2016 State of the Market Report: Energy & Ancillary Services Market Highlights

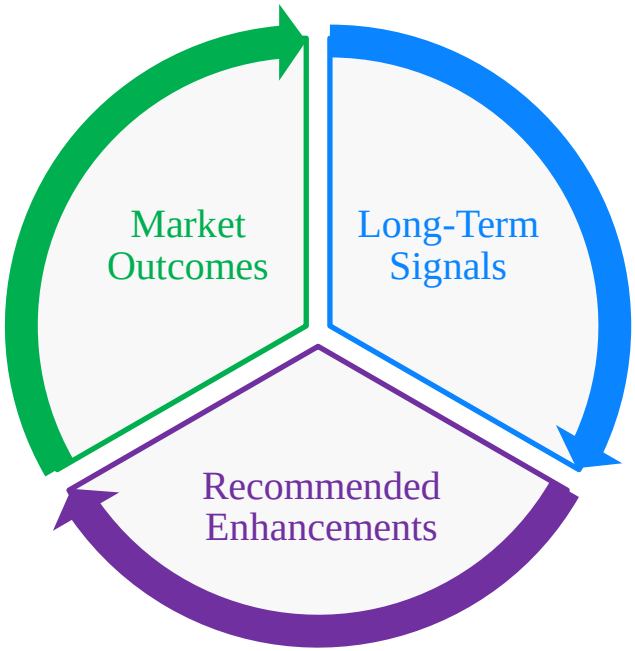
Pallas LeeVanSchaick
NYISO Market Monitoring Unit
Potomac Economics

Market Issues Working Group
June 6, 2017

POTOMAC ECONOMICS

Overview

- Schedule of Presentations
- Market Highlights
  - ✓ All-in Prices, Congestion, Uplift
- Recommendations
  - ✓ New in the 2016 Report
  - ✓ Real-Time Performance Incentives
  - ✓ Real-Time Market Operations



POTOMAC ECONOMICS

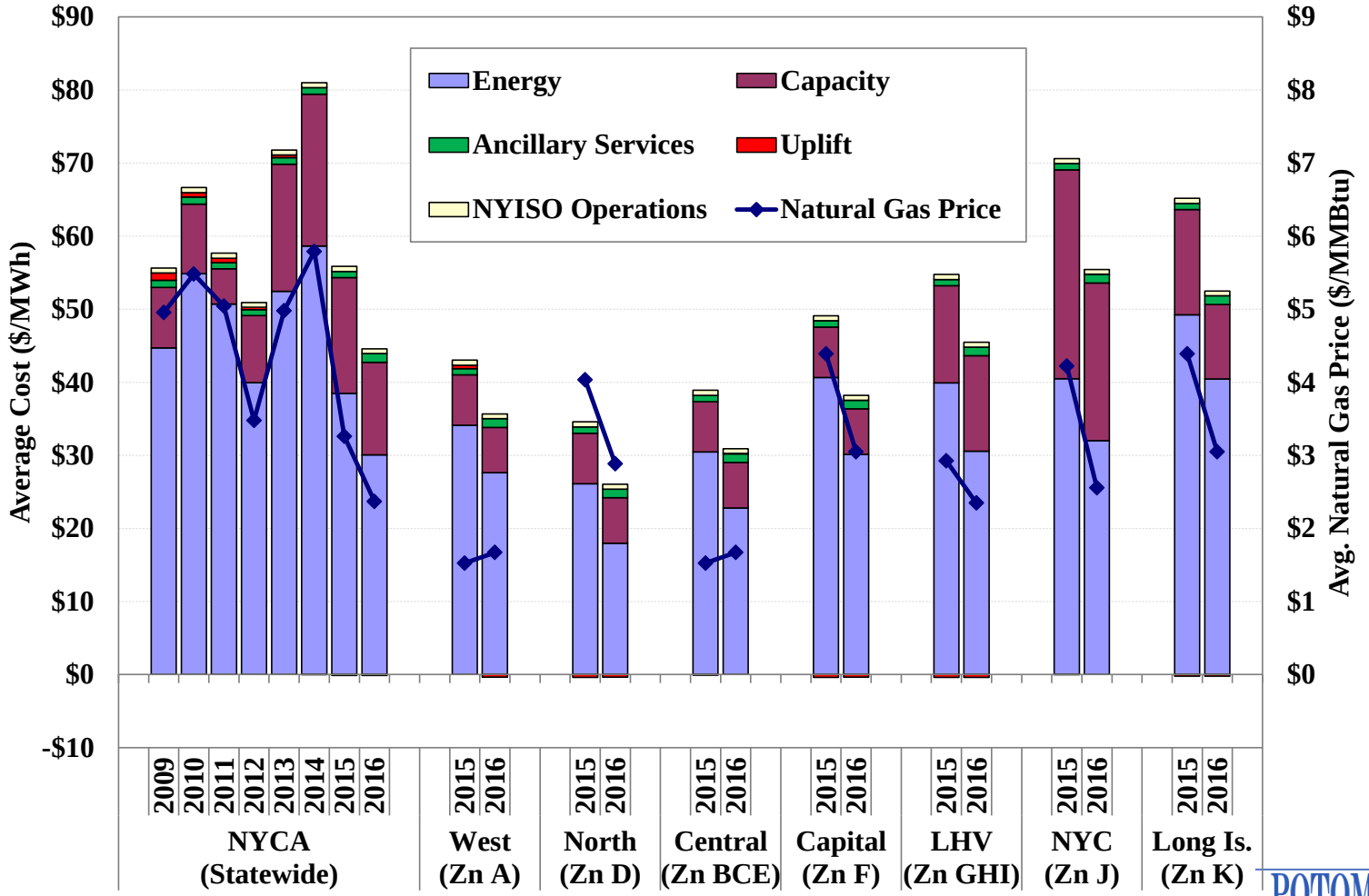
Schedule for Review of 2016 SOM Report

- On May 10: Report posted on NYISO website
- Presentation schedule:
  - ✓ May 17 BIC: Overview of Report & Recommendations
  - ✓ June 1 ICAPWG: Capacity Results & Recommendations
  - ✓ June 6 MIWG: Energy & AS Results & Recommendations
- Submit comments/questions to one of the following:
  - ✓ deckels@nyiso.com, pallas@potomaceconomics.com, & jchen@potomaceconomics.com
- Comments/questions will be addressed case by case.

Market Highlights

POTOMAC ECONOMICS

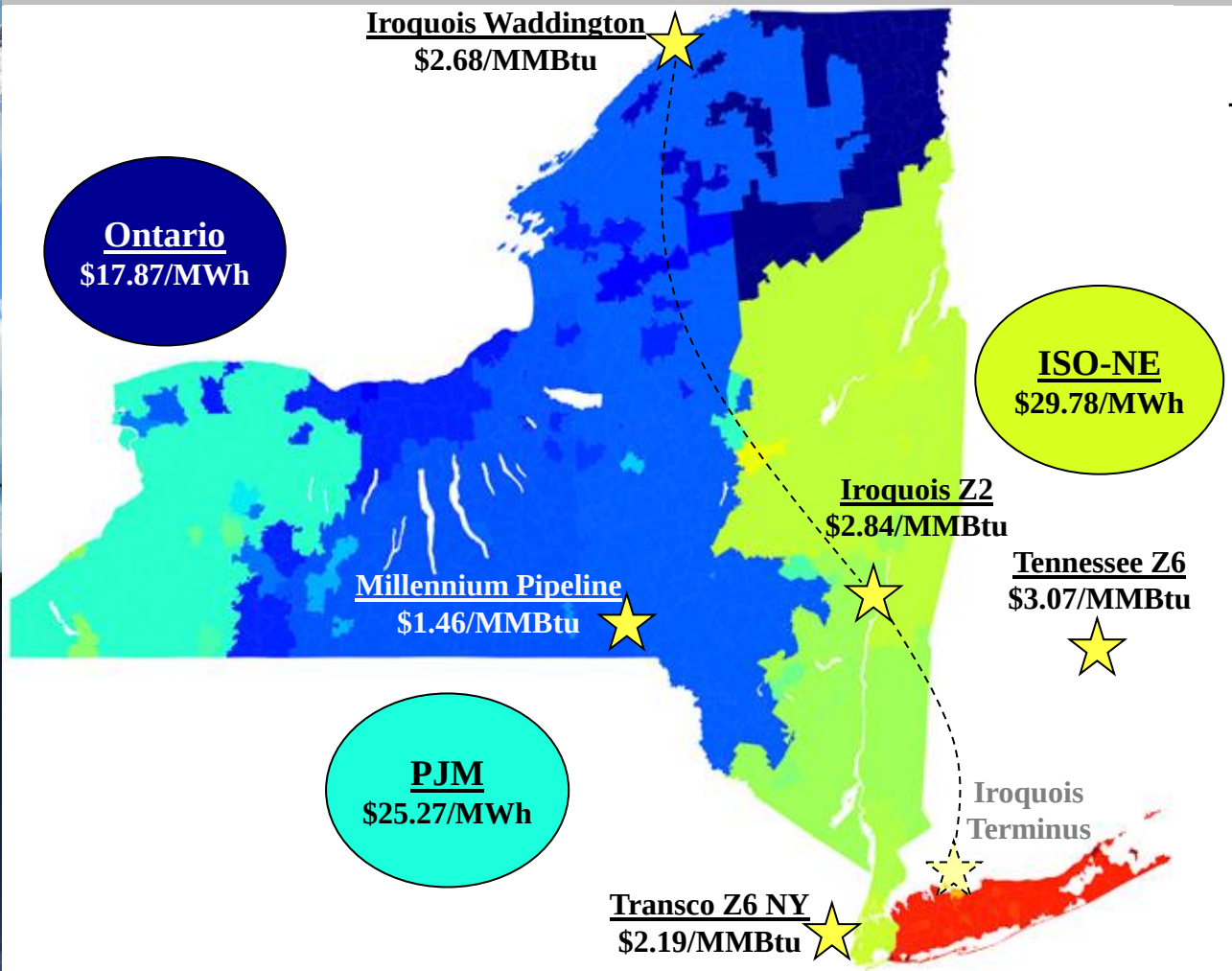
Market Highlights:
Average All-In Price by Region



See Section II.A

POTOMAC ECONOMICS

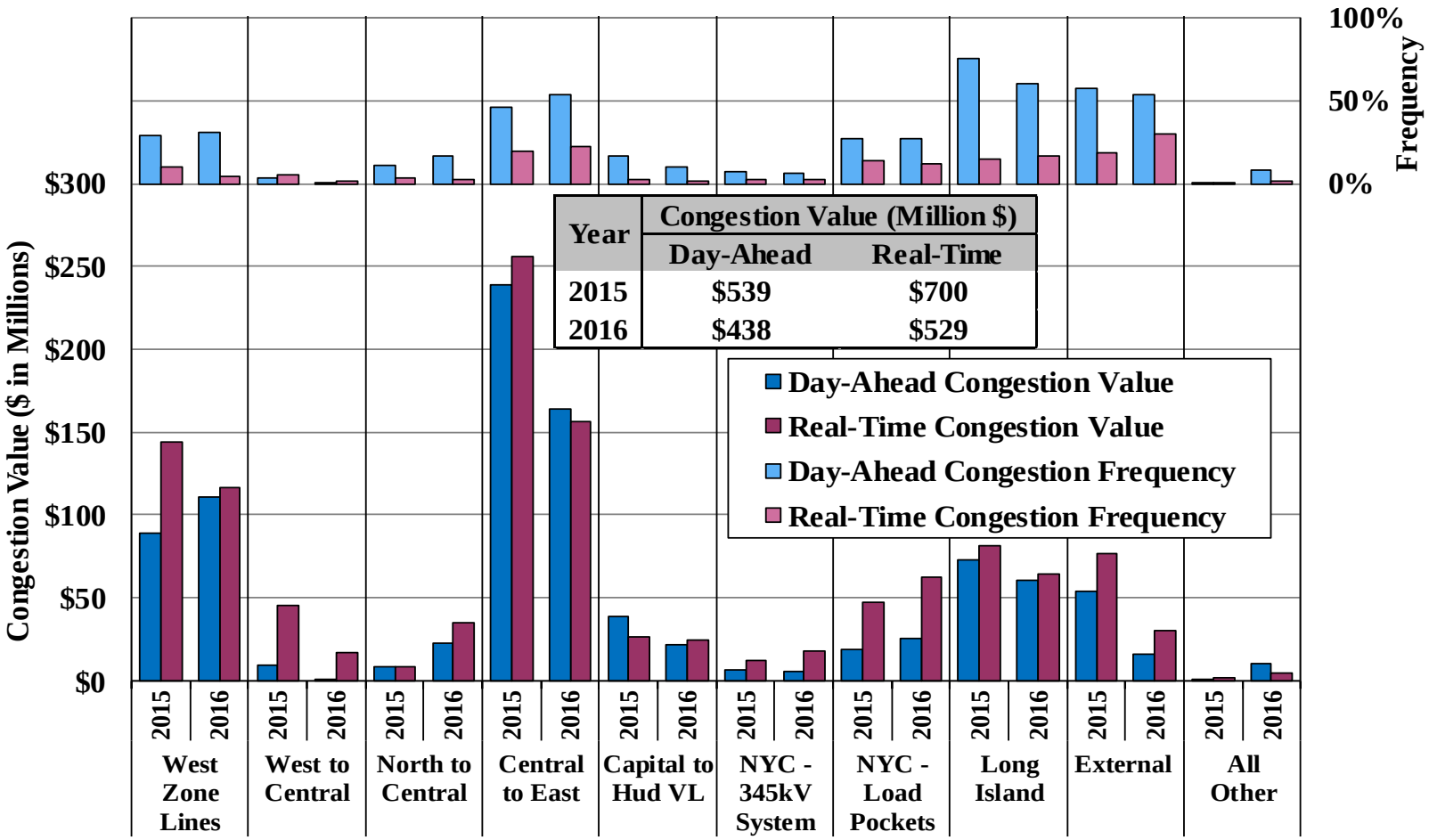
Market Highlights:
Day-Ahead Prices and Congestion Values



See Sections II.B, II.E

POTOMAC ECONOMICS

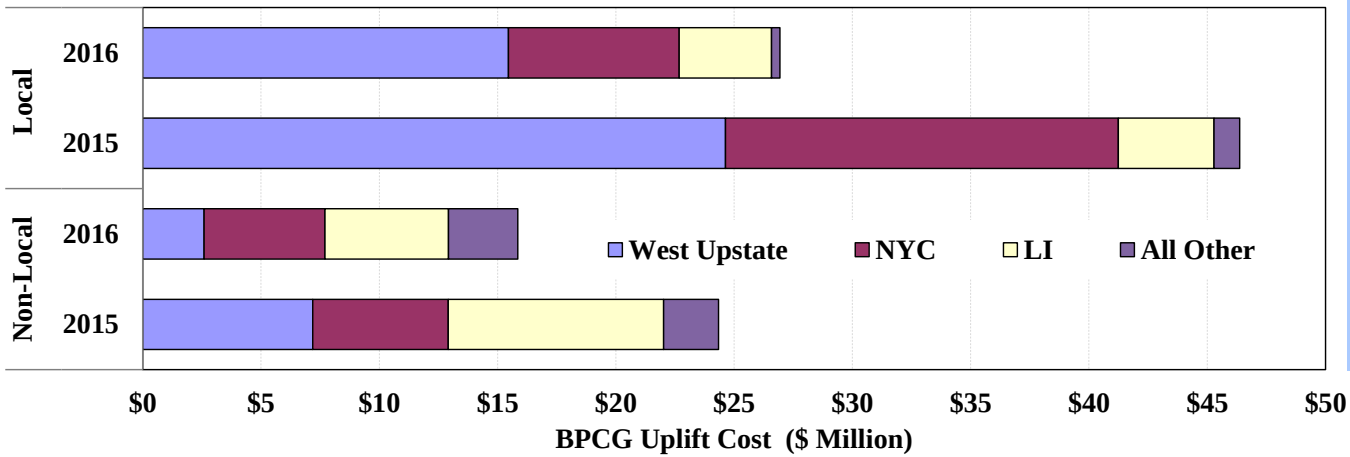
Market Highlights:
Congestion in the DA & RT Markets



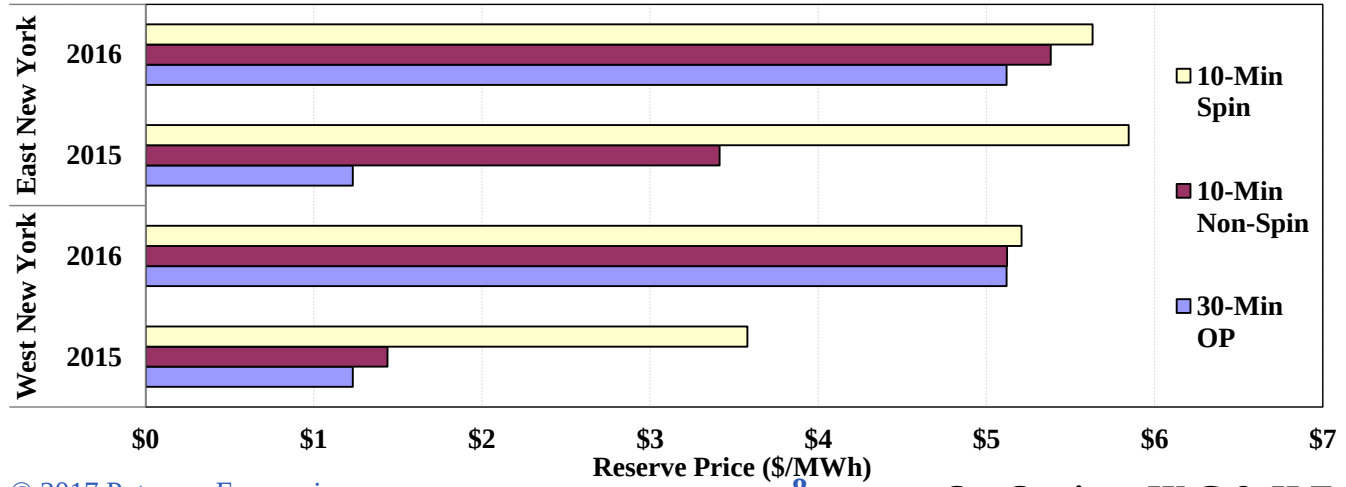
See Section II.E

POTOMAC ECONOMICS

Market Highlights:
BPCG Uplift and Reserve Price



BPCG Uplift

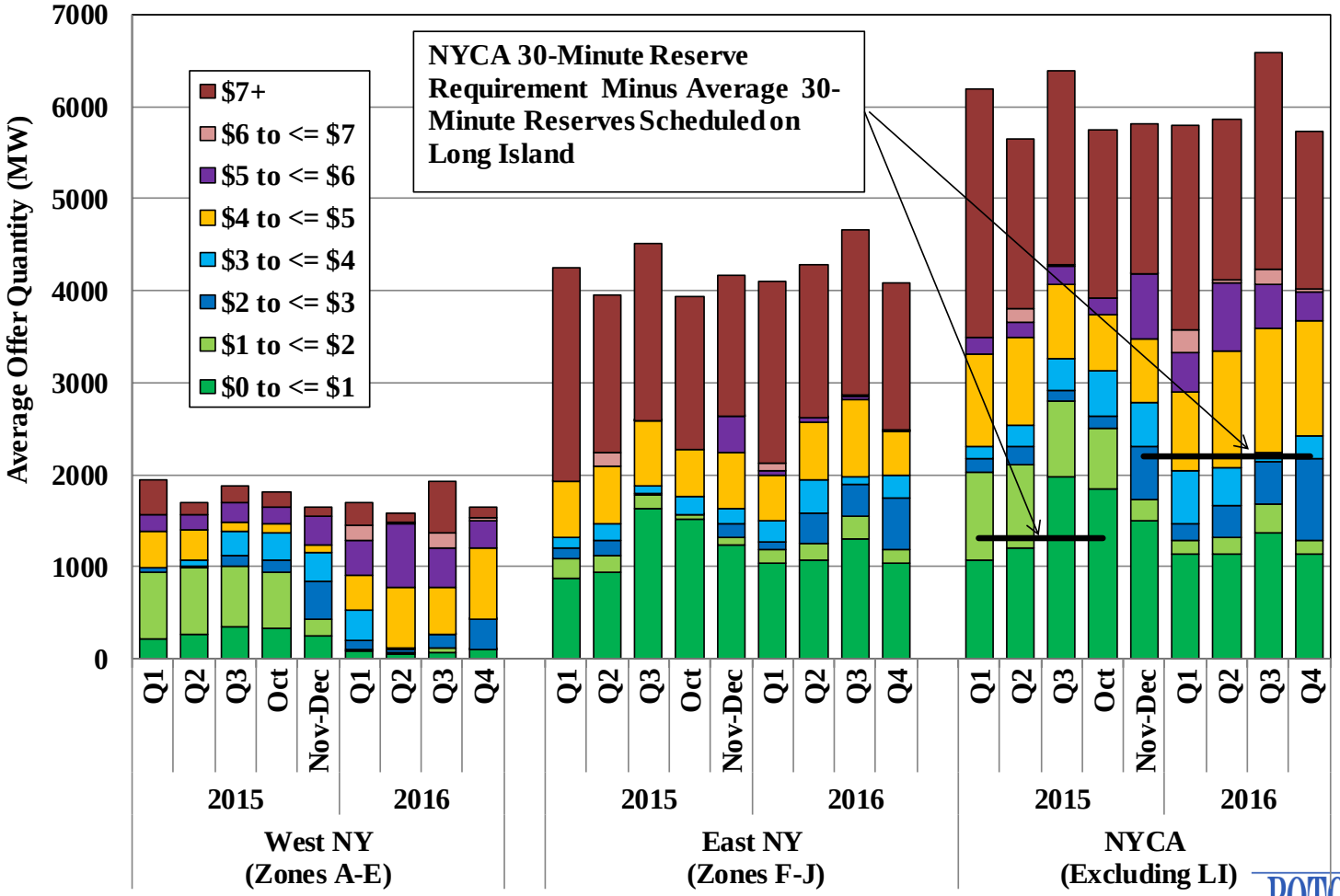


Day-Ahead Reserve Price

See Sections IX.G & II.F

POTOMAC ECONOMICS

Market Highlights:
Day-Ahead Reserve Offer Patterns



See Appendix Section II.D

POTOMAC ECONOMICS

Market Highlights:
Day-Ahead and Balancing Congestion Shortfalls

DAMCR

Category	Day-Ahead	
	2015	2016
West Zone Lines		
Niagara Modeling Assumption	$7.5	$1.8
Other Factors	$9.7	$27.2
Central to East		
Ramapo, ABC & JK PARs	$0.9	$1.9
Other Factors	$5.7	$31.7
North to Central	$14.1	$17.2
NYC Lines	$3.1	$6.2
Long Island Lines		
901/903 PARs	-$11.3	-$2.0
Excess GFTCC Allocations	$4.4	$4.3
Other Factors	$8.7	$10.6
External	-$9.6	-$2.4
All Other Facilities	$3.8	$3.4

BMCR

Category	Balancing	
	2015	2016
West Zone Lines		
Niagara Modeling Assumption	$0.9	-$0.4
Ramapo, ABC & JK PARs	$7.6	$5.7
Other Factors	$17.9	$9.0
Central to East		
Ramapo, ABC & JK PARs	-$7.2	-$8.1
Other Factors	-$3.4	$4.2
Capital to HVL (TSAs)	$3.8	$9.5
Long Island Lines		
901/903 PARs	$3.8	$3.0
Other Factors	$0.9	$0.7
External	$1.3	-$2.0
PJM M2M Payment	-$2.1	-$1.2
All Other Facilities	-$0.5	$2.2

See Section V.A

POTOMAC ECONOMICS

Recommendations for Market Enhancements

POTOMAC ECONOMICS

Real-Time Performance Incentives:
Multiple Recommendations

Principle	Benefits	Approach
• **Prices and compensation should reflect:** ✓ Value of <u>all</u> resources that provide congestion relief; ✓ Performance/ reliability/flexibility of resources; ✓ Marginal cost of maintaining reliability. • **Market requirements should be consistent with operating requirements.**	• **Efficient scheduling of imports and generation which reduces:** ✓ Production costs ✓ Emissions. • **Better investment and performance incentives for:** ✓ Reserve providers ✓ Flexible resources • **Less reliance on capacity market pricing signals.**	• **Quantify congestion relief from reserve scheduling.** • **Consider performance-based adjustments to reserve revenue.** • **Incorporate start costs in GT pricing logic.** • **Dynamically adjust reserve requirements based on conditions.** • **Model 100+ kV constraints in DAM/RT.** • **Utilize constraint-specific GTDCs.**

See Sections IX.C.1, IX.C.2, IX.A.1, IX.A.2, IX.B, IX.F.3

Real-Time Performance Incentives:
New Recommendation 2016-1

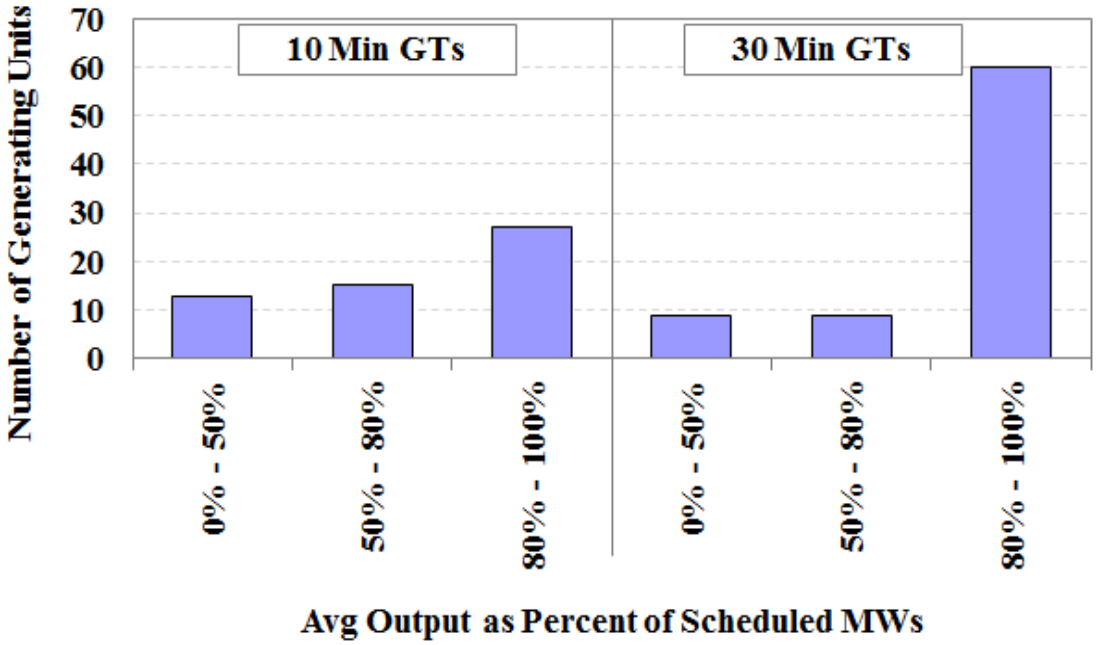
- 2016-1: Consider rules for efficient pricing and settlement when operating reserves provide congestion management relief.
- Reserve capacity in NYC allows higher transmission flows into NYC.
  - ✓ For example: a line with 1,000 MW LTE rating is operated to 1,200 MW when sufficient reserves are available to reduce flows post-contingency.
- In 2016, 92 percent of RT congestion on 345kV lines into NYC occurred when reserve units were not believed to be available.
  - ✓ Unavailability of reserves reduced import limit, leading to congestion.
  - ✓ Congestion management was inefficient when reserve units were deployed to relieve congestion.
- Compensation for reserve units that relieve congestion would provide incentives for units to be available and reliable.
- More important after ConEd-PSEG Wheel expiration.

See Section IX.C.2

Real-Time Performance Incentives: New Recommendation 2016-2

2016-2: Consider means to allow reserve market compensation to reflect actual and/or expected performance.

Average Production by GTs after a Start-Up Instruction



- All reserves are paid the same for reserves regardless of performance.
- Reserve sales are the primary source of revenue for some poor performing units.

See Section IX.C.1
POTOMAC ECONOMICS

Real-Time Performance Incentives:
Recommendations 2014-10 & 2014-12

- 2014-10: Modify criteria for gas turbines to set prices in the real-time market by incorporating start-up costs.
  - ✓ Excluding start-up costs from the price-setting logic leads RT prices to be understated during tight operating conditions.
- 2014-12: Model 100+ kV transmission constraints in the DA and RT markets and develop associated mitigation measures.
  - ✓ Actions used to manage these constraints: (a) OOM dispatch and commitment, (b) reduced imports from Ontario and Quebec, (c) use of simplified interface constraints, (d) reduced exports to PJM and opening PJM-NYISO lines, and (e) Saint Lawrence and Ramapo PAR taps.
  - ✓ Not modeling these constraints leads to under-scheduling of Western NY generation and PJM imports.

See Sections IX.B, IX.F.3

Real-Time Performance Incentives:
Recommendations 2015-17 & 2015-16

- 2015-16: Dynamically adjust operating reserve requirements to account for factors that increase or decrease the amount of reserves that must be held on internal resources.
  - ✓ Long Island reserve schedules should consider the amount of net imports flowing-in from other zones.
  - ✓ East NY reserve schedule should consider Central-East flow.
  - ✓ SENY reserve schedule should consider UPNY-SENY flow.
- 2015-17: Utilize constraint-specific GTDCs to set constraint shadow prices during transmission shortages.
  - ✓ NYISO has filed a short-term enhancement.
  - ✓ In the long-term, GTDCs should be set based on importance, severity, and/or duration of a constraint violation.

See Sections IX.A.1, IX.A.2

Enhance Scheduling of Imports & Peaking Units:
Recommendations 2015-9 & 2012-13

Principle	Benefits	Approach
• Reduce unnecessary barriers to inter-market trading. • Improve forecasting in scheduling models.	• Improve performance of CTS-PJM, CTS-NE, and intraday scheduling processes. • Lower overall dispatch cost by improving external scheduling. • Optimize use of flexible resources.	• Use cost-causation approach when setting transaction fees. • Eliminate structural differences between forecasted and actual market outcomes.

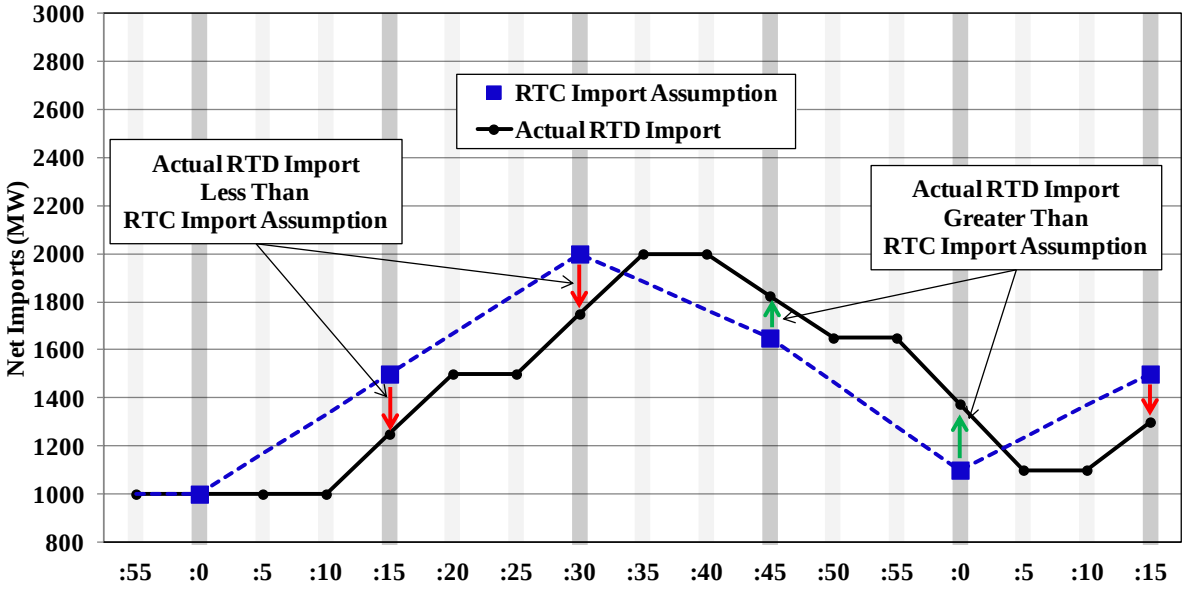
- 2015-9: Eliminate fees for CTS transactions at PJM-NY border.
  - ✓ At the NE-NY border (which does not have fees):
    - ✓ 192 percent more price-sensitive offers are available.
    - ✓ 202 percent more price-sensitive offers are cleared.

See Sections VI.D, IX.E

Enhance Scheduling of Imports & Peaking Units:
Recommendations 2015-9 & 2012-13

- 2012-13: Adjust look ahead evaluations of RTD and RTC to be more consistent with the timing of external transaction ramp and gas turbine commitment.

Illustration of External Transaction Ramp Profiles in RTS



Other Issues:

- RTC and RTD look aheads do not evaluate 5-minute ramp
- RTD cannot keep on a GT even to avoid a shortage.

See Sections VI.D, IX.E
POTOMAC ECONOMICS

List of Recommendations
Energy Market Enhancements – Part I

RECOMMENDATION		Discussed in	Current Effort	High Priority	Scoping/Future
Energy Market Enhancements - Real-Time Pricing and Performance Incentives					
#2016-1	Consider rules for efficient pricing and settlement when operating reserve providers provide congestion management relief.	IX.C.2			X
#2016-2	Consider means allow reserve market compensation to reflect actual and/or expected performance.	IX.C.1			X
#2014-10	Modify criteria for gas turbines to set prices in the real-time market by incorporating start-up costs.	IX.B			
#2014-12	Model 100+ kV transmission constraints in the day-ahead and real-time markets and develop associated mitigation measures.	IX.F.3	X		
#2015-16	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
#2015-17	Utilize constraint-specific graduated transmission demand curves to set constraint shadow prices during transmission shortages.	IX.A.2			X
#2015-9	Eliminate transaction fees for CTS transactions at the PJM-NYISO border.	VI.D			

List of Recommendations
Energy Market Enhancements – Part II

RECOMMENDATION		Discussed in	Current Effort	High Priority	Scoping/Future
Energy Market Enhancements - Real-Time Market Operations					
#2012-8	Operate certain PAR-controlled lines to minimize production costs and create financial rights that compensate affected transmission owners.	IX.D			
#2012-13	Adjust look ahead evaluations of RTD and RTC to be more consistent with the timing of external transaction ramp and gas turbine commitment.	VI.D IX.E	X	X	X
#2014-9	Consider enhancing modeling of loop flows to reflect the effects of expected variations more accurately.	IX.E.4			X
Energy Market Enhancements - BPCG Eligibility Criteria					
#2014-13	Work with generators in NOx bubbles to ensure their RACT compliance plans use the most economic compliance option available.	IX.F.2			
Energy Market Enhancements - Fuel Assurance and Energy Storage					
#2013-11	Consider allowing generators to submit offers that reflect certain energy storage and fuel supply constraints in the day-ahead market.	IX.B.2 (2015 SOM)	X		X