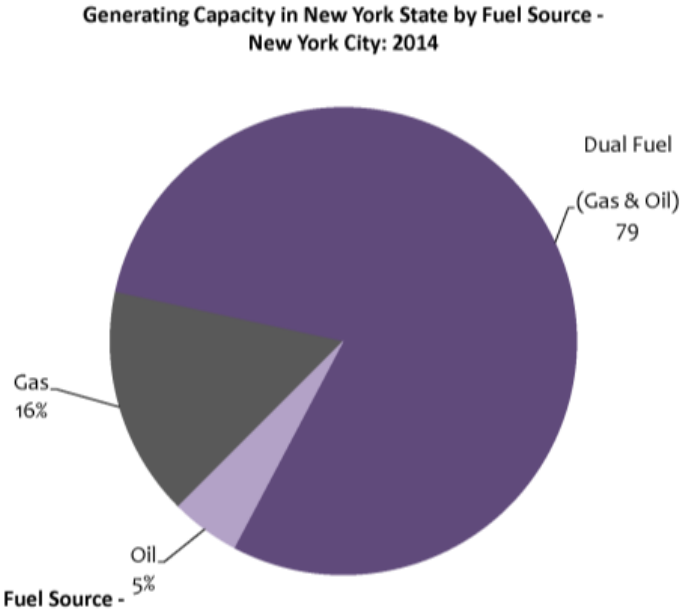
New York Energy Highway Blueprint estimates that cost-effective upgrades along these congested corridors could provide **1,000 MW of additional transmission capacity** between upstate and downstate New York

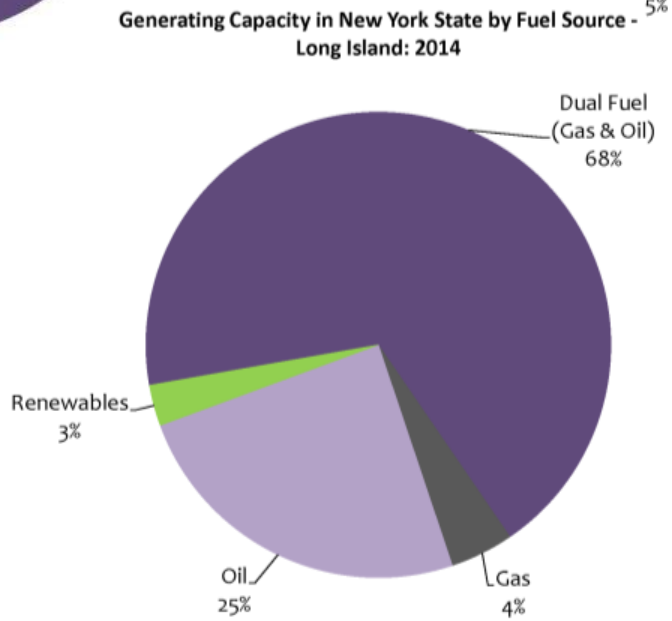
New York's Fuel Mix



New York's Fuel Mix







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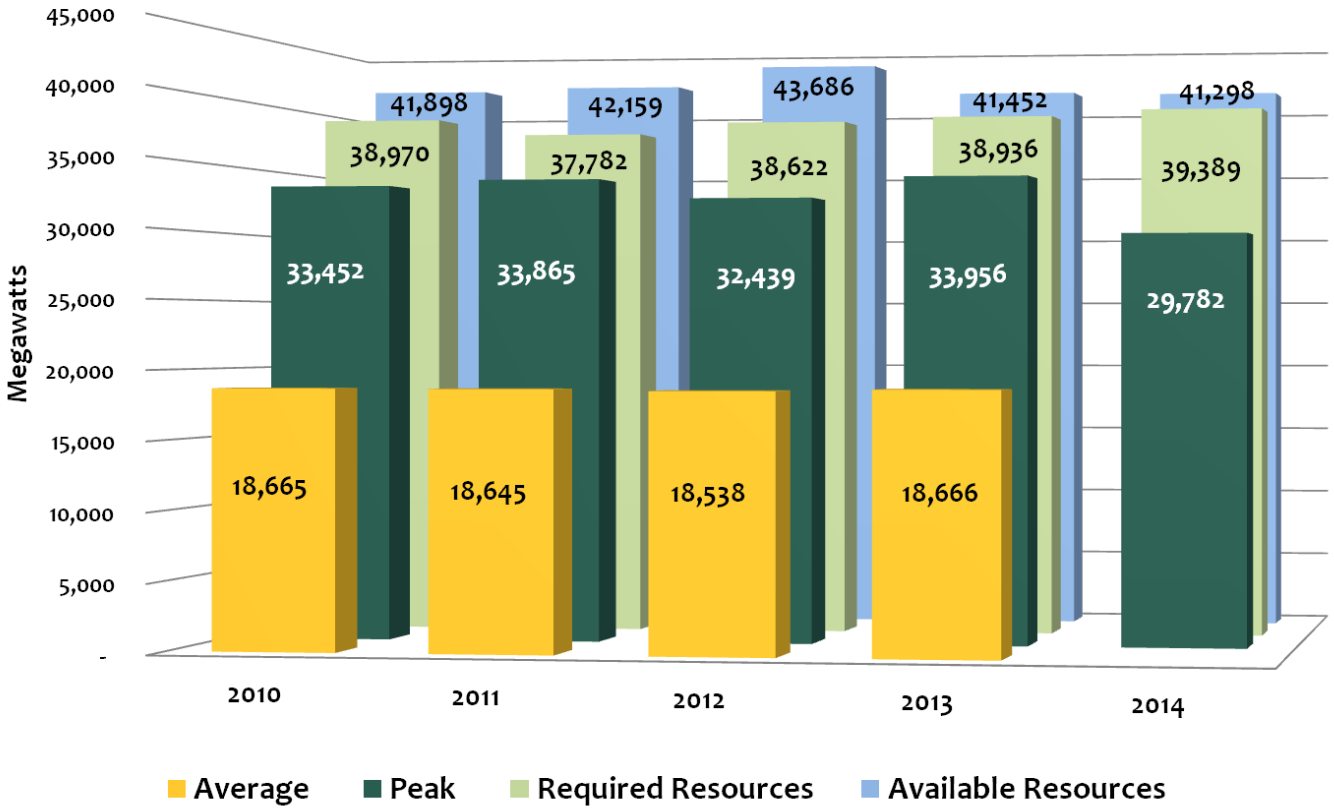
Capacity: Reliability Objective

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



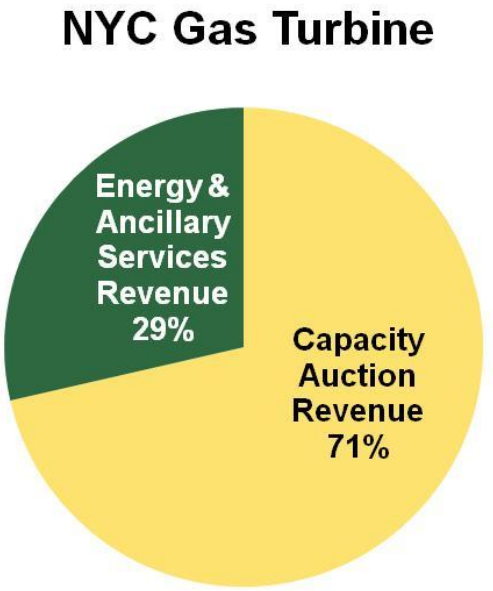
Reserve margins helped to meet the record summer peak load (7/19/13) of 33,956 MW & the record winter peak (1/7/14) of 25,738MW

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

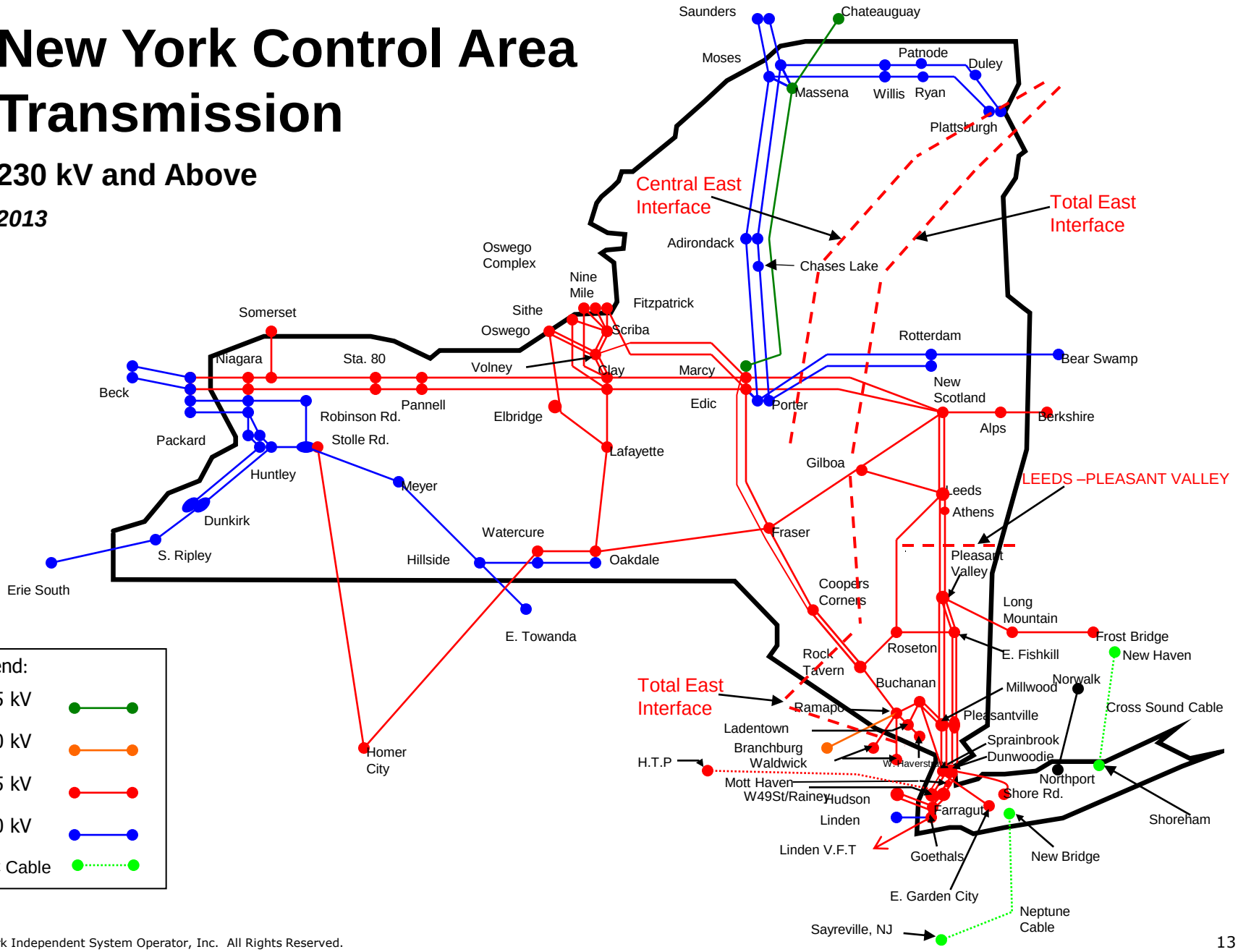


Note: Data approximated from the 2013 State of the Market Report for the New York ISO Markets, Figure 4: Net Revenue and CONE by Location for Various Technologies

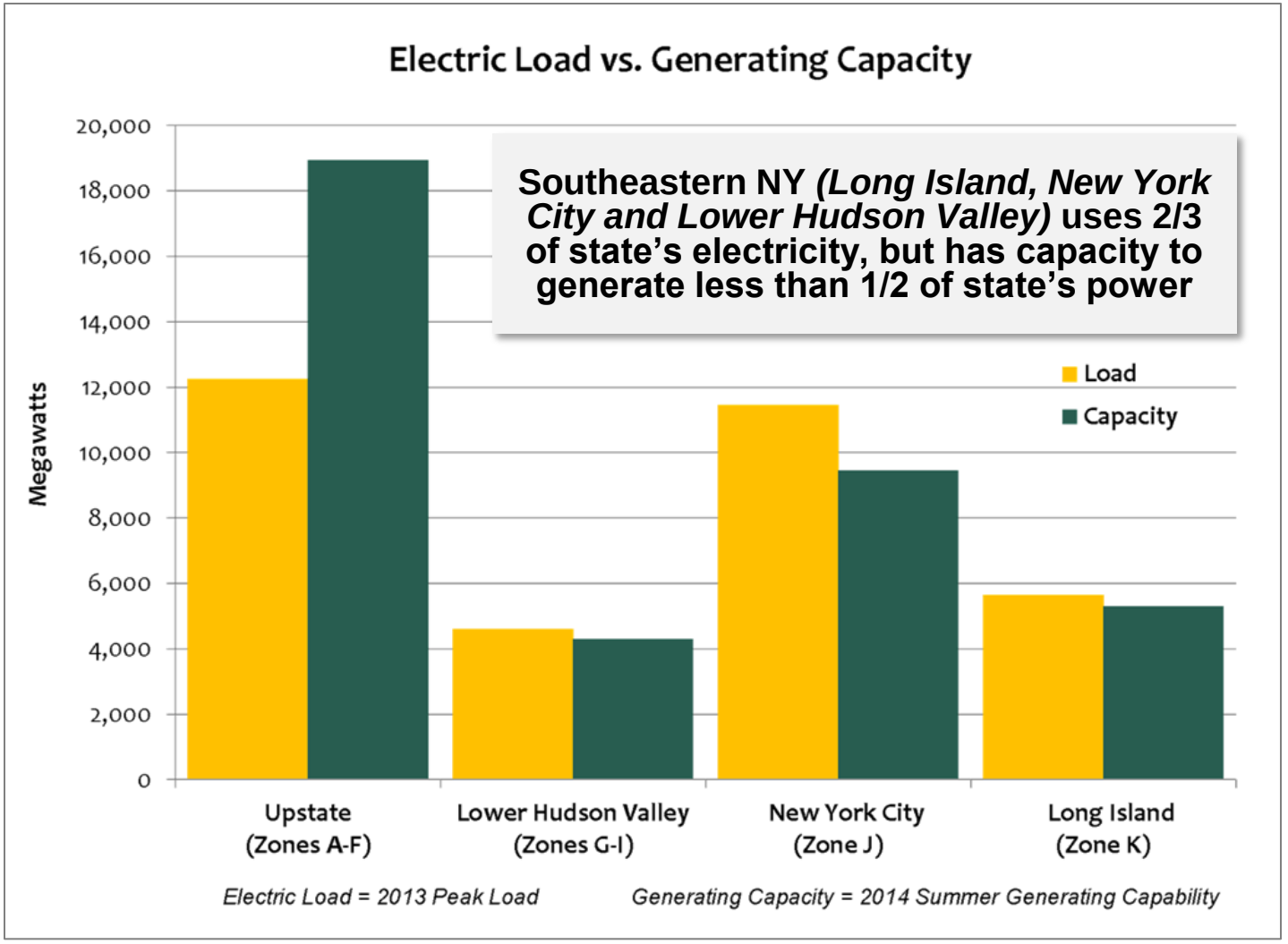
New York Control Area Transmission

230 kV and Above

2013



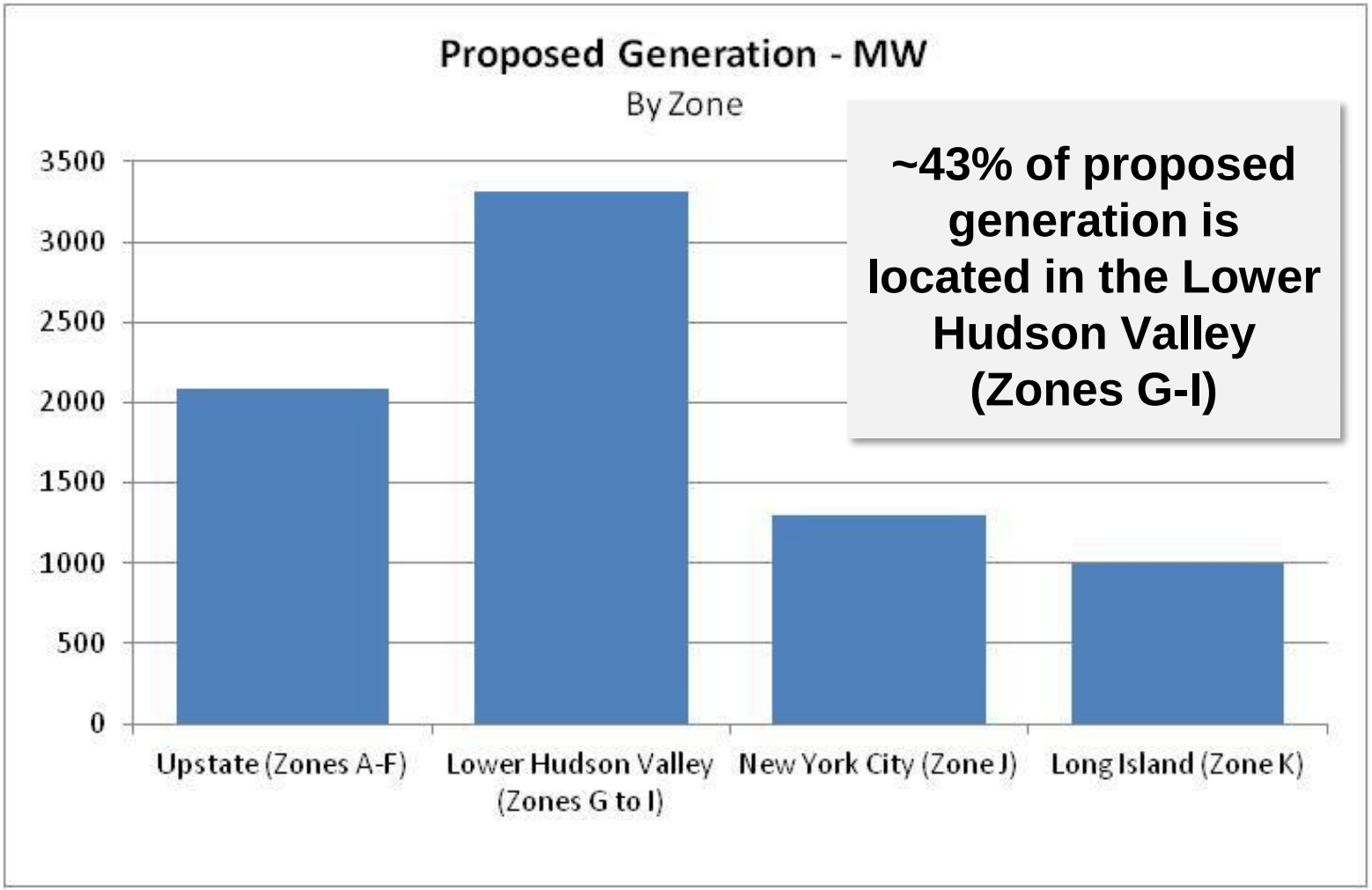
Regional Load & Capacity



Southeastern NY *(Long Island, New York City and Lower Hudson Valley)* uses 2/3 of state's electricity, but has capacity to generate less than 1/2 of state's power

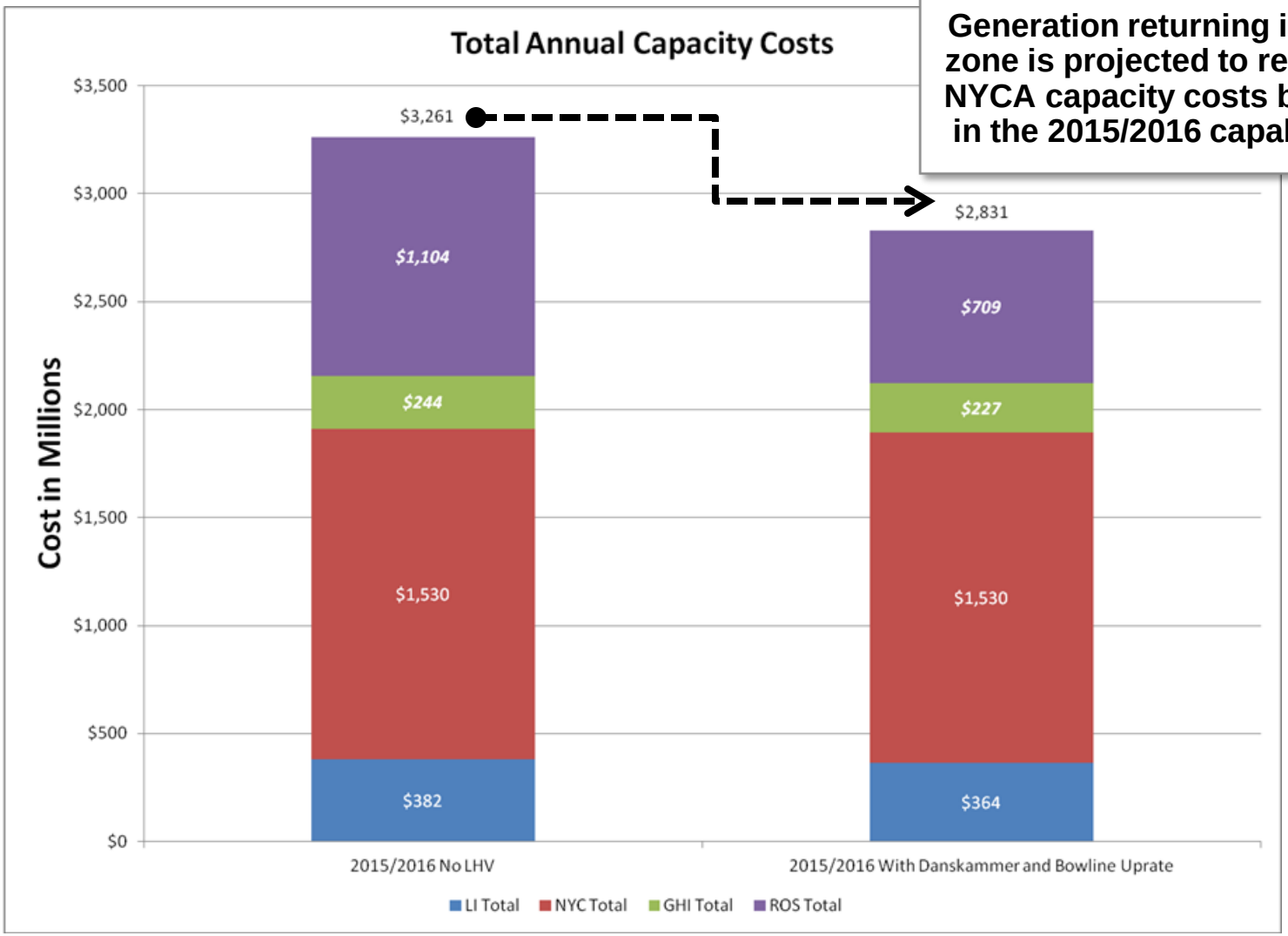
Note: Generating Capacity does not include import capability

Proposed Generation



~43% of proposed generation is located in the Lower Hudson Valley (Zones G-I)

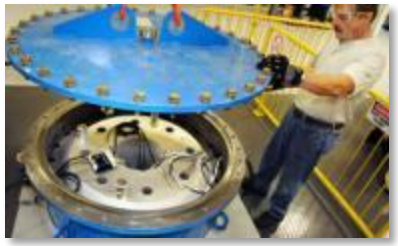
Capacity Cost Projections



Generation returning in the LHV zone is projected to reduce total NYCA capacity costs by ~$400M in the 2015/2016 capability year

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)

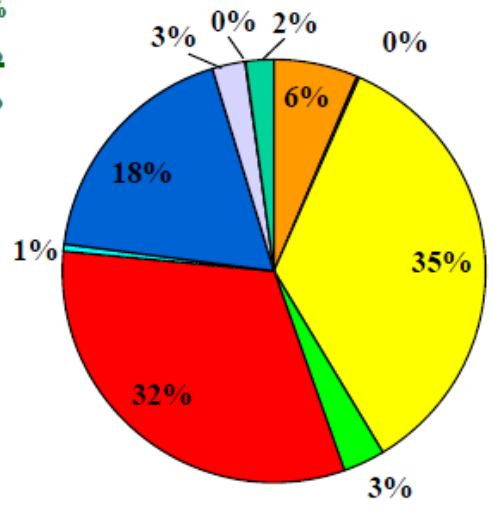
Conventional Hydro 18%

Wind 3%

Solar 0 %

Other 2%

Total 23%



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%)

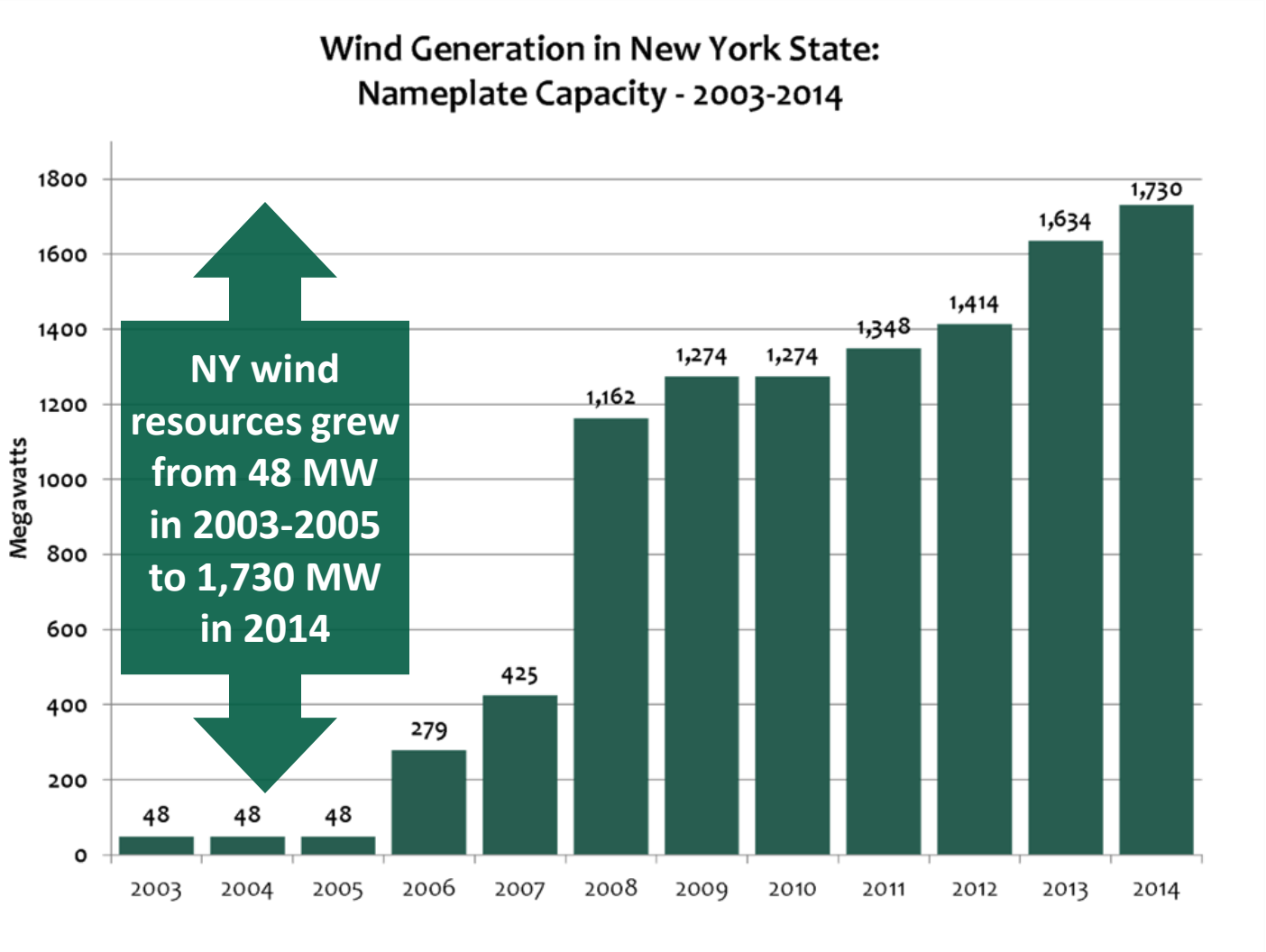
Total 2013 = 140,338 GWh

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

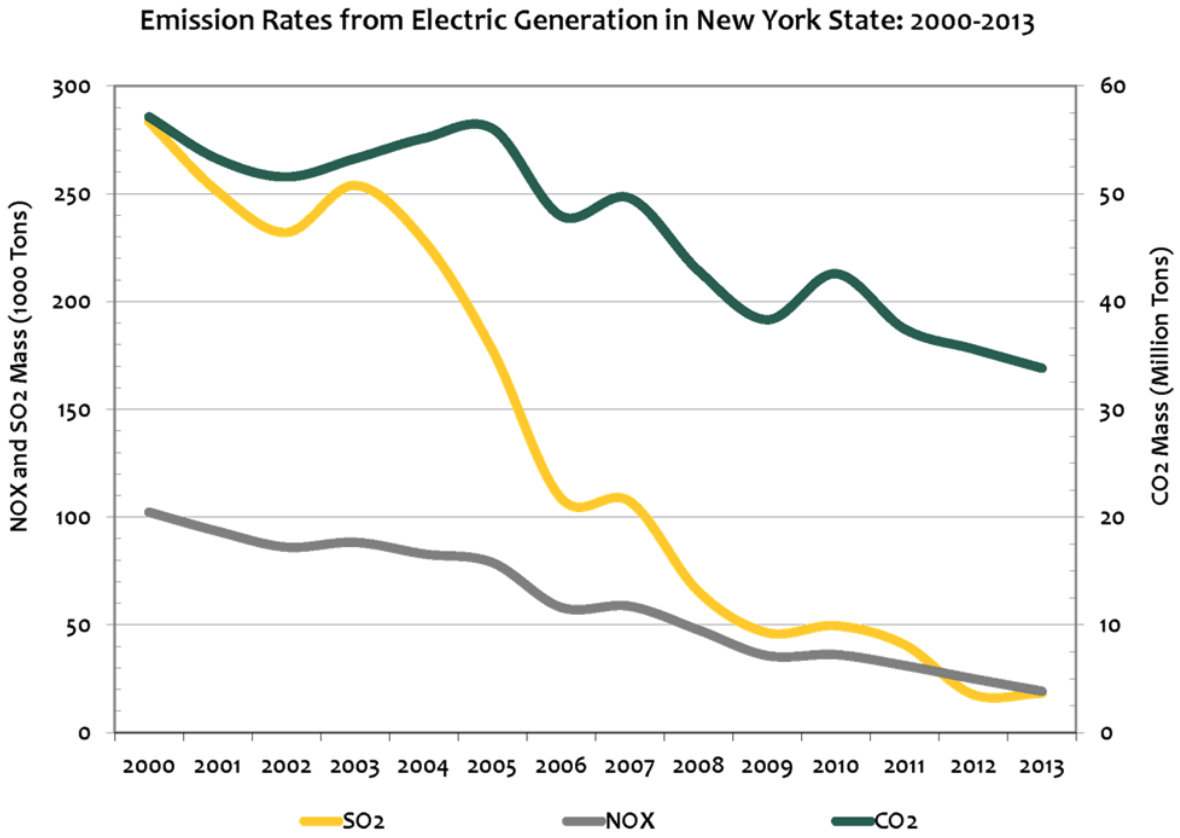
(2) - Includes Methane, Refuse & Wood.

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

Growing Wind Resources



Power Plant Emissions



From 2000 through 2013…

- ***SO_2 down 94%***
- ***NOx down 81%***
- ***CO_2 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:

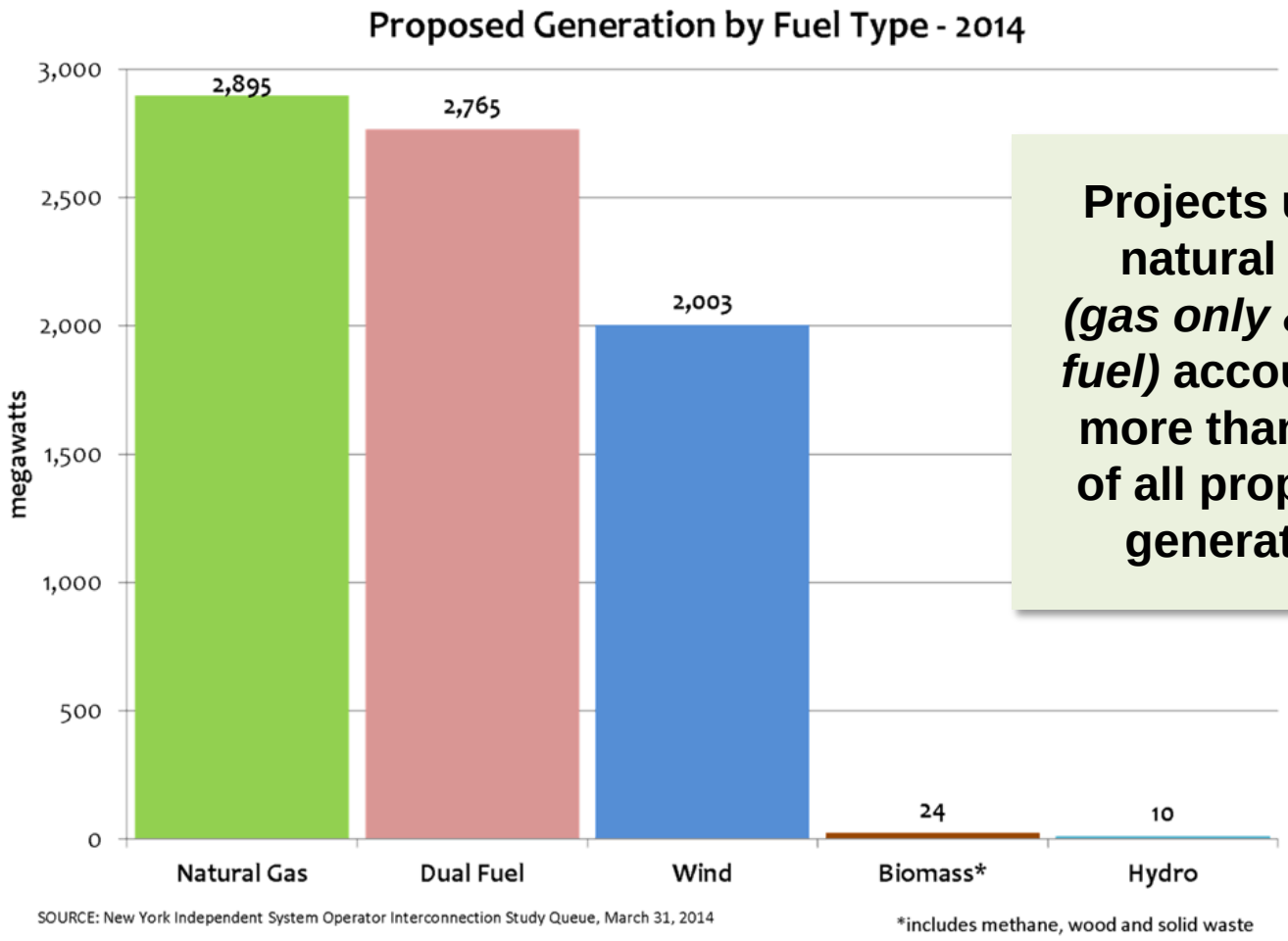
- Added experienced gas system operator in the control center
- Increased day-ahead reference level flexibility for fuel costs
- Generator winter preparedness outreach
- Expanded fuel survey and emissions survey
- New gas infrastructure *(Rockaway Lateral)*

Winter 2015-2016 +

Additional Measures:

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

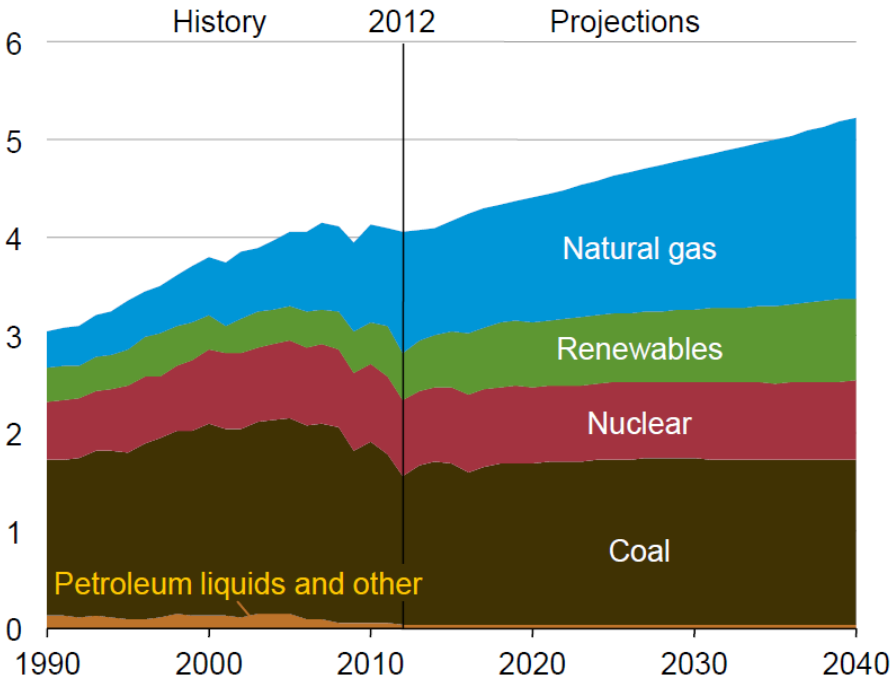
Looking Forward:
Proposed Generation in NYS



Projects using natural gas *(gas only & dual fuel)* account for more than 70% of all proposed generation

Looking Forward:
National Trends

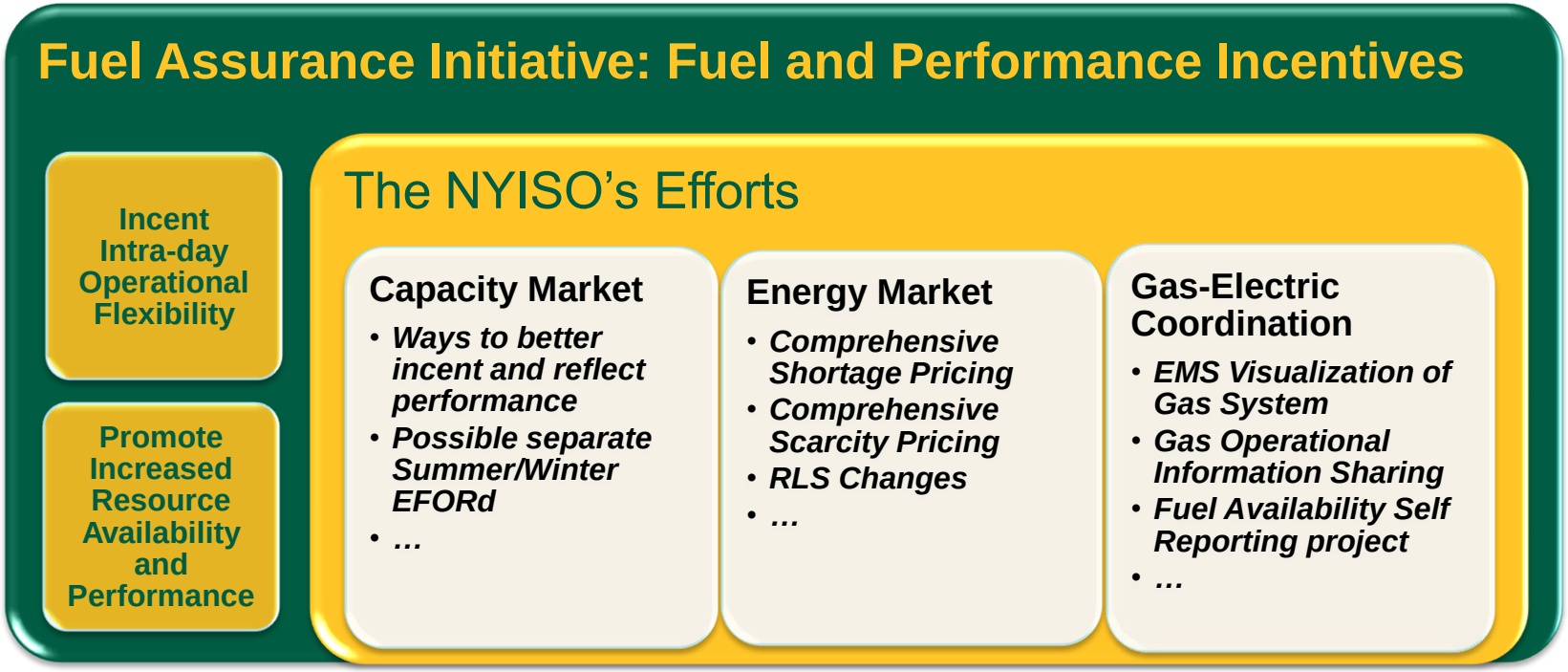
Figure ES-5. Electricity generation by fuel in the Reference case, 1990-2040 (trillion kilowatthours)



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**



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