

Modeling Improvements for Capacity Accreditation

Nikolai Tubbs, Associate Market Design Specialist, Capacity Market Design

Management Committee

March 27, 2024

Agenda

Background

Summary of Proposals

- Gas Constraints
- Correlated Derates
- ICAP Supplier Bidding Requirements

Proposed Tariff Revisions

- Next Steps
- Appendix
 - Previous Discussions



Background



Background

- As part of the 2022 Improving Capacity Accreditation project, the NYISO identified that the functionality utilized in the current resource adequacy analysis -- used to establish New York State installed reserve margins and used as the basis of determining Capacity Accreditation Factors (CAFs) -- related to the modeling of and accounting for attributes, such as correlated fuel unavailability for non-renewable resources, non-fuel-related correlated outages, etc., may limit the basis for identifying certain Capacity Accreditation Resource Classes (CARCs) and calculating CAFs for some resource types
 - Enhancing the model's functionality will enable more accurate calculations of the Resource Adequacy requirements needed to maintain reliability and the CAFs, which will reflect the marginal reliability contributions of each CARC
- The market design was conceptually approved by the Business Issues Committee meeting on December 13, 2023
 - After discussion at the BIC meeting, NYISO presented further tariff refinements to the ICAPWG in January, February, and March, 2024, which enhancements are included in the tariff revisions posted for today's Management Committee Meeting



Summary of Proposals



Summary of Proposals

- The NYISO is proposing tariff revisions to support the Modeling Improvements for Capacity Accreditation Gas Constraints and Correlated Derates tracks.
- The NYISO is proposing tariff revisions to ICAP Supplier Bidding Requirements
- The NYISO is working with the New York State Reliability Council (NYSRC)'s Installed Capacity Subcommittee (ICS) for the adoption of the recommended SCR Modeling in 2024





- Under the proposed market rules ICAP Suppliers will make a "fuel characteristic election" based on a unit's ability to satisfy, in part or in full, requirements for entry into a firm fuel CARC
 - Units will inform the NYISO as to the MW level of their unit covered by firm fuel supply with any remaining MWs being covered under the Non-firm CARC
 - Units may use additive arrangements/contracts to satisfy the applicable requirements



• Firm Requirements:

- <u>Gas</u> Firm transportation contract(s) covering full capacity value with a contract path from a <u>liquid receipt point</u> to unit burner tip during the months of Dec., Jan., and Feb.,
 - Units may use an illiquid receipt point if they have procured a gas supply contract that satisfies the above requirement
- <u>On-site Fuel</u> required to have on-site storage, and if applicable, fuel arrangements/contracts to run at max output for 16 hours/day for 6 days during the months of Dec., Jan., and Feb.,
- Testing Requirement DMNC on primary and additional test on alternate fuel demonstrating max output for 1 hour by Dec. 1 deadline
 - Test must occur during the immediately prior Winter DMNC Test Period or with an out-of-period test confirmed in Nov. of the applicable Winter Capability Period
 - Operational data may be used in lieu of either test
- DMNC used in ICAP calculations will be set using maximum value of the two tests, with any MW difference between the two test values treated as non-firm



- An ICAP Supplier must elect a unit's fuel characteristic by Aug. 1 of the calendar year prior to the start of the subject Capability Year, (*e.g.*, August 1, 2025 for the 2026-2027 Capability Year)
- ICAP Suppliers will be required to substantiate the election for each unit by Dec. 1 of the Capability Year (*e.g.*, the election made by Aug. 1, 2025 must be substantiated by Dec. 1, 2026)
- Data submission includes:
 - Relevant contracts and operating plan
 - Documentation of inventory and completed testing for Dual Fuel and Oil-only Units
- ICAP Suppliers will be permitted to submit data prior to the Aug. 1 election for the subject Capability Year
 - ICAP Suppliers may submit data beginning January 1 for the year in which the election is made (e.g., January 1, 2025, for the August 1, 2025 election)
 - The ISO will undertake reasonable efforts to review an ICAP Supplier's documentation if received prior to Aug. 1 of the subject Capability year and notify the ICAP Supplier if the documentation does not support the elected level of firm capability

• Only submissions received between Aug. 1 and November 30 of the subject Capability Year will count towards meeting the Dec. 1 data submission deadline

• NYISO will evaluate (or, if previously submitted, confirm) contracts and supporting documentation submitted to verify that the conditions affecting firm fuel supply continue to support the ICAP Supplier's election. For example, to confirm that a receipt point previously determined to be liquid continues to be a liquid receipt point for the upcoming winter season



- Shortfall Penalty Units that made an election to demonstrate any amount of firm fuel capability based on having firm supply but that were unable to substantiate/validate the level of firm supply by Dec. 1 or were unable to maintain their firm status may be subject to an ICAP Shortfall penalty
 - The shortfall penalty will be equal to 1.5x the applicable Market-Clearing Price of UCAP times the amount of the shortfall for each month the ICAP Supplier is deemed to have a shortfall
 - If, however, the NYISO determines that the loss of firm status is due to the acts of other parties and not within the ICAP Supplier's control, the shortfall penalty will be equal to 1.0x the applicable Market-Clearing Price of UCAP times the amount of the shortfall for each month the ICAP Supplier is deemed to have a shortfall
 - Units that experience a reduction in firm supply will have their UCAP adjusted based on the new proportion of the applicable requirement that is satisfied



Correlated Derates



Summary

The "Correlated Derates" project addresses issues identified in Potomac Economics' Q3 2022 State of the Market Report as "functionally unavailable capacity" that Potomac believes may not be properly modeled in the IRM/LCR.

Specifically:

- 1. Ambient water-related deratings for steam units
 - Units with once-through water cooling
- 2. Humidity-adjustments for combined and simple cycle combustion turbines
 - Units with inlet cooling systems
- 3. Emergency-only capacity that may not be reliably available in real-time
 - Capacity Limited Resource (CLR): An energy supplier that is able to take extraordinary measures to reliably increase output above its UOL_N and has sold UCAP based on taking those extraordinary measures



Ambient Air and Humidity

- Combustion Turbines and Combined Cycle units are already required to adjust DMNC tests results based on ambient air temperature
- NYISO proposes that units with inlet cooling systems adjust DMNC to output curves based on both temperature and humidity
 - These units can use Dry Bulb temperature and Wet Bulb temperature to obtain Relative Humidity (RH), Specific Humidity (SH) or any other variable they require to obtain the performance of their units at actual and design conditions
- Ambient Air temperature-dependent units and air temperature and humiditydependent units will be required to adjust DMNC MW to a reference point based on the temperature and humidity, as applicable, used for the ICAP forecast
 - Current methodology averages the ambient temperatures recorded at the time of the Transmission District's seasonal peak for four like Capability Periods
 - NYISO to provide Dry Bulb and Wet Bulb values used for the ICAP forecast for each zone



Ambient Water Adjustment

- DMNC will be based on actual operation data for summer capability season
 - No need to provide output curves, flow rates or inlet water temperatures
- Valid operation may occur from July 1 to August 31, with a start time of 10am (HB 10) or later and the testing end time is 10pm (HB 22) or earlier
- Performance based on the sustained maximum net output over four (4) consecutive hours



Capacity Limited Resources

- NYISO proposes to sunset the Capacity Limited Resources provision in the Tariff as of April 30, 2025
- Units would no longer be able to test by taking "extraordinary measures" to increase output
- In the energy market these units would be expected to offer their ICAP equivalent of UCAP sold at UOL_N



ICAP Supplier Bidding Requirements



ICAP Supplier Bidding Requirements

Issue

- The existing market rules do not explicitly prohibit Installed Capacity Suppliers from fulfilling their availability requirement (MST 5.12.7) by offering a portion of their capacity in the DAM at an Emergency Upper Operating Limit (UOLe)
- Emergency Capacity is largely unavailable because operators infrequently use it

Proposal

 NYISO proposes to require each Installed Capacity Supplier, unless exempted, to schedule a bilateral or bid energy in the DAM with a Normal Upper Operating Limit (UOLn) at a level equal to or greater than its Installed Capacity Equivalent of Unforced Capacity supplied, or notify the ISO of any outages

Exemptions

- Combined Cycle Units qualified to offer reserves in their duct-firing range
- Block Loaded Combustion Turbines that can be committed in either peak firing or normal firing mode



Proposed Tariff Revisions



Proposed Tariff Revisions

Natural Gas Constraints:

- MST 5.12 changes include:
 - 5.12.1.15 Establishment of Dual Fuel Testing Requirement
 - 5.12.6.2.2 UCAP Adjustment for Partial Firm Units
 - 5.12.8 Detailed Dual Fuel Testing Requirement
 - 5.12.15 CARC Characteristic Elections
- MST 5.14 changes include:
 - 5.14.2.3.5 Shortfall Penalty
- MST 23.4 changes include:
 - 23.4.5.4 Exemption from Must Offer Requirements of Pivotal Suppliers

Correlated Derates:

- MST 2.3:
 - Changes the definition of a Capacity Limited Resource, such that it is no longer applicable after April 30, 2025
- Sunset Capacity Limited Resources beginning May 1, 2025 in the following sections:
 - MST 4.2 Day-Ahead Markets and Schedules
 - MST 4.3 In-Day Scheduling Changes
 - MST 4.5 Real-Time Market Settlements
 - MST 15.3A.1 Persistent Undergeneration Charges

ICAP Supplier Bidding Requirements:

- MST 5.12 changes include:
 - 5.12.7 Adjusting bidding requirements
 - 5.12.7.2 Exemptions



Next Steps



Next Steps

- Board Review and FERC filing
- 2024: Continue working with NYSRC ICS towards the adoption of the recommended SCR Model



Appendix



Previous Discussions



Date	Working Group	Discussion Points and Links to Materials
January 26, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation: Project Kick Off: https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20- %20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff
February 28, 2023	ICAPWG	Correlated Derates - Overview: https://www.nviso.com/documents/20142/36499713/Correlated_Derates_MIWG_022823_FINAL.pdf/35eaab46-740e-aed0-9e2d- 2207c06a0659 Natural Gas Constraints - Overview: https://www.nviso.com/documents/20142/36499713/Gas%20Constraints%2002_28_2023%20ICAPWG_Final.pdf/e258d867-12f9- 8453-c93b-49bc94b8e803 SCR Modeling - Overview: https://www.nviso.com/documents/20142/36499713/2023-02- 28%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/c1a52495-bc30-3e7c-f5c1-61c38f30fbe4
April 27, 2023	ICAPWG	Natural Gas Constraints - Gas Availability Estimates and Classification: https://www.nyiso.com/documents/20142/37254128/Natural%20Gas%20Constraints%202023_04_27_Final.pdf/0821aba8-bdcd- b1ce-96f3-2d8a740e1356 SCR Modeling - Exploratory Testing Methodology for Existing SCRs: https://www.nyiso.com/documents/20142/37254128/2023- 04%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/30382824-7468-24d2-e567-56c770d6a185 Start up Notifications - Project Overview: https://www.nyiso.com/documents/20142/37254128/Start-up%20notification%20time%20- %20ICAPWG%204.27.2023%20v0.2%20clean.pdf/b44eb773-6f7d-e895-e202-a12f2fb6e24e
May 8, 2023	ICAPWG	Correlated Derates - Ambient Adjustments and Emergency Capacity: https://www.nyiso.com/documents/20142/37431277/5%20Correlated_Derates_ICAPWG_050823.pdf/a1e9a0f4-d922-503d-06d0- 682b49c46c4c



Date	Working Group	Discussion Points and Links to Materials
June 1, 2023	ICAPWG	Natural Gas Constraints – Potential methods for quantifying firm capacity, CARC designation, and fuel election timelines: <u>https://www.nyiso.com/documents/20142/37883690/Natural%20Gas%20Constraints%2006_01_2023_ICAPWG_Final.pdf/d479ea6</u> <u>4-a0d0-86d1-388a-f93d01ff1e10</u>
June 7, 2023	ICAPWG	SCR Modeling – Exploratory Testing Methodology (Continued): https://www.nyiso.com/documents/20142/38023757/2023-06-07%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/250f8f1d-9dfe-5756-640b-c1e31f3a6328
June 27, 2023	ICAPWG	Natural Gas Constraints – Addressing Stakeholder feedback and discussion on simpler framework for classifying units: https://www.nyiso.com/documents/20142/38423065/2%20Natural%20Gas%20Constraints_06_23_2023_ICAPWG_Final.pdf/177ad 95e-1fa3-5c57-a626-d06182b55c9b
July 11, 2023	ICAPWG	SCR Modeling – Exploratory Testing Methodology Initial Results: https://www.nyiso.com/documents/20142/38699263/2023-07-11%20ICAPWG%20Modeling%20v2%20-%20clean.pdf/2f27473b-2292-31d4-ecb7-5d30d6b860f0
July 27, 2023	ICAPWG	Correlated Derates - Ambient Adjustments and Emergency Capacity: https://www.nviso.com/documents/20142/39044934/Correlated_Derates_ICAPWG_072723_final.pdf/0f80f8f2-8100-b8f7-0c65- 0098242634e1 Start-up Time - Long Start-up Time and Considerations: https://www.nviso.com/documents/20142/39044934/Startup%20time%20- %20ICAPWG%207.27.2023_v2.pdf/bbf6fa0d-b45e-6b7f-1697-2c002442b1de
August 9, 2023	ICAPWG	Gas Constraints – Classification Proposal, Requirements for Firm Units, and Data Submittal Timeline: https://www.nyiso.com/documents/20142/39257338/Natural%20Gas%20Constraints_08_09_2023%20ICAPWGv4%20(002).pdf/de 6053e0-030d-5520-ed59-18f2225f0f92



Date	Working Group	Discussion Points and Links to Materials	
September 5, 2023	ICAPWG	Correlated Derates - Ambient Adjustments: https://www.nyiso.com/documents/20142/39768278/5%20Correlated_Derates_ICAPWG_090523_final.pdf/5aa71990-e873-166b- a520-e8e6c44b42e1	
September 18, 2023	ICAPWG	Startup Notification - Recommendation and Draft Tariff Revisions: <u>https://www.nyiso.com/documents/20142/40044890/7%20Start-up%20Time%20Proposed%20Capacity%20Tariff%20Revision%20-%20ICAPWG%2009-18.pdf/9d6e8c5e-b7cd-384c-b713-be93507912ed</u>	
September 20, 2023	ICAPWG	Gas Constraints – Updated Requirement, Data Verification Timeline and Shortfall Penalty: <u>https://www.nyiso.com/documents/20142/40085480/Natural%20Gas%20Constraints_9_20_2023_v4.pdf/8c76a250-d1e0-d30a-</u> <u>2c24-115f10268c65</u>	
October 3, 2023	ICAPWG	SCR Modeling – Project Update: <u>https://www.nyiso.com/documents/20142/40342797/2023-10-03%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/e5b6faa3-7865-c92a-dbf2-39e1ea6c65e8</u>	
October 10, 2023	ICAPWG	Gas Constraints – Response to Stakeholder Feedback, Liquid Receipt Point Guidance, Additive Arrangements: https://www.nyiso.com/documents/20142/40481418/2%20Natural%20Gas%20Constraints_10_10_v3.pdf/7f39851d-f477-6a12- d7d2-52f52af87fcb	
		Correlated Derates - Ambient Adjustment Procedures and CLR Tariff: <u>https://www.nyiso.com/documents/20142/40481418/3%20Correlated_Derates_ICAPWG_101023_final.pdf/76326e11-e97f-cb93-</u> <u>2ca4-902d11365bda</u>	
October 19, 2023	ICAPWG	Startup Notification – Proposed Capacity Tariff Revisions: <u>https://www.nyiso.com/documents/20142/40696384/Start-up%20Time%20Capacity%20Tariff%20Discussion-%20ICAPWG%2010-19.pdf/247ea46c-9bc3-60c5-9363-69d787bb78c9</u>	·k

Date	Working Group	Discussion Points and Links to Materials
October 26, 2023	ICAPWG	SCR Modeling - Enhanced SCR Modeling Results: <u>https://www.nyiso.com/documents/20142/40834869/2023-10-26%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/7d81b04c-e08a-0298-eaa6-cf99d92aa88c</u>
November 8, 2023	ICAPWG	Gas Constraints – Response to Stakeholder Feedback and Market Design Summary + Tariff: https://www.nyiso.com/documents/20142/41049783/Natural%20Gas%20Constraints_11_8_w_Tariff_v5.pdf/8badbfff-06cd-3db3- 46f9-c7de5107e993
November 17, 2023	ICAPWG	Gas Constraints – Response to Stakeholder Feedback: https://www.nyiso.com/documents/20142/41273741/Natural%20Gas%20Constraints_11_17_ICAPWG_v3.pdf/9e3b921a-0161- 3a21-4874-21811077efb5
November 27, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation – Summary: https://www.nyiso.com/documents/20142/41393553/2023-11-27%20ICAPWG%20-%20Modeling%20Improvements%20Summary.pdf/9c383992-bebf-6a4a-e660-4cb96f842ef2
December 4, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation – Tariff Review: <u>https://www.nyiso.com/documents/20142/41570800/2023-12-04%20ICAPWG%20-%20Modeling%20Improvements_v3.pdf/7d334598-46c3-23d8-3217-4bf3eeacadce</u>
December 13, 2023	BIC	Modeling Improvements for Capacity Accreditation – BIC Presentation: https://www.nviso.com/documents/20142/41671891/06%20Modeling%20Improvements%20for%20Capacity%20Accreditation.pdf/4 70bc7a0-277c-dfac-62e6-9cd439f9c813 Motion: https://www.nviso.com/documents/20142/41671891/06%20Modeling%20Improvements%20for%20Capacity%20Accreditation.pdf/4 0tion: https://www.nviso.com/documents/20142/41671891/06%20Modeling%20Improvements%20for%20Capacity%20Accreditation%20M otion.pdf/f6afdb1e-f59a-584b-8280-b9b1cab39151



Date	Working Group	Discussion Points and Links to Materials
December 15, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation – SCR Modeling: https://www.nyiso.com/documents/20142/41825507/12-15-2023%20ICAPWG%20-%20Modeling.pdf/7c754c58-381e-0532-4b13-83181677f3db
February 2, 2024	ICAPWG	Modeling Improvements for Capacity Accreditation – Gas Constraints Tariff & ICAP Supplier Bidding Requirements: https://www.nyiso.com/documents/20142/42748388/2%202024-2-2%20ICAPWG%20-%20Modeling%20Improvements.pdf/0d4f32dd-036d-0a5a-2481- cdf230d35a16
February 20, 2024	ICAPWG	Modeling Improvements for Capacity Accreditation – Gas Constraints Tariff & ICAP Supplier Bidding Requirements: https://www.nyiso.com/documents/20142/43038997/7%202024-2-20%20ICAPWG%20-%20Modeling%20Improvements.pdf/9d48164f-4617-48da- dc06-3838e0fd042f
March 4, 2024	ICAPWG	Modeling Improvements for Capacity Accreditation: https://www.nyiso.com/documents/20142/43315080/2024-3-4%20ICAPWG%20- %20Modeling%20Improvements.pdf/a6f5b52d-6adb-5cec-2e30-c362788dfc50



Our Mission & Vision

 \checkmark

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

