Highlights of the 2018 State of the Market Report for the NYISO Markets

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May 13, 2019

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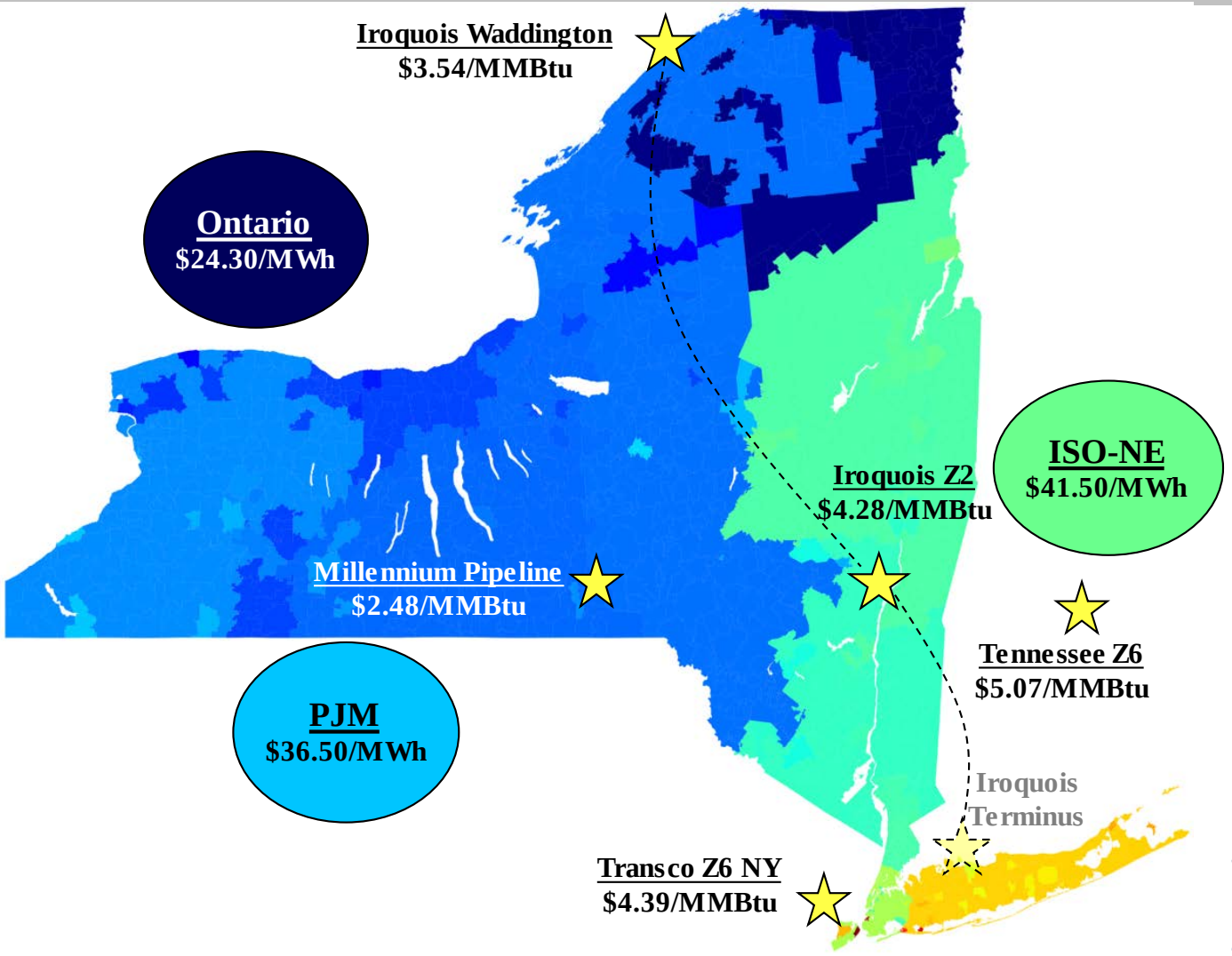
Schedule for 2018 SOM Report

- May 8 – Full report posted on NYISO website
- May 13 – High-level presentation to BIC
- May 17 – More detailed presentation at ICAPWG/MIWG
- Feedback from stakeholders is welcome at any time:
  - ✓ Comments received before May 17 will be addressed at the ICAPWG/MIWG, if possible
  - ✓ Comments received later can be addressed in one-on-one telecon or in an ad hoc working group presentation

Summary of Market Outcomes in 2018

- The NYISO markets performed competitively in 2018.
- Natural gas prices and load levels are two key market drivers:
  - ✓ Average gas prices rose 21 to 47 percent across the state with much of the increase caused by a cold spell in early January.
  - ✓ Gas price spreads between western and eastern New York fell, leading to less west-to-east transmission congestion.
  - ✓ Load rose from low 2017 levels (peak load up 7% and average up 3%) and led to more congestion in NYC and Long Island.
- These fuel price and load trends led to increases in average energy prices of 23 to 36 percent across the state.
- These factors also increased Day-Ahead congestion revenues by 21 percent to $501 million in 2018.

Market Outcomes: Energy Prices and Congestion



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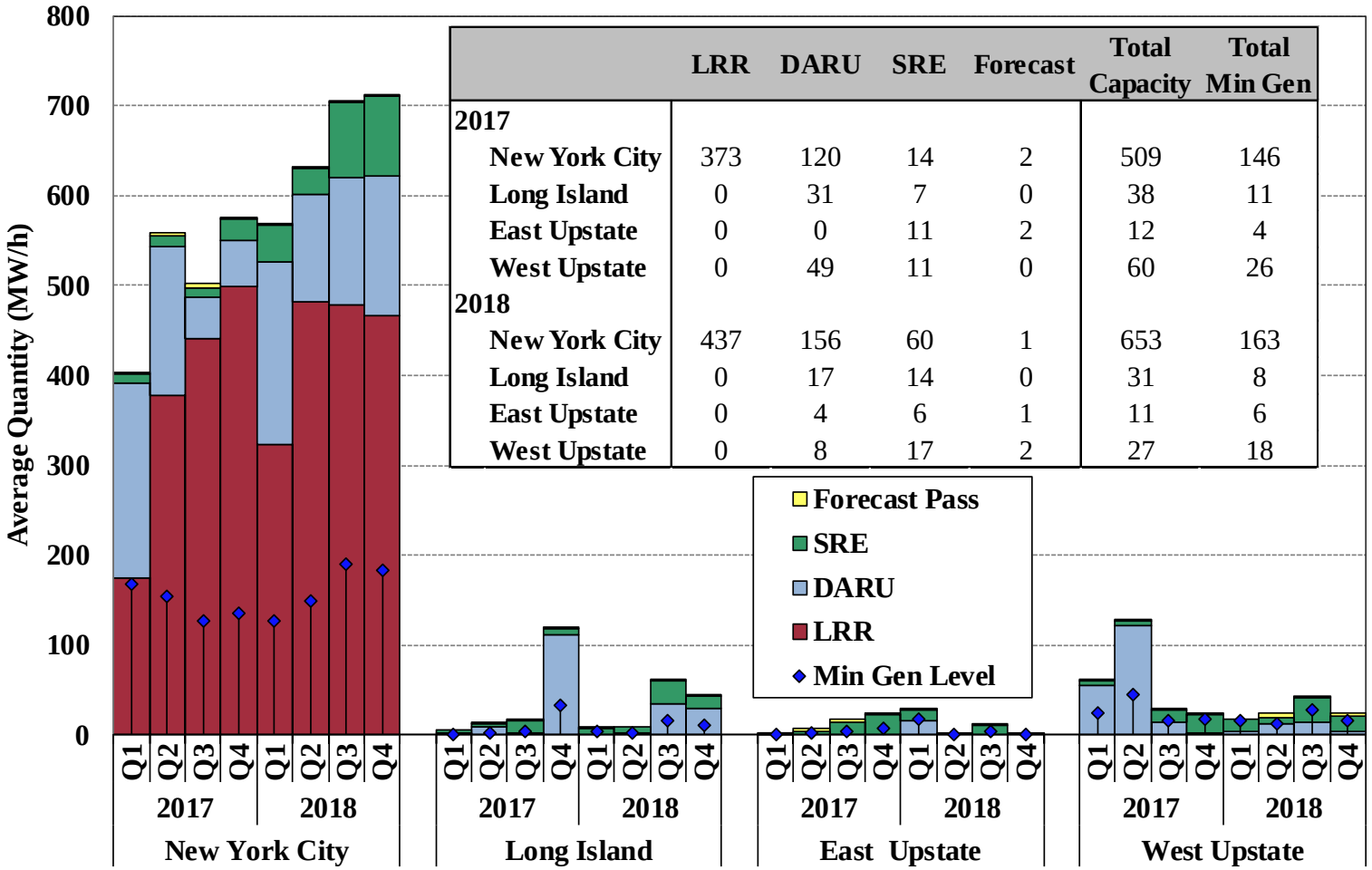
Market Outcomes: Supplemental Commitment for Reliability

	LRR	DARU	SRE	Forecast	Total Capacity	Total Min Gen
2017						
New York City	373	120	14	2	509	146
Long Island	0	31	7	0	38	11
East Upstate	0	0	11	2	12	4
West Upstate	0	49	11	0	60	26
2018						
New York City	437	156	60	1	653	163
Long Island	0	17	14	0	31	8
East Upstate	0	4	6	1	11	6
West Upstate	0	8	17	2	27	18



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Long-Term Investment Signals, Policy Initiatives, and Recommendations

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Principles for Evaluating Market Performance and Future Market Needs

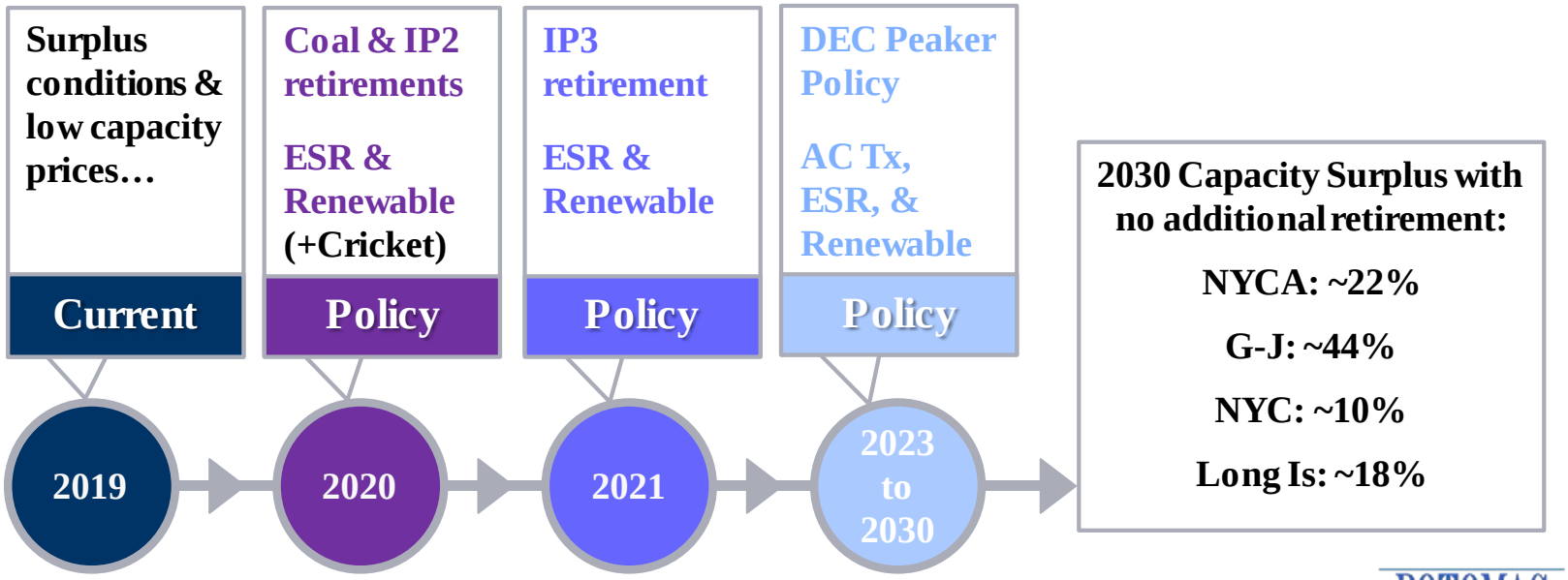
- Energy, ancillary services, & capacity markets together should reward the resources needed today and in the future.
- To integrate renewables efficiently, the market must reflect the value of critical resource attributes:
  - ✓ Flexibility
  - ✓ Local security and reliability
  - ✓ Winter fuel security
  - ✓ Summer resource adequacy
- Public policy additions and retirements will generally reduce the availability of resources with these attributes.
  - ✓ The value of these attributes should rise in an efficient market
- Most of our recommendations are intended to remedy concerns with the market incentives.

Looking Forward:
How Policies Stack Against Present Conditions

- Multiple policies aimed at removing capacity sources:
  - ✓ Indian Point retirement
  - ✓ Coal plants retirement
  - ✓ DEC Peaker policy
- Policies aimed at increasing internal supply:
  - ✓ Renewable policies and battery storage initiatives
  - ✓ Transmission buildout
- Retirement of inflexible generation is needed to make room for:
  - ✓ Policy resources and
  - ✓ Flexible resources that help integrate policy resources
    - ⇨ **This requires efficient market incentives**

Looking Forward: How Policies Stack Against Present Conditions

2018/19 Conditions	NYCA	G-J Locality	New York City	Long Island
Surplus Capacity	7.7%	6.8%	11.2%	10.2%
Capacity Price (as % of Net CONE)	24%	47%	38%	34%



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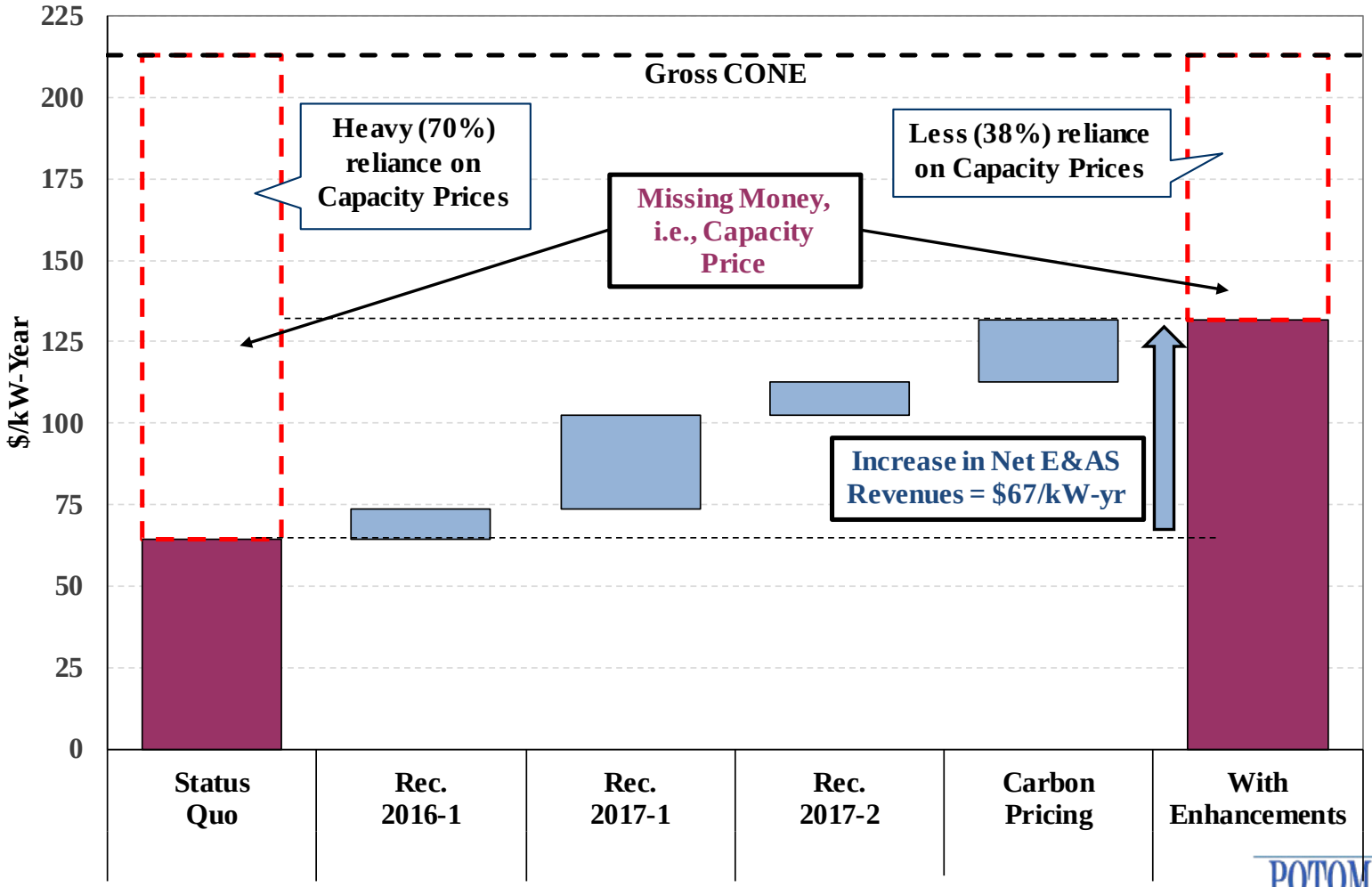
Investment Signals: Enhancing Incentives for Key Attributes

- Increasing E&AS net revenues for flexible units would:
  - ✓ Reduce the capacity revenues needed to maintain reliability
  - ✓ Shift incentives toward repowering older units with:
    - Newer more flexible & fuel-efficient generation
    - Battery storage resources
- Recommended actions:
  - ✓ 2017-1: NYC load pocket reserves
  - ✓ 2017-2: Reserve demand curve increases
  - ✓ 2016-1: Compensate reserves that increase NYC import capability
  - ✓ Carbon pricing

Investment Signals: Enhancing Incentives for Key Attributes



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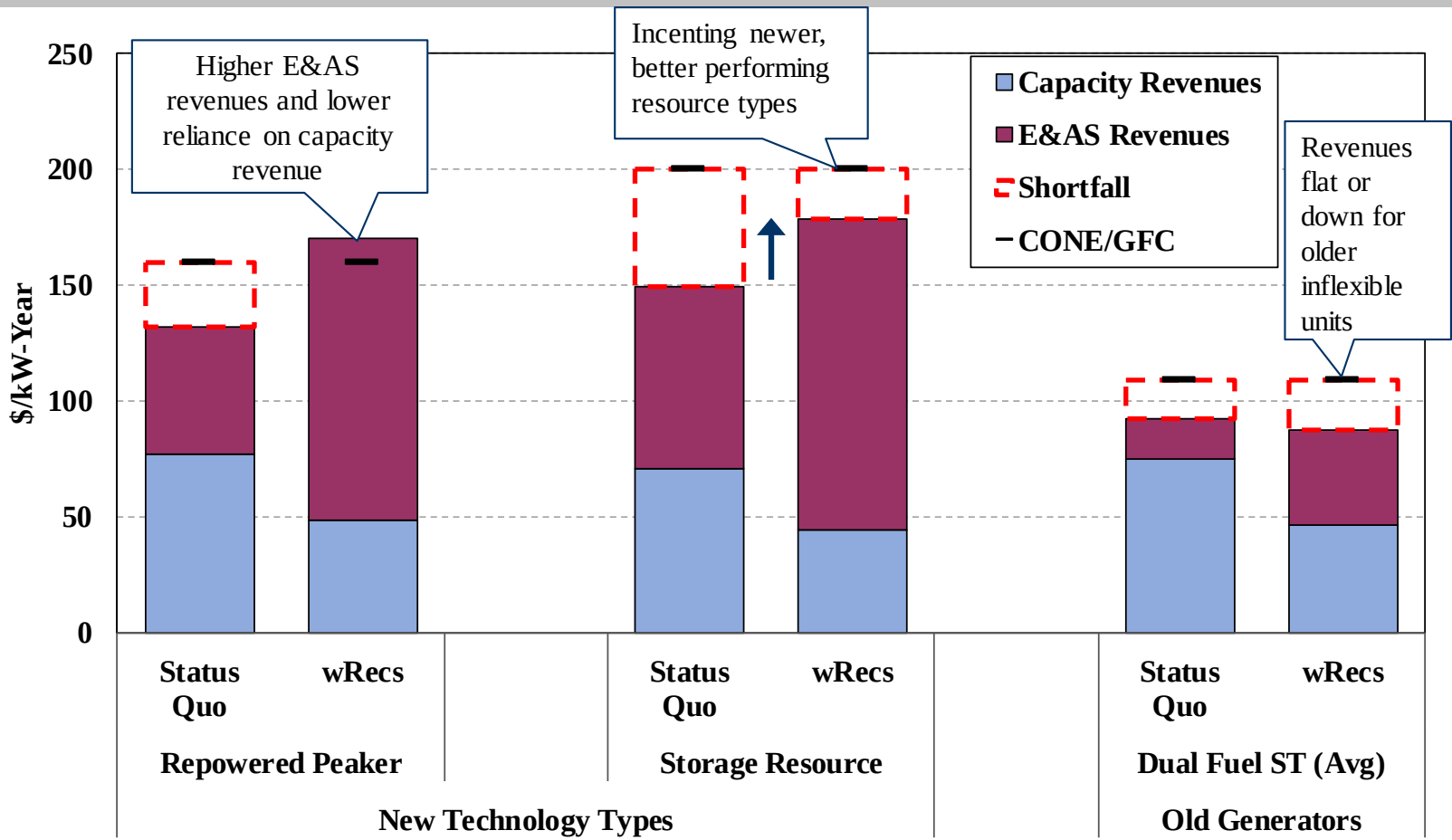
Investment Signals: Enhancing Incentives for Key Attributes



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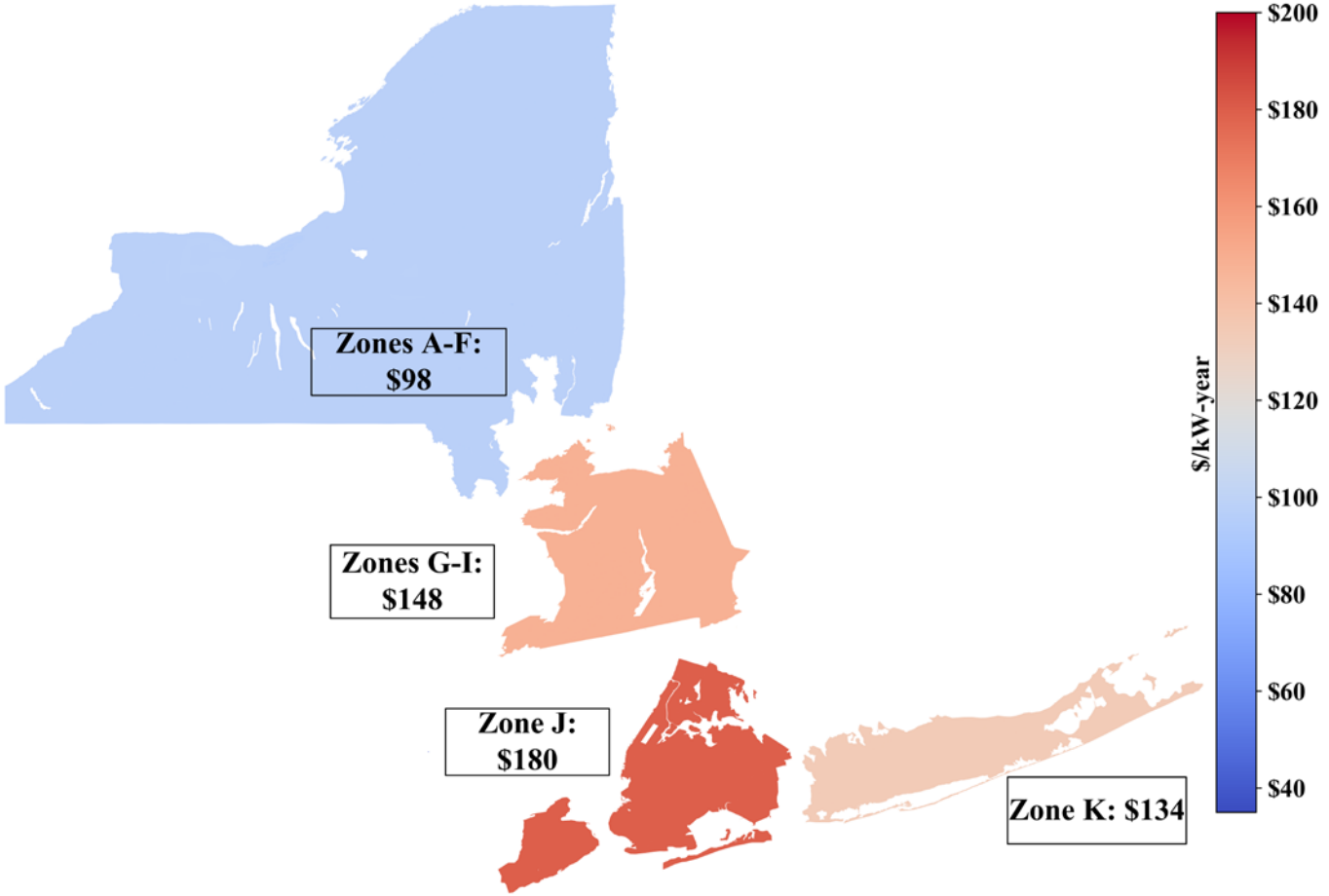
Investment Signals: Improved Locational Capacity Price Signals

- The current capacity market can only produce four prices and provides incentives for:
  - ✓ Excessive investment in some export-constrained areas
  - ✓ Insufficient investment in import-constrained load pockets, or in areas that improve reliability elsewhere (e.g., Long Island)
- The four zone model will not allow prices to change efficiently as units retire and enter, or transmission is built.
- Incentive issues become more acute with anticipated policy-induced retirements – e.g., increases likelihood of OOM contracts to support local reliability in NYC load pockets
- Recommended actions:
  - ✓ Implement Locational Capacity Pricing mechanism

Investment Signals: Improved Locational Capacity Price Signals



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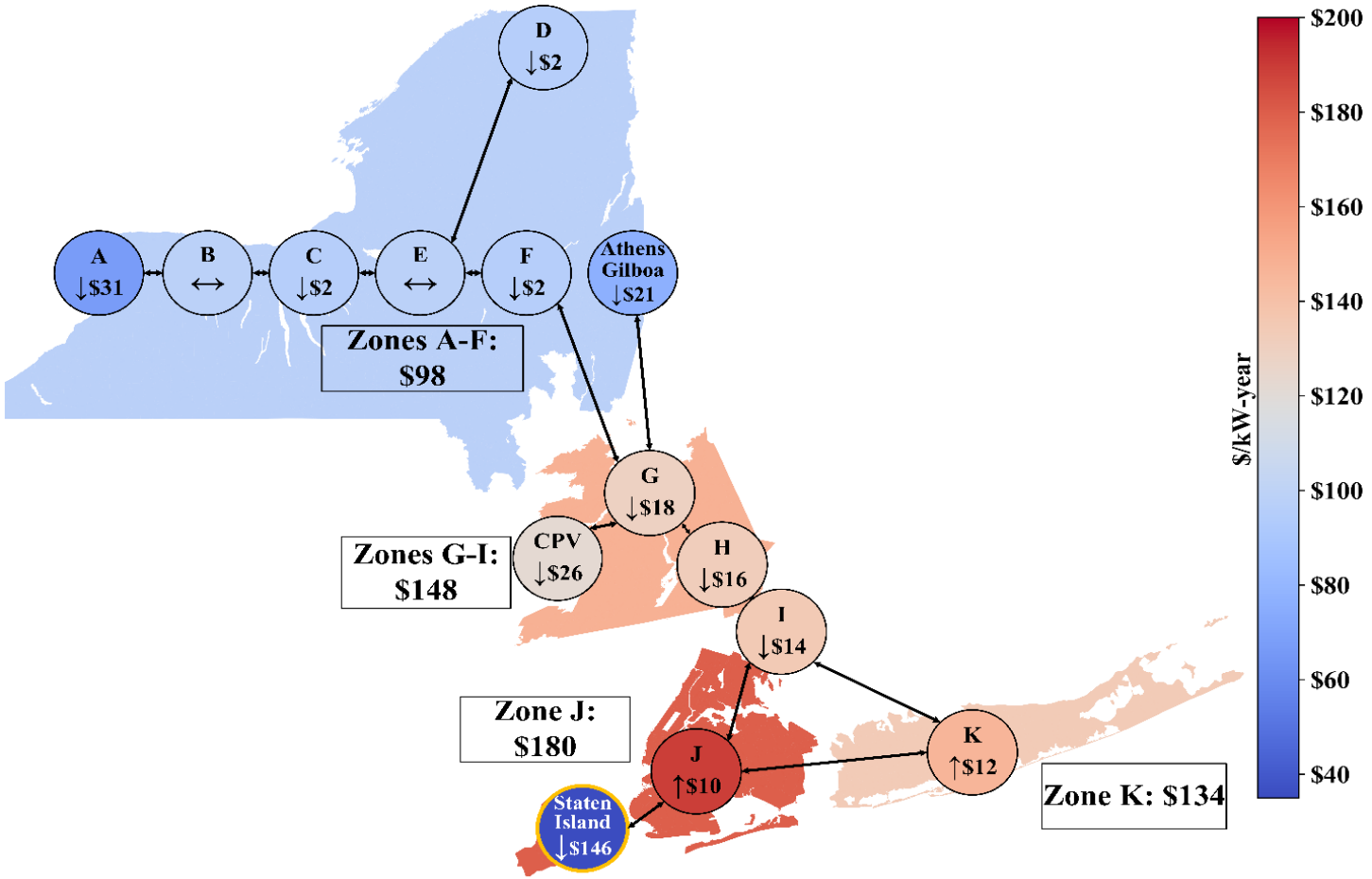

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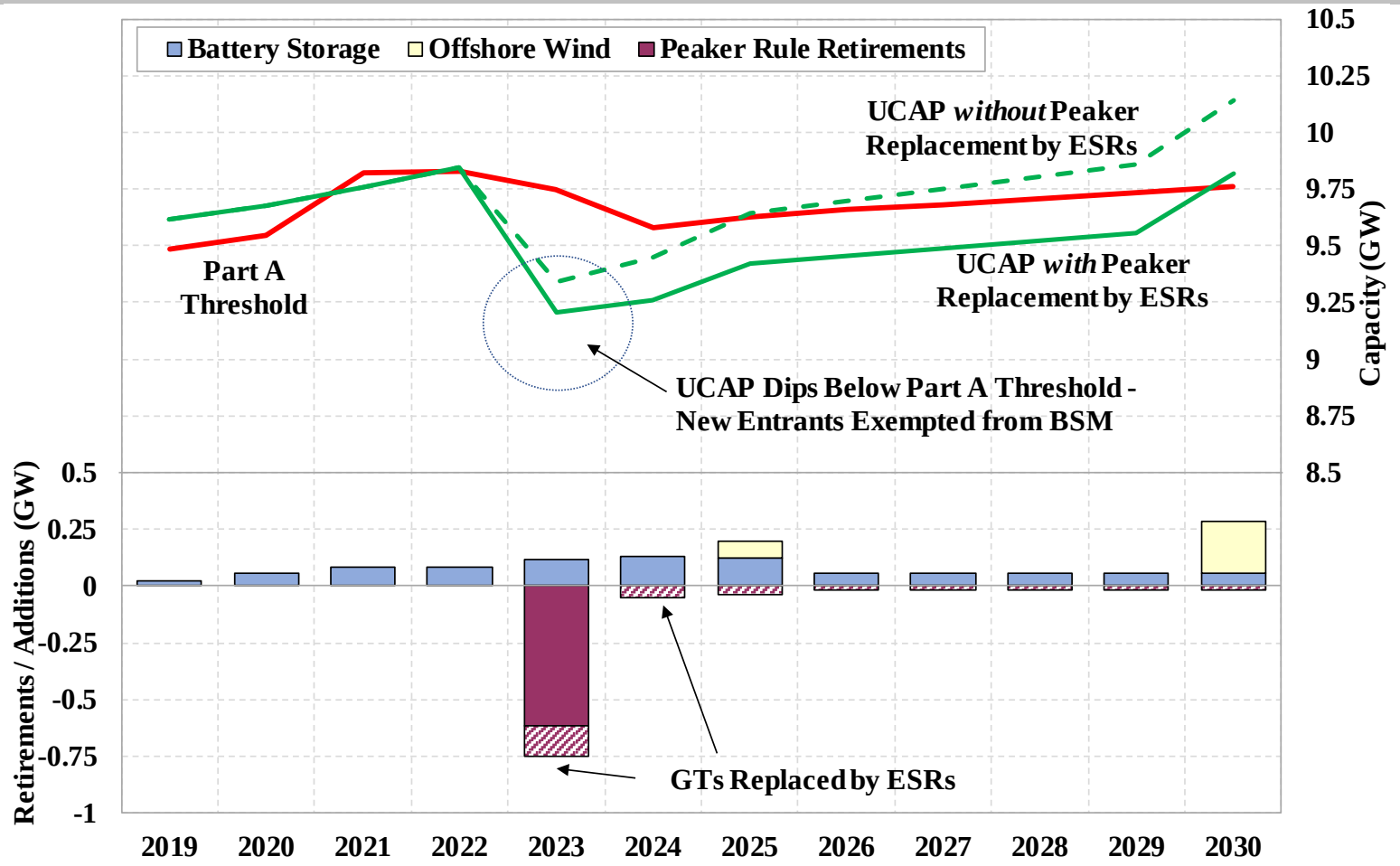
Accommodating Public Policy Resources

- The current BSM rules allow public policy resources to sell capacity if it does not result in excessive capacity surpluses
- Hence, public policy resources will not be mitigated in NYC if new entry is matched with retirements
  - ✓ Policies leading to resource retirements will allow substantial amounts of public policy resources to avoid mitigation
- Retirements will be driven by:
  - ✓ DEC Peaker Rule
  - ✓ Indian Point agreement
  - ✓ Market enhancements that provide incentives for key attributes discussed earlier

Accommodating Public Policy: Application of the Part A Test



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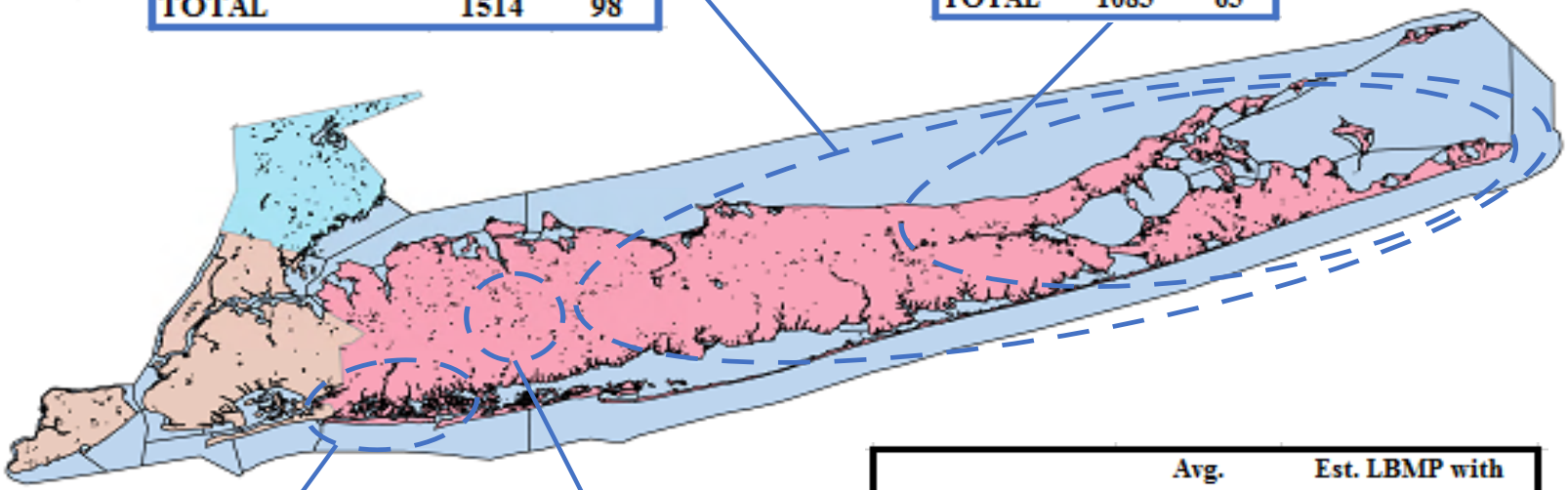
Energy Market Enhancements: Rec #2018-1 Modeling Constraints on Long Island

- OOM dispatch for low-voltage constraints on Long Island:
  - ✓ 119 days led to ~$10 million in uplift
- OOM actions:
  - ✓ Make transmission bottlenecks less transparent and
  - ✓ Suppress E&AS prices
- Congestion pricing would increase LBMPs:
  - ✓ 17 percent in East of Northport load pocket
  - ✓ 44 percent in East End load pocket
- **Modeling local constraints provides: better pricing signals, better investment signals, and reduced emissions.**

Energy Market Enhancements: Rec #2018-1 Modeling Constraints on Long Island

East of Northport	#Hours	#Days
69kV	647	64
138kV	1079	64
TOTAL	1514	98

East End	#Hours	#Days
69kV	159	12
138kV	792	33
TVR	623	56
TOTAL	1083	63



Brentwood	#Hours	#Days
69kV	339	53

Valley Stream	#Hours	#Days
69kV	399	40
138kV	7583	329
TOTAL	7667	333

Load Pocket	Avg. LBMP	Est. LBMP with Local Constraints
Brentwood	$43.72	$43.95
East End	$46.18	$66.61
East of Northport	$43.99	$51.30
Valley Stream	$51.87	$52.18

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Full List of Recommendations for Market Enhancements

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Market Recommendations: Energy Market Enhancements

Number	Section	Recommendations	Current Effort	High Priority
Energy Market Enhancements – Pricing and Performance Incentives				
2018-1	V.B	Model in the day-ahead and real-time markets Long Island transmission constraints that are currently managed by NYISO with OOM actions and develop associated mitigation measures.		
2017-1	VIII.D, IX.H	Model local reserve requirements in New York City load pockets.	✓	✓
2017-2	VIII.D, IX.B	Modify operating reserve demand curves to improve shortage pricing and ensure NYISO reliability.	✓	✓
2016-1	VIII.D, IX.D	Consider rules for efficient pricing and settlement when operating reserve providers provide congestion relief.		
2016-2	VIII.D, IX.D	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.B	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.B	Utilize constraint-specific graduated transmission demand curves to set constraint shadow prices during transmission shortages.	✓	

Market Recommendations: Energy Market Enhancements

Number	Section	Recommendations	Current Effort	High Priority
Energy Market Enhancements – Market Power Mitigation Measures				
2017-3	IX.B	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.G	Consider enhancing modeling of loop flows and flows over PAR-controlled lines to reflect the effects of expected variations more accurately.		
2012-8	IX.E	Operate PAR-controlled lines between New York City and Long Island to minimize production costs and create financial rights that compensate affected transmission owners.		
2012-13	VI.D, IX.G	Adjust look ahead evaluations of RTD and RTC to be more consistent with the timing of external transaction ramp and gas turbine commitment.		

Market Recommendations: Capacity Market and Planning Enhancements

Number	Section	Recommendations	Current Effort	High Priority
Capacity Market – Market Power Mitigation Measures				
2018-2	III.C	Modify the Competitive Entry Exemption to allow contracts that are determined to be competitive and non-discriminatory.		
2018-3	III.C	Consider modifying the Part A test to exempt a New York City unit if the forecasted price of the G-J Locality is higher than its Part A test threshold.		
2018-4	III.C	Develop tariff provisions to perform Mitigation Exemption Tests outside the Class Year process for resources that are smaller than 2 MW.		
2013-2d	III.C	Enhance Buyer-Side Mitigation Forecast Assumptions to deter uneconomic entry while ensuring that economic entrants are not mitigated.		
Capacity Market – Design Enhancements				
2013-1c	VII.D	Implement locational marginal pricing of capacity ("C-LMP") that minimizes the cost of satisfying planning requirements.		✓
2012-1a	VII.D	Establish a dynamic locational capacity framework that reflects potential deliverability, resource adequacy, and transmission security requirements.		
2012-1c	VII.C	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.		

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