

Modeling Improvements for Capacity Accreditation: Proposed Tariff Revisions

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ICAPWG

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Agenda

- **Proposed Tariff Revisions**
- **Responses to Questions from 11/27 ICAPWG**
 - Non-Firm CAF Results
- **Appendix**
 - DMNC above/below demonstrated Firm examples
 - Summary of Proposals
 - Previous discussions

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 deficiency charge
- 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 - Changes the definition of a Capacity Limited Resource, such that it is no longer applicable after April 30, 2025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

Updates from 11/27 ICAPWG

- Revisions highlighted in **yellow** since 11/27 ICAPWG
- **MST 5.12.15**
 - Revisions to provide ISO notification related to the completeness of firm supply documentation and description
- **MST 5.14.2.3.5**
 - Revisions to better describe application of deficiency charge
- **MST 23.4.5.4**
 - Revisions to exempt MW from must offer of Pivotal Suppliers if they are no longer qualified

Additional Updates from 11/27 ICAPWG

■ MST 2.3

- Revised to "no longer be able to register and participate"
- Deleted unnecessary language in the definition
and any existing Resource previously registered as a Capacity Limited Resources shall no longer be able to submit a schedule that indicates that their Normal Upper Operating Limit is a function depending on one or more variables such that it is different from the Resources applicable DMNC without reporting an appropriate outage or derate

■ MST 4.5

- Revised to "register and participate"

Responses to Questions from Previous ICAPWGs

Responses to Questions from 11/27

ICAPWG

- **Ambient Air DMNC test results will also be adjusted using the temperature data consistent with the ICAP Forecast**
 - Update made to slides in Appendix
- **Water Cooled Units taking Ambient Derate count as Forced Outage**
 - NYISO is still evaluating this proposal, and if needed would be brought forward as a separate proposal
- **Usage of UOLn vs UOLe**
 - NYISO is still evaluating potential changes, and if needed would be brought forward as a separate proposal
- **MST 4.2.3.1**
 - (i) commit additional Resources, beyond those committed Day-Ahead, using a SRE and considering (a) Bids submitted to the ISO that were not previously accepted but were designated by the bidder as continuing to be available;
 - This reference is to Bids that are still available
- **Liquid Receipt Point Definition**
 - The ISO has provided preliminary guidance on the characteristics of a liquid receipt point and will update ISO procedures as new information/experience demands*

Liquid Receipt Point Guidance - Slide 8:

https://www.nyiso.com/documents/20142/41049783/Natural%20Gas%20Constraints_11_8_w_Tariff_v5.pdf/8badbff-06cd-3db3-46f9-c7de5107e993

Non-Firm CAF Results

- **The NYISO has developed two sets of CAF results representing the reliability contributions of units subject to natural gas constraints in GE MARS using IRM sensitivity cases S07a-2 and S07b-2**
 - Both sensitivity cases are built upon Emergency Operating Procedure (EOP) sensitivity cases and include 7,000 MW of winter constraint
 - CAF values were calculated by adding a representative 100 MW thermal unit to the base case plus a 100 MW negative Demand Side Management unit with a shape resulting in net-zero MW proxy contribution to the system for the winter months
- **The following CAF results are not the final CAFs nor indicative of the final CAFs that will be used to determine the market revenue of ICAP Suppliers**
 - The final methodology that will be used by the NYSRC in the IRM model is still under discussion

Non-Firm CAF Results

Case	Description	Zone	CAF
S07a-2	EA Recommendation plus 7,000 MW capacity removed for Jan, Feb, Dec	ROS	95.94%
		GHI	96.09%
		J	98.00%
		K	99.56%
S07b-2	EA Recommendation with Winter EA further reduced plus 7,000 MW capacity removed in Jan, Feb, Dec	ROS	54.33%
		GHI	54.79%
		J	68.98%
		K	95.05%

Next Steps

Next Steps

- December 13 BIC
- December 20 MC
- Q1 2024: Board Review and FERC filing
- 2024: Continue working with NYSRC ICS on SCR Modeling
- For any questions or feedback please email ztsmith@nyiso.com and/or ntubbs@nyiso.com

Appendix

DMNC Above/Below Demonstrated Firm Examples

DMNC **below** demonstrated firm level

- CAF for applicable Capability Year: Firm CAF = 100%, Non-firm CAF = 95%
- Nameplate = 105 MW, CRIS = 102 MW
- Elected firm = 101 MW
- Demonstrated firm = 100 MW
 - Either through contracts, inventory, or the alternative fuel DMNC test
- EFORD = 5%
- CASE 1: DMNC is **97 MW**

- $$MW \text{ weighted } CAF = \frac{[MIN(Firm_{demonstrated}, CRIS, DMNC) \times CAF_{firm}] + MAX(0, \{[MIN(CRIS, DMNC) - (Firm_{demonstrated})] \times CAF_{non-firm}\})}{MIN(CRIS, DMNC)} =$$

$$\frac{[MIN(100, 102, 97) \times 100\%] + Max(0, \{[MIN(102, 97) - (100)] \times 95\% \})}{MIN(102, 97)} = \frac{(97 \times 100\%) + (0 \times 95\%)}{97} = \frac{97}{97} = 100.00\%$$
- $ICAP_{adjusted} = MIN(CRIS, DMNC) \times CAF_{weighted} = MIN(102, 97) \times 100.00\% = 97.0 \text{ MW}$
- $UCAP = ICAP_{adjusted} \times (1 - derating \text{ factor}) = 97 \times (1 - 0.05) = 92.2 \text{ MW}$

DMNC above demonstrated firm level

- CAF for applicable Capability Year: Firm CAF = 100%, Non-firm CAF = 95%
- Nameplate = 105 MW, CRIS = 102 MW
- Elected firm = 101 MW
- Demonstrated firm = 100 MW
 - Either through contracts, inventory, or the alternative fuel DMNC test
- EFORd = 5%
- CASE 2: DMNC is 103 MW

- $$MW \text{ weighted } CAF = \frac{[MIN(Firm_{demonstrated}, CRIS, DMNC) \times CAF_{firm}] + MAX(0, \{[MIN(CRIS, DMNC) - (Firm_{demonstrated})] \} \times CAF_{non-firm})}{MIN(CRIS, DMNC)}$$

$$\frac{[MIN(100, 102, 103) \times 100\%] + Max(0, \{[MIN(102, 103) - (100)] \} \times 95\%)}{MIN(102, 103)} = \frac{(100 \times 100\%) + (2 \times 95\%)}{102} = \frac{100 + 1.9}{102} = 99.90\%$$
- $ICAP_{adjusted} = MIN(CRIS, DMNC) \times CAF_{weighted} = MIN(102, 103) \times 99.90\% = 101.9 \text{ MW}$
- $UCAP = ICAP_{adjusted} \times (1 - derating \text{ factor}) = 101.9 \times (1 - 0.05) = 96.8 \text{ MW}$

Summary of Proposals

Summary of Proposals

- **The NYISO is proposing tariff revisions to support Modeling Improvements for Capacity Accreditation project's Gas Constraints and Correlated Derates track**
- **The NYISO is working with the NYSRC ICS on SCR Modeling**
- **The NYISO is no longer proposing changes to Start Up Requirements as part of this effort**

Gas Constraints

Gas Constraints

- **The NYISO has developed a process for units to make a “fuel characteristic election” based on the 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 supply with any remaining MWs being covered under the Non-firm CARC
 - Units may use additive arrangements/contracts to satisfy the applicable requirements

Gas Constraints

■ Firm Requirements:

- Gas – Firm transportation contract(s) covering full capacity Value with a contract path from a liquid supply source to unit burner tip during the months of Dec., Jan., and Feb.,
 - Units may use an illiquid supply source if they have procured a gas supply contract that satisfies the above requirement
- On-site Fuel - required to have the 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
 - ICAP values will be set using maximum value of the two tests, with any MW difference between the two test values treated as non-firm

Gas Constraints

- **The fuel characteristic elections will take place on Aug. 1 for the capability year beginning over a year later, with units required to substantiate their election by Dec. 1 of the applicable Winter Capability Period**
 - Data submission includes:
 - Relevant contracts and operating plan
 - Documentation of inventory and completed testing for Dual Fuel and Oil-only Units
 - Data submissions will begin with the opening of the Generator Fuel and Emissions Reporting Annual Survey

Gas Constraints

- **Shortfall Penalty - Units that made an election to demonstrate any amount of firm fuel capability based on having firm supply but were unable to procure the required supply by Dec. 1 or were unable to maintain their firm status may be subject to an ICAP Shortfall penalty**
 - Units will not be subject to penalties when the loss of firm status is due to the acts of other parties and not within the unit's control
 - 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 address issues identified in Potomac Economics Q3 2022 State of the Market Report as “functionally unavailable capacity” that 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 already required to adjust DMNC tests based on ambient air temperature**
- **Propose units with inlet cooling systems additionally 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
- **Air temperature-dependent units and air temperature and humidity-dependent units 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 to 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**

Emergency Only Capacity

- **Sunset the Capacity Limited Resources provision in the Tariff as of May 1, 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**

Start Up Notification

Start Up Notification

- **Original Proposal was all ICAP Suppliers would need to be able to be started within 24 hours if the 2 day ahead forecast $\geq 90\%$ of Seasonal Peak Forecast**
- **Based off of feedback from stakeholders on emissions concerns, coupled with limitations of some existing Generators to meet this requirement, the NYISO is no longer moving forward with this proposal**

SCR Modeling

SCR Modeling

- **The NYISO has developed an enhanced methodology for modeling SCRs in the IRM, LCR, and capacity accreditation studies**
 - The purpose of the enhanced SCR modeling is to better reflect the expected performance and obligations that SCRs have in the NYISO's market by modeling SCRs as duration limited resources with hourly response rates based on historical performance
 - A detailed overview of the enhanced SCR modeling is included in the Appendix of the [10/26/2023 ICAPWG presentation](#)
- **The NYISO plans to continue discussions on the enhanced SCR modeling with the NYSRC in 2024**
 - If the NYSRC incorporates the enhanced SCR modeling into the 2025 IRM final base case, SCRs would receive SCR-specific CAFs for the 2025-2026 Capability Year
 - Until such time, SCRs will be valued in the ICAP Market using the CAFs of the 4-hour Energy Duration Limited Capacity Accreditation Resource Class

Previous Discussions

Previous Discussions on Modeling Improvements for Capacity Accreditation

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.nyiso.com/documents/20142/36499713/Correlated_Derates_MIWG_022823_FINAL.pdf/35eaab46-740e-aed0-9e2d-2207c06a0659 Natural Gas Constraints - Overview: https://www.nyiso.com/documents/20142/36499713/Gas%20Constraints%2002_28_2023%20ICAPWG_Final.pdf/e258d867-12f9-8453-c93b-49bc94b8e803 SCR Modeling - Overview: https://www.nyiso.com/documents/20142/36499713/2023-02-28%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/c1a52495-bc30-3e7c-f5c1-61c38f30be4
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

Previous Discussions on Modeling Improvements for Capacity Accreditation

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: https://www.nyiso.com/documents/20142/37883690/Natural%20Gas%20Constraints%2006_01_2023_ICAPWG_Final.pdf/d479ea64-a0d0-86d1-388a-f93d01ff1e10
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/177ad95e-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%20Improvements%20-%20SCR%20Modeling%20v2%20-%20clean.pdf/2f27473b-2292-31d4-ecb7-5d30d6b860f0
July 27, 2023	ICAPWG	Correlated Derates - Ambient Adjustments and Emergency Capacity: https://www.nyiso.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.nyiso.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/de6053e0-030d-5520-ed59-18f2225f0f92

Previous Discussions on Modeling Improvements for Capacity Accreditation

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: https://www.nyiso.com/documents/20142/40044890/7%20Startup%20Time%20Proposed%20Capacity%20Tariff%20Revision%20-%20ICAPWG%2009-18.pdf/9d6e8c5e-b7cd-384c-b713-be93507912ed
September 20, 2023	ICAPWG	Gas Constraints – Updated Requirement, Data Verification Timeline and Shortfall Penalty: https://www.nyiso.com/documents/20142/40085480/Natural%20Gas%20Constraints_9_20_2023_v4.pdf/8c76a250-d1e0-d30a-2c24-115f10268c65
October 3, 2023	ICAPWG	SCR Modeling – Project Update: https://www.nyiso.com/documents/20142/40342797/2023-10-03%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/e5b6faa3-7865-c92a-dbf2-39e1ea6c65e8
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: https://www.nyiso.com/documents/20142/40481418/3%20Correlated_Derates_ICAPWG_101023_final.pdf/76326e11-e97f-cb93-2ca4-902d11365bda
October 19, 2023	ICAPWG	Startup Notification – Proposed Capacity Tariff Revisions: https://www.nyiso.com/documents/20142/40696384/Startup%20Time%20Capacity%20Tariff%20Discussion-%20ICAPWG%2010-19.pdf/247ea46c-9bc3-60c5-9363-69d787bb78c9

Previous Discussions on Modeling Improvements for Capacity Accreditation

Date	Working Group	Discussion Points and Links to Materials
October 26, 2023	ICAPWG	SCR Modeling- Enhanced SCR Modeling Results: https://www.nyiso.com/documents/20142/40834869/2023-10-26%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/7d81b04c-e08a-0298-aaa6-cf99d92aa88c
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

Our Mission & 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