2023 State of the Market Report for the NYISO Markets: Capacity Markets and State Policy

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May 30, 2024

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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 2023 SOM Report related to capacity market performance and State policy
  - ✓ Recommended enhancements to improve capacity market performance

Schedule

- The 2023 SOM Report was posted here on May 15.
- The report is being presented at several meetings:
  - ✓ May 29: Management Committee
    - Overview – 60 minutes
  - ✓ May 30: ICAPWG
    - Capacity Market & Policy focus – 90 minutes
  - ✓ June 4: MIWG
    - Energy and Ancillary Services focus – 90 minutes
  - ✓ Additional slots can be scheduled if there is interest.

Net Revenues and Costs

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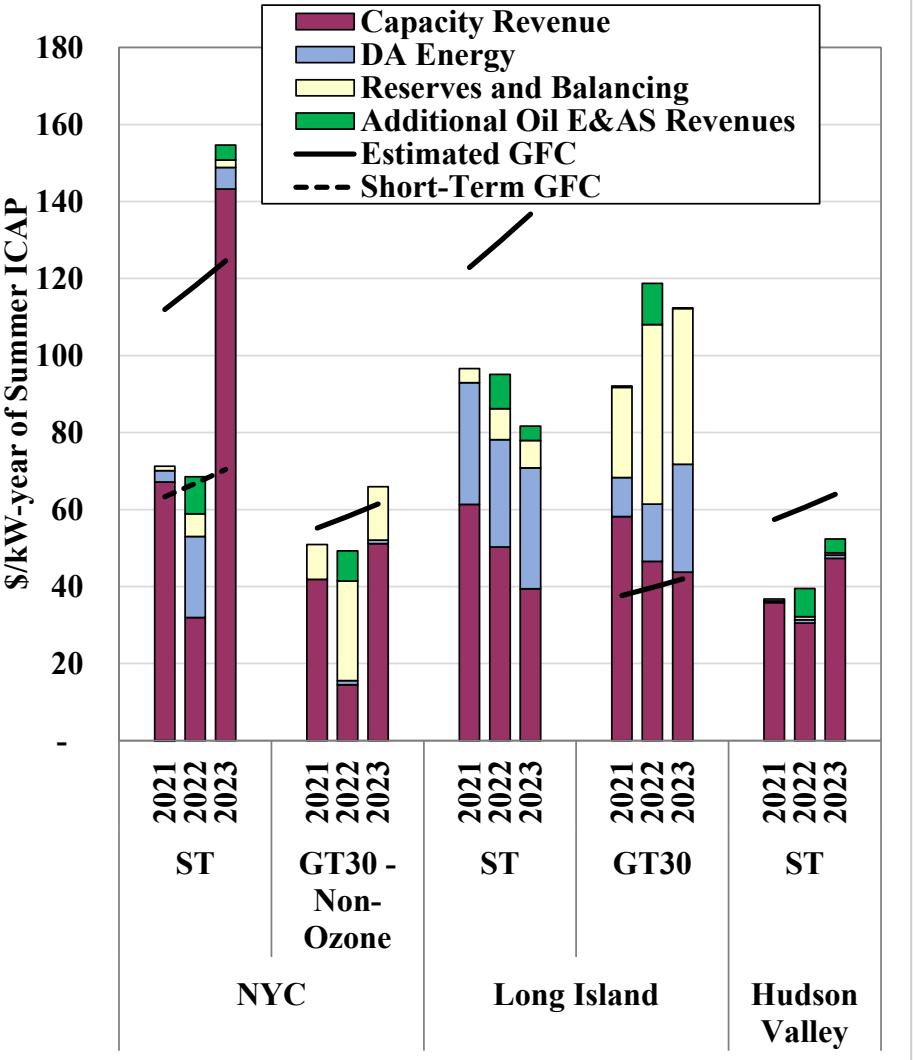
Net Revenues and GFCs for Existing Generation



- Capacity revenues increased in NYC in 2023
- Steam turbines appear:
  - ✓ Economic in NYC
  - ✓ Challenged elsewhere
- GTs are more economic:
  - ✓ Even in NYC without operating during the ozone season (May to September)
- Incentives for fuel-secure generation important for winter reliability

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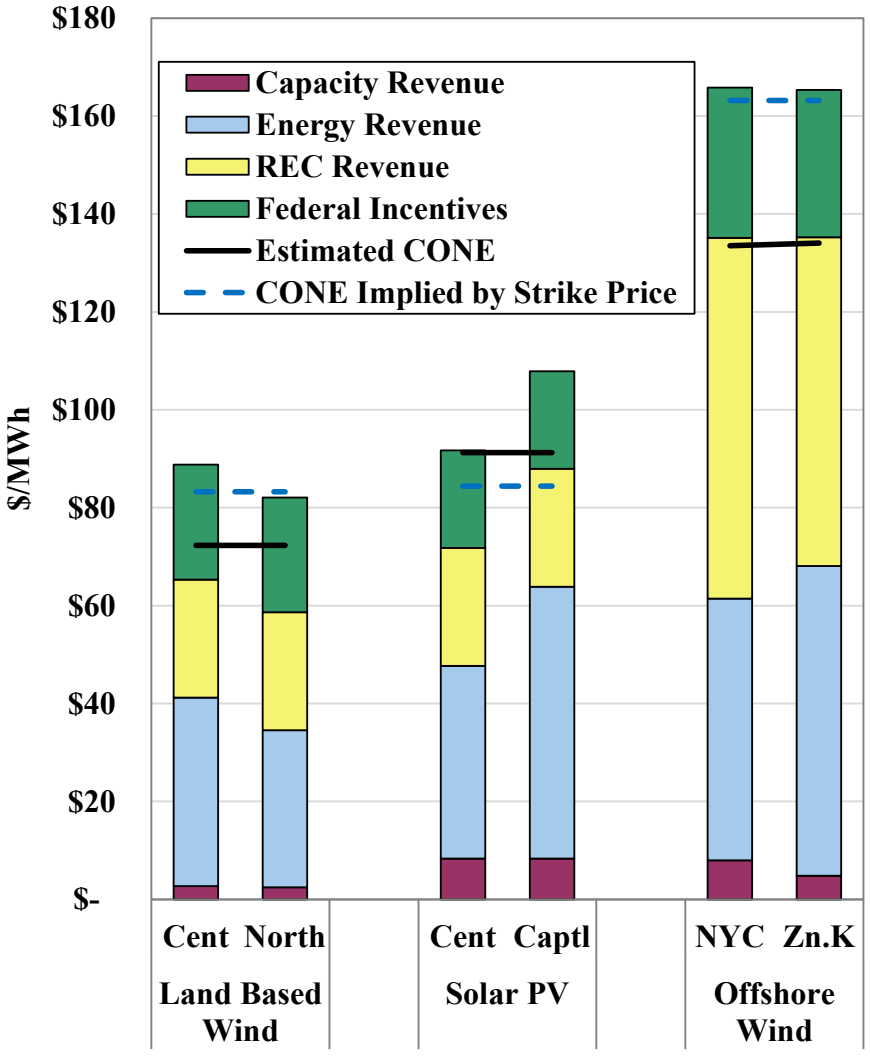
Levelized Cost Implied by Index REC Strike Prices



- Index REC strike prices suggest OSW/LBW may:
  - ✓ Be curtailed more frequently,
  - ✓ Receive lower-than-average LBMPs, or
  - ✓ Experience risk of higher costs.
- Index REC strike prices suggest Solar PV may experience lower-than-estimated costs

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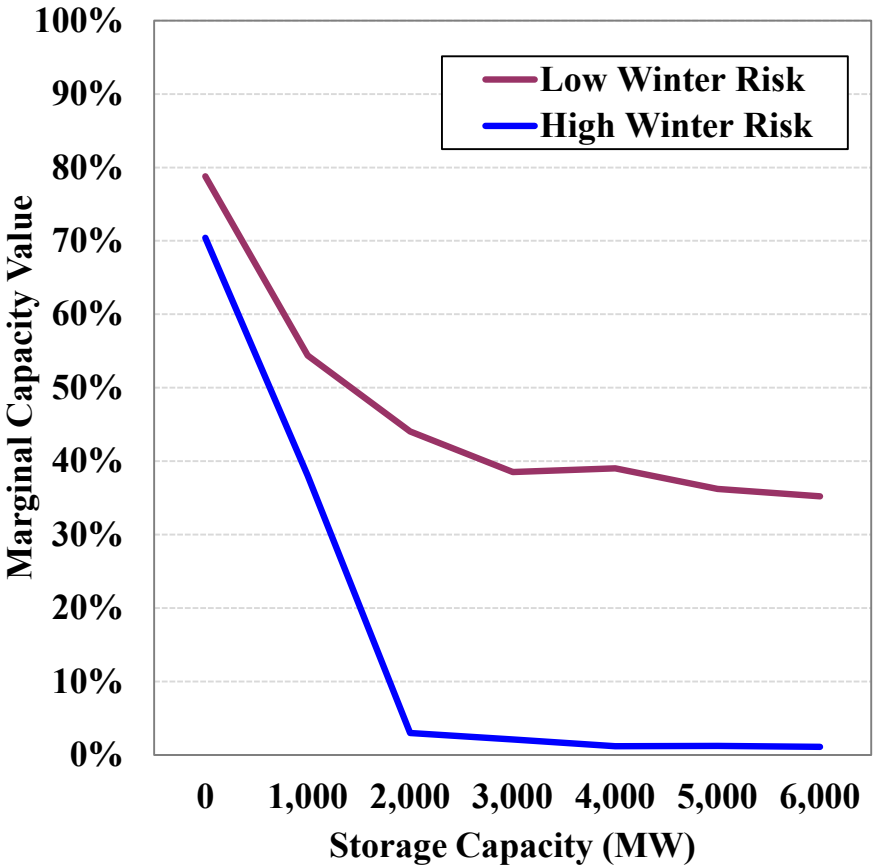
Capacity Accreditation Factors of Battery Storage



- 4-hour battery storage projects likely to face:
  - ✓ Falling CAFs in the summer as penetration increases
  - ✓ Dramatically reduced CAFs under some winter risk scenarios
- Winter reliability risks involve longer periods that stretch on-site fuel inventories, limiting opportunities for charging

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Recommended Capacity Market Enhancements

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Prioritizing Market Enhancements

- Unprecedented levels of policy-driven investment are expected over the coming decade
- The NYISO should focus on enhancements that:
  - ✓ Guide renewable investment to where it is most deliverable
  - ✓ Provide incentives for investment in resources that facilitate integration of intermittent renewables
  - ✓ Encourage retirement of existing generators that have:
    - Inflexible characteristics, and/or
    - Limited availability during gas supply constraints
- These enhancements will facilitate state policy goals at the lowest cost and minimize market harm

Granular Capacity Zones (Rec 2022-4)

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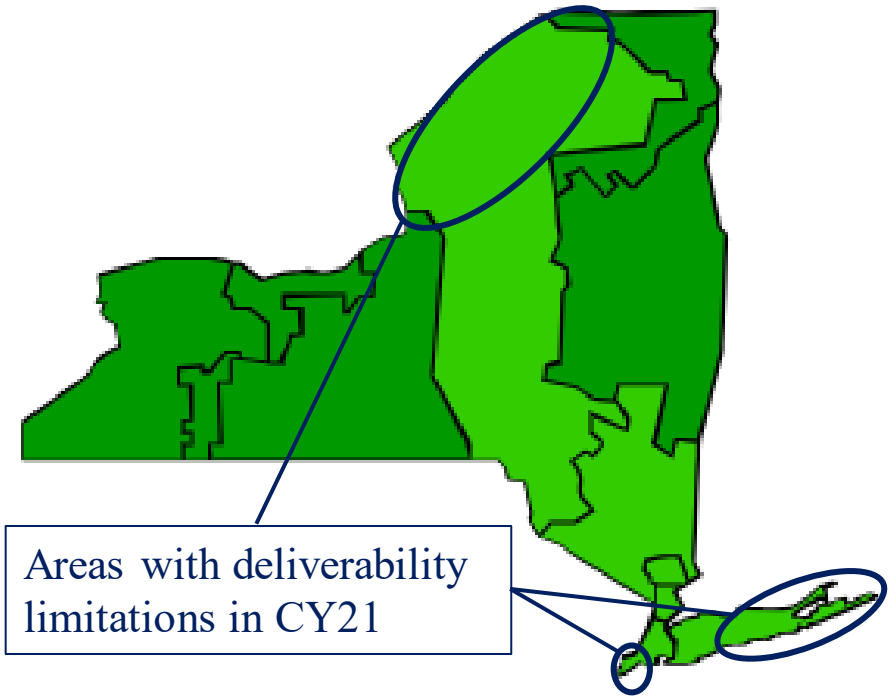
Granular Capacity Zones would Alleviate Barriers from the Deliverability Test



- Deliverability Testing:
  - ✓ Slows interconnection
  - ✓ Inflates ICAP prices in export areas
  - ✓ Protects existing units from competition
  - ✓ Over-allocates cost of upgrades to IPRs and battery storage
- Granular Capacity Zones:
  - ✓ Mitigate or eliminate Deliverability Test
  - ✓ Set efficient locational prices

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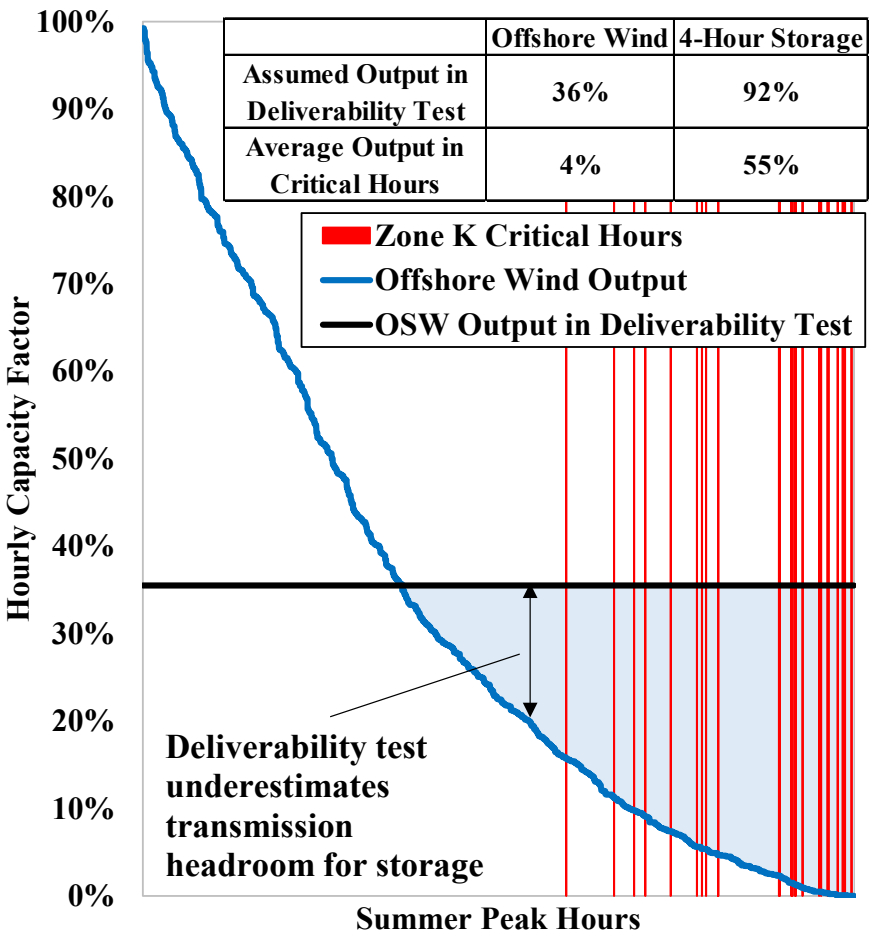
Deliverability Tests of Intermittent Resources Over-estimate Transmission Utilization



- Renewables and battery storage complement one another
- Probabilistic RA models better able to capture synergy between batteries and intermittent
- Difficult to capture in a deterministic test
  - ✓ Deliverability over-estimates impact of wind, solar, batteries

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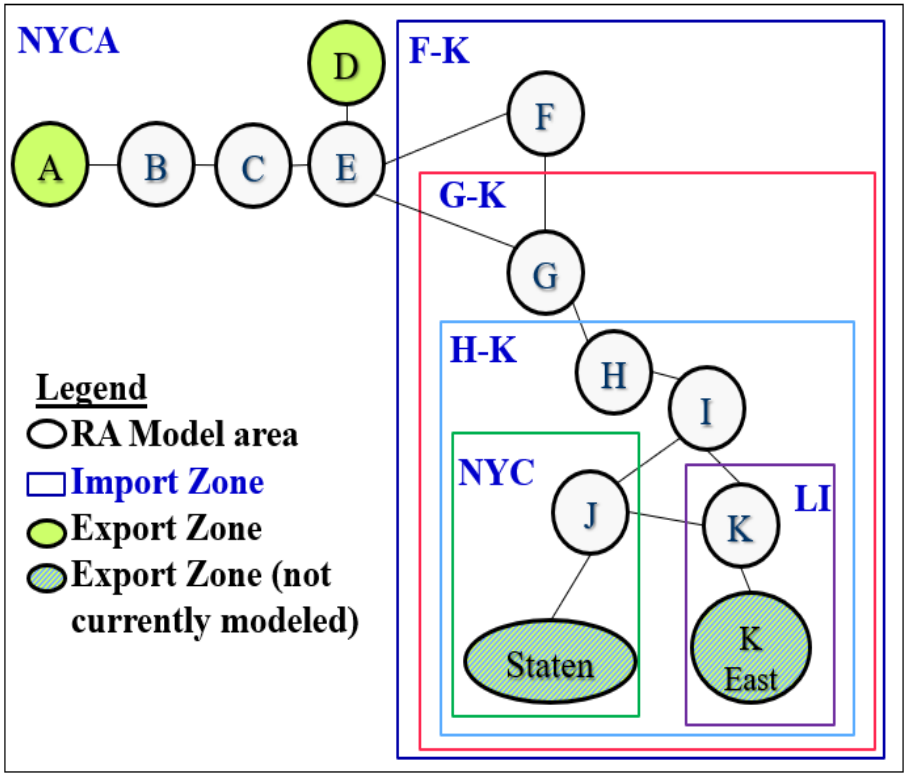
Granular Capacity Zones – Proposed Process Steps 1 to 3

Illustration of Import and Export Zones After Long Island PPTN Projects In Service



1. Represent "as-found" bottlenecks in RA model
   - ✓ Existing ICS process
2. Designate each zone as import/export based on upstream zone's:
   - ✓ Reliability risk
   - ✓ Relative size
3. Use LCR Optimizer to set ICAP reqs using ~5% cost discount in export zones

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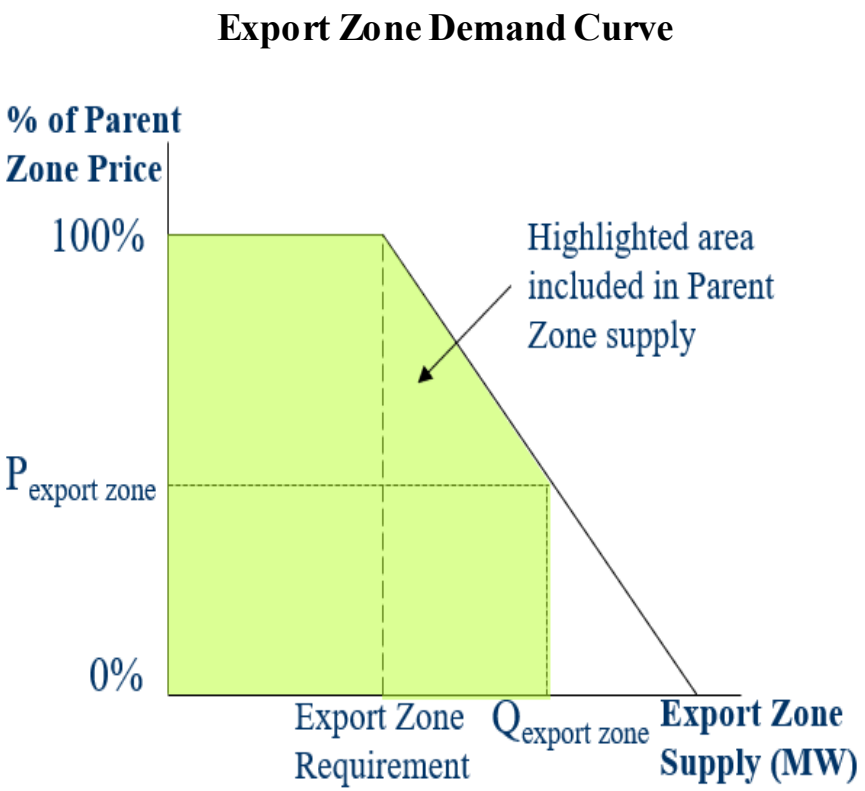
Granular Capacity Zones – Proposed Process Steps 4 & 5



4. Set demand curves
   - ✓ Import DCs as today
   - ✓ Temporary DCs for unanticipated import-constrained zones
   - ✓ Export zone price set as a % of parent
5. Adjust payments to units when RA topology does not accurately characterize their impact on transmission bottlenecks.

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Capacity Compensation for Requirements Driven by Transmission Security (Recs 2022-1 & 2023-4)

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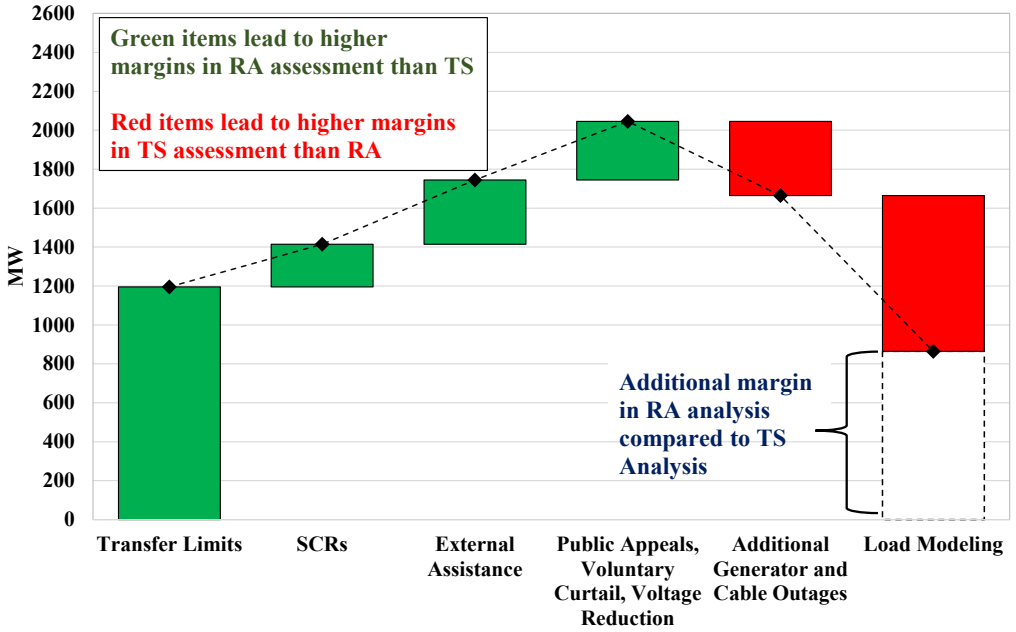
Differences between Transmission Security and Resource Adequacy-Based Requirements

Factors Causing Higher RA-based NYC Margin in 2025



- Market design considerations:
  - ✓ Requirements based on RA and TS
  - ✓ Currently, CAFs based on RA only

- Key differences:
  - ✓ Transfer limits
  - ✓ Extreme loads
  - ✓ EOPs (e.g., SCRs)
  - ✓ Large units
  - ✓ Intermittent units
- Differences will rise because of:
  - ✓ Entry of HVDCs, wind, solar, ESRs
- Assumptions should be justified.

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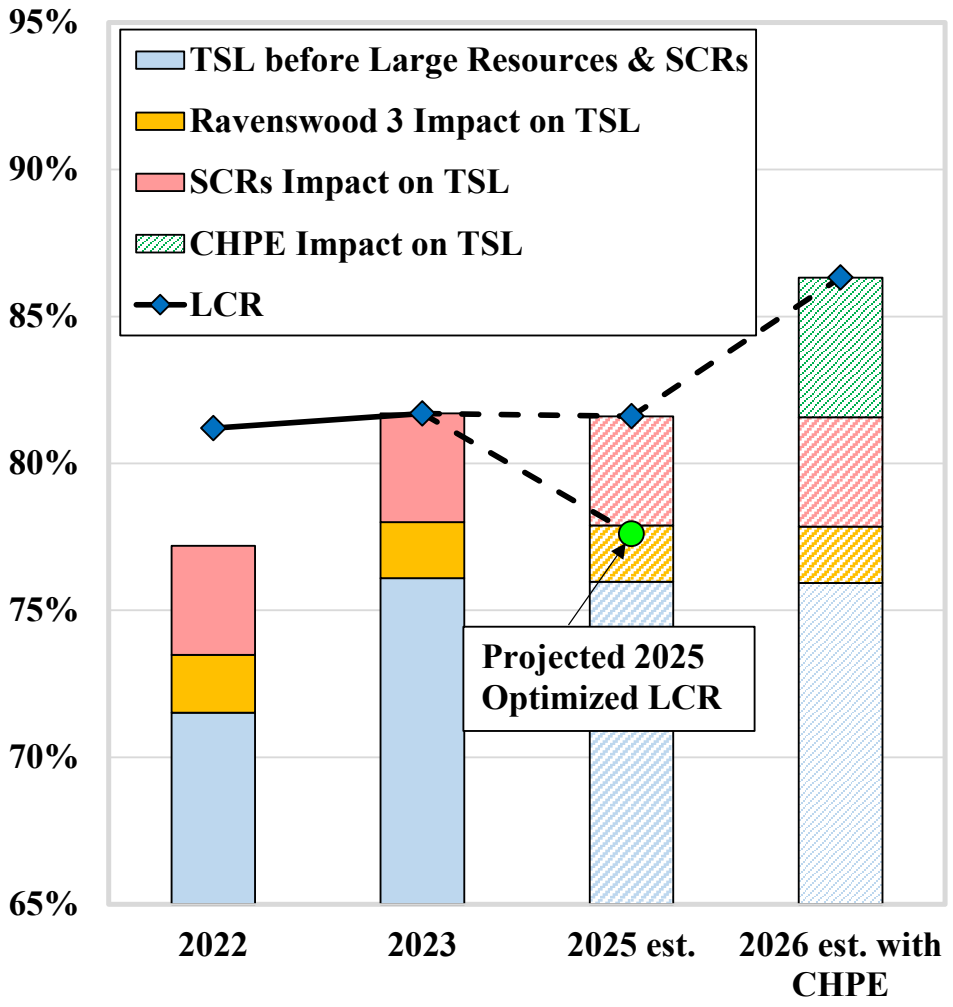
Increasing Role of Transmission Security-Based Requirements in Capacity Market



- TSL floors raise NYC LCR starting in 2023
- TSL raised by:
  - ✓ SCRs
  - ✓ Very large units
  - ✓ Offshore wind
- Estimated overpayment:
  - ✓ ~$50-60M/year from 2023 to 2025
  - ✓ ~$130M in 2026
- See Rec 2022-1 & NYISO project

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Illustration of Rec 2022-1

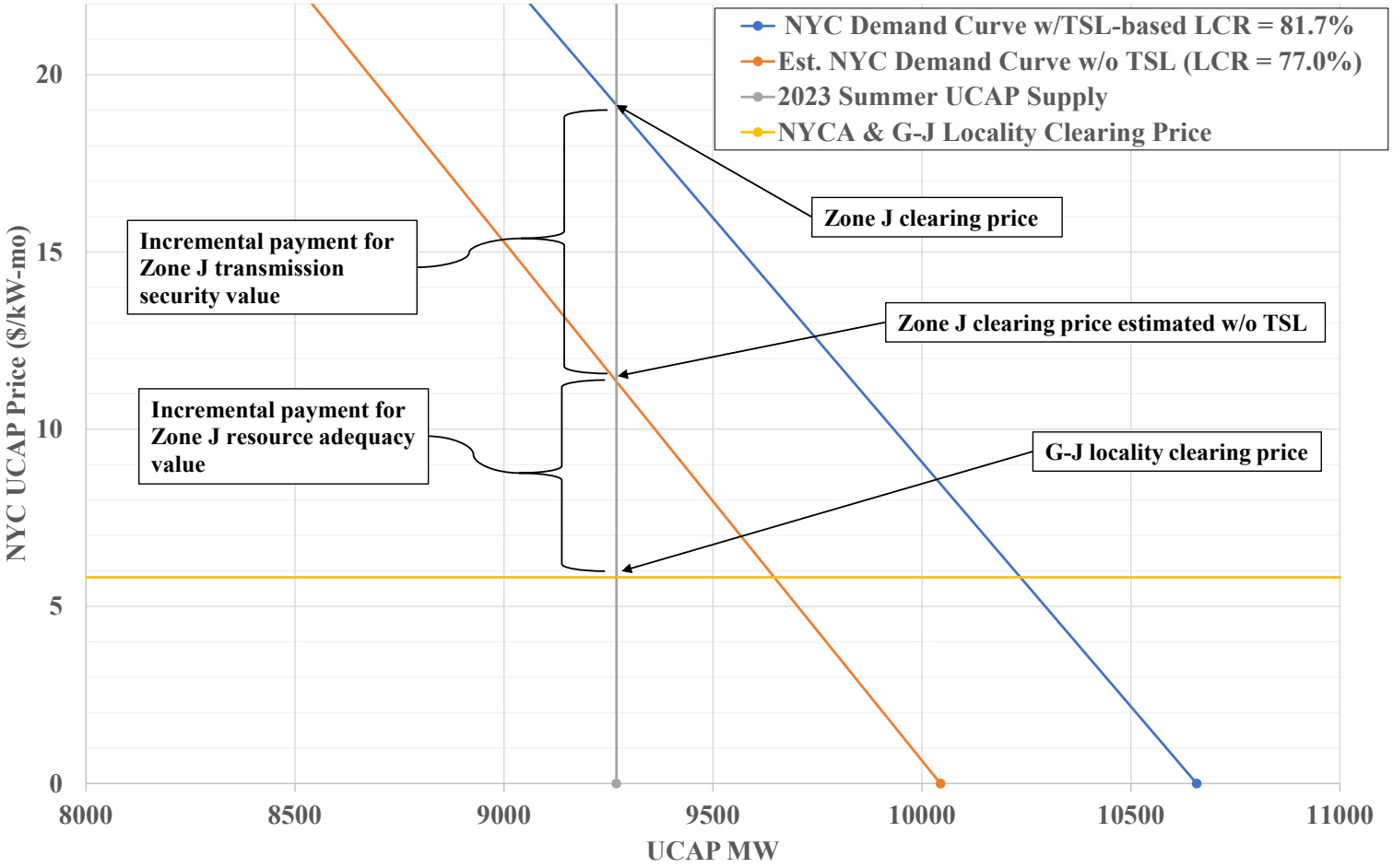

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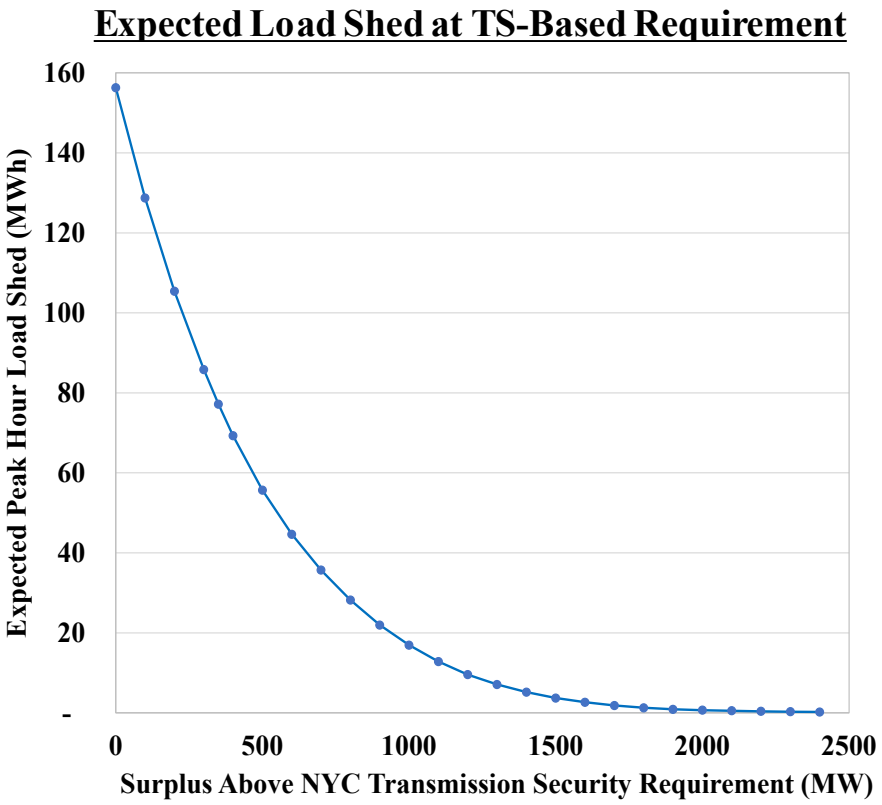
Illustration of Rec 2022-1

- SCRs – Would receive $11.50/kW-mo of UCAP based on the RA value of Zone J resources.
- 1000 MW generator – Assuming third-largest contingency is 720 MW and EFORd is 5 percent, this resource would be paid:
  - ✓ 720 MW of UCAP at Zone J price of $19/kW-mo; and
  - ✓ 230 MW of UCAP at $11.50/kW-mo, the Zone J price for resources that do not contribute to transmission security.
- 800 MW offshore wind – Assuming an MRI of 25% under soon-to-be implemented accreditation rules, it would be paid:
  - ✓ 200 MW of UCAP (based on 25% MRI for 800 MW ICAP) at $11.50/kW-mo price for resource adequacy in Zone J; and
  - ✓ 80 MW of UCAP (based on 10% contribution) at $7.50/kW-mo component for transmission security in Zone J.

Capacity Demand Curves for Transmission Security-Based Requirements (Rec 2023-4)



- Surplus capacity provides increased reliability
  - ✓ Prices should reflect value of additional MWs
- TS criteria based on annual peak load forecast
  - ✓ Value of additional MWs depends on load forecast uncertainty
- Rec 2023-4: Use load forecast uncertainty to set demand curve slope

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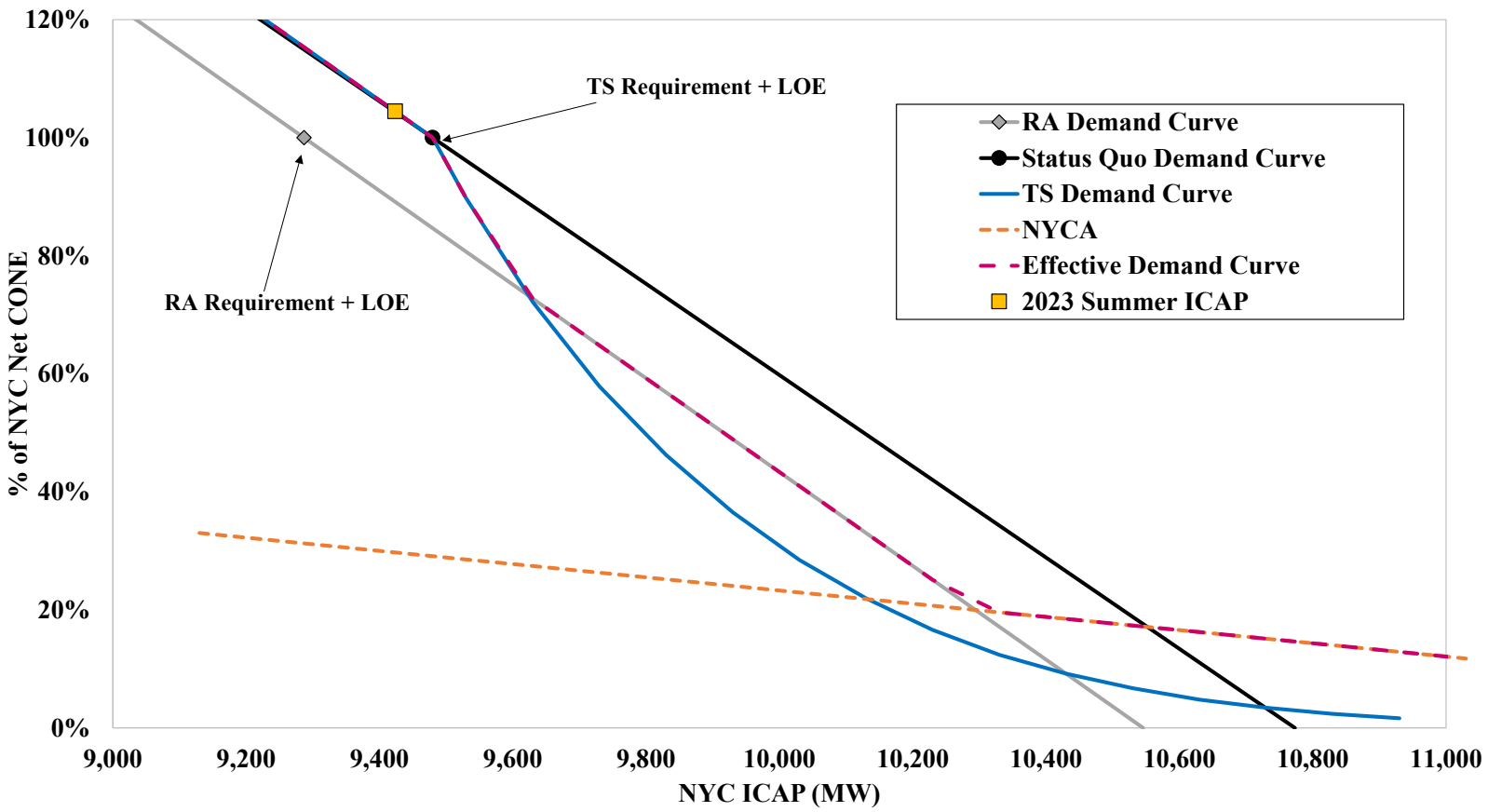
Capacity Demand Curves for Transmission Security-Based Requirements: Illustration of Rec 2023-4



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Seasonal Capacity Market & the Winter-Summer Ratio (Recs 2022-2 & 2023-5)

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Rec 2022-2: Seasonal Capacity Market
Rec 2023-5: Short-Term Need to Address Risk of Extreme Winter Pricing