



Highlights of the 2017 State of the Market Report for the NYISO Markets

Presented by:

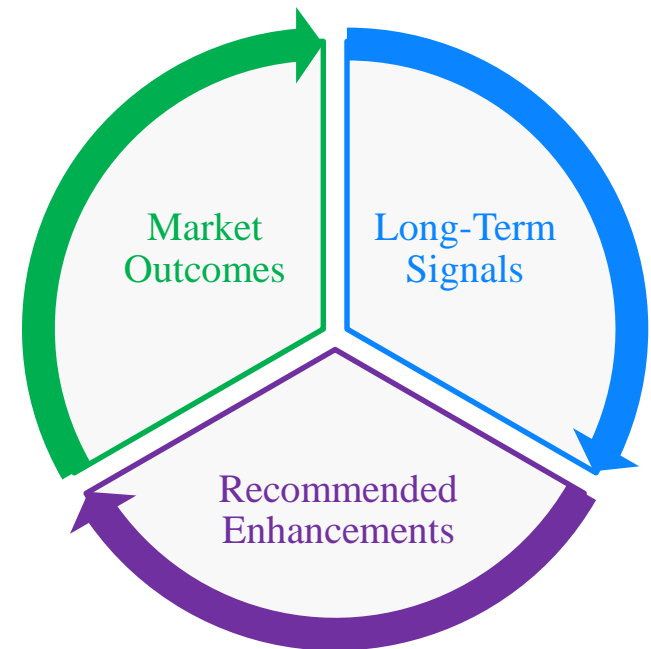
Pallas LeeVanSchaick
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Business Issues Committee Meeting
May 16, 2018



Overview

- Schedule of Presentations
- Market Highlights
 - ✓ Prices, Congestion
 - ✓ Market Operations
- Long-Term Investment Signals
- Recommendations
 - ✓ Performance incentives
 - ✓ Market power mitigation
 - ✓ RT scheduling
 - ✓ Transmission incentives
 - ✓ Capacity market design





Schedule for Review of 2017 SOM Report

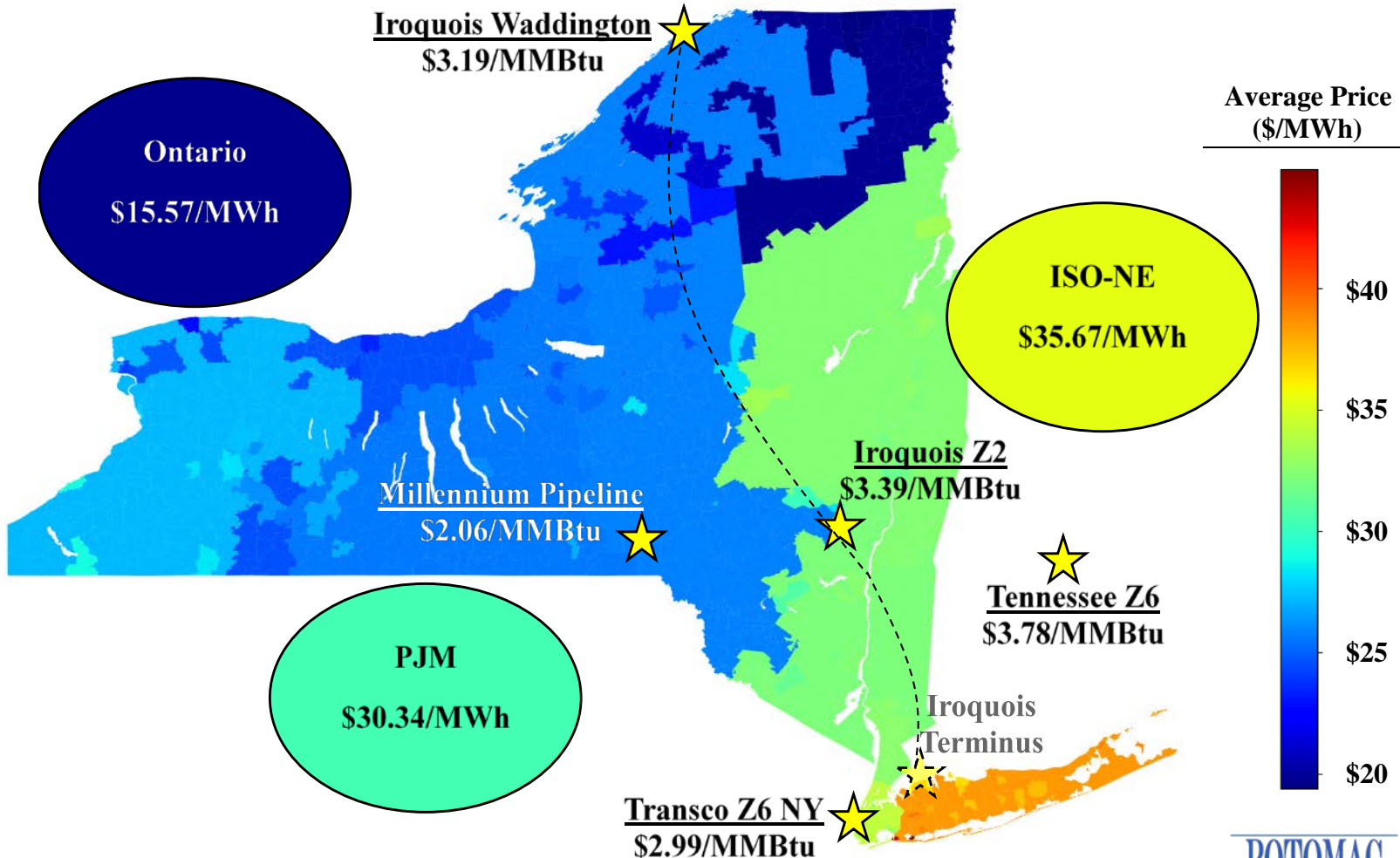
- On May 8: Report posted on NYISO website
- Presentation schedule:
 - ✓ May 16: Overview of Report & Recommendations
 - ✓ May 23: Capacity Results & Recommendations
 - ✓ May 31: Energy & AS Results & Recommendations
- Submit comments/questions to:
 - ✓ deckels@nyiso.com, pallas@potomaceconomics.com, & jchen@potomaceconomics.com



Market Highlights

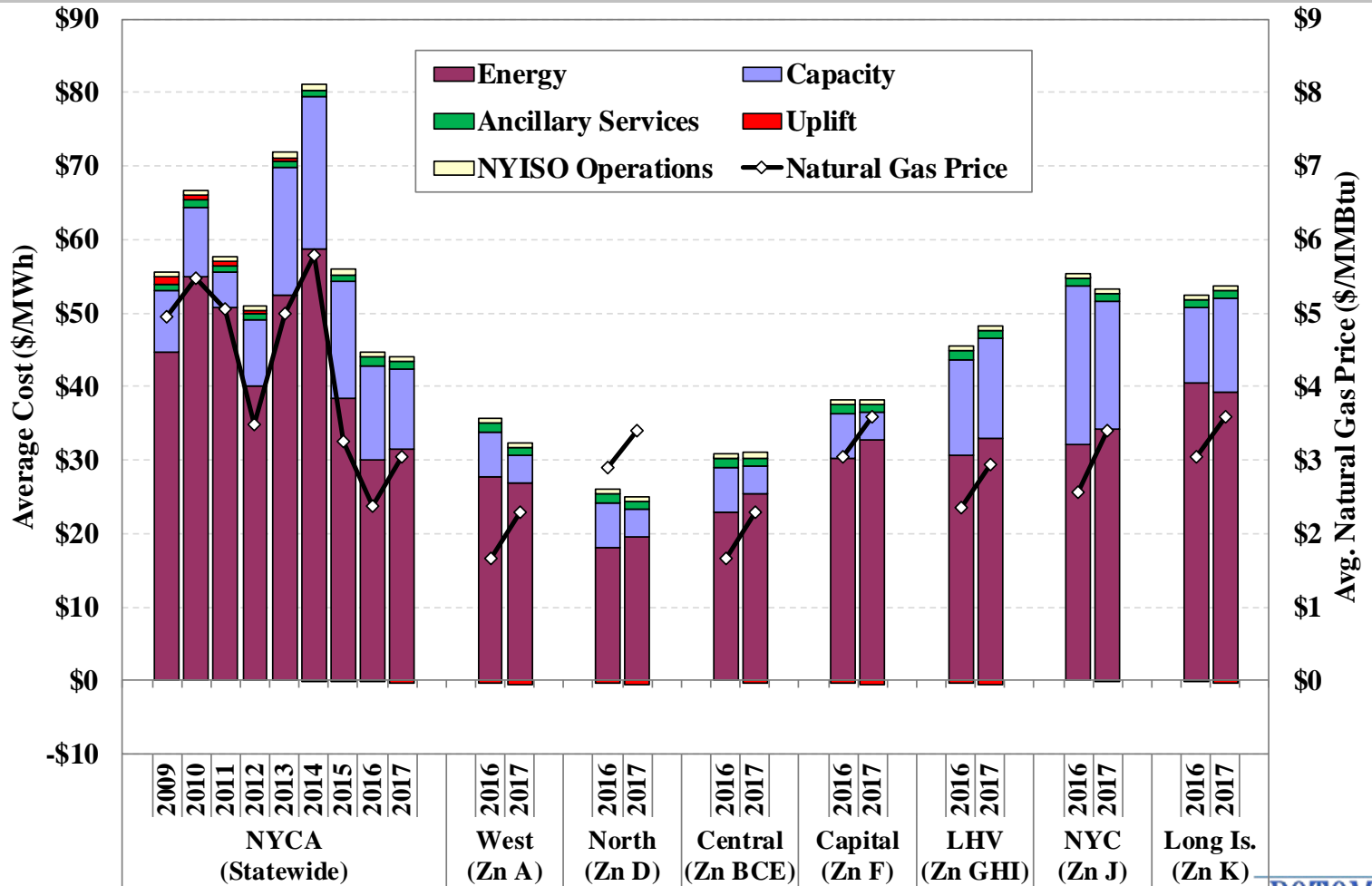


Market Highlights: Energy Prices and Congestion





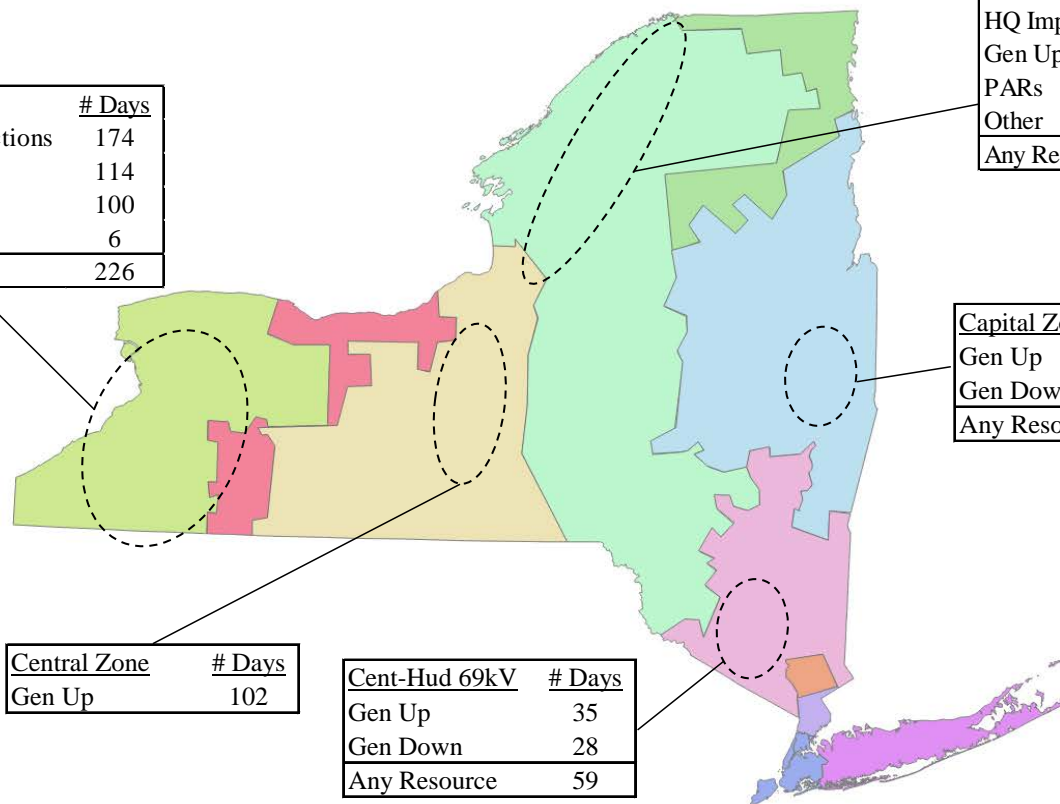
Market Highlights: Average All-In Price by Region



Market Highlights: Operator Actions to Manage 115 kV Constraints



<u>West Zone</u>	<u># Days</u>
External Transactions	174
Gen Up/Down	114
PARs	100
Other	6
Any Resource	226



<u>North Zone</u>	<u># Days</u>
HQ Imports	41
Gen Up/Down	96
PARs	50
Other	10
Any Resource	120

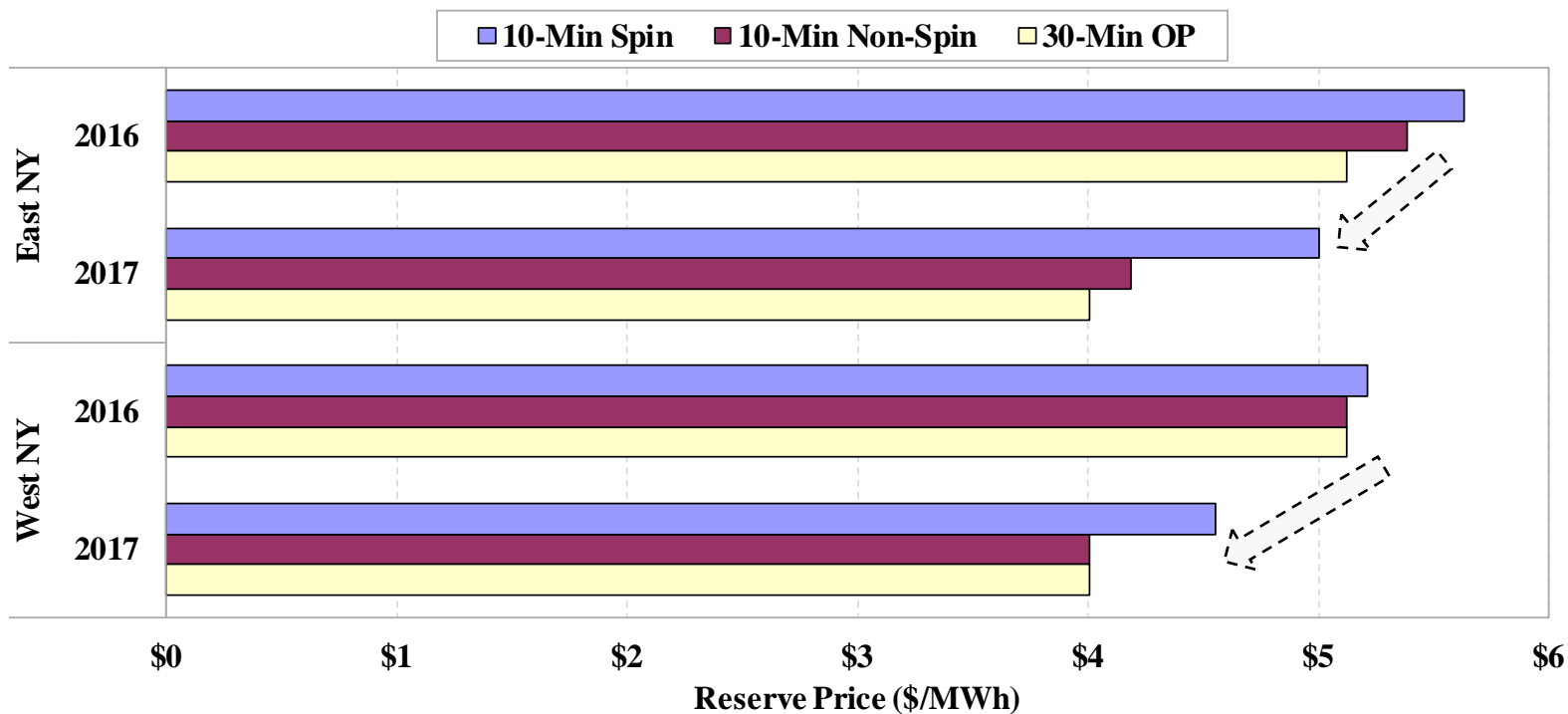
<u>Capital Zone</u>	<u># Days</u>
Gen Up	8
Gen Down	76
Any Resource	83

<u>Central Zone</u>	<u># Days</u>
Gen Up	102

<u>Cent-Hud 69kV</u>	<u># Days</u>
Gen Up	35
Gen Down	28
Any Resource	59

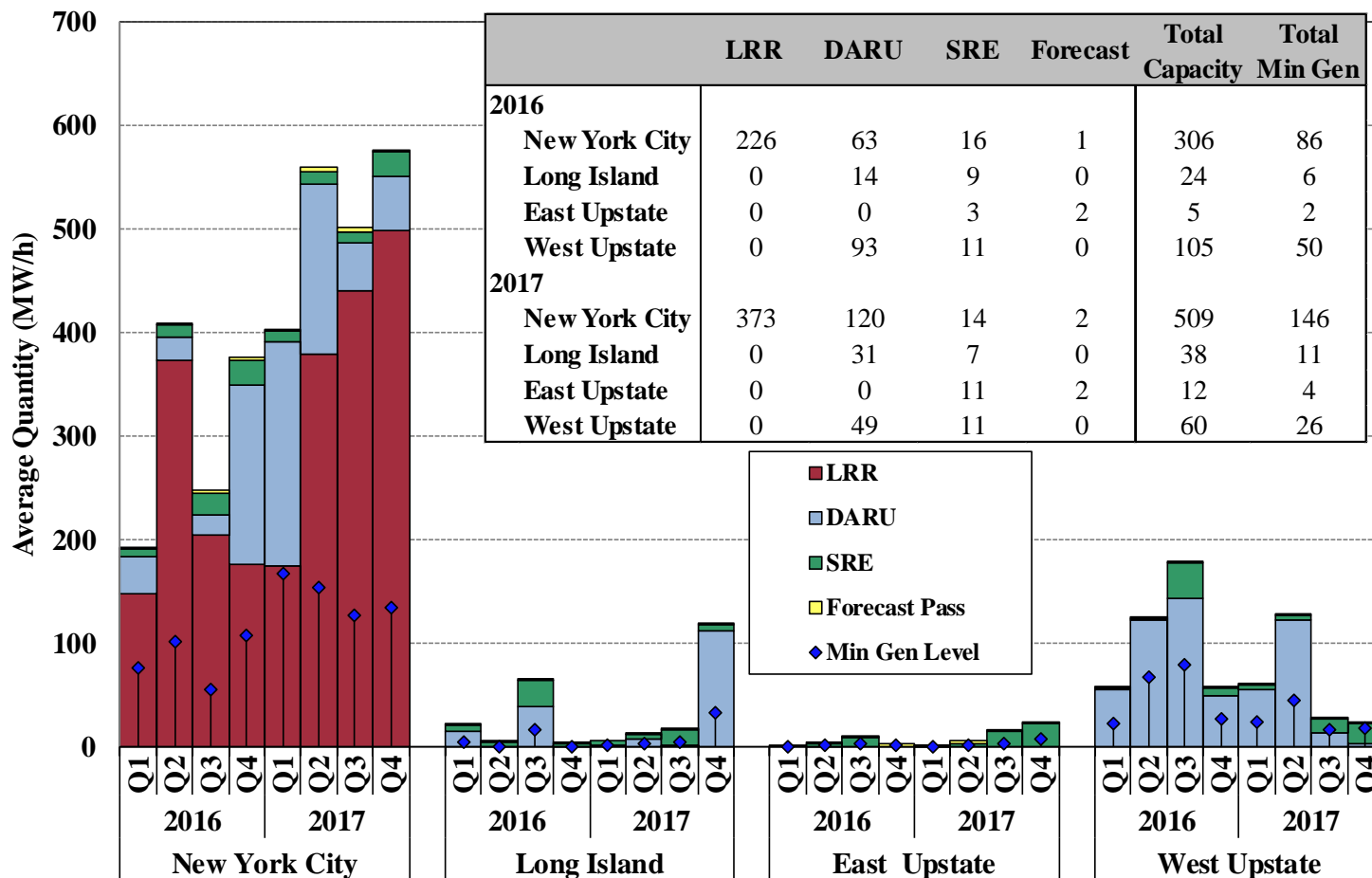


Market Highlights: Day-ahead Reserve Prices



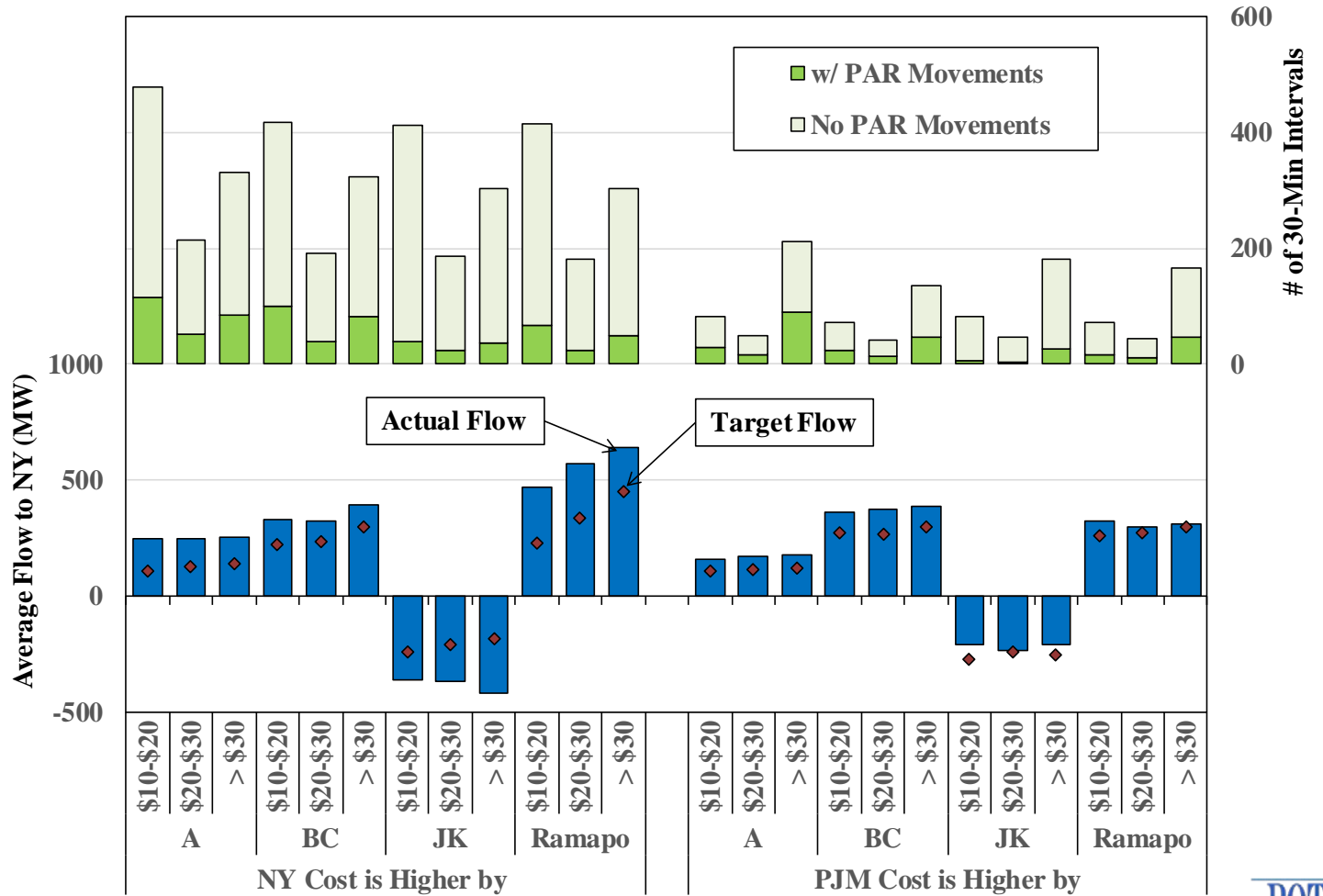
- Ancillary service prices fell across products and in all zones by 11-to-23 percent from 2016 to 2017.
- The reduction was primarily due to reduced offer prices.

Market Highlights: Supplemental Commitment for Reliability





Market Highlights: PAR Operation Under M2M – May to December





Market Highlights: Coordinated Transaction Scheduling

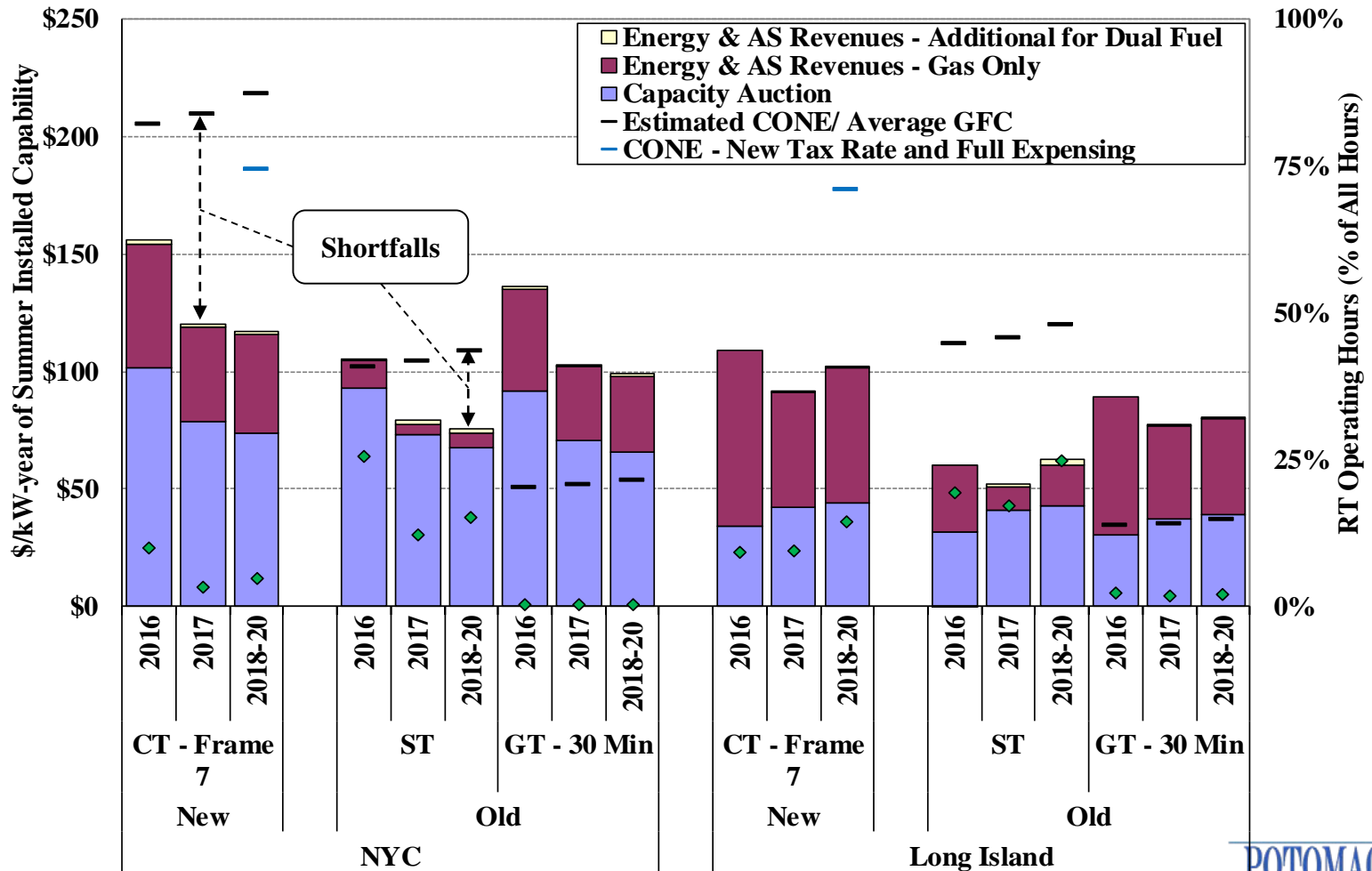
- Increased cost savings: \$1.9M in 2016 to \$5.4M in 2017.
 - ✓ Average forecast error by the NYISO fell 12/18 percent and by ISO-NE fell 26 percent.
 - ✓ Price-sensitive bid volume rose from 810 MW to 1.3 GW.
- Impact of transaction fees: The PJM interface accounts for only 28 percent of bid volume and 11 percent of cost savings.
- Drivers of RTC forecast error:
 - ✓ Constraint modeling, PAR Modeling, loop flows – 39 percent
 - ✓ Load and Wind Forecasting – 22 percent
 - ✓ RTC/RTD Timing & Ramp Profiling – 18 percent
 - ✓ These are also the primary drivers of transient price volatility



Investment Signals

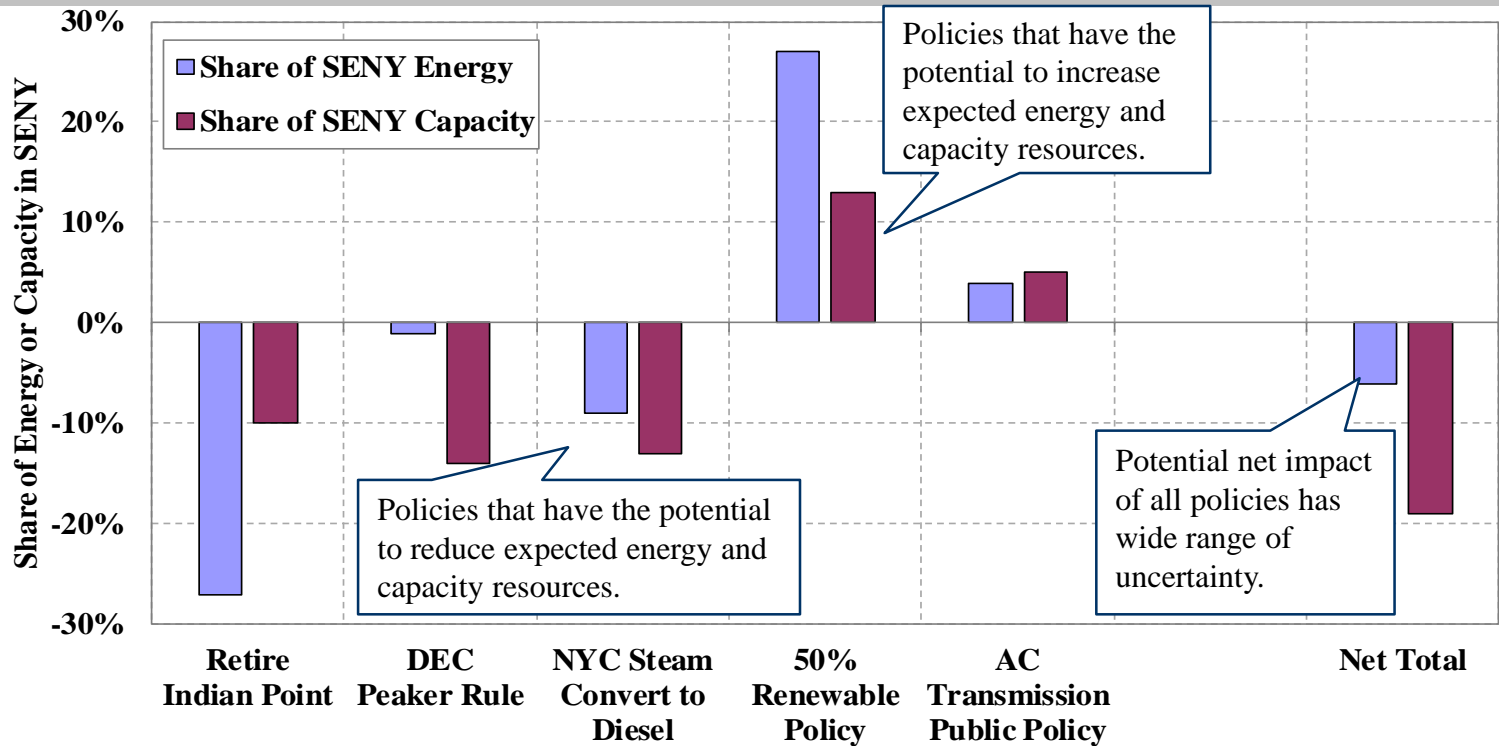


Investment Signals: New and Existing Generators in NYC & LI





Investment Signals: Public Policy Impacts on Resource Mix



- These policies shift value:
 - ✓ Day-Ahead Energy → Ancillary Services + Balancing Energy
 - ✓ Underscores importance of market rules that reward resource flexibility





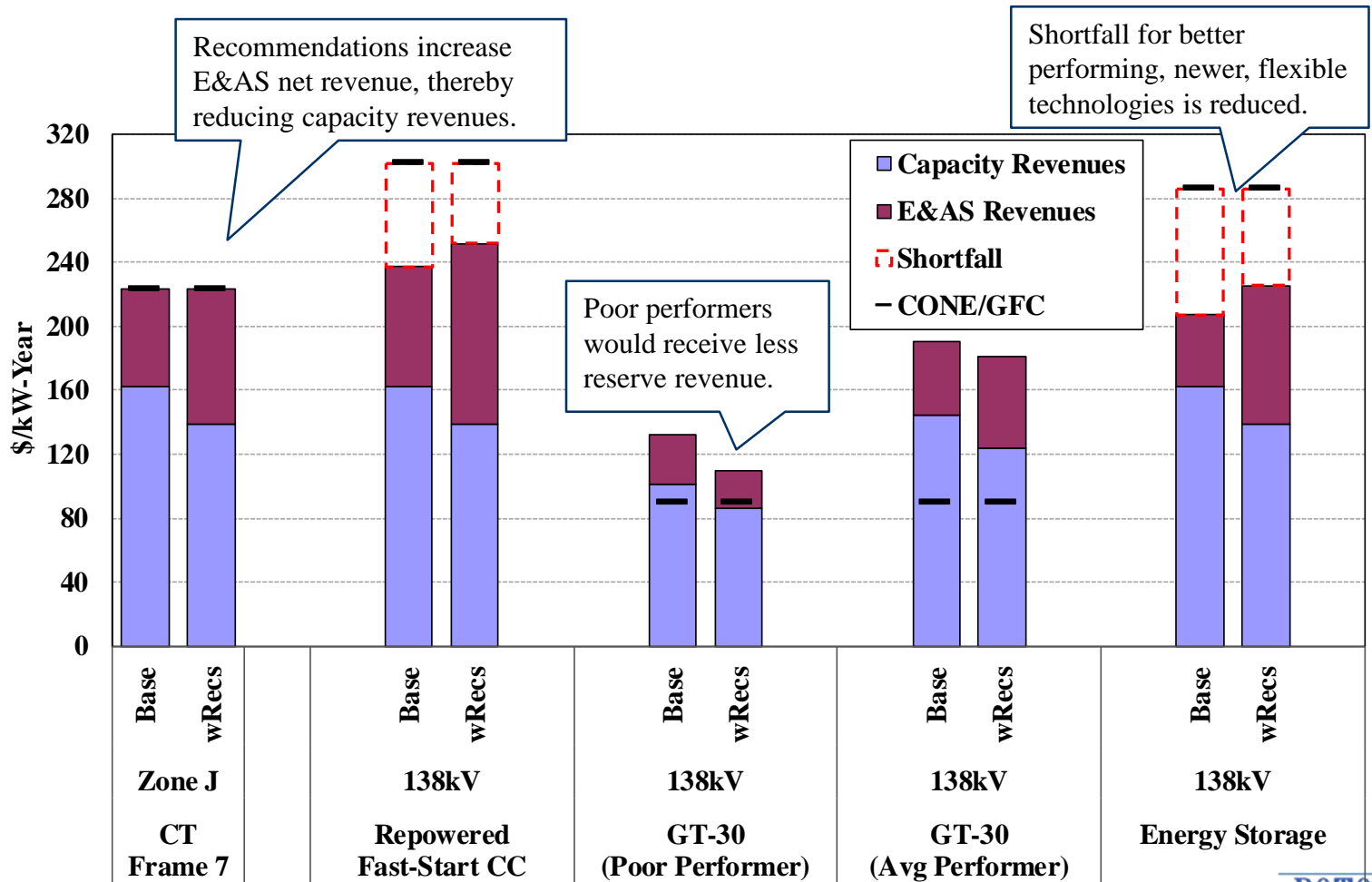
Recommendations for Market Enhancements



Recommendations to Enhance Performance Incentives

- We recommend several actions to better align compensation with generator performance:
 - ✓ 2017-1: Model local reserve requirements in NYC
 - ✓ 2017-2: Raise reserve demand curves to adapt to PJM and ISO-NE “Pay For Performance” capacity market rules
 - ✓ 2016-1: Pay reserve units for congestion relief
 - ✓ 2016-2: Discount reserve payments to poor-performers
- The next figure illustrates the benefits of the recommendations by showing their estimated net revenue impacts.
 - ✓ The figure also assumes partial implementation of 2015-16: Dynamic reserve requirements (NYC load pockets only)

Performance Incentive Recommendations: 2017-1, 2017-2, 2016-1, 2016-2, & 2015-16





Performance Incentive Recommendations: 2015-17 & 2014-12

- These recommendations would enhance incentives but their effects are too complex to model in the net revenue analysis.
 - ✓ 2015-17: Constraint-specific GTDCs
 - NYISO implemented a big improvement in June 2017.
 - However, GTDCs should be set based on importance, severity, and/or duration of a constraint violation.
 - ✓ 2014-12: Model 100kV transmission constraints in the market
 - Would reduce need for operator actions for 115kV system.
 - Would improve incentives to schedule resources more efficiently, maintain 115kV resources, and build transmission and generation relieves congestion.
- The NYISO is making progress on these recommendations.



Mitigation Measures: Recommendations 2017-3 and 2017-4

- Evolving market conditions have revealed gaps in the existing mitigation rules. These have not been exploited significantly, but we recommend rule changes to address the gaps:
 - ✓ 2017-3: Deter generators from over-producing to benefit from negative real-time prices. To illustrate, suppose a generator:
 - DAM: 200 MW schedule at \$20/MWh
 - In RTM: Transmission outage or loop flows require generator to back down
 - Self-schedule 160 MW and LBMP = -\$300/MWh.
 - RT buy-back MWs at *cost* of -\$12,000/hour.
 - ✓ 2017-4: Deter generators from submitting inflated fuel cost estimates to drive up LBMPs.



Enhance Real Time Scheduling: Recommendations 2014-9, 2012-13, & 2015-9

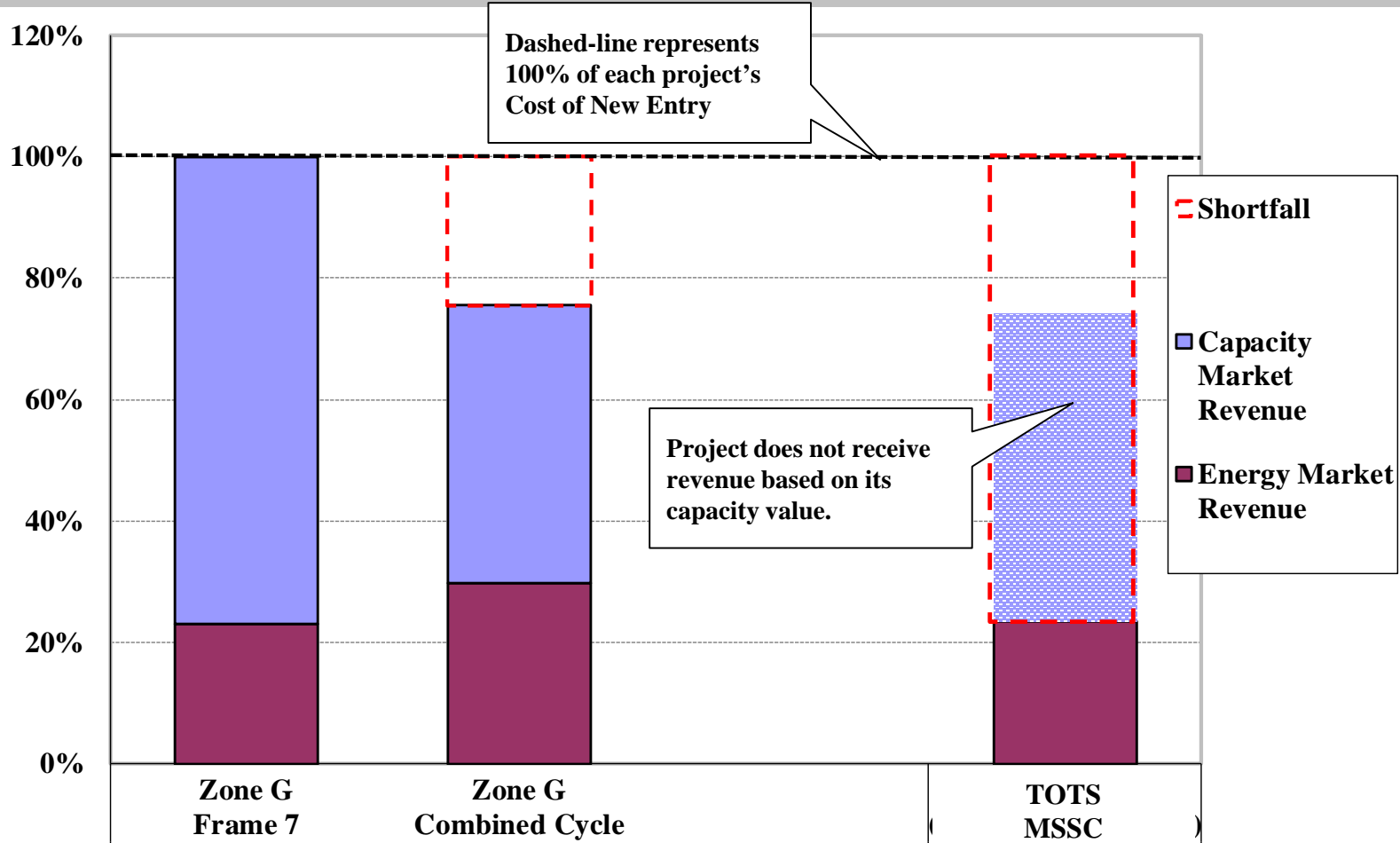
- To improve RTC forecasting, reduce unnecessary RT price volatility, and better utilize external interfaces:
 - ✓ 2014-9: Consider effect of generator dispatch on PAR-controlled line flows and enhance loop flow modeling
 - ✓ 2012-13: Adjust look ahead of RTD and RTC to be consistent
 - ✓ 2015-9: Eliminate transaction fees at the PJM-NYISO border
- Benefits:
 - ✓ Improve performance of CTS with PJM and ISO-NE
 - ✓ Increase potential ramp of PJM and ISO-NE interfaces
 - ✓ Improve fast-start commitment and shut-down decisions



Transmission Incentives & Planning Enhancements Recommendations 2012-1c & 2015-7

- The NYISO markets do not provide incentives for efficient transmission investment. To address this, we recommend:
 - ✓ 2012-1c: Compensate merchant investors for capacity value of transmission upgrades (expanded capability between zones).
 - ✓ 2015-7: Reform CARIS to better identify potential economic transmission.
- Benefits:
 - ✓ Achieve cost savings by lowering barriers to entry (that favor generation and demand response over transmission).
 - ✓ Substantially reduce the need for out-of-market public policy investment.

Transmission Incentives & Planning Enhancements: Recommendations 2012-1c & 2015-7





Capacity Market Pricing: Recommendations 2012-1a & 2013-1c

- We have two key recommendations to improve capacity pricing incentives by location based on planning requirements.
 - ✓ 2012-1a: Establish a more disaggregated set of locations or interfaces to allow the market more flexibility in procuring and pricing capacity.
 - ✓ 2013-1c: Lower costs and improve pricing by the market to optimize its locational procurements.
- Benefits:
 - ✓ Reduce the costs of satisfying resource adequacy needs.
 - ✓ Facilitate efficient investment and retirement.
 - ✓ More adaptable to changes in resource portfolio.
 - ✓ Simplify market administration.



Appendix

Full List of 2017 SOM Recommendations

Recommendations related to Pricing and Performance Incentives

Number	Section	Recommendation	Current Effort	High Priority
Energy Market Enhancements - Pricing and Performance Incentives				
2017-1	IX.G	Model local reserve requirements in New York City load pockets.		
2017-2	IX.A	Consider modifying operating reserve demand curves to ensure NYISO reliability after PJM and ISO-NE implement PFP (“Pay For Performance”) capacity market rules.		✓
2016-1	VIII.C	Consider rules for efficient pricing and settlement when operating reserve providers provide congestion relief.		
2016-2	IX.C	Consider means to allow reserve market compensation to reflect actual and/or expected performance.		
2015-9	VI.D	Eliminate transaction fees for CTS transactions at the PJM-NYISO border.		
2015-16	IX.A	Dynamically adjust operating reserve requirements to account for factors that increase or decrease the amount of reserves that must be held on internal resources.		
2015-17	IX.A	Utilize constraint-specific graduated transmission demand curves to set constraint shadow prices during transmission shortages.	✓	
2014-12	V.A	Model 100+ kV transmission constraints in the day-ahead and real-time markets, and develop associated mitigation measures.	✓	✓

Recommendations related to Mitigation Measures, Market Operations, Uplift, and Fuel Issues

Number	Section	Recommendation	Current Effort	High Priority
Energy Market Enhancements – Market Power Mitigation Measures				
2017-3	IX.A	Modify mitigation rules to address deficiencies in the current rule related to uneconomic over-production.		
2017-4	III.B	Modify mitigation rules to deter the use of fuel cost adjustments by a supplier to economically withhold.		
Energy Market Enhancements - Real-Time Market Operations				
2014-9	VI.D, IX.F	Consider enhancing modeling of loop flows and flows over PAR-controlled lines to reflect the effects of expected variations more accurately.		
2012-8	VI.D, IX.F	Operate certain PAR-controlled lines to minimize production costs and create financial rights that compensate affected transmission owners.		
2012-13	VI.D, IX.F	Adjust look ahead evaluations of RTD and RTC to be more consistent with the timing of external transaction ramp and gas turbine commitment.		
Energy Market Enhancements - BPCG Eligibility and Fuel Limitations/Storage				
2014-13	IX.G	Work with generators in NOx bubbles to ensure their RACT compliance plans use the most economic compliance option available.		
2013-11	IX.B.2 (2015 SOM)	Consider allowing generators to submit offers that reflect certain energy storage and fuel supply constraints in the day-ahead market.	✓	



Recommendations related to Capacity Market Enhancements and Planning Process

Number	Section	Recommendation	Current Effort	High Priority
Capacity Market Enhancements				
2015-8	VII.C	Modify the capacity market to better account for imports from neighboring control areas to import-constrained capacity zones.		
2013-2d	III.C	Enhance Buyer-Side Mitigation Forecast Assumptions to deter uneconomic entry while ensuring that economic entrants are not mitigated.		
2013-1c	VII.B	Implement optimal location marginal cost pricing of capacity that minimizes the cost of satisfying planning requirements.		
2012-1a	VII.F	Establish a dynamic locational capacity framework that reflects potential deliverability, resource adequacy, and transmission security requirements.		
2012-1c	VII.D	Grant financial capacity transfer rights between zones when investors upgrade the transmission system and help satisfy planning reliability needs without receiving a cost-of-service rate.		
Planning Process Enhancements				
2015-7	VII.E	Reform the CARIS process to better identify and fund economically efficient transmission investments.		