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Independent System Operator

# Modeling Improvements for Capacity Accreditation: Project Kick Off

Zach T. Smith, Manager, Capacity Market Design

## Installed Capacity Subcommittee Meeting #273

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# Agenda

- Background
- Scope
- Updated Capacity Accreditation Long Term Plan
- NYSRC Coordination
- Schedule
- Next Steps

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# Background



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# Background

- As part of the 2022 Improving Capacity Accreditation project, limitations 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 -- were identified including the modeling of and accounting for attributes, such as correlated fuel unavailability for non-renewable resources, long start up notification requirements, non-fuel-related correlated outages, etc.
  - Resolving these limitations will enable more accurate calculations of the Resource Adequacy requirements needed to maintain reliability and the Capacity Accreditation Factors, which will reflect the marginal reliability contributions of each Capacity Accreditation Resource Class
- The Modeling Improvements for Capacity Accreditation project deliverable is a Q4 Functional Requirements

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# Scope



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# Scope

- **The following areas of potential enhancements are within scope for this year's project:**
  - Correlated fuel unavailability for non-renewable resources (*i.e.*, gas constraints)
  - Long start up notification requirements
  - Modeling of Special Case Resources
  - Non-fuel-related correlated derates, as identified in the Market Monitoring Unit (MMU)'s Q3 2022 State of the Market report ("Q3 2022 SOM")[1]

[1]As presented at the 12/13/22 ICAPWG meeting

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# Gas Constraints

- **Natural gas constraints have not been captured in the IRM/LCR model to date**
- **This year's project will examine and recommend how to account for natural gas constraints in the availability of non-firm fuel resources in the IRM/LCR model by:**
  - Developing a methodology to identify and quantify natural gas constraints and identify resources impacted by those constraints
  - Developing a methodology to account for the impact of natural gas constraints in GE MARS

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# Start-Up Times

- **Start-up duration and notification requirements have not historically been, nor currently are, captured in the IRM/LCR model**
- **This year's project will examine if/how start-up requirements of non-baseload units should be accounted for in the IRM/LCR model by:**
  - Identifying if start-up requirements of non-baseload units impact the ability of those units to be called upon to serve load under conditions of high loss of load risk
    - If start-up requirements of non-baseload units are found to have an impact, the NYISO will evaluate and recommend how to incorporate that impact into the IRM/LCR model

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# SCR Modeling

- Special Case Resources (SCRs) have historically been, and currently are, modeled in the IRM/LCR model. However, the modeling of SCRs in the IRM/LCR model are not aligned with the expected performance and obligations of SCRs in the NYISO's market
- The following slide highlights differences in the modeling of SCRs in the IRM/LCR model compared to the expected performance and obligations of SCRs in the NYISO's market

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# SCR Modeling vs Expected Performance

- **IRM/LCR modeling**
  - SCRs are modeled as a step in the Emergency Operating Procedure (EOP)
    - GE MARS activates EOP steps if there is not enough capacity to supply load in the simulation
  - GE MARS does not consider certain market requirements such as advanced notice for SCRs
  - The SCR EOP is limited to a maximum of 5 activations per month
  - SCRs are modeled without output hour limitations and therefore can be available for the whole day
  - All SCRs in the NYISO are activated as part of the EOP
  - SCRs are modeled at a derated capacity based on zonal performance factors and zonal Average Coincident Load (ACL) to Customer Base Load (CBL) derates

- **Expected performance and obligations in the NYISO market**
  - Similar to an EOP, the NYISO activates SCRs only when the Day-Ahead Market indicates potential serious shortages of supply for the next day. (ICAP Manual Section 4.12.5)
  - The NYISO is required to provide SCRs with advanced notice at least 21-hours prior to activation
  - There is no maximum number of SCR activations per month in the NYISO market
  - When activated, SCRs have a minimum 4-hour performance obligation. SCRs are not expected to reduce load for the entire day
  - SCRs can be activated separately by LBMP zone
  - SCRs receive capacity payments based on the Aggregation's seasonal performance factor, which "recognizes over-performance by one SCR to compensate for underperformance by another SCR in the same SCR Aggregation in the same hour" (ICAP Manual Section 4.12.2)

# SCR Modeling

- This year's project will examine and recommend how to better reflect the expected performance and obligations of SCRs in the NYISO's market in the modeling of SCRs in the IRM/LCR study

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# Correlated Derates

- **In the IRM/LCR model, correlated derates of combined cycle and combustion turbines are imposed at various load levels that are close to or surpassing the 50-50 peak load forecast**
  - The correlated derates are intended to estimate the reduced capability of combined cycle and combustion turbines at temperatures above the Average Ambient Temperatures
    - Average Ambient Temperatures are used to temperature-adjust the DMNCs of combined cycle and combustion turbines for use in the capacity market. The Average Ambient Temperatures are calculated as the average of the ambient temperatures recorded at the time of the Transmission District's seasonal peak during the previous four like-Capability Periods
  - The various load levels serve as the proxy for different ambient temperatures in the model
- **This year's project will re-evaluate and recommend how to better capture the impact of correlated derates due to ambient conditions, such as air and water temperatures, as well as emergency only capacity (as identified in the in the Q3 2022 SOM) into the IRM/LCR model**

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# Updated Capacity Accreditation Long Term Plan



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# Capacity Accreditation Long Term Plan

- **The Capacity Accreditation project is expected to involve continuous model improvement and implementation over the next several years. The anticipated work scope includes: (Red notes a change from the previously presented 5-Year Plan[1])**
  - 2023
    - Implementation of Capacity Accreditation process and software
    - Research on Gas Constraints, start-up time, SCR modeling, and Correlated Outage issues identified in the Q3 2022 SOM presentation
  - 2024
    - Implementation of work associated with Gas Constraints, Start up time, SCR modeling, and Correlated Outage issues identified in the Q3 2022 SOM presentation
    - Research on Winter Reliability issues, unit size, and, if necessary, any remaining Correlated Outage issues beyond those identified in the Q3 2022 SOM presentation
  - 2025
    - Implementation of work associated with Winter Reliability Issues
    - Continue to investigate techniques to address unit size and, if necessary, any remaining Correlated Outage issues beyond those identified in the Q3 2022 SOM presentation
  - 2026
    - Implementation of unit size and, if necessary, any remaining Correlated Outage issues
    - Research on alignment of load and resource output profiles

[1]As presented at the 10/19/22 ICAPWG meeting

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# NYSRC Coordination



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# NYSRC Coordination

- The NYISO recognizes that the Installed Capacity Subcommittee will also be researching and evaluating modeling improvements related to gas constraints and EOPs this year
- The NYISO will coordinate its work on gas constraints and SCR modeling, conducted as part of the Modeling Improvements project, with the NYSRC's whitepaper efforts

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# Schedule



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# Schedule

- **Q1-Q2**
  - Analysis of areas of potential needed enhancement
- **Q2-Q3**
  - Identification of solutions for areas of needed enhancement
- **Q3-Q4**
  - Prototyping of preferred solutions for areas of needed enhancement
  - Recommendation of market and/or modeling changes to implement the preferred solutions

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# Next Steps



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# Next Steps

- The NYISO plans to return to the ICAPWG in February to discuss gas constraints, SCR modeling, and correlated derate issues, as identified in the Q3 2022 SOM

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# 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

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