Highlights of the 2019 State of the Market Report for the NYISO Markets

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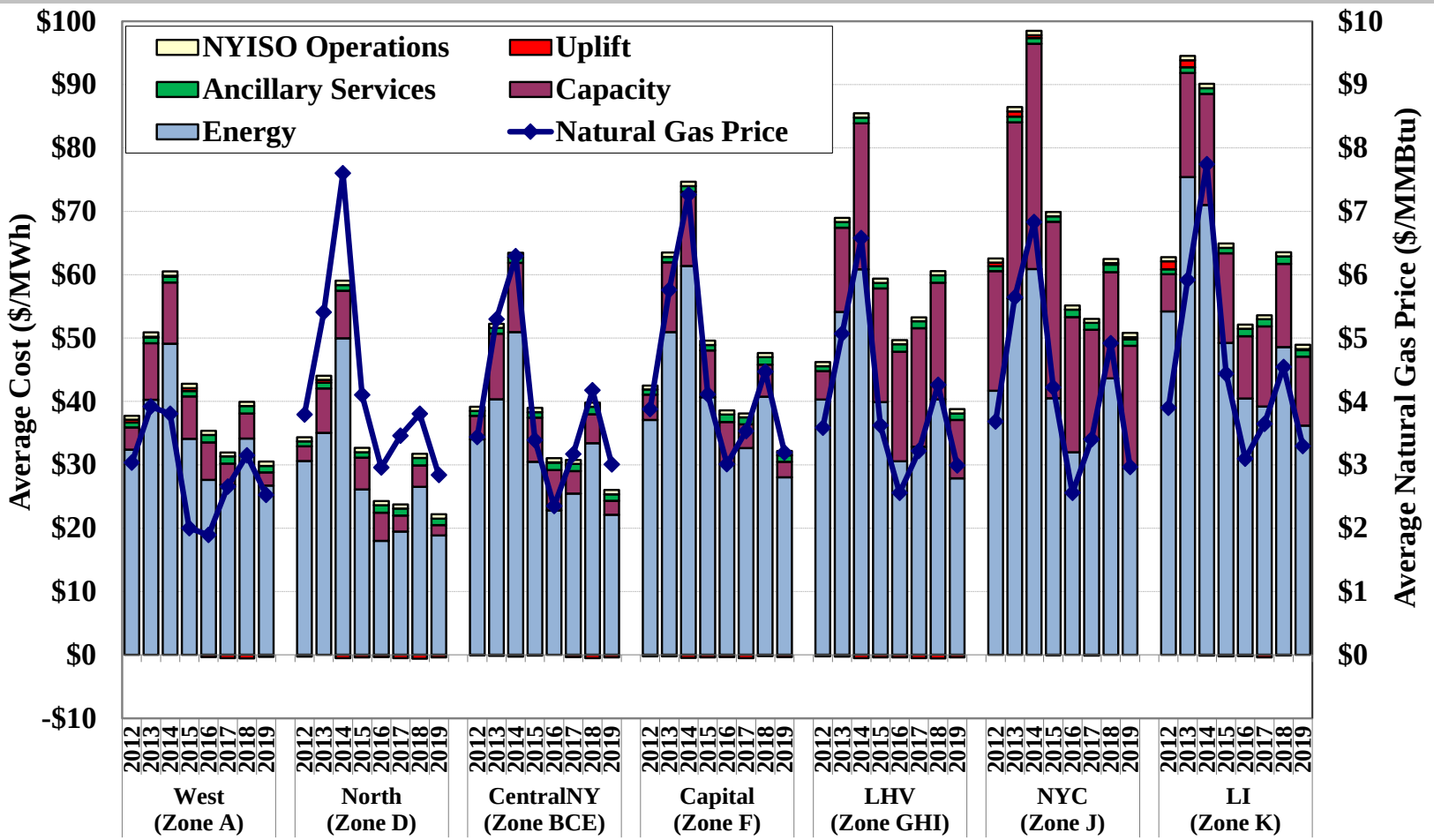
Schedule for 2019 SOM Report

- May 19 – Full report posted on NYISO website
- May 27 – High-level presentation to MC
- June 8 – More detailed presentation at ICAPWG/MIWG
- Feedback from stakeholders is welcome at any time:
  - ✓ Comments received before June 3 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 2019

- The NYISO markets performed competitively in 2019.
- Energy prices were the lowest in the past decade, falling 22 to 34 percent across the state from 2018 because:
  - ✓ Gas prices fell 22 to 41 percent -- the lowest levels since 2016. This was due to: a) mild conditions in both the winter and summer, and b) continued expansion of natural gas production.
  - ✓ Average load fell to the lowest level in more than a decade due to mild weather, energy efficiency, and behind-the-meter solar generation.
- Capacity prices fell to low levels (8 to 26 percent of net CONE) outside NYC primarily because of Local Capacity Requirement changes and new capacity additions.
  - ✓ NYC prices rose, but still averaged just 58 percent of the net CONE.
- Congestion was most prevalent in five areas: (a) through the West Zone, (b) down from the North Zone, (c) across the Central-East interface, (d) in NYC, and (e) in Long Island.

Market Outcomes:
All-In Costs and Natural Gas Prices



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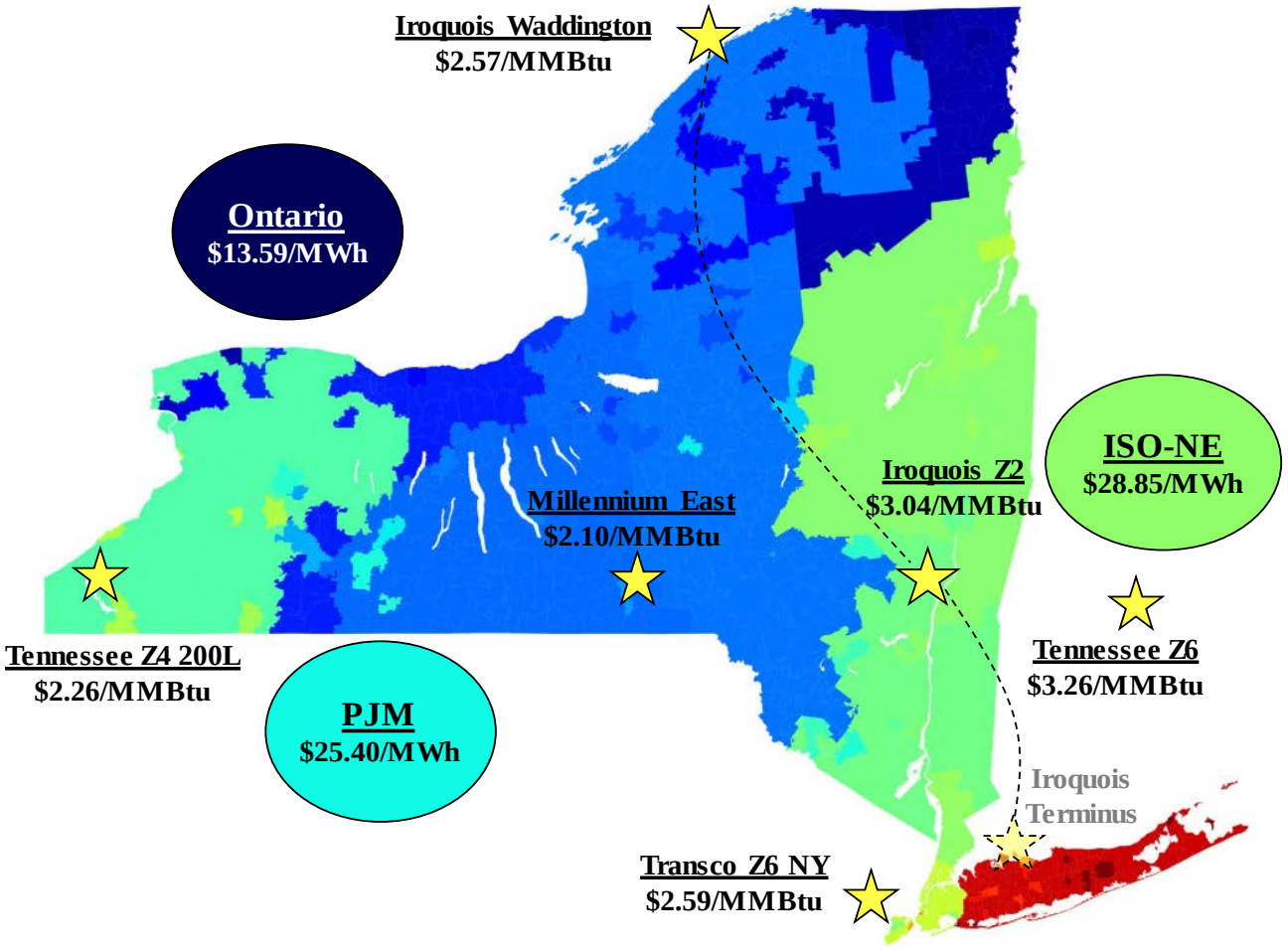
Market Outcomes: Energy Prices and Congestion



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Wholesale Markets Facilitate Long-Term Policy Goals

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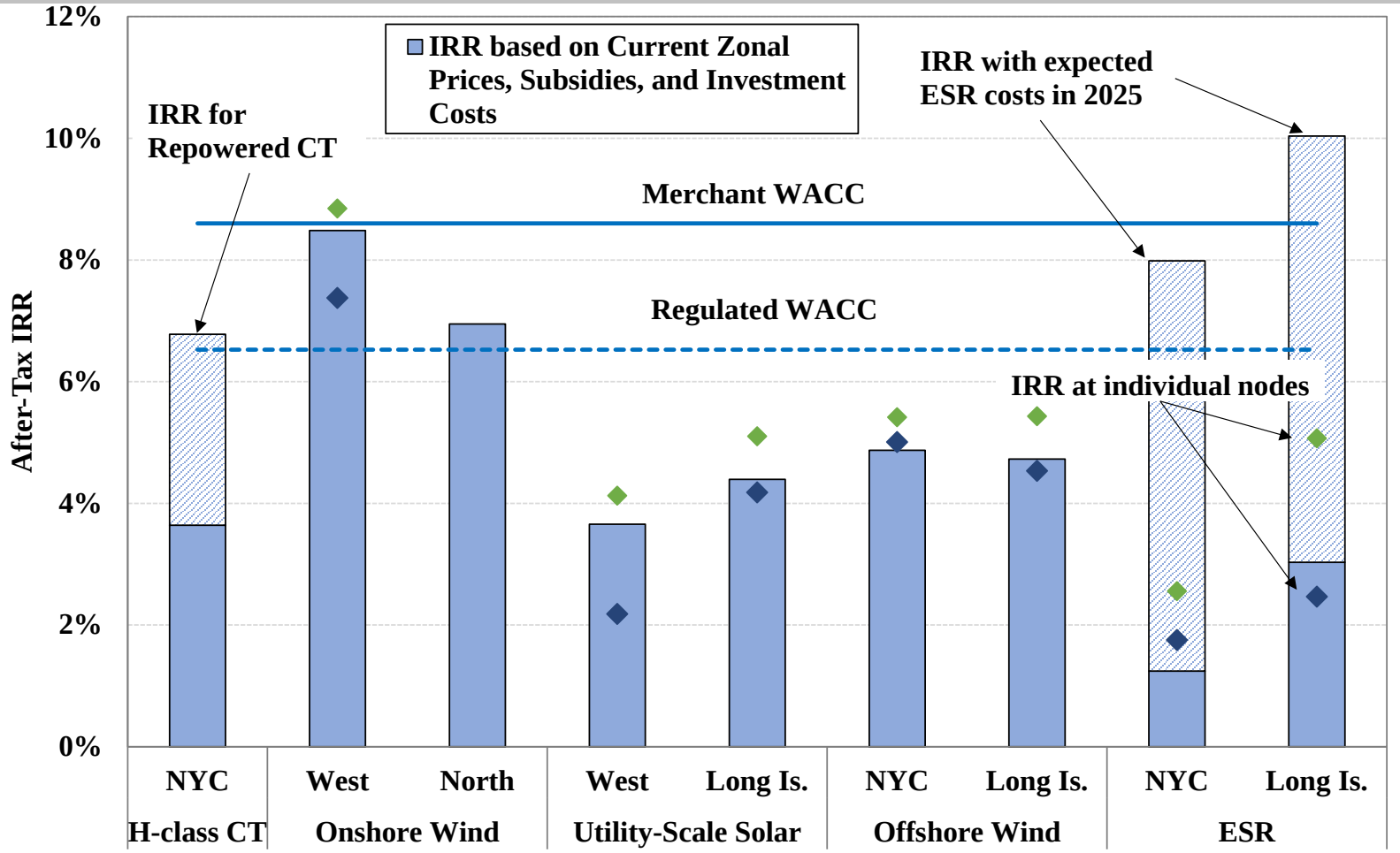
Robust Markets Guide Policy-Driven Investment

- NY State policies create challenges for the wholesale market:
  - ✓ Increased penetration of intermittent generators:
    - Requires more resource flexibility
  - ✓ Subsidies for selected resources:
    - Can lead to surplus capacity conditions & low wholesale prices
    - May undermine investor confidence in the wholesale market
    - Without a balanced approach to mitigation, this leads to a spiral of rising subsidies, RMR contracts, and weak incentives.
- Robust wholesale market incentives complement state policy.
  - ✓ Competitive incentives drive core component of investment decisions.
  - ✓ Incentives vary considerably by technology and location.
  - ✓ Highest value projects are most likely to be most competitive in a solicitation for policy resources.

Robust Markets Guide Policy-Driven Investment



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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.
- With greater renewable penetration, the market must reflect the value of critical resource attributes:
  - ✓ Flexibility
  - ✓ Local congestion and reliability impacts
  - ✓ Winter fuel security
  - ✓ Summer resource adequacy
- Public policy additions and retirements tend to 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 these market incentives.

Modifying Buyer-Side Mitigation Rules to Better Accommodate Policy Goals

- BSM rules should strike a reasonable balance between:
  - ✓ Preventing capacity price suppression, and
  - ✓ Facilitating state policies to change the resource mix.
  - ✓ This is done by tying the amount of new entry to retirements.
- Recently, the NYISO filed enhancements to the BSM rules aimed at new renewable generation, battery storage, and other PPRs.
- In the long-term, other initiatives may lead to the retirement of older units and new entry of PPRs, including:
  - ✓ Energy, ancillary services, and capacity market enhancements that reward flexibility (and reduce revenues to inflexible units)
  - ✓ Public policy initiatives that effect retirements (e.g., the DEC "peaker rule")

Long-Term Investment Signals and Recommendations

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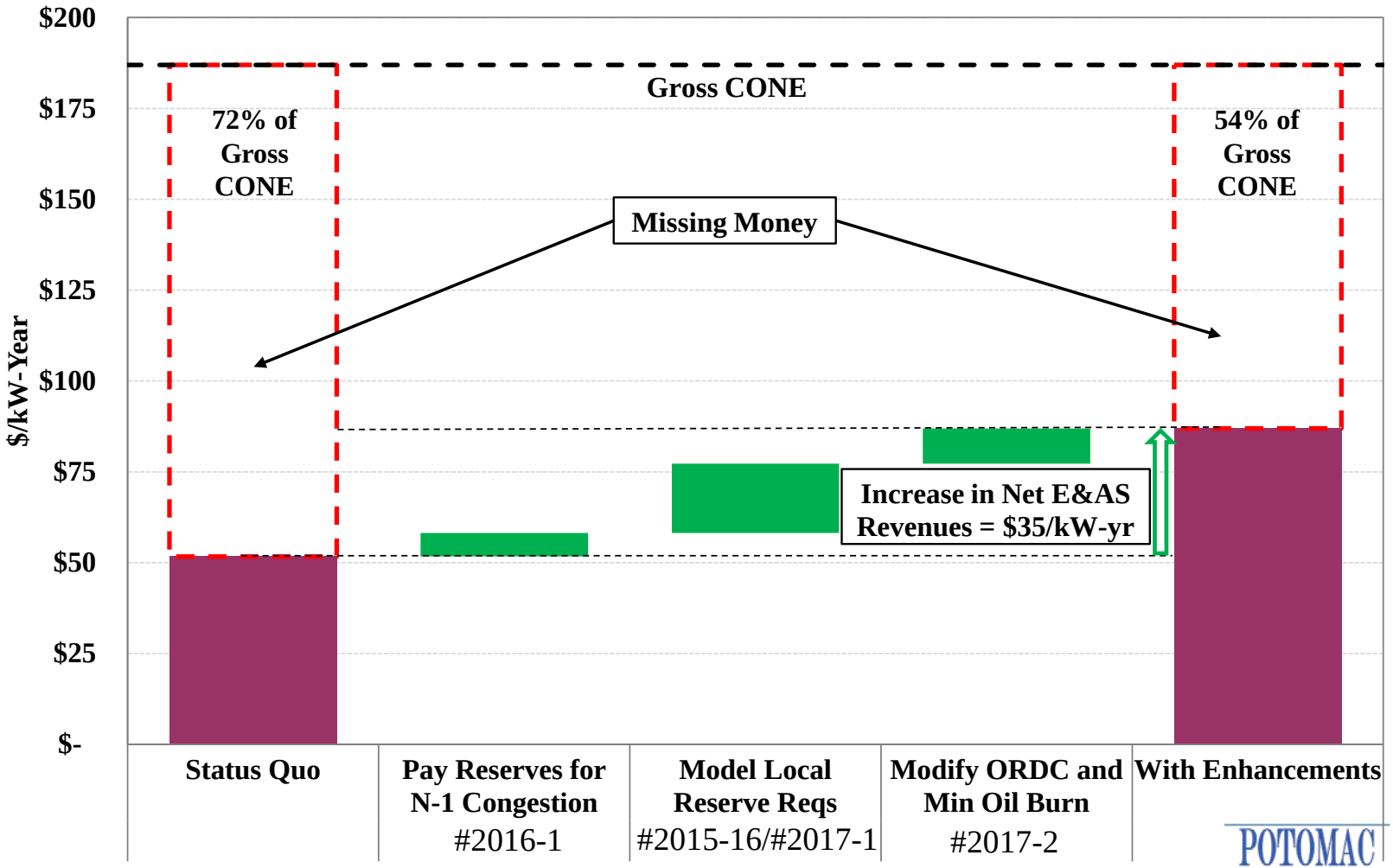
Investment Signals: Enhancing Incentives for Key Attributes

- Increasing E&AS net revenues for flexible units would:
  - ✓ Reduce the capacity revenues needed to maintain reliability
  - ✓ Shift incentives toward retiring older units or repowering with:
    - Newer more flexible & fuel-efficient generation
    - Battery storage
- Recommendations for improving New York's shortage pricing and other aspects of its Energy and AS Markets:
  - ✓ 2015-16: Dynamic reserve requirements
  - ✓ 2017-1: NYC locational reserve requirements
  - ✓ 2017-2: Reserve demand curve increases
  - ✓ 2016-1: Compensate reserves that increase transfer capability
  - ✓ 2018-1: Long Island congestion on low voltage system

Investment Signals: Enhancing Incentives for Key Attributes (NYC)



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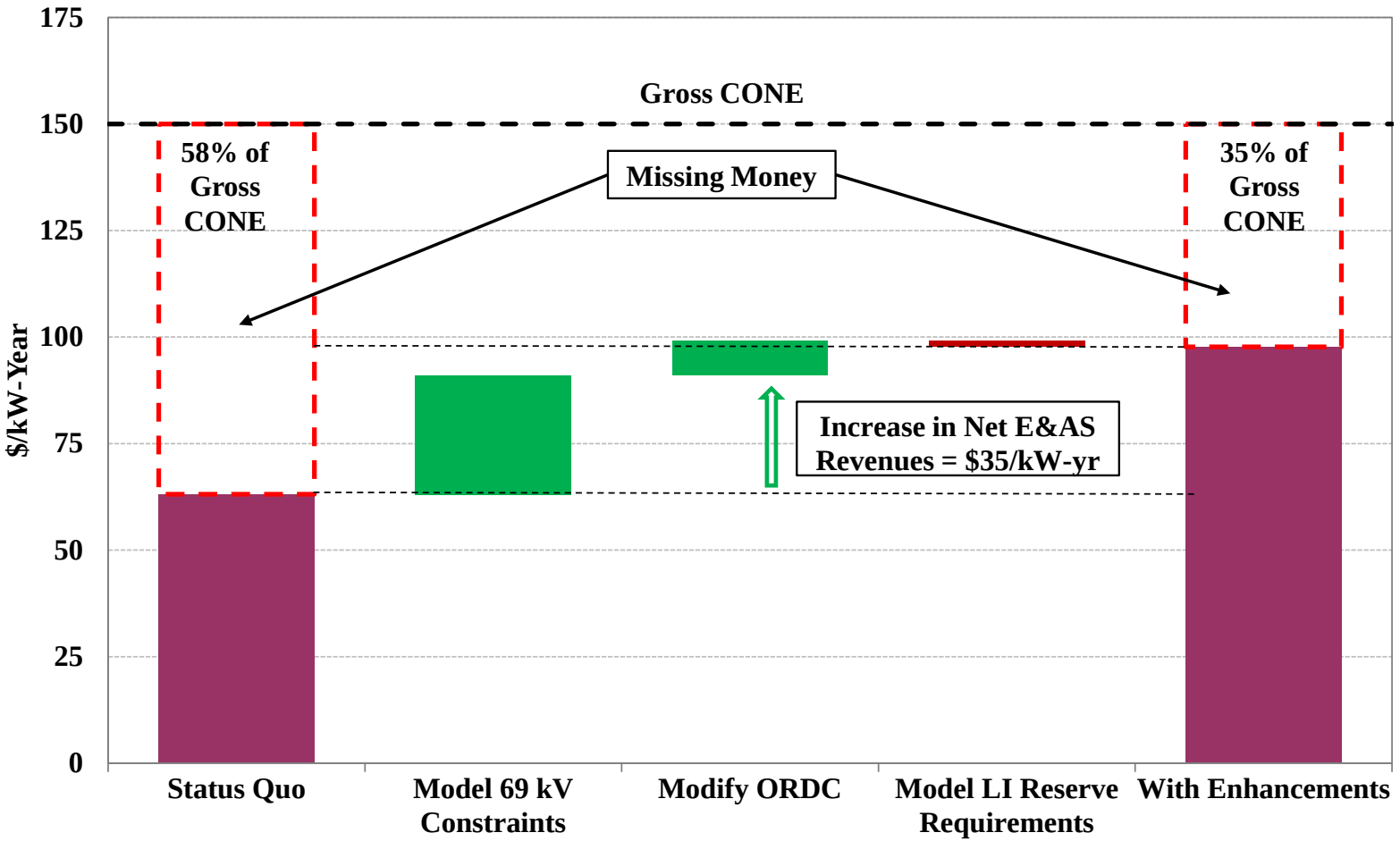
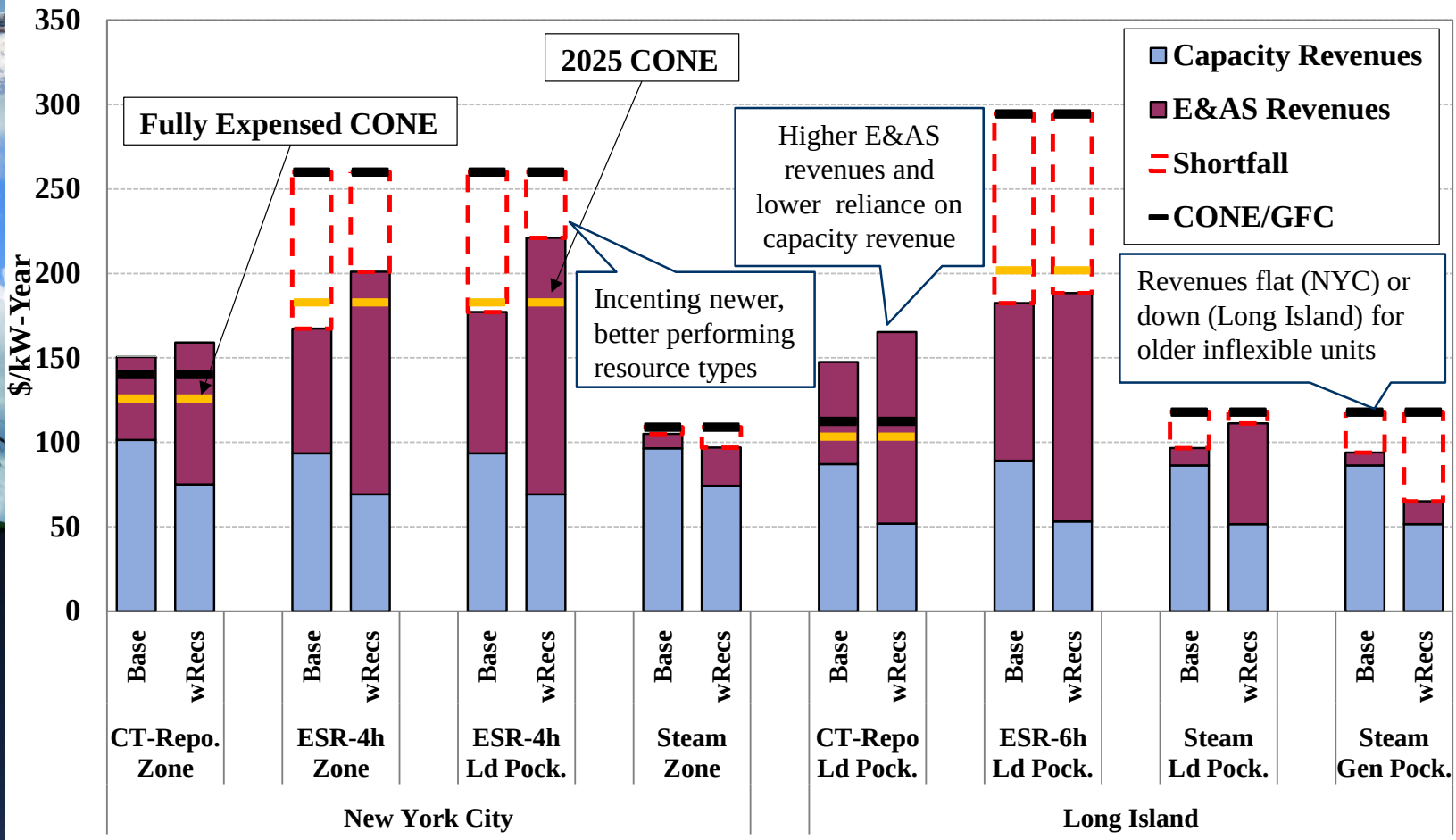
Investment Signals: Enhancing Incentives for Key Attributes (LI)



Investment Signals: Potential Impact of Incentives on Technologies



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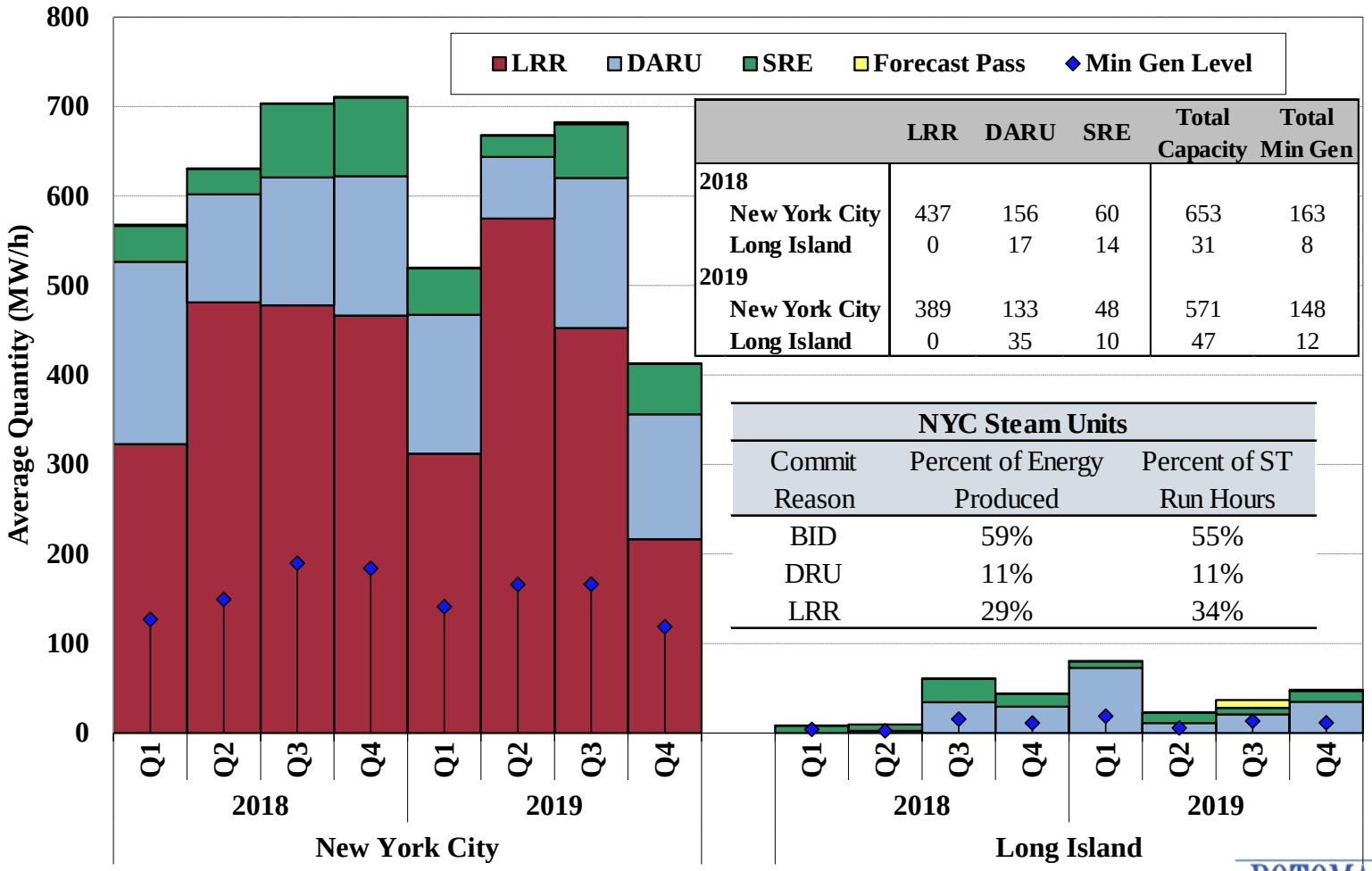
Energy Market Enhancements: Reserves for NYC Congestion Management

Transmission Facility		Average Constraint Limit (MW)		
		N-1 Limit Used	Seasonal LTE	Seasonal STE
345 kV	Gowanus-Farragut	1067	834	1303
	Motthavn-Rainey	1067	834	1298
	Dunwodie-Motthavn	1073	842	1302
	Sprnbrk-W49th ST	1292	1009	1575
	W49th ST-E13th ST	1251	961	1537
138 kV	Foxhills-Greenwd	312	247	377
	Willwbrk-Foxhills	351	262	439
	Gowanus-Greenwd	324	298	350
	Vernon-Greenwd	240	228	251

- In 2019, 47 percent (or $29 million) of real-time congestion occurred on N-1 transmission constraints that would have been loaded above LTE after a single contingency.
- The additional transfer capability above LTE on New York City transmission facilities averaged:
  - ✓ 15 to 90 MW for 138 kV load-pockets
  - ✓ 200 to 300 MW for the 345 kV system during congested hours

See #2016-1

Energy Market Enhancements: Supplemental Commitments for Reserves



	LRR	DARU	SRE	Total Capacity	Total Min Gen
2018					
New York City	437	156	60	653	163
Long Island	0	17	14	31	8
2019					
New York City	389	133	48	571	148
Long Island	0	35	10	47	12

NYC Steam Units

Commit Reason	Percent of Energy Produced	Percent of ST Run Hours
BID	59%	55%
DRU	11%	11%
LRR	29%	34%

See #2017-1 & #2015-16

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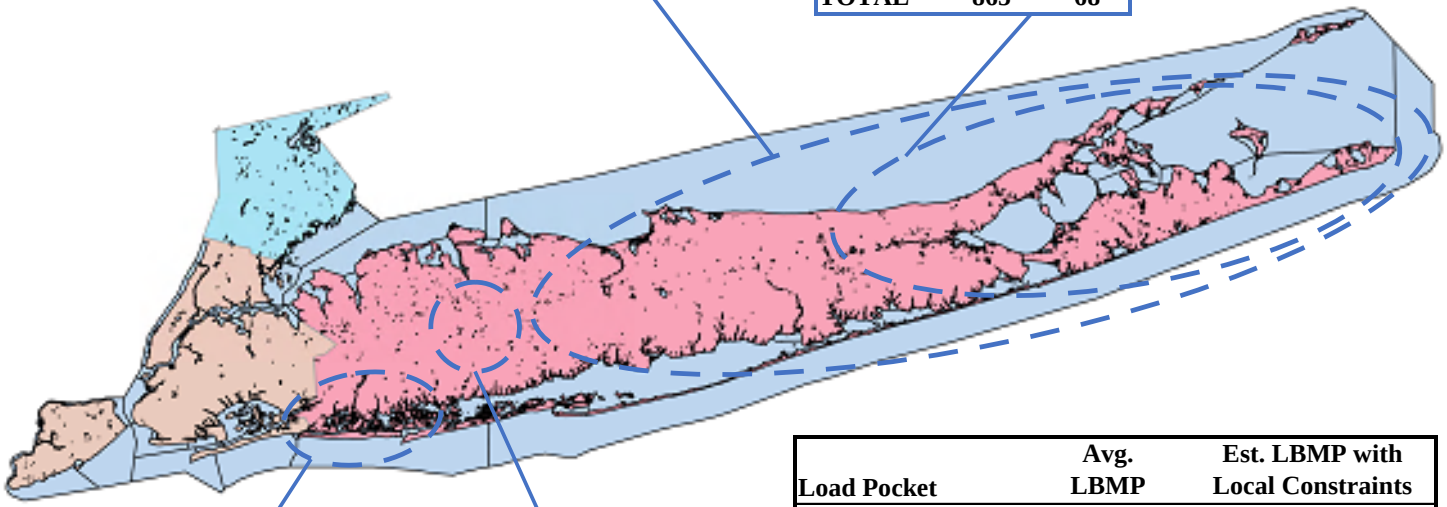
Energy Market Enhancements: Modeling Constraints on Long Island

- OOM actions:
  - ✓ Make transmission bottlenecks less transparent to investors
  - ✓ Suppress E&AS prices
- Modeling low-voltage constraints in the market software would:
  - ✓ Facilitate more efficient PAR operations
  - ✓ Reduce inefficient dispatch of oil-fired generation
- Congestion pricing would increase LBMPs:
  - ✓ 12 percent in East of Northport load pocket
  - ✓ 53 percent in East End load pocket
- Recommendation #2018-1 would provide better pricing signals, better investment signals, and reduced emissions.

Energy Market Enhancements: Modeling Constraints on Long Island

East of Northport	#Hours	#Days
69kV	754	48
138kV	1173	114
TOTAL	1860	145

East End	#Hours	#Days
69kV	71	8
138kV	71	13
TVR	813	61
TOTAL	865	68



Valley Stream	#Hours	#Days
69kV	624	53
138kV	6601	353
TOTAL	6780	354

Brentwood	#Hours	#Days
69kV	381	48
138kV	2	1
TOTAL	383	49

Load Pocket	Avg. LBMP	Est. LBMP with Local Constraints
Brentwood	$32.69	$33.68
East End	$36.19	$55.41
East of Northport	$34.76	$38.82
Valley Stream	$36.84	$39.39

See #2018-1

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Long Term Investment Signals: Capacity Prices by Location & Technology

- The current capacity market's four-region framework:
  - ✓ Provides excessive incentives to import capacity,
  - ✓ Makes excessive payments to generators in export-constrained areas,
  - ✓ Gives insufficient incentives for investment in import-constrained areas and new transmission, and
  - ✓ Places inefficient deliverability requirements on new investments.
- The current market design will not adapt compensation efficiently to:
  - ✓ Shifting transmission bottlenecks, and
  - ✓ An evolving resource mix with more non-conventional resources.
- In the long-term, we have recommended that the NYISO implement locational marginal pricing for capacity or "C-LMP" (#2013-1c).
  - ✓ In the short-term, additional evaluation is needed to determine how this concept would perform under a wide range of conditions.

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				
2019-1	VIII.C	Set day-ahead and real-time reserve clearing prices considering reserve constraints for Long Island.		
2018-1	V.B, VIII.C	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.C, IX.G	Model local reserve requirements in New York City load pockets.	✓	✓
2017-2	VIII.C, IX.A	Modify operating reserve demand curves to improve shortage pricing and ensure NYISO reliability.	✓	✓
2016-1	VIII.C, IX.C	Consider rules for efficient pricing and settlement when operating reserve providers provide congestion relief.		✓
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.	✓	

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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				
2019-2	V.A	Adjust offer/bid floor from negative $1000/MWh to negative $150/MWh.		
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.D	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.F	Adjust look ahead evaluations of RTD and RTC to be more consistent with the timing of external transaction ramp and gas turbine commitment.		

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Market Recommendations: Capacity Market and Planning Enhancements

Number	Section	Recommendations	Current Effort	High Priority
Capacity Market – Market Power Mitigation Measures				
2019-3	III.C	Modify the Part A test to allow public policy resources to obtain exemptions when it would not result in price suppression below competitive levels.	✓	✓
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.	✓	
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				
2019-4	VII.B	Modify translation of the annual revenue requirement for the demand curve unit into monthly demand curves that consider reliability value.		
2019-5	VII.B	Translate demand curve reference point from ICAP to UCAP terms based on the demand curve unit technology.		
2013-1c	VII.D	Implement locational marginal pricing of capacity ("C-LMP") that minimizes the cost of satisfying planning requirements.		✓
2012-1c	VII.E	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.F	Reform the transmission planning process to better identify and fund economically efficient transmission investments.		