

# Modeling Improvements for Capacity Accreditation: Natural Gas Constraints

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06/01/2023

# Today's Objective

- Today's objective is to gather stakeholder feedback related to potential methodologies for quantifying the firm capacities of units, classifying them, and the required timelines for submitting necessary information

# Agenda

- Previous Discussions
- Background
- LOLE Findings
- ISONE Accreditation of Firm Capacity
- CARC Designation Utilizing ISONE Approach
- Fuel Supply Election Timelines
- Next Steps
- Appendix

# Previous Discussions

# Previous Discussions on Modeling Improvements for Capacity Accreditation

Date	Working Group	Discussion Points and Links to Materials
January 23, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation: Project Kick Off: <a href="https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff">https://www.nyiso.com/documents/20142/35880057/2023-01-26%20ICAPWG%20Modeling%20Improvements%20-%20Kick%20Off.pdf/c7ac6b6e-c90b-54b4-832d-ec6ecfc8f7ff</a>
February 28, 2023	ICAPWG	Correlated Derates Overview: <a href="https://www.nyiso.com/documents/20142/36499713/Correlated_Derates_MIWG_022823_FINAL.pdf/35eaab46-740e-aed0-9e2d-2207c06a0659">https://www.nyiso.com/documents/20142/36499713/Correlated_Derates_MIWG_022823_FINAL.pdf/35eaab46-740e-aed0-9e2d-2207c06a0659</a> Natural Gas Constraints Overview: <a href="https://www.nyiso.com/documents/20142/36499713/Gas%20Constraints%2002_28_2023%20ICAPWG_Final.pdf/e258d867-12f9-8453-c93b-49bc94b8e803">https://www.nyiso.com/documents/20142/36499713/Gas%20Constraints%2002_28_2023%20ICAPWG_Final.pdf/e258d867-12f9-8453-c93b-49bc94b8e803</a> SCR Modeling Overview: <a href="https://www.nyiso.com/documents/20142/36499713/2023-02-28%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/c1a52495-bc30-3e7c-f5c1-61c38f30fbe4">https://www.nyiso.com/documents/20142/36499713/2023-02-28%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/c1a52495-bc30-3e7c-f5c1-61c38f30fbe4</a>
April 27, 2023	ICAPWG	Natural Gas Constraints - Gas Availability Estimates and Classification: <a href="https://www.nyiso.com/documents/20142/37254128/Natural%20Gas%20Constraints%202023_04_27_Final.pdf/0821aba8-bdcd-b1ce-96f3-2d8a740e1356">https://www.nyiso.com/documents/20142/37254128/Natural%20Gas%20Constraints%202023_04_27_Final.pdf/0821aba8-bdcd-b1ce-96f3-2d8a740e1356</a> SCR Modeling - Current IRM Modeling and Historic SCR Performance, Exploratory Testing <a href="https://www.nyiso.com/documents/20142/37254128/2023-04%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/30382824-7468-24d2-e567-56c770d6a185">https://www.nyiso.com/documents/20142/37254128/2023-04%20ICAPWG%20Modeling%20Improvements%20-%20SCR%20Modeling.pdf/30382824-7468-24d2-e567-56c770d6a185</a> Start up Notifications - Project Overview: <a href="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">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</a>
May 8, 2023	ICAPWG	Correlated Derates - Ambient Adjustments and Emergency Capacity: <a href="https://www.nyiso.com/documents/20142/37431277/5%20Correlated_Derates_ICAPWG_050823.pdf/a1e9a0f4-d922-503d-06d0-682b49c46c4c">https://www.nyiso.com/documents/20142/37431277/5%20Correlated_Derates_ICAPWG_050823.pdf/a1e9a0f4-d922-503d-06d0-682b49c46c4c</a>

# Background

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- Capacity accreditation reflects resources' contribution to resource adequacy with the goal of producing more efficient ICAP Market outcomes
- Recent winter reliability concerns have raised questions of the availability of generation utilizing natural gas as a primary fuel source on a non-firm basis due to pipeline and/or other constraints
- For this portion of the Modeling Improvements for Capacity Accreditation project, the NYISO is looking to develop methodologies to identify and quantify natural gas constraints and resources impacted by such constraints in addition to corresponding methodologies for implementation in GE MARS.
  - The Special Case Resource modeling, Correlated Derates, and Start-up Notification portions of Modeling Improvements for Capacity Accreditation will be covered in separate discussions.
- The 2023 Project deliverable is Q4 – Functional Requirements

# LOLE Findings



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- The NYISO has completed preliminary testing to understand the LOLE impacts of gas unavailability finding that 7000MW of capacity reductions in zones F-K yielded minimal LOLE movement due to the current amount of winter risk reflected in today's RA model
  - At this time, it is anticipated that fuel secure units and fuel insecure units will have similar accreditation values
- However, this portion of the Modeling Improvements project looks to develop the process which will prepare the market for future winter risk
  - The modeling improvement to reflect reliability risk of winter gas constraints is under the whitepaper effort with the NYSRC via the ICS discussion

# ISONE Accreditation of Firm Capacity

# ISONE Firm Capacity Approach

- **ISONE sets Capacity Accreditation values by classifying the firm portion of a unit's capacity based on their additive fuel arrangement's ability to meet corresponding requirements including:**
  - Firm Daily Operations Requirement (FDOR)
    - **For Pipeline FT and Gas Sales Contract arrangements**
      - Minimum amount of firm fuel corresponding to the total number of hours at max QC available daily from firm transportation or gas sales
  - Firm Seasonal Operations Requirement (FSOR)
    - **For Gas Sales Contract arrangements**
      - Minimum amount of firm fuel corresponding to the total number of hours at max QC available from gas sales contracts across the winter capability period
  - Firm Oil Storage Requirement (FOSR)
    - **For On-site storage arrangements**
      - Minimum amount of firm fuel corresponding to hours at max QC on oil, available during multiple days of extreme cold weather, from dedicated storage
- **Note that Gas Sales Contract arrangements are subject to both FDOR and FSOR with the least satisfied requirement setting the accredited value**

# ISONE Firm Daily Operations Requirement (FDOR) 10 hours/day

- FDOR is compared to a unit's Firm Daily Operation Hours (FDOH) and reflects the required amount of fuel to cover periods where natural gas is unavailable
- $$FDOH = \frac{MDQ}{HR \times QC}$$
  - The NYISO would use ICAP in lieu of QC
- **FDOR requirement in ISONE is based on:**
  - Operational limits (i.e., start up and shutdown times, min up, and sustained max)
  - A ratio of the observed average of gas-only generation to gas only generation minus operationally limited units (gas only units with physical and/or operational constraints affecting procurement on cold days) and peaking resources on > 55 HDD
    - This ratio is then multiplied by 24 to produce a value of approximately 9.4 hours and then is rounded to 10 to incorporate fuel inefficiencies from cycling and ramping.

# ISONE Firm Seasonal Operations Requirement (FSOR) 11 days or 110 hours/season

- This value is compared to a unit's Firm Seasonal Hourly Operations FSOH and reflects the minimum amount of firm fuel required to cover periods of natural gas unavailability

- $$FSOH = \frac{TCQ}{HR \times QC}$$

- FSOR is based on an analysis looking to estimate the number of constrained days @ > 55 HDDs with considerations including:

- Costs of having firm contracts to meet max number of days (16)
- Tail risk of only covering the average (3.7)
  - Solution: Set contract length requirement to where firm contract length covers 99% of HDD > 55 (11 Days or 110 Hours)

# ISONE Firm Oil Storage Requirement (FOSR) 40 hours

- This value is compared to Firm Oil Storage Hours (FOSH) and reflects the onsite storage required to cover multi-day periods of gas unavailability
- $$FOSH = \frac{Storage}{HR_{oil} \times Cap_{oil}}$$
- To set the FOSR requirement, ISONE looked at the duration of cold snaps on HDDs > 55
  - Their solution was to set the requirement to 40-hours based on the 90<sup>th</sup> percentile value of cold snaps being four days and the FDOR being 10 hours

# Firm Quantification Example (ISONE Requirements)

- Unit with 100 MW capacity has Pipeline FT with MDQ of 5000 MMBtu with assumed heat rate of 10 MMBtu/MWh
  - Unit also has onsite storage worth 10,000 MMBtu
- At full output, this unit's Pipeline FT covers 5 hours a day which, using the ISONE requirement, is 50% of the 10-hour FDOR.
- Assuming full output of the alternate fuel is also 100 MW, and the unit's onsite storage covers 10 hours, then 25% of the ISONE requirement is satisfied based on the 40-hour FOSR
  - In this case, since the unit had two fuels subject to two requirements, the firm capacities would be additive to 75%
  - Is 75% sufficient to be considered fuel secure?

# CARC Designation Utilizing ISONE Constructs



# CARC Assignment

- **The NYISO could utilize ISONE's construct, substituting its own fuel requirements, to set thresholds for determining unit fuel security**
  - **Hypothetical Threshold Structures:**
    - Two buckets, where firm  $< 75\%$  of ICAP = fuel Insecure, and  $> 75\%$  = fuel Secure, or
    - Multiple buckets, where below 75% = fuel insecure, 76 - 85% = somewhat Secure, 86 - 100% = fuel secure
    - Use firm percentage of resource capacity (ISONE Approach – not clear how this would work with NYISO accreditation structure)
    - Other
- **Threshold structure is contingent on:**
  - How the NYISO decides firm capacities are to be quantified and the corresponding requirements
  - The NYISO would also need to specify which fuel arrangements exist in the NYCA control area and the constructs/requirements to which they apply

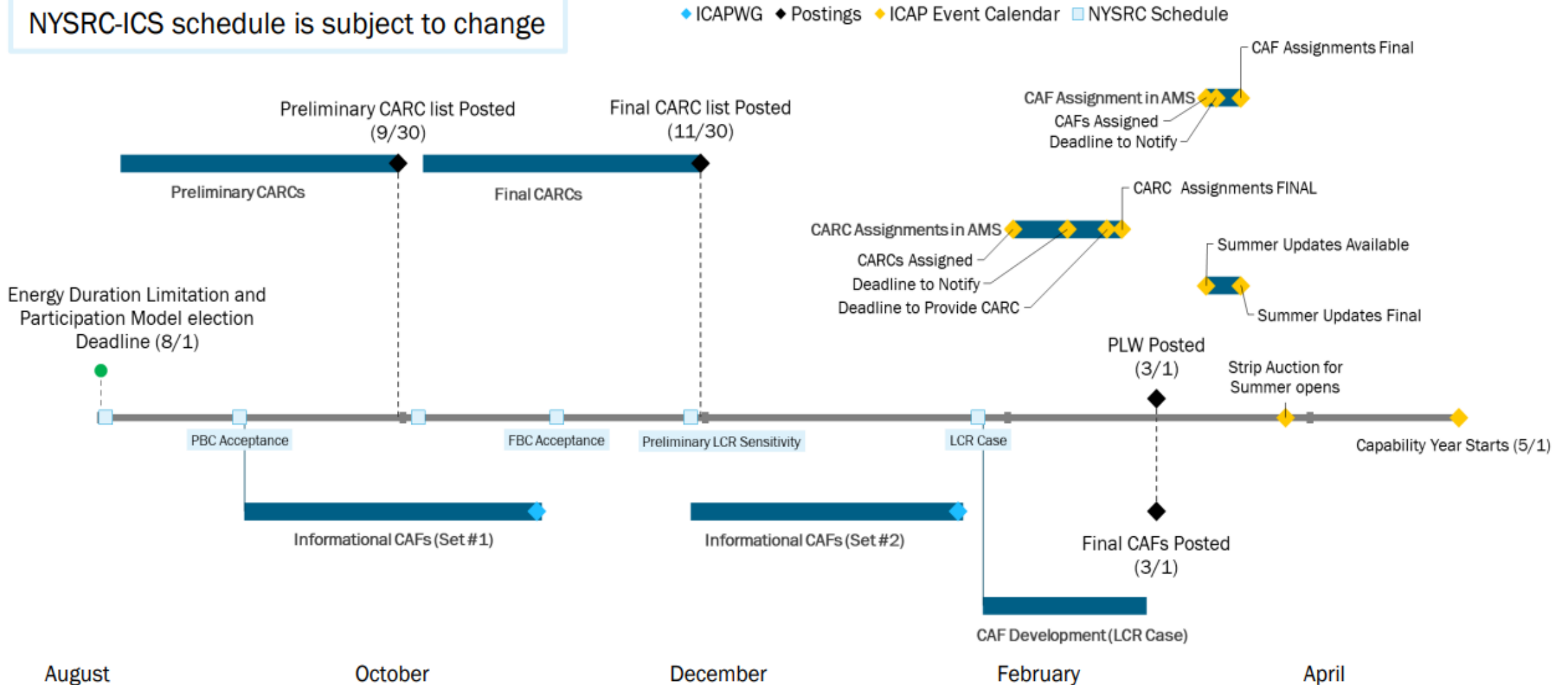
# Additional Requirement Considerations

- **Considerations for determining the period(s) of coverage used in the requirements for the NYISO market could include:**
  - Winter Peak Load Window
  - Length of Selected Periods from NYISO Cold Weather Operations
  - 2019 Fuel and Energy Security 3-day cold snaps and extreme weather events lasting longer than 14 days.
  - Heating Degree Days
  - Number of winter days with load over a specified level
- **The findings of the 2023 Fuel and Energy Security Study will help inform these requirements**

# Fuel Supply Election Timelines

# Capacity Accreditation Timeline

NYSRC-ICS schedule is subject to change



\*Approximate timeline for illustrative purposes, actual dates may change

# Timeline Considerations for Fuel Supply Elections

- **The process of accrediting units based on their fuel supplies will need to align with one or more existing timelines including:**
  - Capacity Accreditation
  - Generator Fuel and Emissions Reporting (GFER) annual survey
- **The primary issue with making elections is that they will affect the Winter Capability period starting over a year later.**
  - The NYISO will need to understand how to use available data (historic and/or new submittals) to accredit units for the winter capability period
- **Both timelines have start dates/deadlines in August**
  - Capacity Accreditation – Participation Model Elections – **8/1**, Preliminary CARCs **9/30**, Final CARCs assignments ~ **11/30 – 3/1**
    - Tariff does not currently allow final CARC assignments to be revised past the deadline
  - GFER – Administered at the end of August (NYISO Discretion)
    - The NYISO generally leaves the survey open for thirty days
    - The GFER annual survey does have the ability to be reopened beyond its completion date to incorporate updated information
      - Weekly survey can also be used to incorporate information
    - **GFER data gathered during the annual process still suffers from the timeline disconnect**
      - Data gathered in August of 2023 would set the accreditation value for the 2024/25 winter
      - However, moving the GFER deadline to August 1 to reconcile initial data gathering could be useful

# Potential Timeline Options

- **Include but not limited to:**

1. Modifications to Capacity Accreditation timeline to incorporate new information closer to and/or in the Winter Capability Period (Would Require Tariff Revisions)
  - Units would compare their expected firm status against the metrics used to classify units into CARCs, and as winter gets closer, would be required to provide information (via GFER or different mechanism) substantiating their fuel security as they do/do not procure firm arrangements.
  - The NYISO would then utilize the new information to adjust their CARC
    - **Ex post CARC adjustments would have implications for the RA modeling process**
2. Elections based on expectation of dual/firm fuel capability with penalties for failure to demonstrate
  - Units would make their elections in the same way as the previous method but would be subject to penalties if they are unable to meet the threshold in which they claimed to be capable of.
    - ISONE is looking to allow units to increase their accreditation value using Enhanced Energy Capability (EEC) which is backed by Non-commercial Financial Assurance (NCFA) which places capital at risk until the new capability is demonstrated
    - This or a similar construct applied to the NYISO capacity market would allow units to make elections in line with the Capacity Accreditation timeline and improve their firm capacity rating

# Potential Timeline Options Cont'd

- **Both options could use a historic look-back to see how much firm capacity resources have procured in past winters as an aid in placing units into CARCs**
  - This would give the NYISO a reasonable expectation as to whether units will be available during periods of gas scarcity
  - Strengthens the incentive to procure firm fuel arrangements and report information back to the NYISO
- **Important Consideration: Moving to a seasonal accreditation structure could alleviate some of the difficulty in aligning accreditation timelines with those of fuel procurement**

# Next Steps



# Next Steps

- Return to a late June/early July ICAPWG to continue the discussion with stakeholders.
- For any questions or feedback please email [ntubbs@nyiso.com](mailto:ntubbs@nyiso.com)

# Appendix

# 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