

# Evolving Resource Adequacy Models: Min-Max Operating Temperatures

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# Agenda

- **Background**
- **Min-Max Operating Temperature Submittals**
- **Current NYISO Modeling Practices**
- **Next Steps**

# Background

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- **Load uncertainty is incorporated in the base case of the IRM model by using Bins that measure load response to a probabilistic distribution of seasonal peak-producing temperatures**
- **Upper Bins (Bins 1-3) represent cases where the system experiences temperatures driving higher seasonal peak loads than the baseline forecast**
- **Multiple units are providing minimum and maximum operational temperature data that do not meet the temperature thresholds corresponding to the upper Bins**
  - This introduces risk to whether our system can adequately respond to loads driven by these temperatures

# Project Scope

- **As part of this project, the NYISO plans to:**
  1. Understand how generators derive their minimum and maximum operational temperature data
  2. Understand current NYISO modeling practices for extreme temperatures
  3. Measure the installed capacity at risk of being unavailable during extreme bin contingencies due to operational temperature limitations
  4. Identify potential modeling improvements

# Today's Objective

- As part of this project, the NYISO plans to:
  1. Understand how generators derive their minimum and maximum operational temperature data
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# Min-Max Operating Temperature Submittals

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- **Section 3.3 of the Transmission and Dispatch Manual requires ICAP suppliers to complete an annual Generator Fuel and Emissions Reporting (GFER) survey<sup>1</sup>**
- **As part of this survey, Generation Owners are required to submit minimum and maximum operating temperatures<sup>2</sup>**
  - There is no standard method for deriving maximum operating temperatures, but there is a standard method for deriving minimum operating temperatures

1. [Transmission and Dispatch Operations Manual](#)  
2. [GFER User's Guide](#)



# Minimum Operating Temperature Submittals

- **In compliance with NERC Standard EOP-011-2<sup>1</sup>, Generation Owners are required to submit minimum operating temperatures that reflect either:**
  1. A minimum design temperature
  2. A minimum historical operating temperature
  3. A minimum operating temperature determined by an engineering analysis
- **These guidelines became effective on April 1, 2023**
- **The NERC guidelines were created to enhance reliability by providing more awareness of unit limitations during cold weather events<sup>2</sup>**
  - In reference to FERC's report, *The South Central United States Cold Weather Bulk Electric System Event of January 17, 2018*<sup>3</sup>

1. [EOP-011-2](#)
2. [Cold Weather Project 2019-06](#)
3. [FERC Report](#)

# Current NYISO Modeling Practices

# Current NYISO Modeling Practices

- **The Capacity Model used for the IRM study accounts for the impact of ambient temperatures on the output of thermal units**
  - Uses temperature correction curves provided by units to estimate their output based on temperatures ranging from 60F to over 100F<sup>1</sup>
  - Captures the reduction in output for units operating at temperatures above DMNC test temperatures
  - MARS derates unit capacities based on area loads as a proxy for ambient temperatures

1. [2024 IRM Report-Appendix A](#)

# Current NYISO Modeling Practices (cont'd)

## ■ Thermal Units

- The ambient temperature correction curves cover a limited temperature range that may not capture resource-specific limitations outside of that range

## ■ Non-Thermal Units

- The Capacity Model does not include temperature curves or account for the impact of ambient air temperature for non-thermal units

# Next Steps

# Evaluation of Extreme Temperatures on Installed Capacity

- **The NYISO's evaluation will:**
  - Compare min-max operational temperatures with extreme bin temperature thresholds
  - Quantify the potential capacity losses during extreme bin contingencies
  - Classify losses by participation model and zone
- **Planning to present results to the ICAPWG on April 2<sup>nd</sup>**

# Additional Next Steps – 2024 Q2

- Identify and evaluate areas of potential modeling enhancement
- Begin conducting modeling tests

# Previous Discussions



# Previous Discussions

Date	Working Group	Discussion Points and Links to Materials
February 7, 2024	ICAPWG	Evolving Resource Adequacy Project Kick Off: <a href="https://www.nyiso.com/documents/20142/42807168/Evolving%20Resource%20Adequacy%20Models%20Kick%20off%20v1.pdf/1c028164-74dc-cf39-d6d4-0873ea3367b3">https://www.nyiso.com/documents/20142/42807168/Evolving%20Resource%20Adequacy%20Models%20Kick%20off%20v1.pdf/1c028164-74dc-cf39-d6d4-0873ea3367b3</a>

# 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

# Questions?