Highlights from the 2021 State of the Market Report for the NYISO Markets

Presented by:

Pallas LeeVanSchaick
NYISO Market Monitoring Unit
Potomac Economics

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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 if 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 only highlights from our 2021 SOM Report, including:
  - ✓ A summary of market outcomes and investment trends.
  - ✓ High priority recommended market enhancements for the:
    - Energy and ancillary services markets; and
    - Capacity market

Schedule

- The MMU will present its 2021 SOM at several stakeholder meetings:
  - ✓ May 24: MIWG/ICAPWG
    - Capacity Market & Public Policy focus – 75 minutes
  - ✓ May 25: Management Committee
    - Overview – 1 hour
  - ✓ May 26: MIWG/ICAPWG
    - Energy and Ancillary Services focus – 75 minutes
  - ✓ Additional slots can be scheduled if there is interest.

Market Outcomes and Investment Trends

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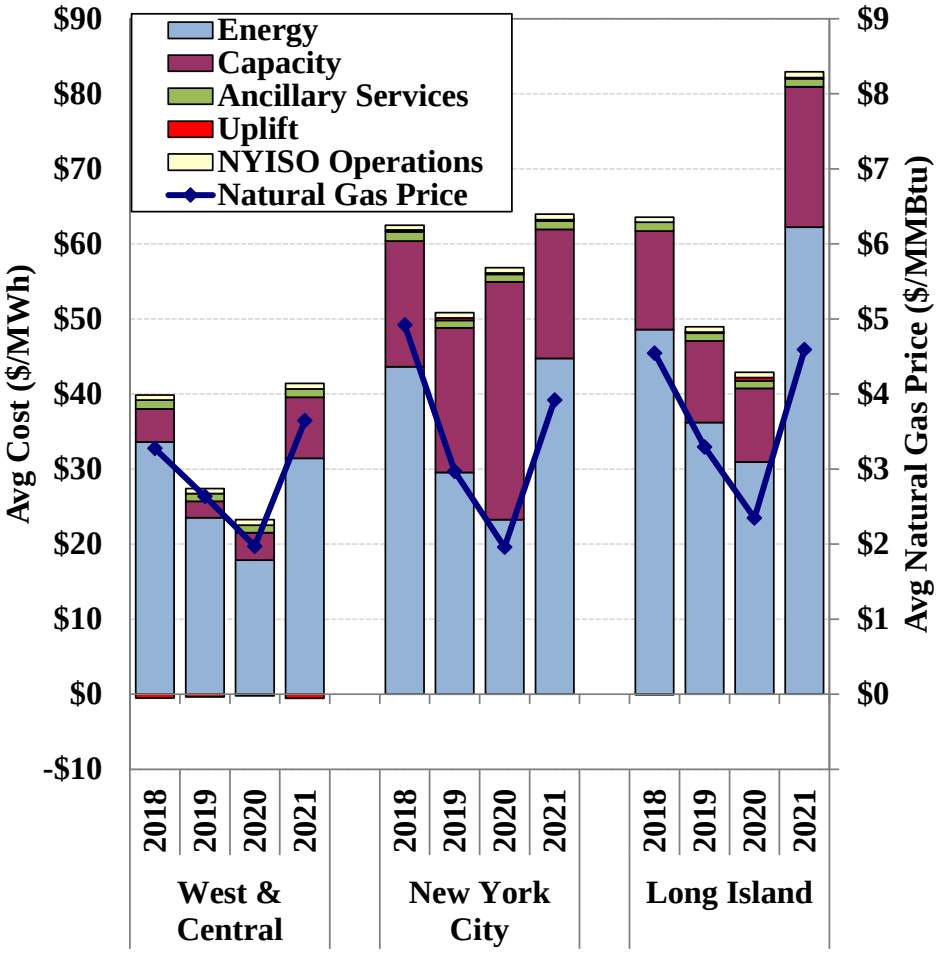
All In Price Trends



- Energy prices rose in 2021 because of:
  - ✓ Gas prices
  - ✓ IP nuke retirement
  - ✓ Planned and forced transmission outages
  - ✓ Return of normal gas and power demand after year affected by COVID
- Capacity prices in 2021 fell in NYC and rose in other areas

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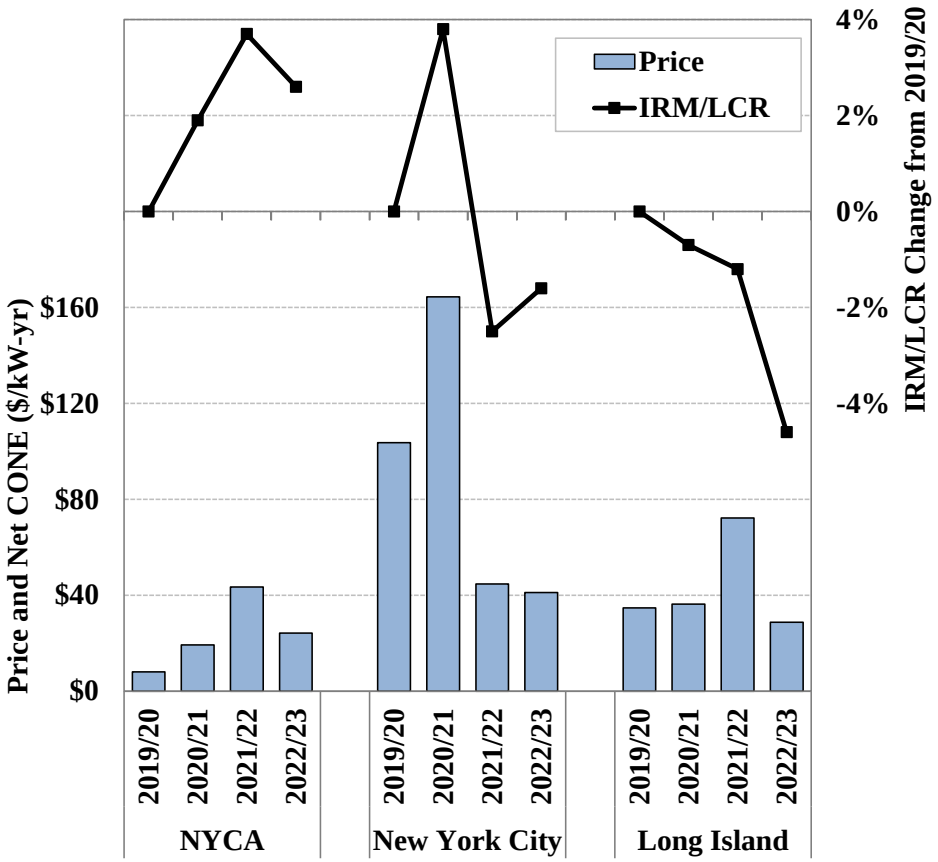
Capacity Price Trends



- Prices have been volatile primarily because of:
  - ✓ Volatile requirements (IRM and LCRs)
- The current IRM and LCR processes:
  - ✓ Are not well-coordinated
  - ✓ Do not account for shifting transmission bottlenecks
- The LCR Optimizer uses a flawed objective function

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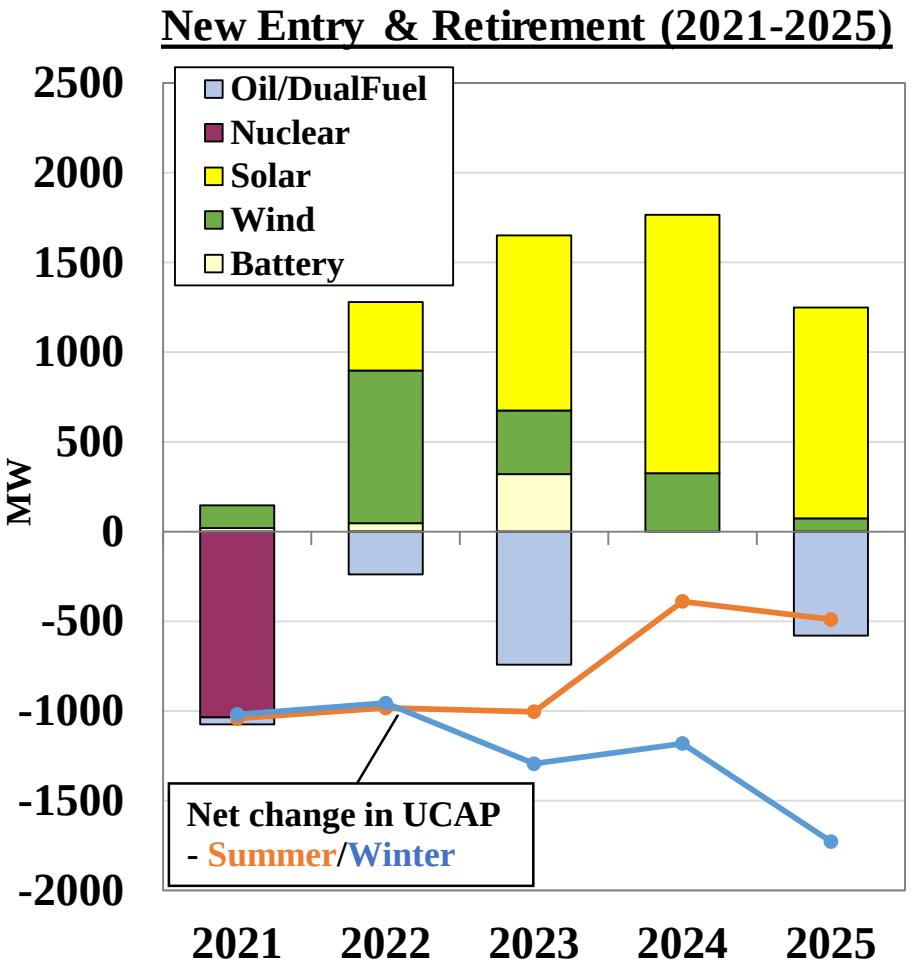
Capacity Market Performance Issues

- Some resource types do not receive efficient capacity compensation – NYISO is actively working to address this
- Capacity prices do not provide adequate locational signals:
  - ✓ The emergence of new transmission bottlenecks contributes to IRM and LCR volatility – Example: lack of A/B capacity zone has raised the IRM and lowered LCRs since 2021/22
  - ✓ Deliverability constraints can be a barrier to new investment. Examples:
    - Long Island byways would have required inefficient upgrades for partially deliverable projects
    - Incumbent generators in some generation pockets are: (a) over-compensated and (b) protected from competition

Potential New Entry and Retirement Trends



- Potential entry and retirements will reduce:
  - ✓ NYC capacity margin significantly
  - ✓ Winter capacity margin more than summer
  - ✓ Share of Eastern NY gens with firm fuel by 15 percent
- Capacity market is not designed to satisfy winter reliability needs

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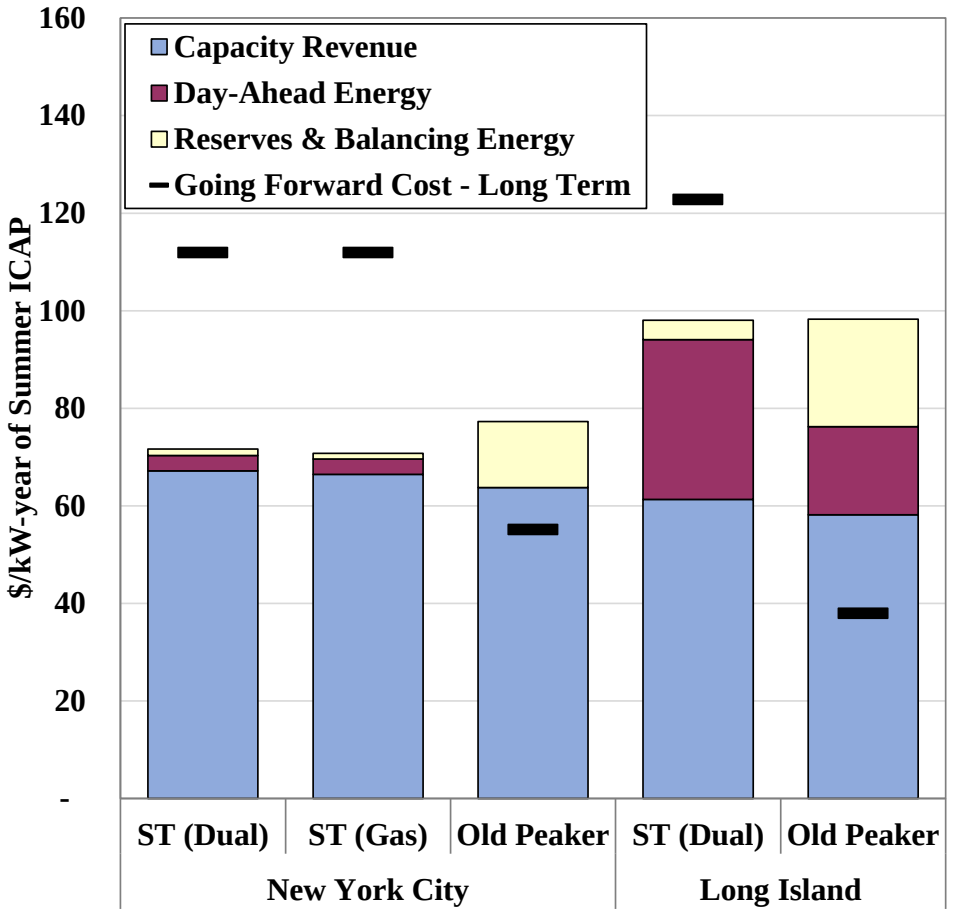
Profitability of Existing Generation in 2021



- Incentive to retire steam turbines until peaker retirements occur
- Old peakers are retiring due to permitting (not economics)
- Weak incentives to retain dual fuel (over gas-only) due to lack of:
  - ✓ Capacity accreditation rules
  - ✓ Reserve market rules
  - ✓ Efficient shortage pricing

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Recommended 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 help integrate 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

Energy & Ancillary Services Market Enhancements

- Increasing E&AS net revenues for flexible units would:
  - ✓ Reduce the capacity revenues needed to maintain reliability
  - ✓ Encourage older inflexible units to retire
  - ✓ Attract flexible resources to key areas
- NYISO is working on addressing two key recommendations:
  - ✓ 2017-1: NYC locational reserve requirements
  - ✓ 2015-16: Dynamic reserve requirements – This will enable:
    - Appropriate modeling of the existing Eastern, SENY, Long Island, NYC, and statewide reserve requirements
    - Efficient scheduling during and after Thunderstorm Alerts
    - Fuller representation of Long Island reserve requirements (see 2019-1 & 2021-2)
    - Modeling of other local reserve areas as needed

Energy & Ancillary Services Market Enhancements

- We also recommend enhancements to E&AS markets:
  - ✓ 2016-1: Compensate reserve providers that increase transfer capability by allowing use of higher line ratings
  - ✓ 2017-2: Reserve demand curve increases for statewide requirements to reduce OOM actions and reflect risk to load
  - ✓ 2020-2: Eliminate offline fast-start pricing which undermines incentives for flexible resources
  - ✓ 2021-3: Model TVR constraints on East End of Long Island in the energy market
- Increased penetration of intermittent generation will accentuate the need for these enhancements
- Evolving resource mix will increase need for longer lead time reserves to address net load forecast uncertainty (see 2021-1)

Capacity Market Enhancements: Short-Term

Recommendation #2021-4 – Improve capacity modeling and accreditation for specific unit types:

- ✓ Intermittent generation,
- ✓ Energy-limited resources,
- ✓ Gas-only generation,
- ✓ Inflexible generation, and
- ✓ Emergency demand response.

- This would provide efficient rules to guide future investment by:
  - ✓ Recognizing diminishing value as penetration rises
  - ✓ Increasing compensation for complementary technologies
  - ✓ Encouraging retirement of low-value units
  - ✓ Recognizing drivers of winter resource adequacy needs
- NYISO's *Capacity Accreditation Phase II* is evaluating these

Capacity Market Enhancements: Long-Term

- *Recommendation #2013-1c* – C-LMP would provide appropriate investment incentives over time as:
  - ✓ Transmission bottlenecks shift – However, the current four-zone capacity market framework will produce volatile requirements and prices as new bottlenecks emerge
  - ✓ Deliverability issues become more complex – C-LMP is better designed to provide appropriate accreditation to partially deliverable resources
- Improved recognition of differences between summer and winter resource adequacy needs in the capacity market
  - ✓ Winter requirement should be based on winter demand
  - ✓ Some technologies exhibit large differences between summer and winter value (e.g., wind, solar, gas-only)