Highlights from the 2022 State of the Market Report for the NYISO Markets: Capacity Markets and State Policy

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Introduction

- As the Market Monitoring Unit for NYISO, we produce an annual State of the Market (SOM) Report to:
  - ✓ Evaluate the performance of the markets;
  - ✓ Identify market flaws or market power concerns; and
  - ✓ Recommend improvements in the market design.
- Given the breadth of the report, this presentation covers highlights from our 2022 SOM Report related to capacity market performance and state policy in the NYISO markets

Schedule

- The 2022 SOM was posted here on May 17.
- This report is being presented at several meetings:
  - ✓ May 25: MIWG
    - Energy and Ancillary Services focus – 90 minutes
  - ✓ May 31: Market Committee
    - Overview – one hour
  - ✓ June 6: ICAPWG
    - Capacity Market & Policy focus – 90 minutes
  - ✓ Plan to stay on schedule for each presentation – Additional slots can be scheduled if there is interest.

Evaluation of Capacity Market and Deliverability

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Capacity Market Performance

- The market has maintained reliability with minimal OOM investment for 20 years. However, the changing resource mix reveals major challenges:
  - ✓ Deliverability testing poses a barrier to entry
  - ✓ Capacity prices do not provide adequate locational signals
  - ✓ The IRM and LCR processes produce results that are inefficient and overly volatile
  - ✓ Resource adequacy modeling improvements are needed for efficient capacity accreditation
  - ✓ Capacity prices do not reflect seasonal differences in the value of capacity
- The following slides discuss these issues.

Class Year Deliverability Study

- New resources must complete Deliverability Study to receive CRIS and sell capacity
  - ✓ If not deliverable, assigned cost allocation for System Deliverability Upgrades (SDUs)
- $1.5 billion in SDUs identified for Class Year 2021 projects
- Key aspects of the deliverability test:
  - ✓ Resource must be deliverable throughout capacity zone/region
  - ✓ Each bottleneck tested by increasing output of all upstream resources to max
  - ✓ Renewables modeled using UCAP derating factor (UCDF) based on average summer peak output (e.g. assume 48% capacity factor for solar)

Impact of SDUs on Cost of New Resources
Preliminary CY21 SDUs

Area	Queue #	Type	Requested CRIS MW (ICAP)	Deliverable CRIS MW (ICAP)	SDU Cost ($/kW UCAP)		Final Decision
					$ per kW UCAP	Levelized (% of Net CONE)	
Northern NY - Thousand Island	774	Solar	119	55	**1,136**	**140**	Withdraw from CY
	864	Solar	120	55	**1,125**	**139**	Accept partial CRIS (46%)
	881	Solar	100	38	**1,837**	**227**	Withdraw from CY
	882	Solar	100	55	**1,354**	**167**	Withdraw from CY
	953	Solar	125	49	**1,306**	**161**	Withdraw from CY
N.Y.C. - Staten Island	840	Storage	650	121	**795**	**50**	Accept partial CRIS (19%)
Long Island - West	958	Wind	96	0	**528**	**61**	Withdraw from CY
	959	Wind	1260	0	**528**	**61**	Withdraw from CY
Long Island - Central	925	Storage	100	0	**1,206**	**138**	Withdraw from CY
	942	Storage	60	0	**2,557**	**293**	Withdraw from CY
Long Island - East	766	Wind	880	0	**468**	**54**	Accept SDU
	987	Wind	44	0	**468**	**54**	Accept SDU
	956	Storage	110	0	**577**	**66**	Accept SDU
	965	Storage	77	0	**669**	**77**	Accept SDU
	994	Storage	90	0	**610**	**70**	Withdraw from CY
	746	Storage	150	0	**542**	**62**	Withdraw from CY

Final SDUs for the four LI projects that accepted fell to $224/kW UCAP

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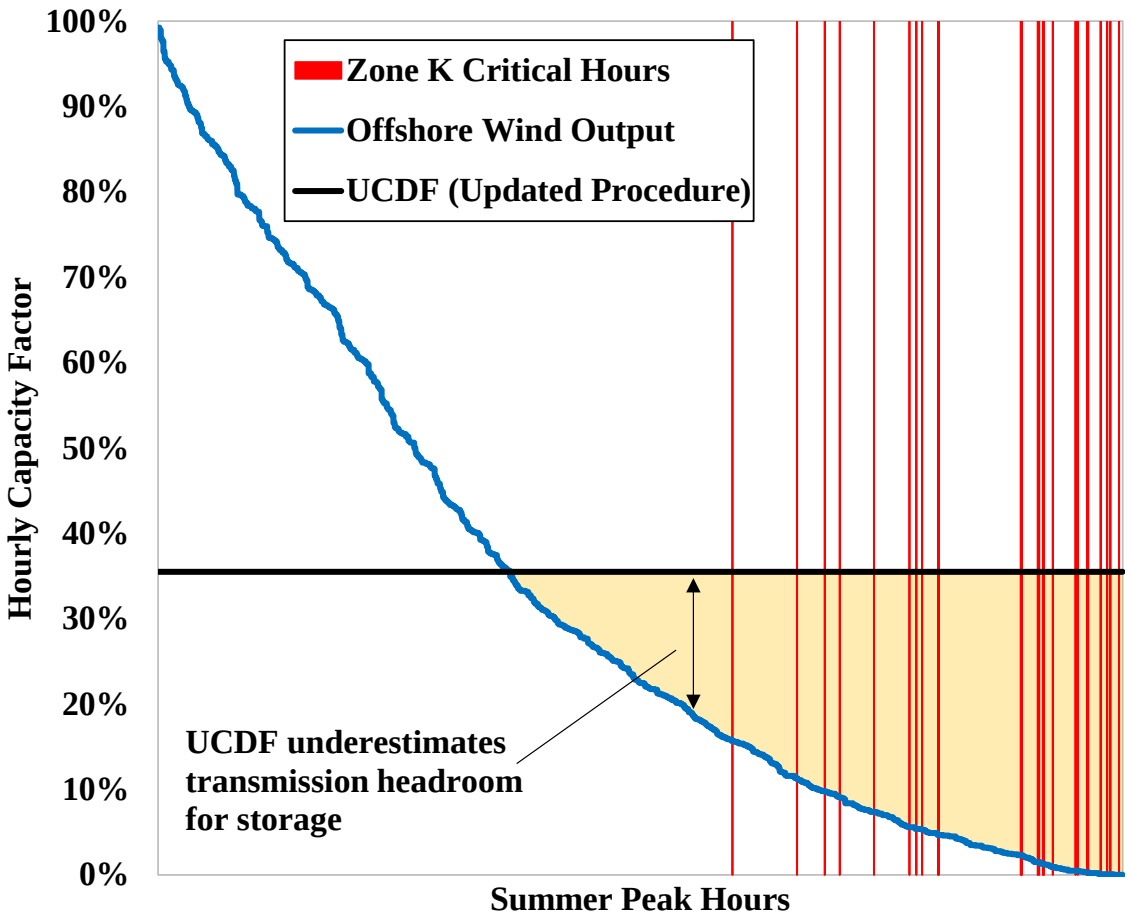
Issues with Deliverability Process

- Models unrealistic dispatch patterns when testing deliverability
- Is poorly suited to test renewables and storage accurately
- Establishes permanent CRIS rights that may not accurately reflect deliverability over time
- Protects existing resources from competition
  - ✓ Incumbent generators facing same constraint get full capacity payment

Issues with Deliverability Process
Treatment of Renewables and Storage



- NYISO proposed updated UCDF for renewables based on MARS
- Updated procedure will still estimate deliverability inaccurately
- Synergies between wind and storage particularly underestimated

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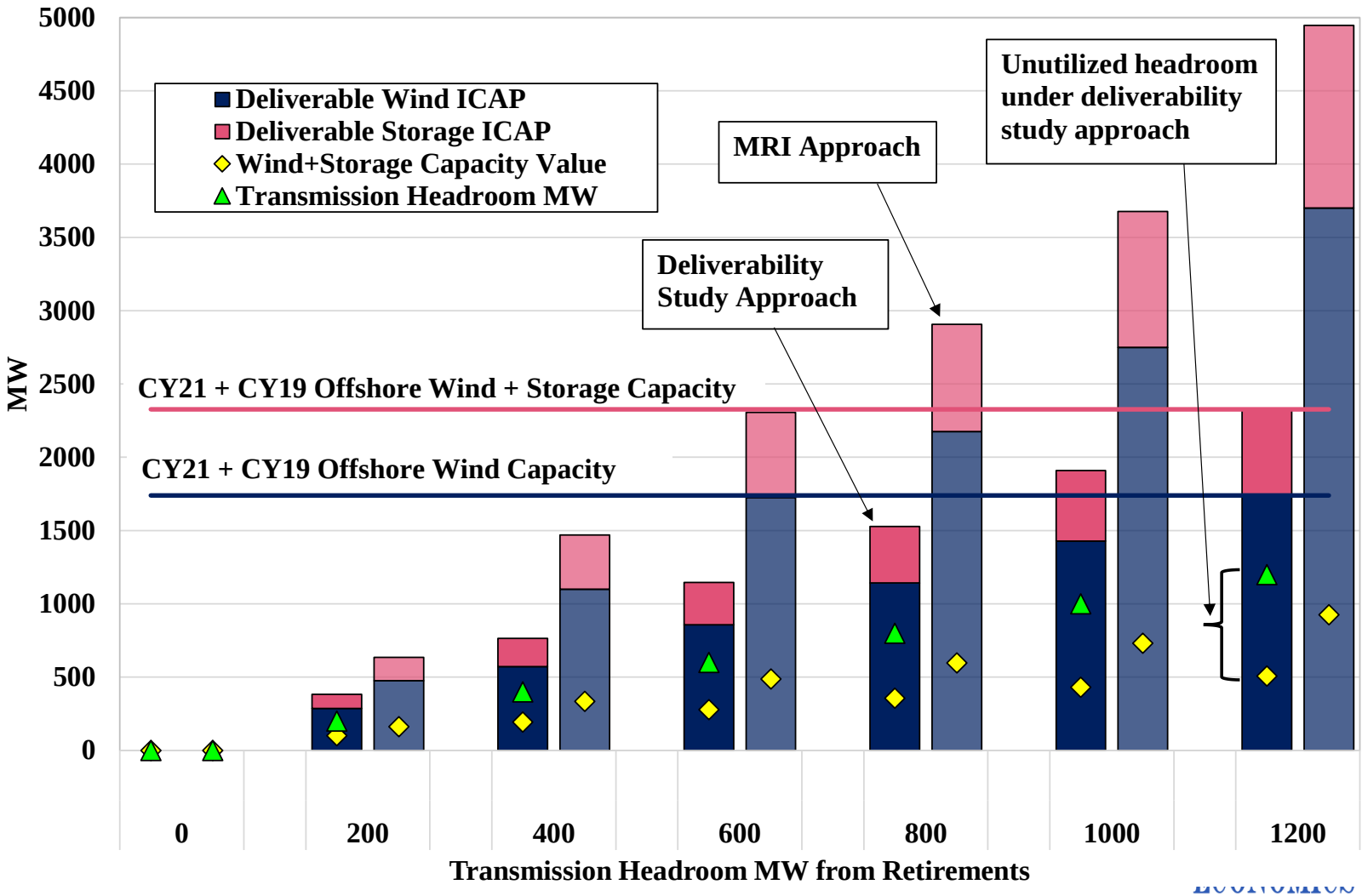
Deliverability Study Underestimates Headroom

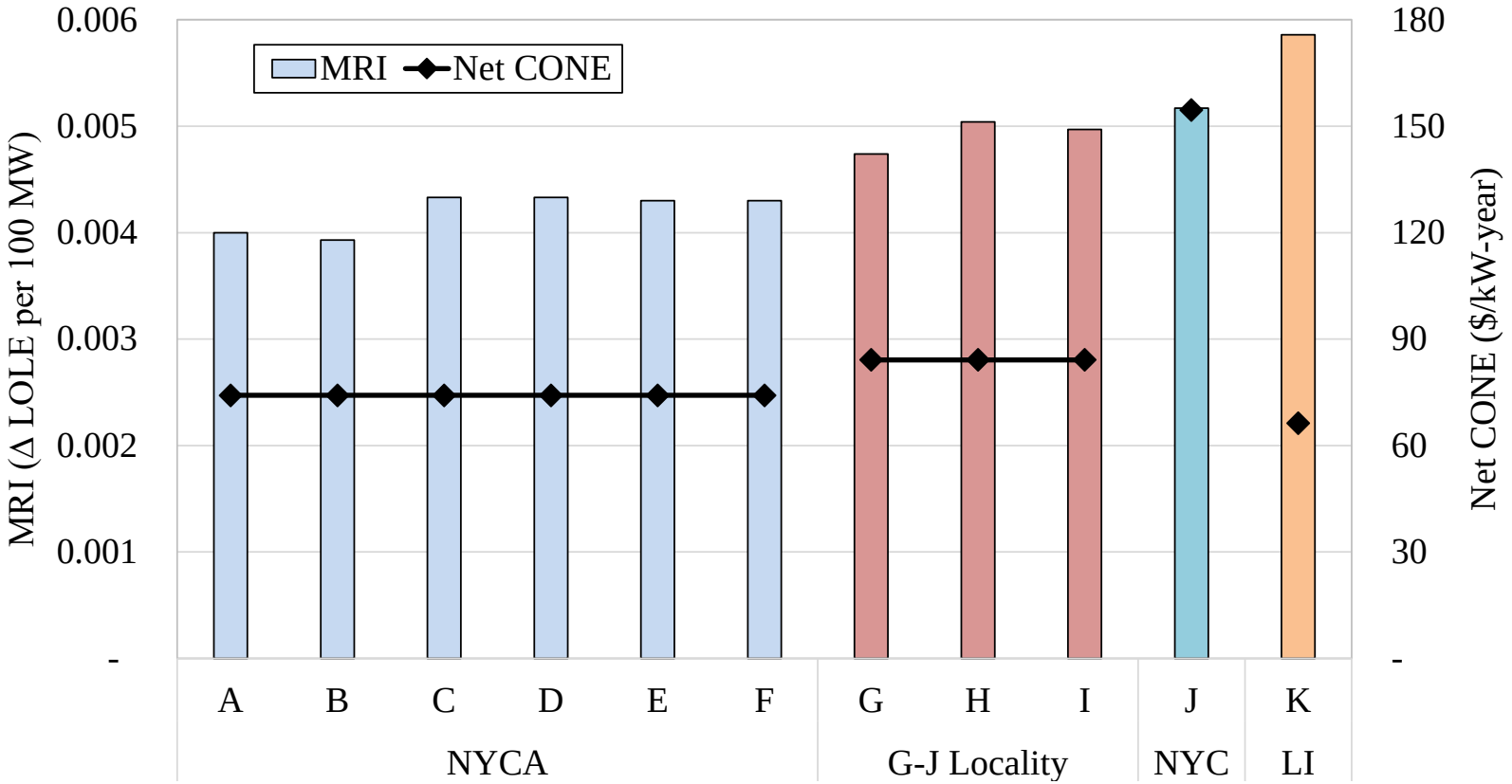
East/Central Long Island Example



Capacity Market Locational Signals

- Current four zones don't capture all relevant constraints
- Existing or potential bottlenecks within capacity zones:
  - ✓ Staten Island and NYC
  - ✓ Zones A/B and ROS
  - ✓ Zones G and H
  - ✓ Zones A-E and Zone F
- Zone creation process is inadequate – relies on deliverability study framework
- Flaws in LCR Optimizer contribute to inefficient/volatile requirements
  - ✓ Current NYISO project underway to consider Optimizer objective function and other issues

MRI and Net CONE by Zone
2023/24 LCR Case at Level-of-Excess



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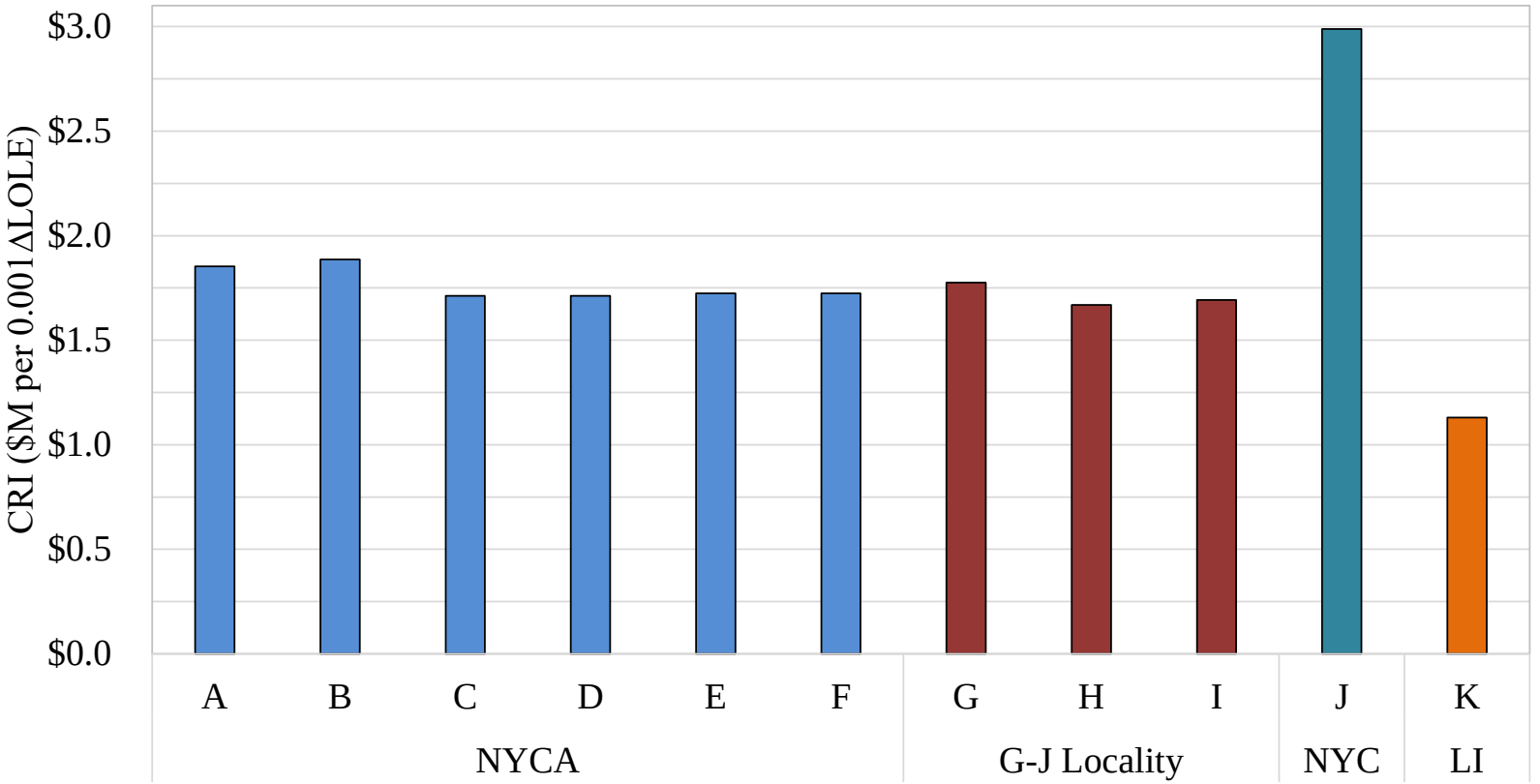
Cost of Reliability Improvement (CRI) By Zone

2023/24 LCR Case at Level-of-Excess



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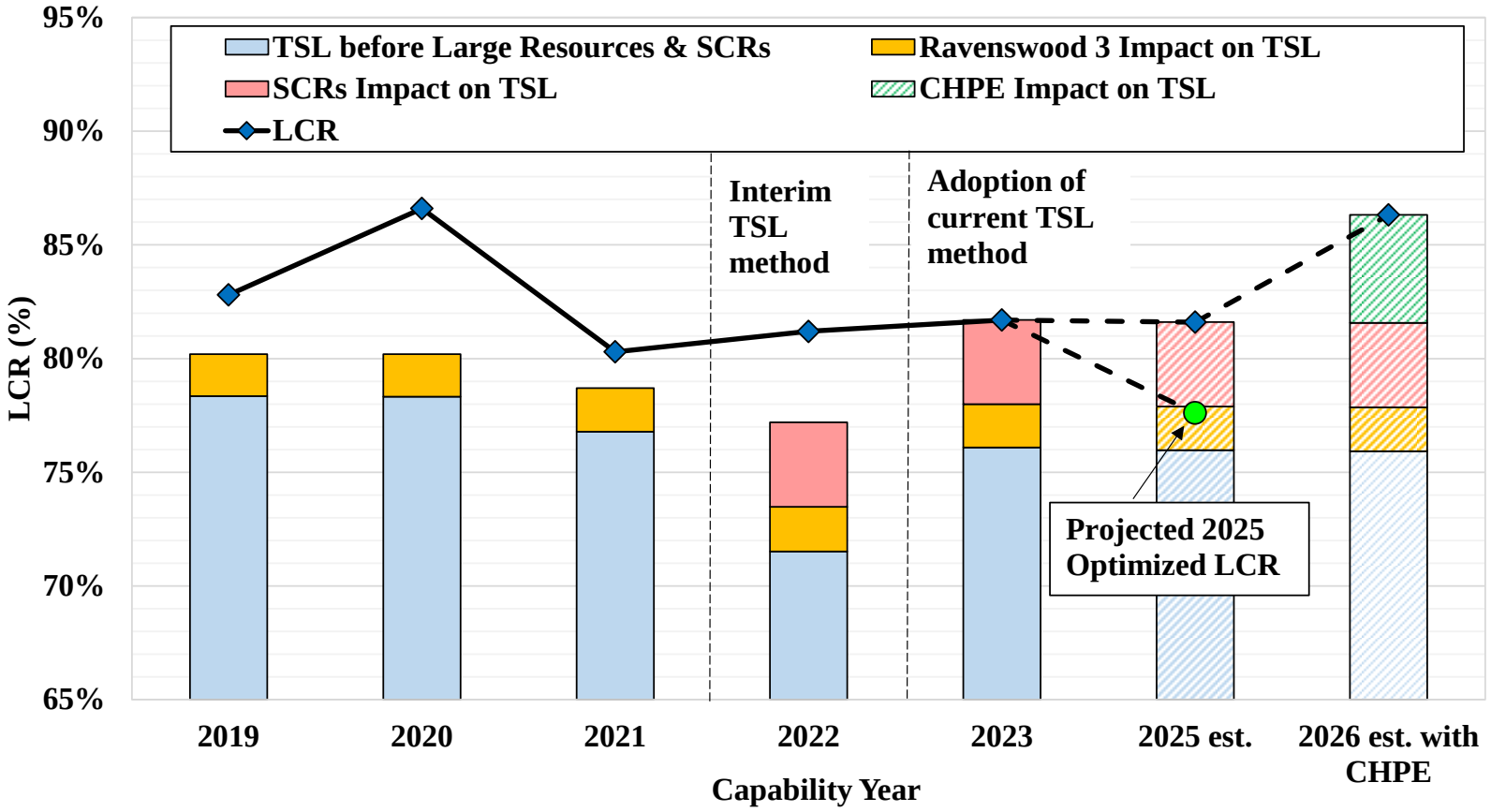
Increasing Role of Transmission Security Limits (TSLs)

- LCR Optimizer uses minimum 'floors' based on TSLs
- NYISO recently updated TSL calculation to align with planning process – caused TSLs to rise and set NYC LCR in 2023/24
- Some resources contribute less towards TSL-based LCRs:
  - ✓ SCRs contribute 0 MW, assumed to be not available
  - ✓ Large resources can increase largest contingency, raise LCR
  - ✓ When TSLs bind, these resources cause LCR and consumer payments to increase
  - ✓ SCRs and large resources in NYC over-compensated by approx. $0 to $52 million in 2023/24

Impact of TSL on Future NYC LCRs



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Capacity Market Recommendations Addressing Locational Signals and Deliverability

- *Recommendation #2022-4* – Implement a dynamic process for defining granular locations in the capacity market.
  - ✓ Recommend zones based on bottlenecks, align with planning model
  - ✓ Will reduce need for and effects of flawed deliverability process.
  - ✓ Allow for more efficient zonal prices to reduce overpayments and improve incentives to retain capacity in key areas.
- *Recommendation #2022-1* – Compensate capacity suppliers based on their contribution to transmission security LCRs are set by TSL.
  - ✓ Would eliminate overcompensation of large resources and SCRs when they cause the LCR in their zone to increase.
- *Recommendation #2013-1c* – Implement locational marginal pricing of capacity ("CLMP")
- *Recommendation #2012-1c* – Establish financial capacity transfer rights

Other Capacity Market Recommendations

- *Recommendation 2021-2* – Improve capacity modeling and accreditation for specific types of resources.
  - ✓ NYISO has adopted capacity accreditation based on marginal contribution to reliability
  - ✓ Resource adequacy modeling improvements are still needed for various resource types
  - ✓ Recommend to address over-compensation of thermal resources with functionally unavailable capacity
- *Recommendation 2022-2* – Establish seasonal capacity requirements and demand curves.

Role of NYISO Markets in State Policy

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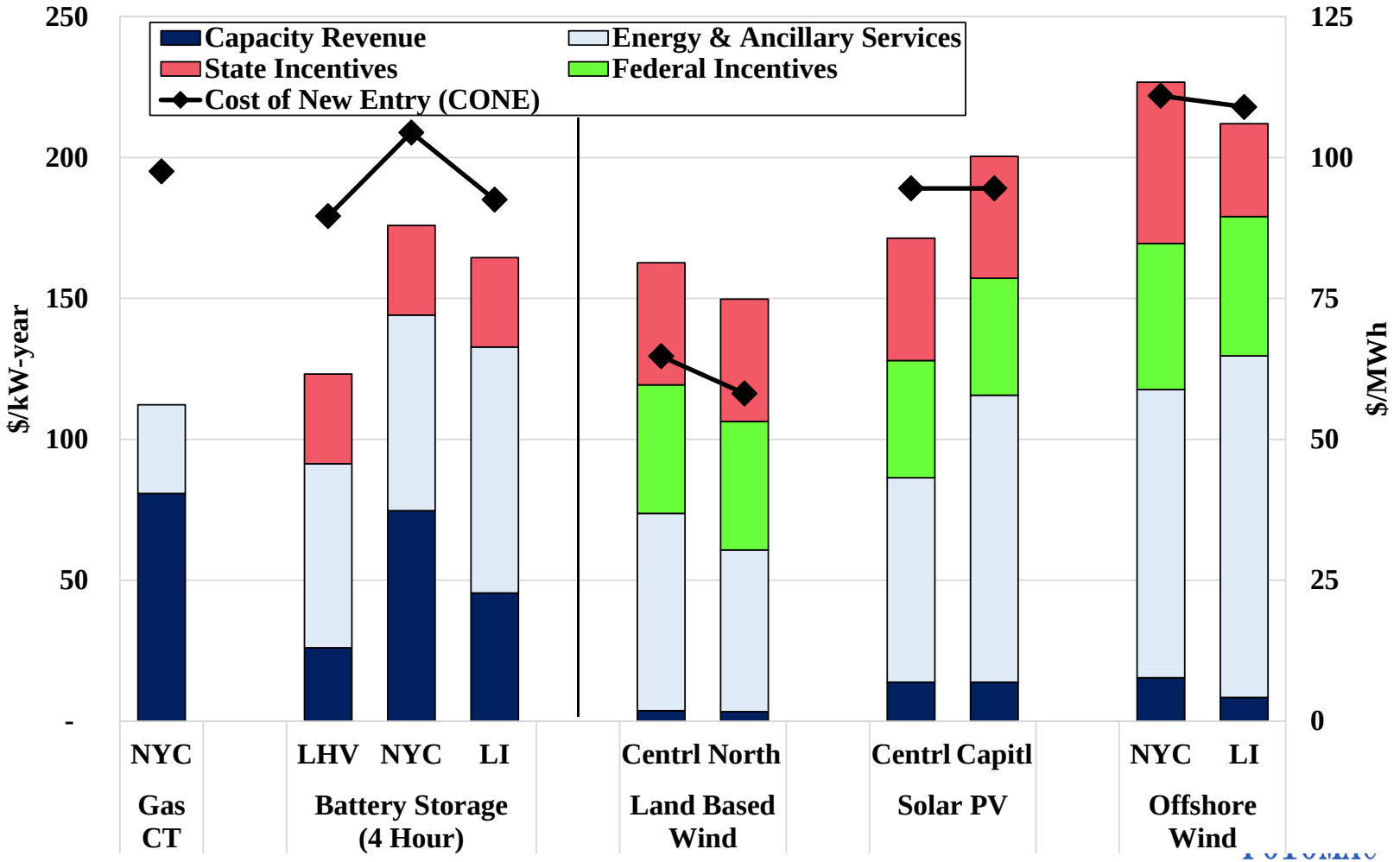
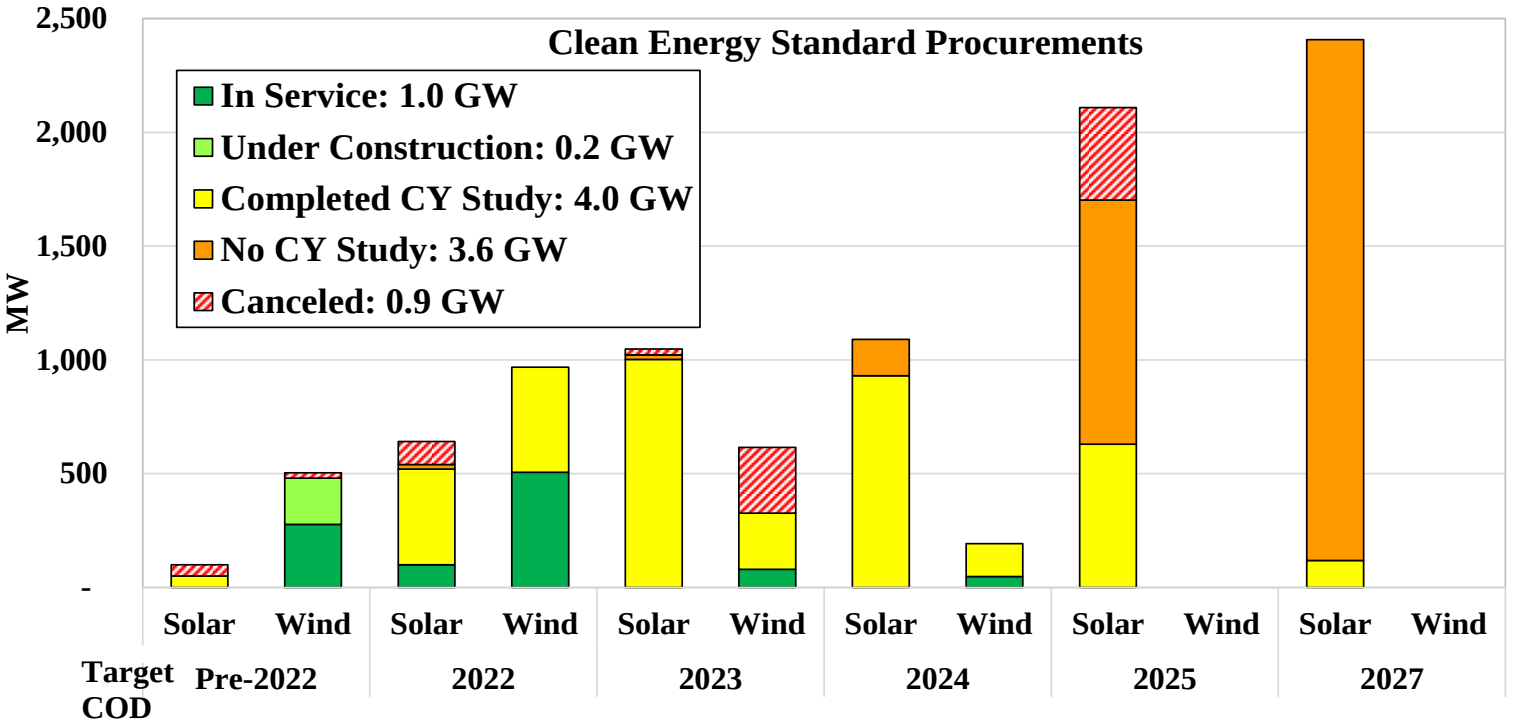
Role of NYISO Markets in Clean Energy Investment

- New investments in New York's power sector are largely driven by state policy
- Pursuing clean energy targets efficiently will have massive implications for costs borne by consumers
- NYISO markets play an important role in helping meet state goals as efficiently as possible
  - ✓ Signal which policy-driven projects provide the most value to the power system and therefore require the least subsidy
  - ✓ Attract investment in complementary resources that provide reliability and flexibility
  - ✓ Reduce the informational burden of planning by promoting market-based investment and innovation

Investment Signals for New Resources
Net Revenue and CONE, 2020-2022



Renewable Investment Behind State Targets



- NYISO developing reforms to streamline the Class Year process
- New investment hampered by:
  - ✓ REC cannibalization → NY Cap-and-Invest could help address
  - ✓ Deliverability Test process

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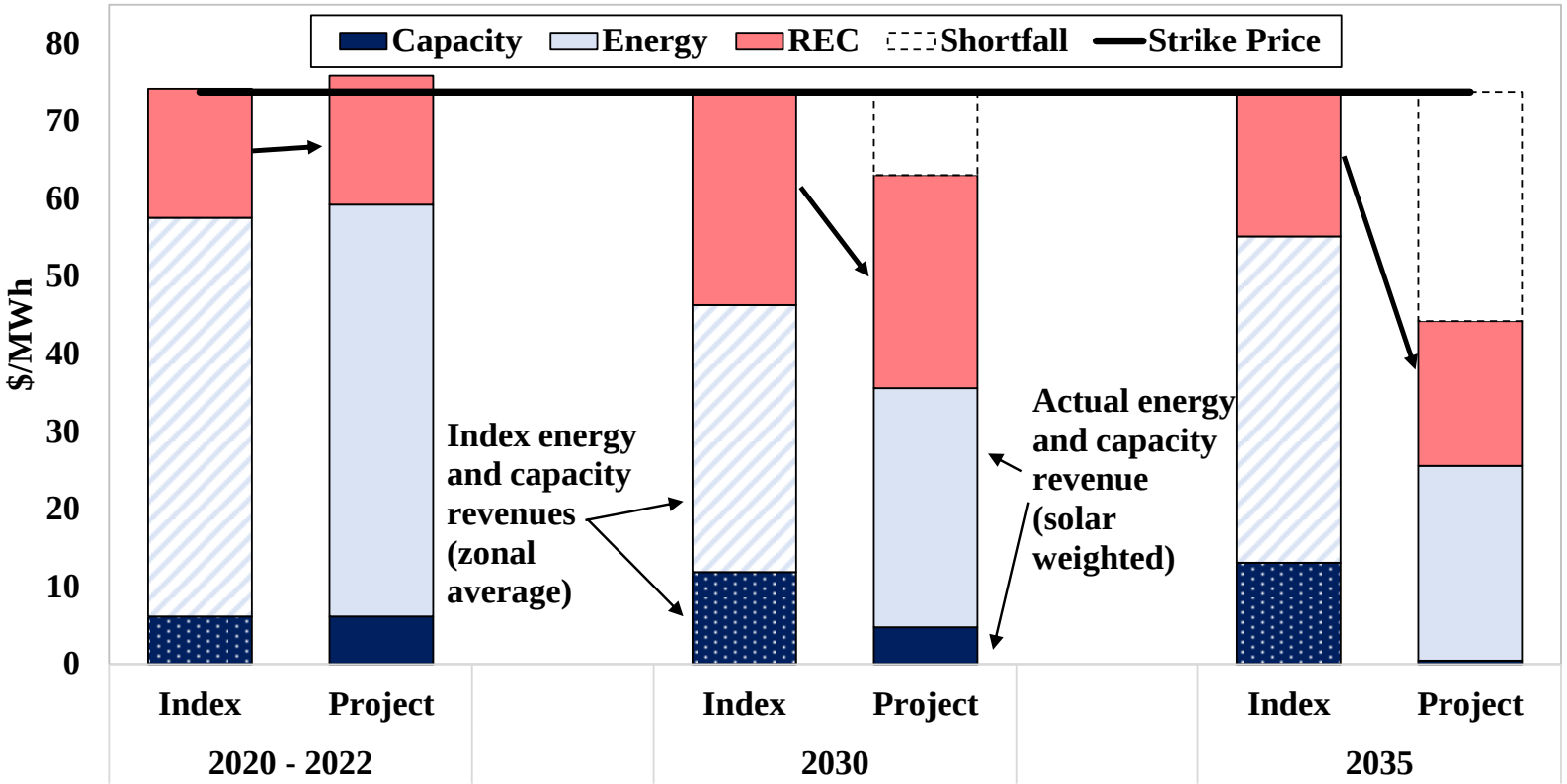
Market Risk for Renewable Projects
Solar Project in System & Resource Outlook



- Future state sponsored renewable projects create risks for current entrants
- Potential revenue shortfalls under Index REC framework

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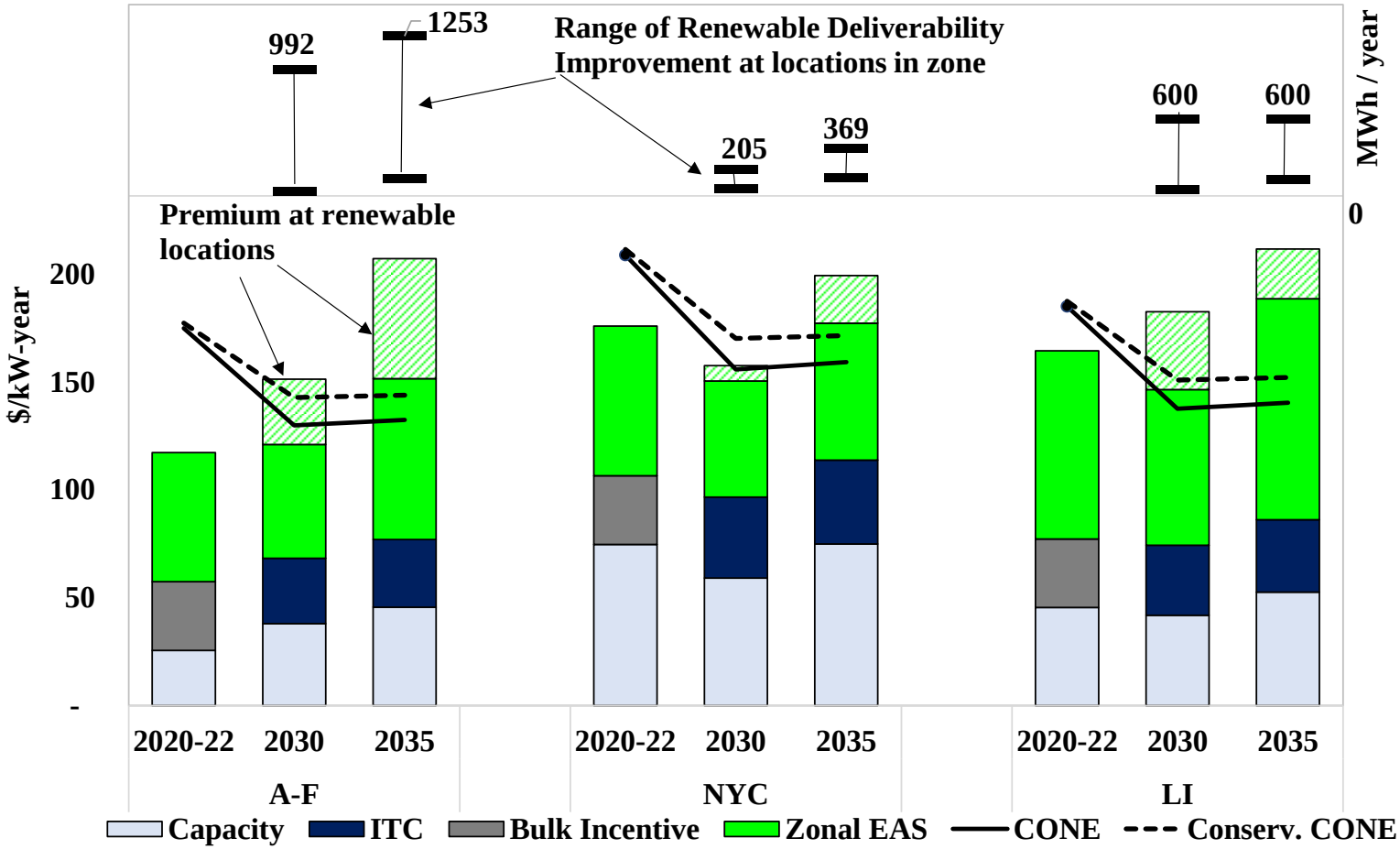
Market Signals for Energy Storage in System & Resource Outlook



- Market signals support storage investment when it efficiently helps to integrate renewables

Markets and Policy
Conclusions and Recommendations

- NYISO market design efficiently rewards storage for reducing curtailment of renewables and providing capacity value
  - ✓ Implication: markets can incentivize the level/types/locations of storage that efficiently complement renewables
- Recommended enhancements would better value flexibility provided by storage
  - ✓ Capacity accreditation modeling (#2021-4) and granular capacity market locations (#2022-4)
  - ✓ Reserves in NYC and Long Is. (#2017-1, #2021-2)
  - ✓ Compensate reserve providers that improve transmission system utilization (#2016-1)
  - ✓ Improve shortage pricing (#2017-2)
  - ✓ Dynamic reserves (#2015-16)
  - ✓ Longer duration reserve products (#2021-1)