New York ISO
Independent System Operator

Winter Reliability Capacity Enhancements

Issue Discovery Report

A Report by the
New York Independent System Operator

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Summary

For decades, the New York Control Area (NYCA) power system has been summer peaking. As a result, the processes and Installed Capacity (ICAP) market are designed to maintain resource adequacy have been oriented toward meeting summer peak demand. This orientation toward summer peaking is expected to change as the NYCA power system undergoes significant changes in supply and demand in the next decade. Specifically, intermittent resources are expected to increase, and much of the thermal generation in NYCA is expected to retire or face tightening fuel supply. At the same time, winter demand is expected to increase due to electrification of space heating and transportation. Combined, these changes are expected to increase winter resource adequacy risk for the NYCA power system.

This Issue Discovery Report on Winter Reliability Capacity Enhancements addresses some of the challenges with the expected, increased winter resource adequacy risk and potential areas for evolving the NYISO ICAP market over the next several years to respond to these anticipated changes. This report primarily identifies near-terms issues reflecting current procedures and calculations that may need to be recalibrated, so the ICAP market continues to send appropriate price signals. Some longer-term issues are also identified, which may require reassessment and restructuring of current resource adequacy processes and/or development of new processes. Associated processes such as the development of the Installed Reserve Margin (IRM) that will help maintain winter resource adequacy are outside the scope of this report and are being addressed in other forums.

Consistent with an Issue Discovery Project, this report describes issues and does not make recommendations. In 2025, NYISO's *Winter Reliability Capacity Enhancement Project* will provide stakeholders with the opportunity to consider proposed revisions to the NYISO Market Administration and Control Area Services Tariff (NYISO Market Services Tariff) and procedures that address the issues discussed herein.

Issues identified in this report include the following:

- ICAP Requirements
- UCAP Obligations
- Deliverability
- Capacity Accreditation Factors

- Demand Curves
- Peak Load Window
- Capacity Imports
- Market Power Mitigation

This report first discusses the anticipated changes in supply and demand in the NYCA that are shifting resource adequacy risk to the winter and driving the need to reassess the ICAP market. The report then provides a description of the development of the IRM and an overview of the ICAP market. The report then identifies issues that may need to be addressed to adapt NYISO's ICAP market processes to the changing NYCA power system.

Factors Impacting Future Winter Reliability in NYCA

A variety of regulatory, legal, and technical changes are impacting both supply and demand dynamics in NYCA and neighboring control areas. Regulatory programs such as the Federal Acid Rain Program and the Regional Greenhouse Gas Initiative limit the emission of several pollutants, including CO_2. In addition, the federal tax code and State Renewable Energy Credits program provide direct financial support for clean energy. As discussed further below, the most impactful legal action in New York State is the Climate Leadership and Clean Power Act (Climate Act), which mandates a 100% greenhouse gas emission-free electrical power system by 2040 and an 85% reduction in statewide emissions by 2050. The Climate Act is expected to reduce or eliminate fossil generation and promote the large-scale electrification of end-use demand, which would drive NYCA to become a winter resource adequacy risk system. Finally, due to decreasing costs and improved technical performance of wind, solar, and battery technologies, low- or no-emission energy sources are becoming more cost competitive with fossil-fueled generation.

Changing Supply

The Climate Act mandates 6,000 megawatts (MWs) of distributed solar by 2025, 3,000 MWs of energy storage by 2030, and 9,000 MWs of offshore wind by 2035. In June 2024, the State of New York Public Service Commission raised the energy storage goal to 6,000 MW.[1] New York State has separately contracted for 1,250 MW of emission-free generation to flow into New York City from Hydro Quebec via the Champlain Hudson Power Express (CHPE) project. Combined with energy efficiency investments and other programs, these resources are expected to replace much of New York State's fossil-fueled thermal generators. These new resources have different summer and winter characteristics than the thermal resources they are replacing. For example, wind resources generally have higher availability in winter, while solar resources have significantly higher availability in summer. Furthermore, CHPE is contracted to sell ICAP in the Summer Capability Period, not the Winter Capability Period. Finally, as fossil-fueled generators retire, the amount of ICAP available in the winter is expected to decrease.

Supply is also changing in several other respects. Limited natural gas pipeline capacity may become more impactful in the future, especially if dual-fuel resources continue to exit the ICAP market due to emissions restrictions, age, and the lack of new interstate pipeline capacity in New

[1] *In the Matter of Energy Storage Deployment Program*, Case No. 18-E-0130 (June 20, 2024).

York State due to the transition to emission-free resources. Additionally, available external ICAP from neighboring control areas may be reduced in the winter due to electrification in those areas. Specifically, ISO New England, PJM Interconnection (PJM), and Ontario are all projecting a transition to winter peaking/winter resource adequacy risk systems in the next decade, which may restrict the availability of external ICAP.

Changing Demand

Electric demand (or "load") has been flat or declining over the past decade due to energy efficiency standards and investment in distributed solar. That trend is expected to reverse. The anticipated increase in load is due to the electrification of transportation that is currently served by oil and the electrification of space heating that is currently served by natural gas. Like the impact of space cooling demand on the summer peak today, future space heating demand may also drive winter peak demand significantly higher because it is highly correlated with weather conditions. The anticipated increase in demand is also due to economic activity (e.g., the increase in large loads such as data centers and advanced manufacturing).[2] Winter load forecast uncertainty is also expected to increase as the winter peak becomes increasingly weather dependent.

Installed Capacity Market Overview

Since its inception, NYISO has operated an ICAP market. The ICAP market is designed to maintain sufficient capacity to reliably serve peak electric demand in New York State by putting an explicit market value on resource adequacy. While New York State has a diverse climate that includes the Northern Load Zone with winter peak demand, the coincident peak load for the NYCA system occurs in the summer. Therefore, the NYCA planning requirements and ICAP market are based on meeting summer peak needs. While the IRM is set annually, and the additional percentage of resources required by the IRM is relative to a single, forecasted peak load hour, the ICAP market is designed to procure sufficient resources for every hour of the year.

The IRM is determined by the New York State Reliability Council (NYSRC), with modeling and data support from the NYISO. The planning reserve requirement is based on meeting a Loss of Load Expectation (LOLE) target of 1 loss of load event-days per 10 years (or 0.1 annual loss of load event-days). This LOLE target sets an IRM in terms of ICAP. As such, load serving entities are required to procure their share of the ICAP requirement based on their contribution to the summer

[2] NYISO 2024 Load & Capacity Data Book (Gold Book).

peak. The NYISO also uses the IRM model to develop final Locational Minimum Installed Capacity Requirements (LCRs), which indicate the amount of capacity that must be sourced from within a Locality[3] to meet demand. The NYISO then translates the ICAP requirements into an Unforced Capacity (UCAP) requirement for each Locality that aligns with how supply is measured in the ICAP market. Because resource availability and, thus, resources' UCAPs vary by season, the NYISO sets seasonal (i.e., Summer and Winter Capability Period) UCAP requirements. A resource that has sold UCAP into the ICAP market is required every day to offer that resource into the energy market, self-schedule that resource to operate, or notify the NYISO if it is unavailable.

Installed Reserve Margin

NYSRC is responsible for setting the annual IRM to maintain sufficient resources to serve load in NYCA. NYISO provides the NYSRC with modeling and data support during the IRM formation process. The IRM represents the minimum amount of ICAP from internal generators, imports, and Special Case Resources (SCRs)[4] required to reliably serve the forecast peak electrical demand during the Capability Year. The NYISO uses the NYSRC-determined IRM and sets the LCRs for the Localities to maintain sufficient capacity is in these import-constrained locations meeting the 0.1 LOLE criteria. The IRM and LCRs are calculated using a probabilistic model that accounts for the expected variability of demand and supply. The General Electric Multi-Area Reliability Simulation (GE MARS) model inputs include power transfer limits between areas, the capabilities of generators and other resources, the forced outage rates of these resources, electrical load forecasts, and load forecast uncertainty. The GE MARS model uses generators' annual, average forced outage rates.

Currently, the combination of higher load and lower thermal generation capability causes resource adequacy risk to be concentrated in the summer. Some winter resource adequacy risks may be present but is not fully represented in the GE MARS model due to the focus on summer conditions. The NYSRC is currently evaluating the modeling of fuel constraints in the GE MARS model, which will likely have an impact on future IRM studies.[5] If fuel supply to generators becomes sufficiently constrained, winter resource adequacy risk may begin to appear before NYCA becomes a winter

[3] A Locality is "a single [Locational Based Marginal Price (LBMP)] Load Zone or set of adjacent LBMP Load Zones within which a minimum level of [ICAP] must be maintained . . . specifically identified . . . to mean (1) Load Zone J [(New York City)]; (2) Load Zone K [(Long Island)]; and (3) Load Zones G, H, I, and J collectively (i.e., the G-J Locality). *See* NYISO Market Services Tariff section 2.12.

[4] SCRs are electricity consumers that can reduce load as directed by the NYISO. There is a 100KW minimum eligibility requirement to quality as an SCR.

[5] On June 14, 2024, the NYSRC EC approved the Gas Constraints Modeling Whitepaper. *See* https://www.nysrc.org/wp-content/uploads/2024/06/Gas-Constraints-Modeling-Whitepaper-Final.pdf

peaking system.

The IRM is developed during the year prior to the start of the applicable Capability Year, beginning in January with issue identification related to modeling and other process considerations. The NYSRC Executive Committee (NYSRC EC) approves the Final IRM the following December, prior to the May 1st commencement of the Capability Year.

Installed Capacity Market

The purpose of the ICAP market is to most economically procure the capacity required to maintain resource adequacy, while sending appropriate price signals for investment in new and existing generation resources. The price is set in the ICAP market based on the intersection of demand, as determined by the load and IRM, and supply, as determined by the quantity of ICAP (translated into UCAP) offered into the ICAP market. The maximum amount of ICAP a resource may sell in the market is the lower of its maximum physical capacity or its Capacity Resource Interconnection Service (CRIS) rights. CRIS is determined by a Deliverability study, with deliverability being the ability to deliver the aggregate of NYCA capacity resources to the aggregate of the NYCA load under summer peak load conditions. To determine ICAP, dispatchable resources demonstrate their Dependable Maximum Capability for each season by testing and then adjusting their output based on ambient conditions, if warranted. Intermittent resources do not test; instead, they are accredited for the ICAP that represents the lower of their nameplate capacity or CRIS. ICAP suppliers are assigned a Capacity Accreditation Resource Class (CARC), based on the supplier's characteristics. They are then assigned a Capacity Accreditation Factor (CAF) based on the Marginal Reliability Improvement (MRI) calculated for the ICAP Supplier's respective CARC and capacity zone. To appropriately value ICAP Suppliers based on their contribution to meeting system reliability needs, the NYISO uses historical performance to estimate the probability that an ICAP supplier and LSEs will be available to serve load. Generally, a resource's UCAP will be determined by combining ICAP, its CAF, and the resource-specific derating factor. The amount of UCAP that intermittent resources, including wind and solar, can supply is weighted according to the amount of output during the Peak Load Window, which is calculated based on the percentage of total LOLE during the Summer Capability Period that occurs in each hour by utilizing the LCR study model. Pursuant to the NYISO Market Services Tariff, the UCAP obligation for each LSE is based on each load's share of coincident peak demand that occurs in either July or August.

The NYISO administers three ICAP auctions: (1) Strip or Capability Period Auction every Capability Period (twice a year); (2) Monthly Auction; and (3) Spot Market Auction. The Capability Period

Auction is run at least 30 days prior to the start of the Capability Period and solves for a six-month Strip of UCAP at a single price/kW-month. The Spot Market Auction is a mandatory auction that takes place every month for the upcoming month; it runs 4-5 business days prior to the start of the month. Load Serving Entities (LSEs) must procure any additional capacity needed to meet their capacity obligations.

LSEs do not bid into the Spot Market Auction; that auction is solved using the ICAP Demand Curve. All supply and corresponding demand curve values that are used to clear the ICAP spot market are converted into UCAP values. The spot market clearing price is determined from the intersection of the supply curve that is composed of suppliers' capacity offers with the downward sloping demand curve. The demand curve is anchored on an estimated annual revenue requirement (ARR) of a proxy unit that represents the Cost of New Entry in the ICAP market. A recent enhancement to the demand curve accepted by the Federal Energy Regulatory Commission, which will go into effect in the 2025-26 Capability Year, accounts for the differences in the resource adequacy risks by apportioning the ARR to the Summer and Winter Capability Periods based on the percentage of LOLE in each season. To encourage capacity market participation in all months, the NYISO established limits on the portion of the ARR allocated in each Capability Period with a ceiling of 65% and a floor of 35%.[6]

Areas for Potential Enhancements

As described above, expected changes to the NYCA power system require a reassessment of inputs and processes that are used in the ICAP market. The changes to the ICAP market structure should be consistent with competitive market principles of incentivizing the right amount of capacity, in the right locations, and at the right time. The NYISO's Independent Market Monitor (MMU) has raised concerns that the risks associated with winter reliability are not being properly reflected in the ICAP market, which may cause volatility and incorrect price signals. Each of the issues identified in this report could be addressed individually and provide an enhancement to the current ICAP market construct.

These issues can also be viewed in the context of a transition to a fully seasonal ICAP market. A fully seasonal ICAP market could mean that, while resources are expected to participate in the ICAP market for the entire year, the requirements would account for the unique reliability risks for each

[6] *New York Indep. Sys. Operator, Inc.*, Docket No. ER24-701-000 (Feb. 15, 2024) (delegated letter order).

season and ICAP payments along with ICAP market elements would be structured for each season based on the resources' effectiveness in addressing those reliability risks.

ICAP Requirements

The NYCA Minimum ICAP Requirement equals the forecasted NYCA peak load multiplied by one plus the IRM. The forecast peak load is based on the previous Capability Year's coincident peak load. Therefore, the ICAP requirement is currently the same in both the Summer and Winter Capability Periods. Historically, the Winter Capability Period has been characterized by lower peak demand and more available ICAP than the Summer Capability Period. Additional winter capacity has been largely a result of thermal generators' ability to increase output as ambient temperatures decrease.[7] For fossil-fuel units, winter ICAP currently exceeds summer ICAP by about 3,000 MW.

To account for historical availability of resources, the ICAP requirement is translated into a UCAP requirement for both Summer and Winter Capability Periods. As generator availability varies by season, different ICAP to UCAP translation factors are used for summer and winter. While adjustments are made to the UCAP requirements in the Summer and Winter Capability Periods to account for seasonal availability, the ICAP requirement remains anchored to a single peak demand. As a result, the ICAP requirements may not directly reflect the relative resource adequacy risk in each season. However, because the IRM studies the full year to assess resource adequacy risk, the IRM may provide sufficient information to develop separate Summer and Winter Capability Period ICAP requirements. Separate requirements for Summer and Winter Capability Periods could include the development of seasonal LCRs as well. In developing seasonal requirements, and in consultation with the NYSRC, consideration could also be given to allocating LOLE seasonally.

UCAP Obligations

All LSEs receive a capacity obligation set in ICAP terms and translated by the NYISO to minimum UCAP requirements. The NYISO calculates LSEs' minimum UCAP requirements as a share of the minimum UCAP requirement for the Transmission District in which the LSEs are located. The NYISO allocates the NYCA minimum UCAP requirement among all LSEs prior to the beginning of each Capability Year.[8] This methodology is consistent with the IRM setting process, which is based on a single, coincident peak demand. Pursuant to the NYISO Market Services Tariff and for cost

[7] The first law of thermodynamics is that the mechanical work done by a heat engine in one cycle is equal to the difference between the heat energy taken in at the higher temperature and the heat energy rejected at the lower temperature.

[8] NYISO Market Services Tariff section 5.11.

allocation purposes, the ICAP peak is restricted to the highest load during a non-holiday weekday hour in July or August.

If the NYCA transitions to a winter peak, calculating an LSE's UCAP obligation based on its contribution in July or August would no longer accurately reflect the LSE's contribution to meeting the needed supply during peak winter conditions. If winter resource adequacy risk is modeled in a seasonal ICAP market construct, cost causation principles would support separate UCAP obligations for loads (ICAP tags) for Summer and Winter Capability Periods. Allocating ICAP costs based on contribution to summer and winter resource adequacy risk could also improve incentives for flexible customers to respond in periods of highest resource adequacy risk. Because retail cost allocation to end-use customers is the responsibility of the New York State Public Service Commission and is implemented by the New York Transmission Owners and Municipal Utilities, any change to ICAP tags would require a collaborative process with these stakeholders.

Deliverability

Under the current construct in the ICAP market, resources must be deliverable throughout the Load Zone in which they qualify to sell capacity. To determine deliverability, NYISO studies the NYCA transmission system's ability to deliver the aggregate of NYCA capacity resources to the aggregate of the NYCA load under summer peak load conditions. If a resource is deliverable, it is awarded Capacity Resource Interconnection Service (CRIS). A resource's CRIS sets the upper limit of the capacity that the resource can sell. In some cases, to receive CRIS, a resource must fund system deliverability upgrades, which can be significant.

A resource's Winter Capability Period CRIS is its Summer Capability Period CRIS adjusted by the ratio of a resource's winter to summer output (Winter-Summer Ratio), adjusted for peak ambient temperatures. This methodology is a proxy for the output change for thermal resources and will generally award additional CRIS in the Winter Capability Period. However, as the NYCA system becomes less dependent on thermal resources and the demand shifts due to electrification, adjustments based on winter ambient conditions may not fully reflect the change in resource deliverability in the Summer and Winter Capability Periods.

Capacity Accreditation Factors

As described above, the NYISO translates resources' ICAP requirements into UCAP requirements based on CAFs, which measure a resource's contribution to LOLE. Because NYISO's historical approach to modeling NYCA reliability, LOLE focuses on the summer peak and the CAFs are an annual value that reflect resources' contributions to meeting the Summer Capability Period's

resource adequacy risks. However, as resource adequacy risks change, annual CAF values may not provide clear signals of resources' seasonal contributions to resource adequacy. This is particularly true for intermittent resources such as solar and wind that have large seasonal differences in availability. If the NYISO shifts to seasonal ICAP requirements, seasonal CAFs will likely send a clearer signal of resources' contributions to each season's resource adequacy requirements.

Demand Curves

In the ICAP Spot Market Auction, the NYISO uses demand curves to determine the market-clearing price and quantity of ICAP purchased. The ICAP demand curves are anchored to monthly ICAP reference point prices. The monthly ICAP reference point prices for the NYCA ICAP demand curve and each Locality ICAP demand curve are based on a monthly translation of Annual Reference Value (ARV) for that location, which is the estimated levelized embedded cost of a new peaking plant for the Rest-of-State region (in the case of the ARV for the NYCA) or a Locality (in the case of the ARV for a Locality) less an estimate of annual net revenue offsets from the sale of energy and ancillary services for the Rest-of-State region or Locality, as appropriate. Thus, the ARV represents the amount of revenue that a new peaking plant would need to recover annually in the ICAP market for the plant to enter at the reference point assumed excess conditions.[9]

In translating the ARV value from an annual value to a monthly value ($/kW-month), the NYISO accounts for additional capacity that is available in the Winter Capability Period and uses the applicable Winter-Summer Ratio value to adjust each demand curve. Starting with the 2025-2026 Capability Year, the NYISO will utilize separate ICAP demand curves for each Capability Period that account for the relative share of resource adequacy risk in the Capability Period (as indicated by the results of modeling approved by the NYSRC for determining the NYCA IRM). This enhancement is intended to result in ICAP demand curves that facilitate an allocation of capacity market revenue between the Summer and Winter Capability Periods that better align with the relative risk of reliability events in each Capability Period. However, the use of the seasonal ICAP demand curves assumes that the ICAP requirements are the same for the Summer and Winter Capability Periods within a Capability Year. If separate ICAP requirements are established for the Summer and Winter Capability Periods, the Winter-Summer Ratio component of the reference point price formulas would likely need to be revised or may no longer be needed. Additionally, the Winter-Summer Ratio may benefit from requiring Unforced Capacity Deliverability Right (UDR) owners to make

[9] *See* MST section 5.14.1.2.2.

separate elections for summer and winter to reflect seasonal variation in UDR availability.[10] In addition, other adjustments to the calculation of the monthly ICAP reference point prices for the ICAP demand curves may be required to continue to send appropriate price signals. For example, to further adjust the ICAP demand curves to incent capacity sales in periods of highest risk, the NYISO's MMU has recommended consideration of monthly adjustments to demand curves in order to distribute revenue based on the probability of load shedding events in the month.[11]

Additionally, as noted above, the NYISO uses the CAF and assumed derating factor of the reference unit to translate the applicable ICAP reference point to a UCAP reference point for use in the auctions. Currently, the NYISO utilizes one set of annual CAFs for both the Summer and Winter Capability Periods within a Capability Year. If NYISO transitions to seasonal CAFs, NYISO would need to consider those CAFs in the selection of the reference unit for each capacity zone.

Peak Load Windows

The NYISO establishes a separate Peak Load Window for the Summer and Winter Capability Periods. The Peak Load Window is utilized in part to determine the resource-specific derating factors for intermittent resources and ICAP suppliers with Energy Duration Limitations. To determine the Peak Load Window for a Summer Capability Period, NYISO uses the LCR model to calculate the percentage of total hourly LOLE during the Summer Capability Period that occurs in each hour. Starting with the Capability Year that began on May 1, 2024, the Summer Capability and Winter Capability Period Peak Load Window are by an annual review process and updated if it does not capture at least 90% of the hourly LOLE occurring in the Summer Capability Period. NYISO reviews both the Summer and Winter Peak Load Windows to determine if they are consistent with the expected hours of resource adequacy risk based on operating experience and/or expected grid conditions for the upcoming Capability Year. The Peak Load Window for the Winter Capability Period is set at hour-beginning 16 to 21 until updated Winter Capability Period modeling approaches and assumptions are incorporated in the LCR model. Once a sufficient level of Winter Capability Period LOLE is reflected in the IRM and LCR model, a more formulaic process may be needed to assess the need for a new Winter Capability Period Peak Load Window annually.

Capacity Imports and Exports

External ICAP suppliers may participate in the ICAP market, subject to deliverability to the NYCA border and availability of Import Rights. The deliverability of External Installed Capacity is

[10] Potomac Economics, State of the Market Recommendation 2023-5.
[11] Potomac Economics, State of the Market Recommendation 2019-4.

evaluated annually as a part of the process that sets Import Rights for the upcoming Capability Year. The External Installed Capacity deliverability test is performed using NYISO's forecast of NYCA CRIS resources, transmission facilities, and load in the upcoming Capability Year. As with the modeling of CRIS for internal resources, the modeling of external deliverability is a snapshot of NYCA's summer peak conditions. As the system changes to incorporate more intermittent resources and the system begins to shift to winter peaking, the use of summer peak conditions to set the annual Import Limit may need to be re-evaluated. For example, solar resources may contribute significantly to power flows during the summer peak but may have a negligible impact during winter peak.

Of note, the IRM assumes that external resources that have Import Rights into a Locality known as Unforced Capacity Deliverability Rights or into NYCA known as External-to-Rest of State Deliverability Rights or have sold firm capacity using External CRIS are available for the Capability Year. However, some of these resources, particularly those from winter peaking ISOs/RTOs, may not export capacity in all months. In recent years, sales of external capacity into the NYCA have been significantly lower during the Winter Capability Period. When import assumptions used in the IRM setting process diverge from actual imports in the Winter Capability Period, then the IRM may not accurately reflect the winter resource adequacy risk. In addition, ICAP market pricing may become more volatile if the assumptions used in adjusting the seasonal demand curves, such as the Winter-Summer Ratio, are not consistent with available seasonal capacity.

Market Mitigation

In overseeing that the ICAP market produces competitive prices, NYISO has the authority to mitigate ICAP supplier bids to prevent physical or economic withholding. A pivotal supplier test is applied in both the Summer and Winter Capability Periods to determine whether a supplier may have the ability and incentive to economically withhold capacity. That test is based on the amount of UCAP (MW) controlled by a market participant and its affiliates. In the Summer Capability Period, capacity (MW) is generally the limiting factor in meeting aggregate demand. In the Winter Capability Period, the limiting factor may be both capacity and energy (MW-hours) as fuel supply becomes constrained. To maintain competitive results in the ICAP market, particularly if there is a shift toward distinct Summer and Winter Capability Period ICAP requirements, it may be necessary to develop alternate methods for assessing market power in the Winter Capability Period.

Conclusion

This Issue Discovery Report highlights the changing nature of the NYCA power system, potential impacts to system resource planning process, and the need to re-evaluate certain processes or create new processes to continue incentivizing and procuring sufficient reserve capacity to maintain system reliability. In 2025, the issues identified in this report will be addressed further as part of the *Winter Reliability Capacity Enhancement Project*.

Separately, the NYISO continues to enhance its ICAP accreditation methods, with ongoing efforts to define firm and non-firm fuel CARCs for thermal resources to better reflect the marginal reliability contributions of resources with firm fuel supply during the Winter Capability Period to meeting NYSRC resource adequacy requirements. These new CARCs provisions in the NYISO Market Services Tariff have been accepted by the Federal Energy Regulatory Commission and will be implemented in the 2026-2027 Capability Year. Work is ongoing to update reliability modeling and define the full requirements and administrative processes to support the implementation of these new NYISO Market Services Tariff provisions.

Appendix

State of the Market Recommendations

Citing growing winter resource adequacy risk, the NYISO's MMU has highlighted the issue of setting seasonal capacity prices based on an annual requirement that may not accurately reflect the balance of resource adequacy risk between seasons. As the NYCA's summer and winter resource adequacy needs evolve, having the same ICAP requirements in all months could lead to the following market problems:

- Adjusting demand curves based on the ICAP Winter-Summer Ratio could result in price volatility;
- Demand curves may not provide adequate signals to maintain reliability when conditions differ from the IRM study assumptions; and
- Changes in the proportion of winter and summer resource adequacy risk in the IRM study could cause large arbitrary changes in annual capacity revenues.

In addition to these issues, the MMU is concerned that the timeline for determining ICAP market parameters may fail to adequately incentivize resources to take actions that promote winter reliability. Specifically, the assumptions regarding the status of generators in the IRM base case are typically finalized in the fall before the corresponding May-April Capability Year. Also, the assumptions regarding winter ICAP supply resources will be locked in over a year before the key December – February winter months. As a result, the MMU is concerned that the ICAP market may establish ICAP requirements and CAF values that limit opportunities for gas-fired generators to profitably enhance reliability by demonstrating the acquisition of firm fuel contracts.

To address these issues, in Recommendation 2022-2, the MMU recommends an ICAP market with seasonal requirements, CAFs, and demand curves. This ICAP market framework would establish separate capacity requirements for Summer and Winter Capability Periods so that each season procures sufficient UCAP to satisfy reliability criteria. The MMU states that this approach would establish ICAP requirements and demand curves that consider the reliability needs of each seasonal Capability Period separately, so that prices are not distorted by relative ICAP values between the Summer and Winter Capability Periods. A seasonal ICAP market would include the following:

1. Seasonal requirements that reflect the amount of capacity needed to satisfy the targeted level of reliability in each seasonal Capability Period, taking into consideration generator availability and load;

2. Seasonal Demand Curves with reference prices set so that the price approaches the Net Cost of New Entry of the reference technology as the UCAP supply approaches the UCAP requirement in any season; and
3. Winter Capability Period requirements consistent with the winter season so that any changes in resource status and fuel procurements can be accurately incorporated into ICAP requirements and CAF values.

Other System Operators

Other Independent System Operators and Regional Transmission Operators have also begun adapting their resource adequacy planning and ICAP markets in response to increasing winter resource adequacy risk. In 2022, the Midcontinent Independent System Operator (MISO) established a system-wide Planning Reserve Margin in terms of UCAP for each season. The Planning Reserve Margin is based on LOLE metrics derived through probabilistic modeling, first solving to the industry standard annual LOLE risk target of 1 day in 10 years. As LOLE risk is currently small to non-existent in winter, spring and fall, MISO solves the LOLE to a minimum seasonal criterion of 0.01 (or a "one day in 100" requirement). MISO continues to conduct an annual ICAP auction in the spring preceding the applicable Planning Year, but the auction clears the requirements separately for each season. MISO's move to a seasonal ICAP market was largely driven by a changing resource mix. For example, under the annual construct, MISO calculated a class average wind capacity credit for the 2022-2023 Planning Year of 15.5%, while, under the seasonal construct for the 2023-2024 Planning Year, the class average wind capacity credit ranged from 18.1% for summer to 40.3% for winter.

PJM's recent operating experience with natural gas and renewable resources in the winter periods have demonstrated that the current modeling approaches focused on peak load conditions and average performance do not fully capture all the risks that impact resource adequacy needs and resource performance. In addition to changing from an average to a marginal performance metric for capacity accreditation, PJM is adding an expected unserved energy reliability metric that accounts for all hours, rather than only peak hours, to better quantify the disparate seasonal performance of some resources.[12]

[12] *PJM Interconnection, L.L.C.*, 186 FERC ¶ 61,080, at P 183, *reh'g denied and modified on other grounds*, 189 FERC ¶ 61,043 (2024).