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Independent System Operator

Winter Reliability Capacity Enhancements: Analysis of Seasonal Capacity Accreditation Factors

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ICAPWG

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Agenda

- Project Overview
- Today's Objective
- Analysis of Seasonal Capacity Accreditation Factors
- Market Design Options Evaluated
- Conclusion

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Project Overview

- **The objective of the Winter Reliability Capacity Enhancements project is to develop potential changes to the ICAP market that will support efficient market outcomes as the NYCA trends towards increasing winter resource adequacy risk.**
  - NYISO efforts this year are focused on developing winter capacity requirements, seasonal demand curves, and seasonal elections
- **The 2025 project goal is Market Design Complete, with the following milestones:**
  - Consumer Impact Analysis (CIA)
  - Seek Business Issues Committee (BIC) approval of proposed Tariff revisions

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Today's Objective

- In the proposed market design concept for the Winter Reliability Capacity Enhancements project presented at the July 29, 2025 ICAPWG, the NYISO recommended retaining annual Capacity Accreditation Factors (CAFs)
- The NYISO made this recommendation after evaluating whether seasonal CAFs will send a clearer signal of resources' contributions to each season's resource adequacy requirements[1]
- This presentation reviews the NYISO's analysis of seasonal CAFs underlying the NYISO's recommendation to retain annual CAFs

[1] At the May 5, 2025 ICAPWG, the NYISO identified this question as one of the issues to evaluate. Link: Winter Reliability Capacity Enhancements: Existing Annual Capacity Accreditation Methodology

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Analysis of Seasonal CAFs

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Resource Adequacy Construct

- CAFs reflect the marginal reliability contributions of resources participating in the ICAP market towards meeting the New York State Reliability Council's (NYSRC) resource adequacy requirements for the upcoming Capability Year based on the Installed Reserve Margin (IRM) study
- The NYISO utilizes the final Locational Minimum Installed Capacity Requirements (LCR) case, which is derived from the IRM, as the starting point for calculating the annual CAFs for each Capacity Accreditation Resource Class (CARC)
- There are currently no seasonal reliability criteria established for the IRM study
  - The IRM and LCR base case represents reliability risks across two seasons at annual 0.1 Loss of Load Expectation (LOLE) criterion
- Because annual CAFs are calculated using the final LCR case, annual CAFs reflect the marginal reliability values against the annual 0.1 LOLE criterion
- Because only the annual 0.1 LOLE criterion is currently modeled in the IRM study, there is no stable criteria to calculate seasonal CAFs (i.e., resources' marginal reliability values for each season)
  - Using the IRM modeled seasonal reliability risks as the basis for seasonal CAFs could introduce significant volatility in the seasonal CAF values
    - If only summer reliability risk is presented in the IRM study (e.g., 2024 – 2025 Capability Year), under the winter seasonal CAFs, the perfect unit and the representative unit may both provide zero marginal reliability value
    - If winter risk becomes the dominated risk some CARCs, such as non-firm and solar, may have a seasonal CAF near zero (see Appendix for test cases)

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Implications of Zero Seasonal CAFs

- **System reliability requires capacity to be available throughout the entire Capability Year, not just the months/seasons with IRM modeled reliability risk**
  - For example, in the month of November, reliability risk can start to emerge if sufficient capacity is removed
- **Zero seasonal CAFs could also impact the revenue sufficiency of a resource as the ICAP demand curves are designed to allow resources to recover revenue in both summer and winter**
- **Implementing separate summer and winter CAFs may reduce available capacity for normal grid operations when the seasonal CAFs are zero**
  - Resources with a zero CAF value for a particular season would have no Unforced Capacity (UCAP) for sale in the season
  - With no UCAP sales, these resources would not have a bid/schedule/notify (B/S/N) requirement, which could impact the operation of the Energy market as illustrated in Slides 8 and 9

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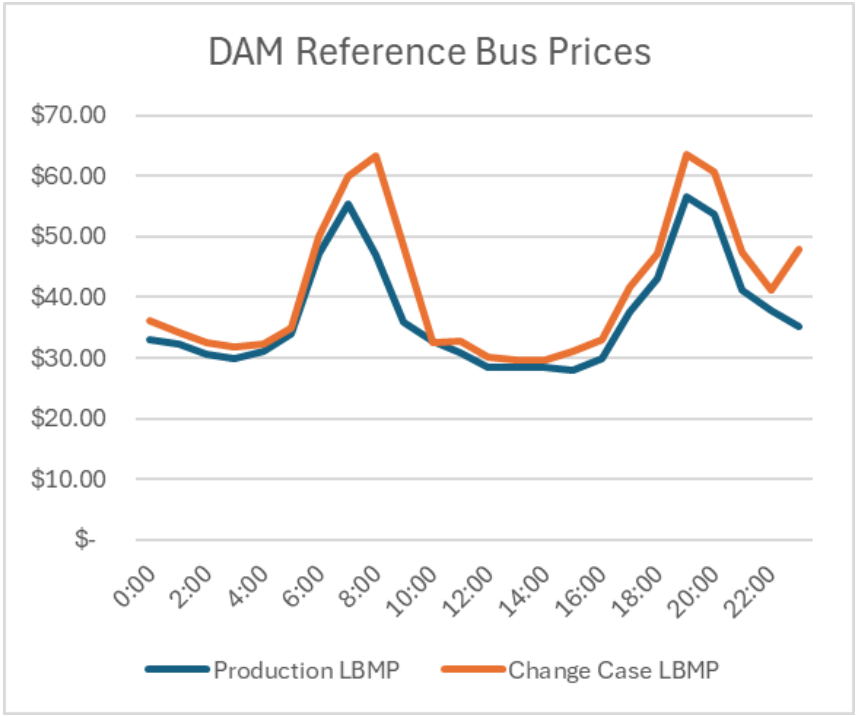
Value of Bid Requirement

- While not representative of actual market outcomes, the impact of the requirement for an ICAP Supplier to bid into the ICAP market on an off-peak day can be illustrated by re-running the Day-Ahead Market with “non-firm” generators unavailable
- In this example, the “Change Case” production cost increased by approximately $10 million



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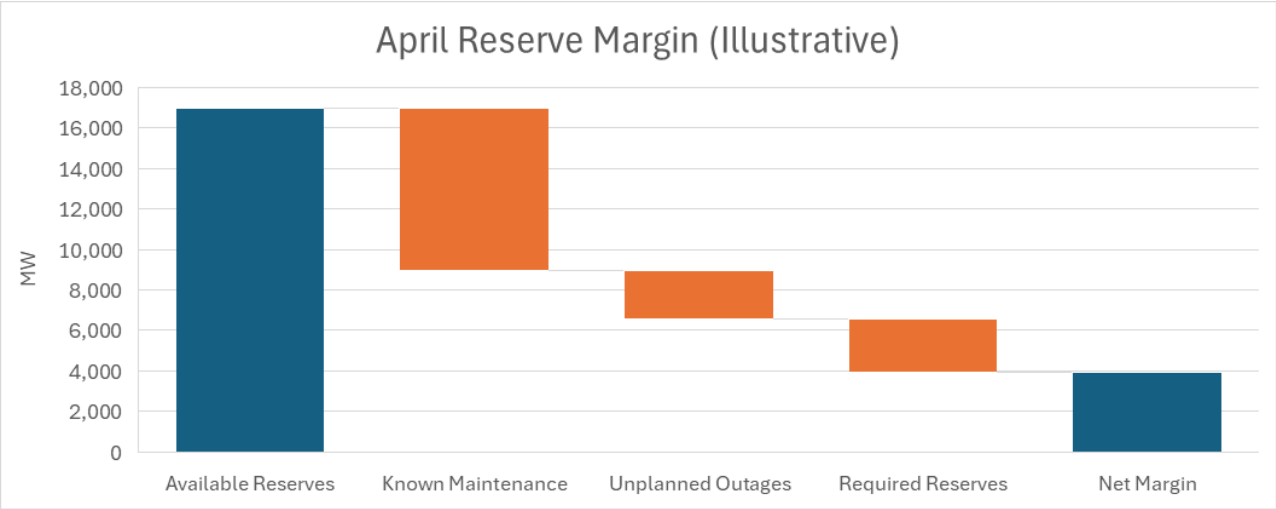
Value of Schedule Requirement

- **Generation and transmission maintenance outages are scheduled in off-peak months to reduce risk to system reliability in peak months**
  - The NYISO's maintenance scheduling process ensures availability of sufficient operating reserves ("Net Margin") in all weeks of the Capability Year



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Market Design Options Evaluated

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Market Design Options Evaluated

- **The NYISO evaluated three design options for seasonal and annual CAF to mitigate zero or close to zero CAF values**
  1. Weighted annual CAFs using seasonal CAF values
  2. Attribute payments
  3. Annual CAFs

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Weighted CAF Using Seasonal CAF Values

- **Weight annual CAFs using seasonal CAF values**
  - Conduct the CAF assessment to develop seasonal CAF values
  - Calculate a weighted average annual CAF by weighing the season with higher risk more heavily than the season with lesser risk (e.g., 65% for the higher risk season, 35% for the lower risk season)
  - For example, when summer is the highest risk a resource with a 100% summer CAF and a 0% winter CAF would receive a 65% annual CAF [=100*0.65 + 0*0.35]
- **Pros**
  - Uses seasonal CAFs but provides revenue stability and minimum payments to retain resources during all seasons
- **Cons**
  - CAFs may become set by boundaries rather than annual marginal reliability improvement (MRI)
  - No basis for setting weights

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Attribute Payments

- **Conduct CAF assessment to calculate seasonal CAFs**
  - The seasonal CAF values may be zero
- **Pay resources explicitly for taking on an annual B/S/N requirement to be available to meet reliability needs**
- **Pros**
  - Potentially addresses issues with maintenance scheduling and short-term resource availability planning for resources that have no ICAP sales
- **Cons**
  - There is no clear cost basis for such a payment as a service
  - The cost of this attribute for the proxy unit may be insufficient to compensate a Generator in the firm fuel CARC for taking on an annual B/S/N requirement

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Annual CAFs

- **Retain current process that sets CAFs based on annual MRI**
- **Consistent with the annual IRM and LCR setting process**
  - CAFs will continue to be calculated using the final LCR case and applied annually to resources using the MRI technique
  - Compensates resources for B/S/N in all seasons

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Conclusion

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Conclusion

- Annual CAFs are consistent with the current IRM model and processes
- The modeled seasonal reliability risk is already embedded in the annual CAF
- Annual CAFs encourage annual participation
- If in the future the NYSRC establishes seasonal reliability criteria, seasonal CAFs may be revisited

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Appendix

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Analysis of Seasonal CAFs

- As part of the Winter Reliability Capacity Enhancements project, the NYISO has evaluated methods for calculating Seasonal CAFs
- The NYISO engaged GE Vernova to calculate winter NYISO Minimum ICAP Requirements and winter CAFs
- The preliminary results show zero and near-zero CAFs for non-firm gas and solar resources (see Slide 21)
  - With fuel constraints included in the model, sufficient LOLE may be present in winter to calculate CAFs at criteria (0.1 LOLE)
  - Note: These preliminary results are being provided to inform NYISO stakeholders and market participants of the possible impact of seasonal CAFs. They are based on test cases and a potential seasonal CAF methodology that are still under development and, therefore, should not be relied upon

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Analysis of Seasonal CAFs: Case Setup

- **Started with the 2025-2026 IRM final base case with a fuel constrained case with winter scaling**
  - See fuel constrained case models gas-only generators as unavailable at higher winter load levels, as described here: Gas Constraints Modeling Whitepaper - 2024-2025 IRM Study
  - Winter load shapes scaled to winter peak demand
- **The winter case was derived by removing capacity in only the winter months in the same locations and proportions as specified in the Tan45 case**
  - Tan45 is the approved methodology described in NYSRC Policy 5-19
  - Shifting ratios provided by the NYISO based on the established and approved NYSRC methodology. Same shifting ratios were used in winter as in summer
- **Seasonal CAFs were calculated for each scenario using the winter LOLE improvement in the calculation of MRI**

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Analysis of Seasonal CAFs: Cases Analyzed

- **Using the derived winter case, winter CAFs were calculated for the following CARCs and Localities:**
  - Non-firm in downstate localities (J and K)
  - Solar in Rest-of-State and Long Island
  - Wind in Rest-of-State and Long Island
  - Energy Duration Limited (EDL) (2, 4 and 6 hour) all localities

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Analysis of Seasonal CAFs: Preliminary Winter CAF Results[1]

- In GE Vernova's analysis, non-firm and solar provide little reliability value in winter

CARC	CAF
Non-firm Gas J	0%
Non-firm Gas K	0%
Solar K	1%
Solar ROS	2%
Wind ROS	20%

CARC	CAF
2 Hour EDL Zone J	67%
6 Hour EDL Zone J	91%
2 Hour EDL Zone K	73%
6 Hour EDL Zone K	95%
2 Hour EDL GHI	71%
6 Hour EDL GHI	91%
2 Hour EDL ROS	71%
6 Hour EDL ROS	91%

[1]These preliminary results are being provided to inform NYISO stakeholders and market participants of the possible impact of seasonal CAFs. They are based on test cases and a potential seasonal CAF methodology that are still under development and, therefore, should not be relied upon.

Analysis of Seasonal CAFs: GE Vernova's Conclusions

- Seasonal CAF values in the winter season may be highly dependent on resource type
- Duration and hours chosen for EDLs may have an impact on winter CAF values
- With the inclusion of fuel constraints, sufficient LOLE may exist in winter to calculate winter CAFs at 0.1 LOLE thresholds

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Previous ICAPWG Presentations

Date	Working Group	Discussion Points and Links to Materials
January 30, 2025	ICAPWG	2025 Winter Reliability Capacity Enhancements: Project Kick-off https://www.nyiso.com/documents/20142/49408264/04%202025%20Winter%20Reliability%20Kick-off%20Presentation.pdf/
April 1, 2025	ICAPWG	Winter Reliability Capacity Enhancements: Winter Requirements https://www.nyiso.com/documents/20142/50614388/2025%20Winter%20Reliability%20Capacity%20Enhancements%20April%201%20ICAPWG%20(1).pdf/
April 9, 2025	ICAPWG	Winter Reliability Capacity Enhancements: Seasonal Elections https://www.nyiso.com/documents/20142/50769536/2025%20Winter%20Reliability%20-%20Seasonal%20Elections%204.9.25%20Final.pdf/
May 5, 2025	ICAPWG	Winter Reliability Capacity Enhancements: Existing Annual Capacity Accreditation Factor Methodology https://www.nyiso.com/documents/20142/51249988/Winter%20Reliability%20-%20Annual%20CAF%20Methodology%205.5.25%20-%20Final.pdf/
May 20, 2025	ICAPWG	2025 Winter Reliability Capacity Enhancements: Demand Curves Review https://www.nyiso.com/documents/20142/51501157/Winter%20Reliability%20-%20Demand%20Curves%2052025%20icap.pdf/
July 29, 2025	ICAPWG	Winter Reliability Capacity Enhancements: Concept Proposal https://www.nyiso.com/documents/20142/52778669/2025%20Winter%20Reliability%20-%20July%2029%20ICAPWG%20MDC_Final.1.pdf/

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Our Mission and Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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