



Highlights from the 2015 State of the Market Report for the NYISO Markets

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May 25, 2016



Schedule for Review of 2015 SOM Report

- On 5/5: Report posted on NYISO website
- Presentation schedule:
 - ✓ 5/12 ICAPWG: Capacity Market Results & Recommendations
 - ✓ 5/20 MIWG: Energy Market Results & Recommendations
 - ✓ 5/25 MC: Overview of Report & Recommendations
- Comments/questions submitted by 5/25 will be posted on the NYISO website and addressed on a best-efforts basis at the 5/20 and 5/25 meetings.
 - ✓ To: deckels@nyiso.com & pallas@potomaceconomics.com
- Comments/questions received after 5/25 will be addressed case by case.



Highlights and Market Summary: Energy Market Results and Net Revenues

- The energy markets performed competitively and price variations were driven primarily by fundamentals (i.e., demand, fuel prices, supply availability).
- Falling natural gas prices led to substantially lower energy prices, congestion, and uplift levels.

Energy Prices and Congestion

- The NYISO experienced mild summer weather and winter conditions that improved slightly from 2014 (but were still severe by historic standards).
 - ✓ Natural gas prices fell 38 to 58 percent from 2014 to 2015, helping to reduce electricity prices by 32 to 49 percent over the same period.
- All-in prices ranged from \$35/MWh in the North Zone to \$71/MWh in NYC.
- Congestion from west-to-east on the natural gas pipeline system led to a similar pattern of congestion in the NYISO energy markets.
 - ✓ Flows across western New York and the Central-East Interface accounted for 61 percent of the \$539 million in day-ahead congestion revenue.



Highlights and Market Summary: Energy Market Results and Net Revenues

Long-Term Economic Signals

- Falling energy and capacity prices reduced the net revenues for most types of resources at most locations.
 - ✓ A new standard combustion turbine would not have covered its entry cost in any zone (except the West Zone) in 2015.
 - ✓ Conditions in the West Zone have become more favorable to gas-fired generation because of congestion patterns and very low natural gas prices. However, these conditions may be temporary.
- Low natural gas and associated energy prices have reduced the profitability of low-CO₂ emitting resources (i.e., existing nuclear and new renewable units).
 - ✓ Existing nuclear capacity outside SENY is uneconomic at 2015 prices.
 - ✓ Building new renewables is a more costly approach for lowering CO₂ emissions than maintaining nuclear units, but building new gas-fired units to displace remaining inefficient generation is lower-cost than both approaches.
 - ✓ This underscores the value of technology-neutral approaches for achieving emission reduction goals.



Highlights and Market Summary: Capacity Market & Uplift Charges

Capacity Market in 2015/16 Capability Year:

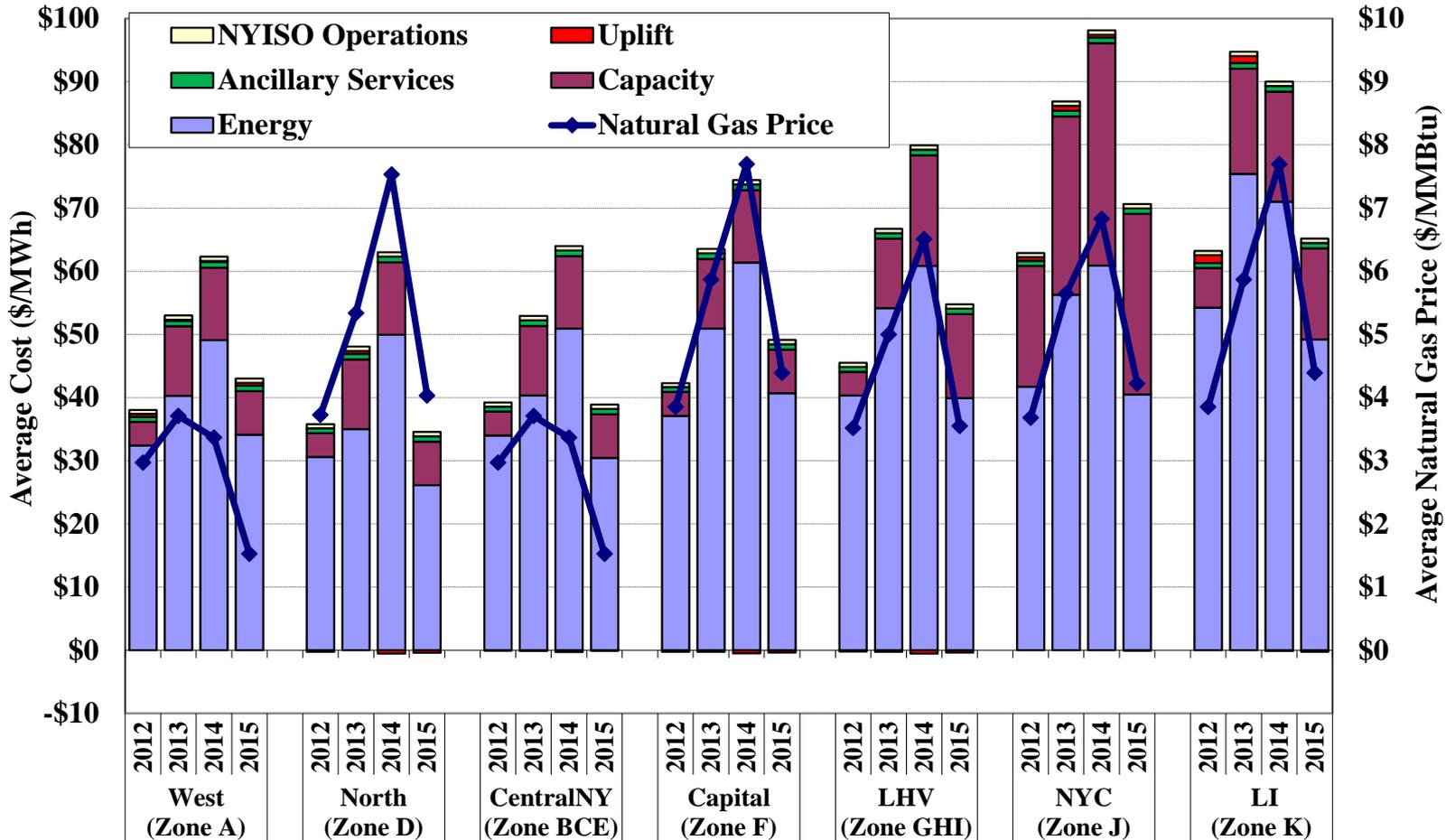
- Prices fell 40 percent to an average of \$2.39/kW-month in “Rest of State” because 1.2 GW of capacity returned service in Southeast New York.
- Prices fell 21 and 24 percent to an average of \$10.68/kW-month in NYC and \$3.68/kW-month in Long Island.
 - ✓ Returning capacity in the Lower Hudson Valley alleviated the UPNY-SENY constraints, reducing the local capacity requirements for NYC and Long Island.
- Prices fell 24 percent to an average of \$6.17/kW-month in Lower Hudson Valley.
 - ✓ The return of capacity to the Lower Hudson Valley caused its LCR to increase, offsetting the price effects of the additional supply.

Uplift Charges:

- Uplift from guarantee payments fell 52 percent to \$71 million because of low gas prices and improved winter market performance.
- Day-ahead congestion shortfalls (revenues less than TCC obligations) totaled \$37 million, most of which were caused by transmission outages and allocated to TOs.
- Balancing congestion shortfalls (real-time capability less than assumed day ahead) rose to \$19 million, primarily when loop flows and transmission outages reduced available transfer capability in western NY.

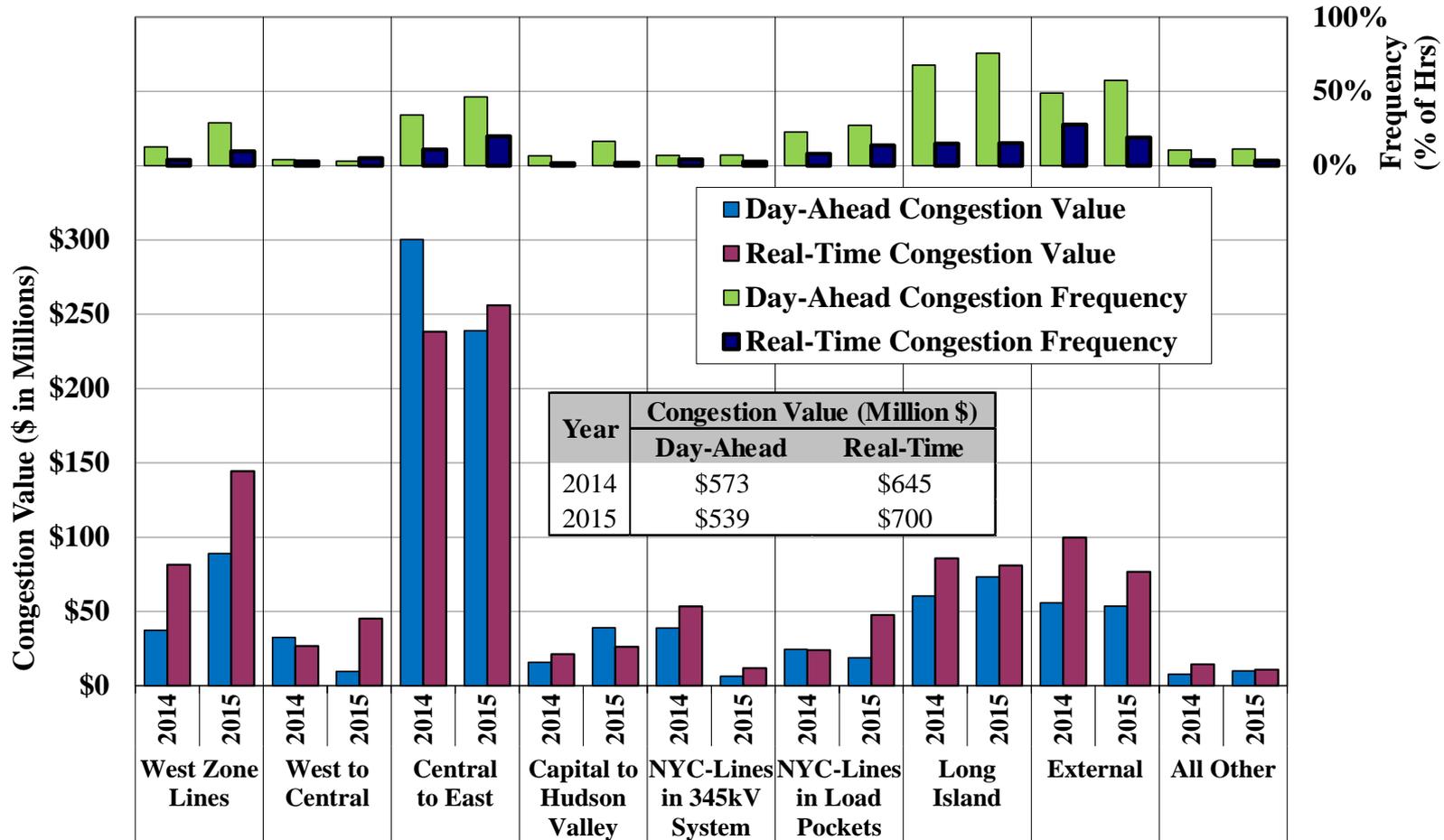


Highlights and Market Summary: Average All-In Price by Region



See Sections I.A & III.A

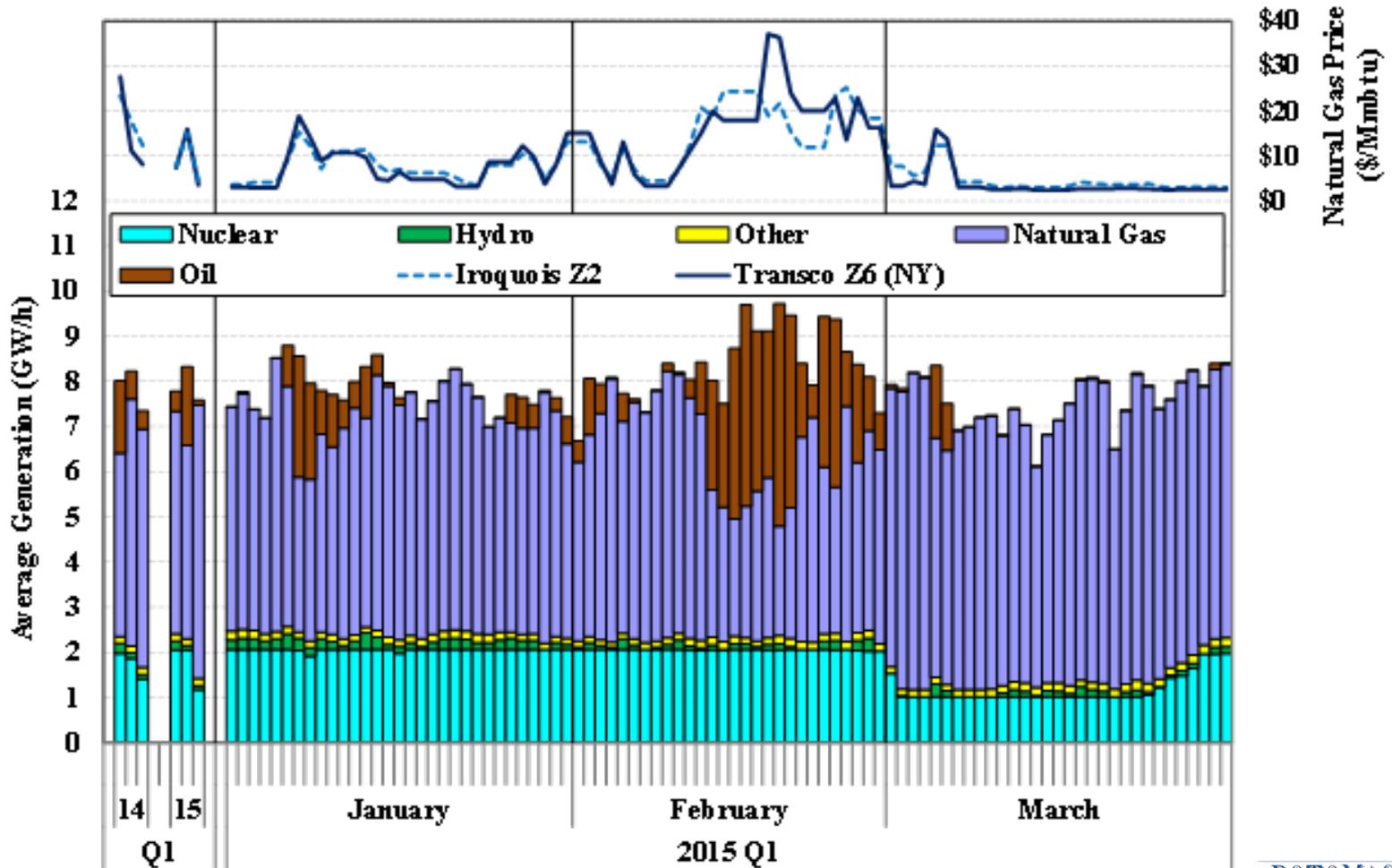
Highlights and Market Summary: Congestion in the DA & RT Markets



See Sections I.A & III.E



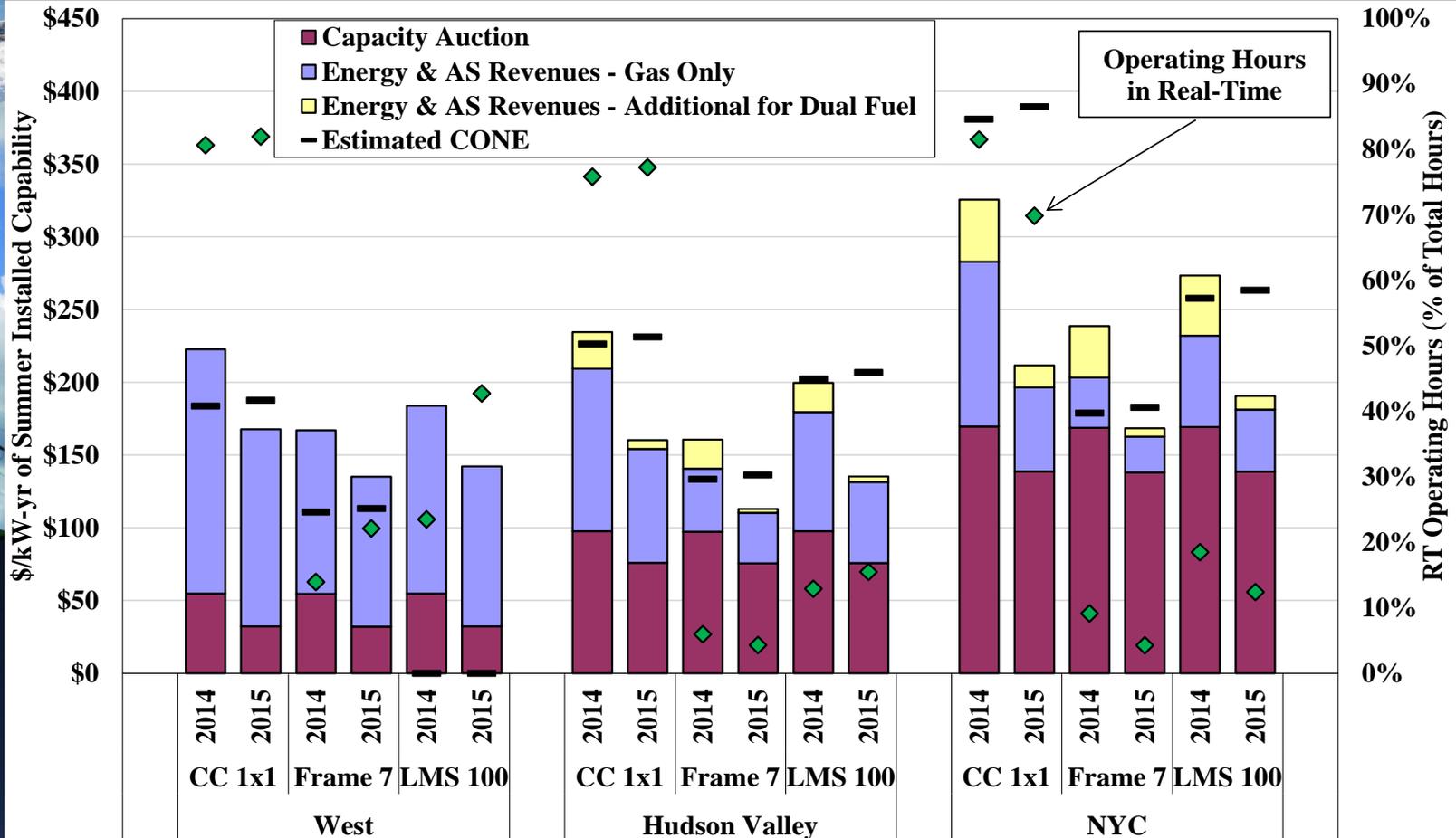
Highlights and Market Summary: Fuel Use and Gas Prices in Eastern NY



See Sections I.D, III.C, & IX.B.1



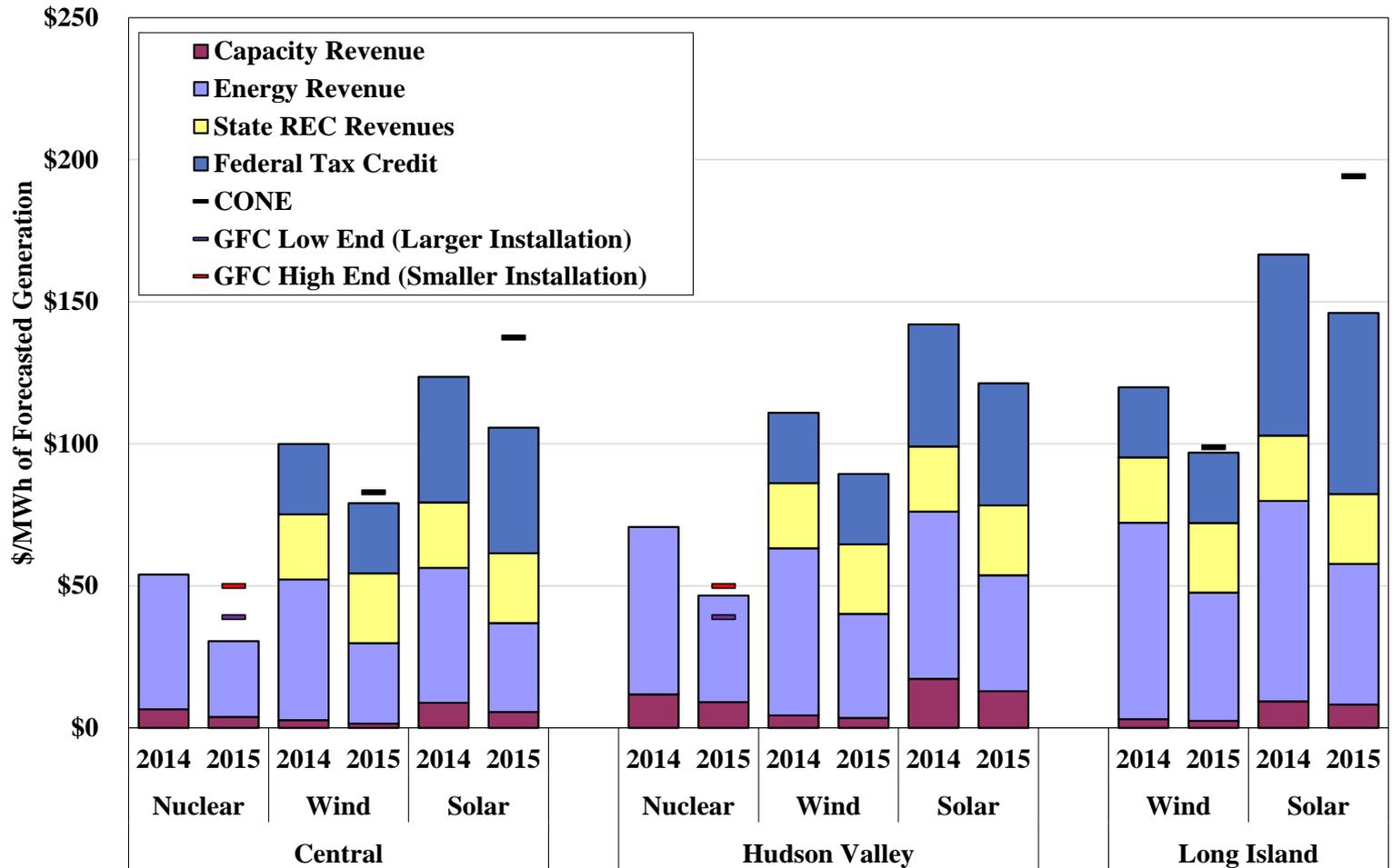
Highlights and Market Summary: Net Revenue for New Fossil-Fuel Units



See Sections I.A & III.G



Highlights and Market Summary: Net Revenue of Nuclear and Renewable Units



See Sections I.A & III.G



Capacity Prices as a Signal of Reliability Value: **Recommendation #1 – High Priority**

1. *Implement location-based marginal cost pricing of capacity that minimizes the cost of satisfying planning reliability criteria.*
 - Principles:
 - ✓ Price = Reliability Value
 - ✓ Minimize the costs of satisfying reliability needs
 - Approach:
 - ✓ Optimize LCRs and the IRM, while considering Zone K exports with an export limit and benefit ratio.
 - Benefits:
 - ✓ Reduce cost of satisfying resource adequacy criteria by tens of millions of dollars per year.
 - ✓ Reduce volatility of prices and requirements for investors.



Modify Treatment of Capacity Exports: **Recommendation #8 – High Priority**

8. *Modify the capacity market and planning process to better account for capacity that is exported to neighboring control areas from import-constrained capacity zones.*
- Example:
 - a) ROS unit sells 100 MW to ISO-NE and LHV unit sells 100 MW to NYISO
 - b) ROS unit sells 100 MW to NYISO and LHV unit sells 100 MW to ISO-NE
 - Injections in both cases: 100 MW in ROS and 100 MW in LHV
 - Withdrawals in both cases: 100 MW in NY and 100 MW in NE
 - NYISO operators will take the same steps to deliver in both cases.
 - Impact on NYISO operations and reliability is identical
 - Market impact should be identical



Modify Treatment of Capacity Exports: Recommendation #8 – High Priority

- Principle:
 - ✓ Capacity clearing price = Value of additional MWs in area
 - ✓ Capacity payment = Reliability value to NYISO
- Approach:
 - ✓ Account for the reliability benefits provided by a SENY resource that exports to another control area when clearing G-J Locality.
 - ✓ Compensate exporter based on local/ROS price differential.
 - ✓ Adjust planning assumptions to recognize these benefits.
- Benefits:
 - ✓ Avoid scenario where prices are inflated beginning in June 2018:
 - In G-J Locality by \$40/kW-year,
 - ✓ Reduce uncertainty regarding future prices and reliability needs.

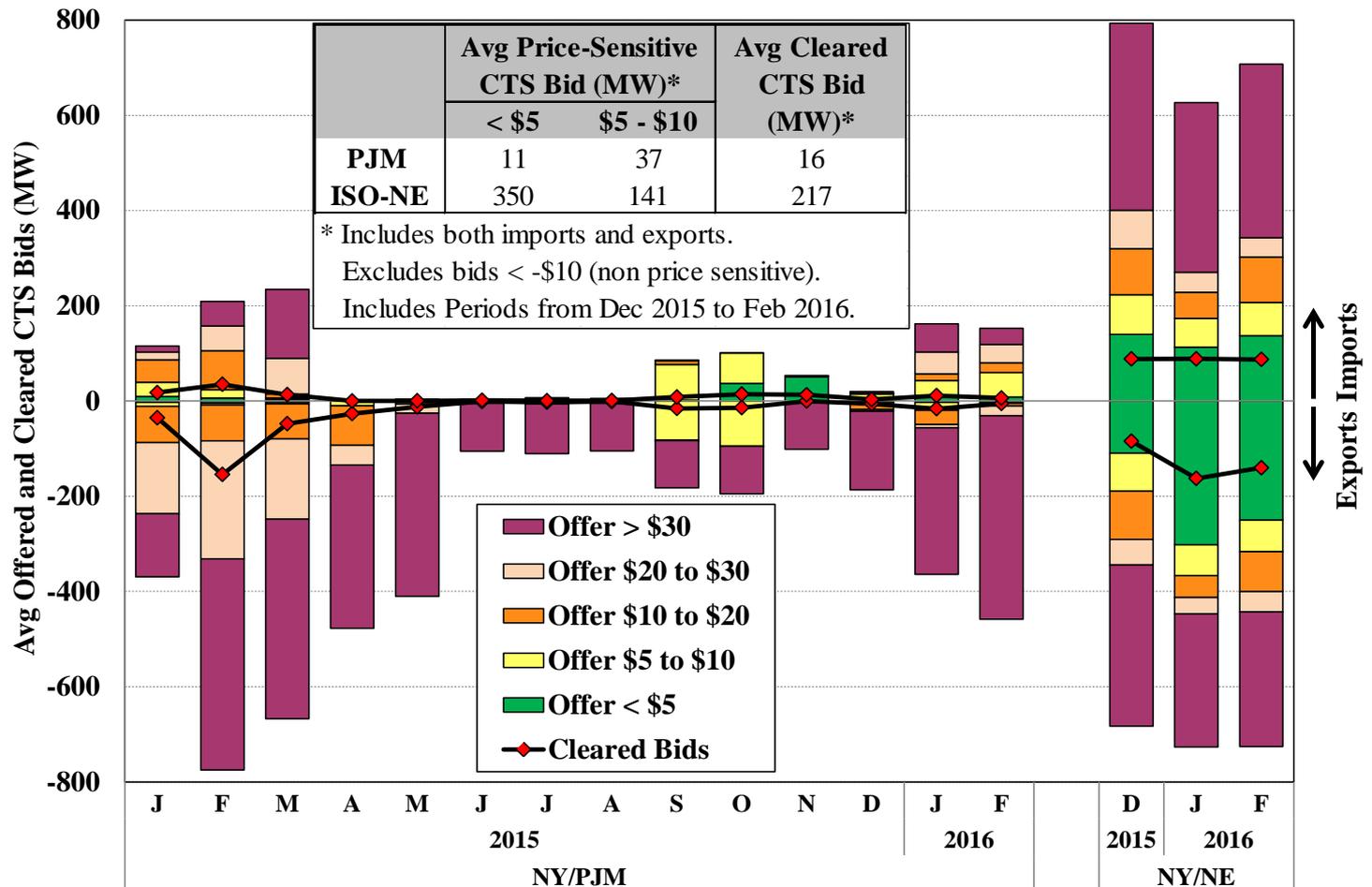


Enhance Modeling/Coordination with NE & PJM

Recommendations #9 & #12

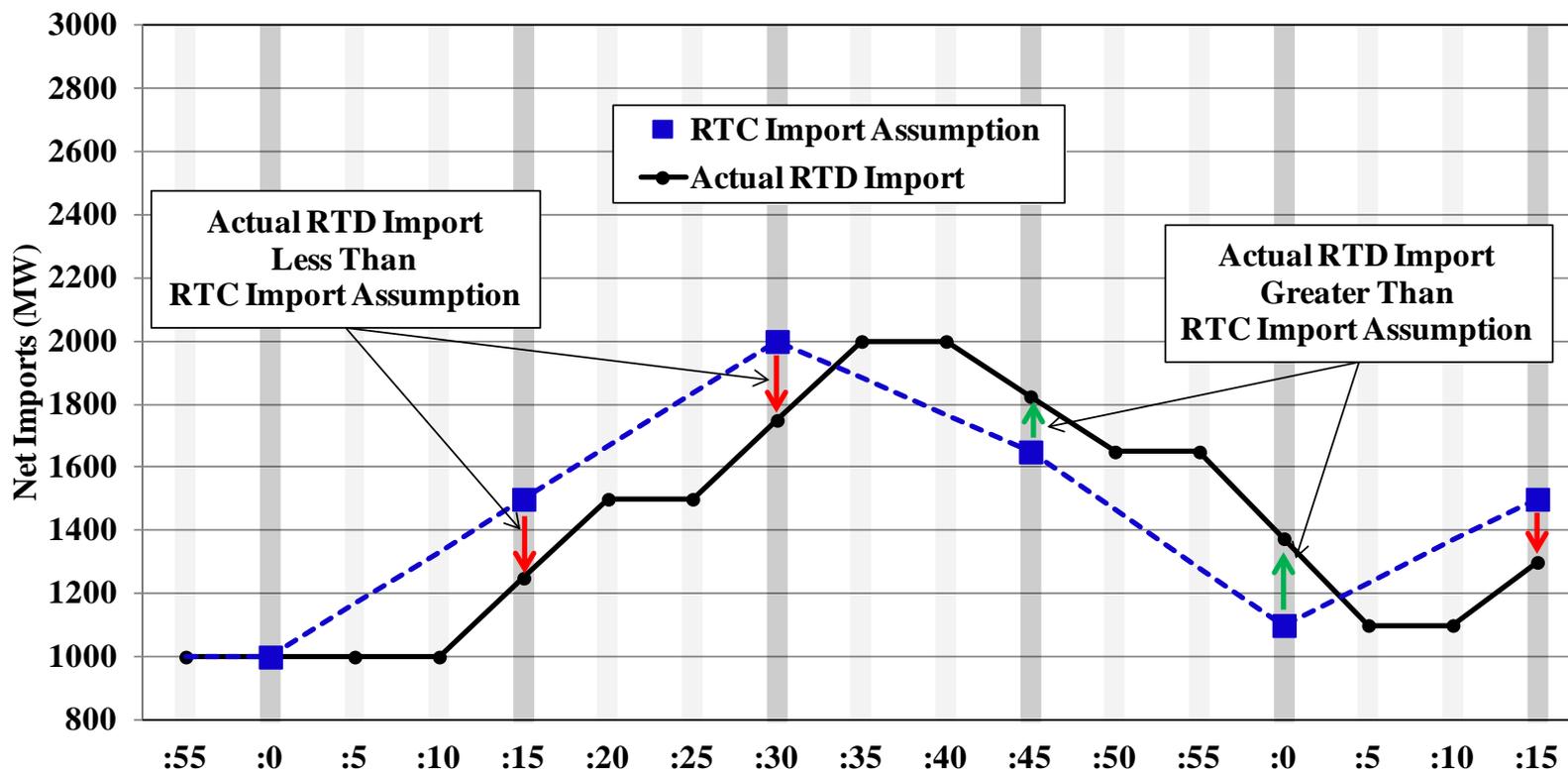
9. *Eliminate fees for CTS transactions at the PJM-NYISO border.*
12. *Adjust RTC and RTD look ahead evaluations to be consistent with timing of external transaction ramp and GT commitment.*
- Principle: Reduce unnecessary volatility and barriers to trading
 - Approach:
 - ✓ Use cost-causation approach when setting transaction fees.
 - ✓ Eliminate structural differences between forecast & actual outcomes.
 - Benefits:
 - ✓ Improve performance of CTS-PJM, CTS-NE, and intraday scheduling processes.
 - ✓ Reduce overall dispatch costs by improving external scheduling.
 - ✓ Reduce unnecessary price volatility.

Enhance Coordination with Other Control Areas: Recommendation #9



See Sections I.D, VII.D, & XI

Enhance Modeling/Coordination: Recommendation #12 – High Priority



See Sections I.D, IX.E, XI, & A-IV.D



Modernize Grandfathered Wheeling Agreements: Recommendations #10 & #11 – High Priority

10. *Incorporate the ABC and JK interfaces (between SE New York and PJM) into M2M process.*
 11. *Operate PAR-controlled lines to minimize production costs and create financial rights that compensate affected TOs.*
- Principles/Approach:
 - ✓ Use transmission to reduce production costs
 - ✓ Convert physical transmission rights and transactions into financial rights
 - Benefits:
 - ✓ Reduce production costs (up to \$44M/year combined)
 - ✓ Reduce unnecessary price spikes for Long Island customers
 - ✓ Create financial rights that benefit NYC customers



Enhance RT Performance Incentives: Recommendations #14, #15, #17, and #20

14. *Enhance criteria for gas turbines to set energy prices.*
15. *Model 100+kV transmission constraints in the day-ahead and real-time markets.*
17. *Enhance real-time pricing during transmission shortages.*
20. *Recognize gas system limits for reserve providers.*
 - Principles:
 - ✓ Price = marginal cost of maintaining reliability
 - ✓ Reward resources based on flexibility and performance in satisfying NYISO's reliability needs
 - Benefits:
 - ✓ Efficient scheduling of generation and imports
 - ✓ Increased investment in resources with flexible characteristics
 - ✓ Improve resource performance
 - ✓ Reduce reliance on capacity market



Enhance RT Performance Incentives: **Out-of-Merit Dispatch & Recommendation #15**

Region	OOM Station-Hours		
	2014	2015	% Change
West Upstate	2031	5050	149%
East Upstate	189	222	17%
New York City	241	613	154%
Long Island	701	1621	131%
Total	3162	7506	137%

In addition, 115kV congestion was also managed by:

(A) Instructing the Niagara plant out-of-market to shift generation among its units in 950 hours.

(B) Taking out-of-service two transmission lines on the NYISO-PJM interface for a combined 2,470 hours.

Enhance RT Performance Incentives: Transmission Shortages & Recommendation #17

Transmission Facilities	Transmission Shortage MW					
	< 5 MW		5 - 20 MW		> 20 MW	
	# Intervals	Avg Shadow Price (\$/MWh)	# Intervals	Avg Shadow Price (\$/MWh)	# Intervals	Avg Shadow Price (\$/MWh)
West Zone 230 kV Lines	125	\$1,376	1264	\$528	1048	\$870
Upstate - LIPA 345 kV Lines	365	\$233	752	\$247	545	\$309
E. Garden City - Valley Stream	556	\$884	848	\$738	232	\$872
Greenwood Load Pocket	214	\$2,117	872	\$119	246	\$62
All NYCA Facilities	1783	\$875	5072	\$364	2806	\$542

See Sections I.D, IX.A.2, & XI



Reform CARIS Process: Recommendation #7

7. *Reform the CARIS process to better identify and fund economically efficient transmission projects.*
- Principle: Fund transmission projects when that are more economic than potential generation and DR projects.
 - Approach:
 - ✓ Recognize value of transmission for satisfying planning criteria (as is done for generation and DR).
 - ✓ Enhance analytical methods used to evaluate the benefits of a proposed project.
 - Benefits:
 - ✓ Provide incentives for new investment that are technology-neutral.



Reform CARIS Process: Recommendation #7 – Specific Enhancements

- a) *Include Capacity Market Benefits* – The B/C ratio should include capacity value as estimated in discussion of Recommendation #2.
- b) *Revise Retirement and New Entry Assumptions* – Remove “Compensatory MWs” and base new entry assumptions on the demand curve reset model.
- c) *Enhance Gas System Modeling* – The value of future electric transmission investment will depend heavily on the gas market. NYISO should evaluate options for enhanced modeling.
- d) *Enhance Electric System Modeling* – The simulation model should be enhanced with a better representation of outages and real-time contingencies and other events.
- e) *Reduce 80 Percent Voting Requirement*
- f) *Eliminate \$25 Million Minimum Threshold*

List of Recommendations: Capacity & Transmission Planning

RECOMMENDATION	Discussed in	Current Effort	High Priority	Scoping/Future
<u>Capacity Market Enhancements</u>				
(1) Implement location-based marginal cost pricing of capacity that minimizes the cost of satisfying planning reliability criteria.	VIII.C	X	X	
(2) Grant financial capacity transfer rights between zones when investors upgrade the transmission system and help satisfy planning reliability needs without a cost-of-service rate.	VIII.D			X
(3) Establish a dynamic locational capacity framework that addresses future potential deliverability constraints to allow prices to reflect the locational value of capacity and quickly adjust to changes in	VIII.F			X
(4) Enhance Buyer-Side Mitigation measures to deter uneconomic entry while ensuring that economic entrants are not mitigated.				
(a) Reform the Offer Floor for mitigated projects.	IV.C.2			
(b) Modify assumptions used to forecast ICAP prices and net revenues, especially relating to the treatment of existing generation and potential new entrants.	IV.C.2	X		
(5) Expand buyer-side mitigation measures to address other actions that can suppress capacity prices.	IV.C.2	X		X
(6) Modify the pivotal supplier test to prevent a large NYC supplier from circumventing the mitigation rules by selling capacity in the forward capacity auctions (i.e., the strip and monthly auctions) to avoid being designated as a pivotal supplier for NYC.	IV.C.4			
<u>Economic Transmission Planning Process</u>				
(7) Reform the CARIS process to better identify and fund economically efficient transmission investments.	VIII.E			X



List of Recommendations: Broader Regional Markets & RT Market Operations

RECOMMENDATION	Discussed in	Current Effort	High Priority	Scoping/Future
<u>Broader Regional Markets</u>				
(8) Modify the capacity market and planning process to better account for capacity that is exported to neighboring control areas from import-constrained capacity zones.	VIII.B		X	
(9) Eliminate transaction fees for CTS transactions at the PJM-NYISO border.	VII.D			
(10) After the ConEd-PSEG wheeling agreement expires, work with PJM to coordinate scheduling of the associated controllable lines (i.e., the A, B, C, J, and K lines) to minimize production costs across the two regions.	IX.D			
<u>Energy Market Enhancements - RT Market Operations</u>				
(11) Operate certain PAR-controlled lines to minimize production costs and create financial rights that compensate affected transmission owners.	IX.D		X	
(12) Adjust look ahead evaluations of RTD and RTC to be more consistent with the timing of external transaction ramp and gas turbine commitment.	VII.D IX.E	X	X	X
(13) Consider enhancing modeling of loop flows and PAR-controlled lines to reflect the effects of expected generation, load, and PAR-controls on line flows more accurately.	IX.E	X		X

List of Recommendations: Energy Market Enhancements

RECOMMENDATION	Discussed in	Current Effort	High Priority	Scoping/Future
<u>Energy Market Enhancements - RT Pricing</u>				
(14) Modify criteria for GTs to set prices in the real-time market by allowing GTs to be eligible to set price in the final pricing pass and incorporating start-up costs.	IX.C	X		
(15) Model 100+ kV transmission constraints in the DA and RT markets using economic commitment and dispatch software.	IX.F.3			
(16) Dynamically adjust operating reserve requirements to account for factors that increase or decrease the amount of reserves that must be held on internal resources.	IX.A.1			X
(17) When a transmission constraint cannot be satisfied, utilize graduated transmission demand curves to set constraint shadow prices.	IX.A.2			X
<u>Energy Market Enhancements - BPCG Eligibility Criteria</u>				
(18) Work with generators in NOx bubbles to ensure their RACT compliance plans use the most economic compliance option available.	IX.F.2			
<u>Energy Market Enhancements - Fuel Assurance</u>				
(19) Consider allowing generators to submit offers that reflect certain energy storage and fuel supply constraints in the day-ahead market.	IX.B.2	X		X
(20) Enhance recognition of gas system limitations when scheduling resources to provide operating reserves.	IX.B.2			X
<u>Energy Market Enhancements - DAM Scheduling</u>				
(21) Improve assumptions in the commitment logic of the DAM to avoid scheduling uneconomic gas turbines.	V.A			