

Modeling Improvements for Capacity Accreditation: Correlated Derates

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Agenda

- Review
- Ambient Adjustments
- Emergency Capacity
- Next Steps

Previous Discussions

Date	Working Group	Discussion Points and Links to Materials
January 23, 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	Modeling Improvements for Capacity Accreditation: Correlated Derates https://www.nyiso.com/documents/20142/36499713/Correlated_Derates_MIWG_022823_FINAL.pdf/35eaab46-740e-aed0-9e2d-2207c06a0659
May 8, 2023	ICAPWG	Modeling Improvements for Capacity Accreditation: Correlated Derates https://www.nyiso.com/documents/20142/37431277/5%20Correlated_Derates_ICAPWG_050823.pdf/a1e9a0f4-d922-503d-06d0-682b49c46c4c

Ambient Adjustments

Review

- **Currently, DMNC tests on internal combustion, combustion units and combined cycle units must be temperature adjusted**
 - The Average Ambient Temperature used for the temperature adjustment is the average of the ambient temperatures recorded at the time of the Transmission District's seasonal peak during the previous four like-Capability Periods
 - These units correct their DMNC test MW value to a curve, usually reducing the amount of capacity that can be sold
- **The MMU has noted a “significant amount” of ICAP from fossil-fuel and nuclear generators is qualified but functionally unavailable due to ambient conditions and recommends more units be temperature adjusted**
- **This project considers methodologies to calculate seasonal capacity ratings that are adjusted for ambient water, air temperature and humidity conditions for affected generators**

Proposed Ambient Adjustment Process

- **Develop a questionnaire for thermal generators to describe their cooling systems**
 - For reference, a public database of generator cooling systems can be found here: [Form EIA-860 detailed data with previous form data \(EIA-860A/860B\)](#)
- **Thermal generators to be categorized based on their responses**
 1. Air Temperature Adjusted (as currently done for CTs and CCs)
 2. Air Temperature and Humidity Adjusted
 3. Water Temperature Adjusted*
- **Based on the category, each generator would then provide an output curve, and adjust their DMNC to expected ambient conditions at the time of system peak**
 - **Once-through water cooled units to be provided an alternate adjustment method, as described in the following slides**

* Initially proposed as “Air and Water Temperature Adjusted.” Additional analysis showed no statistically significant effect of air temperature on the power output of once-through water cooled generators.

Ambient Water Adjustments

- **NYISO collects extensive air temperature and humidity data for NYCA**
 - [Load Data - NYISO](#)
- **NYISO does not collect water temperature data, and public sources are limited**
- **Even if public water temperature data were available, ambient adjustment for water-cooled units is specific and can be affected by a variety of factors, including:**
 - Condenser type and operator actions
 - Low-pressure turbine load
 - Intake water depth and tides
 - DEC permit restrictions (SPDES)
- **NYISO proposing two options for compliance for these units**

Ambient Water Adjustment Option 1

- **Unit operators to provide ambient water temperature output curves and inlet water temperatures**
 - Units would report inlet water temperature during DMNC test and adjust seasonal capability to an inlet water temperature reference point for the peak day
 - A minimum of 5-years of water inlet temperatures during past seasonal rating periods must be provided for benchmarking
- **Follows methodology defined in NYISO ICAP Manual, Attachment M**

Ambient Water Adjustment Option 2

- Valid testing for summer capability season can occur without the need to provide curves and inlet water temperatures for adjustments when testing during peak load hours from July through August
- Actual operation during the July-August testing period may substitute for DMNC test data, provided it is submitted in an acceptable format

Updating Procedure to Weather Adjust DMNC Test Data

- **Current methodology averages the ambient temperatures recorded at the time of the Transmission District's seasonal peak for four like Capability Periods**
 - Ambient adjustments based on observed conditions may not be consistent with design criteria conditions
- **Proposal for air temperature and humidity-dependent units is to adjust DMNC MW to a reference point based on the temperature and humidity used for the ICAP forecast**
 - NYISO Demand Forecasting utilizes a Cumulative Temperature and Humidity Index (CTHI) for ICAP forecast. Proposing to use the components of the CTHI to ambient adjust thermal units

Capacity Limited Resources (“CLR’s”)

Review

■ MMU Recommendation #2021-4

- NYISO currently overestimates the installed capacity of certain generators. This includes resources with emergency capacity that is virtually never committed in practice
- Recommends developing procedures to more accurately determine the ICAP of units with functionally unavailable capacity

■ A portion of the “Emergency Capacity” that is functionally unavailable as identified by MMU is from Capacity Limited Resources

- Approximately 150 MW of emergency capacity above normal capacity, but varies depending upon day, season and year

ICAP Manual: Attachment M

- **A Capacity Limited Resource (CLR) is an energy supplier that is able to take extraordinary measures to reliably increase its output above its UOL_N and has sold UCAP based on taking those extraordinary measures**
 - To register as a CLR unit, the unit operator must describe the operational or plant configuration changes that can be taken to increase output. Examples of a CLR include, but are not limited to, a steam plant that has the ability to remove its top feedwater heater from service
 - The UOL_E submitted for the CLR resource must be: (i) greater than or equal to that of UOL_N in both the DA and RT offer; (ii) achievable at the request of the NYISO under extraordinary conditions; and (iii) in the DA offer, equal to or greater than the unit's ICAP obligation.

NYISO Recommendation

- **Sunset the Capacity Limited Resources provision in the Tariff**
 - 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
- **NYISO is examining the remaining portion of the “Emergency Capacity” identified by MMU and will clarify the relevant impact to the ICAP Markets**

Next Steps

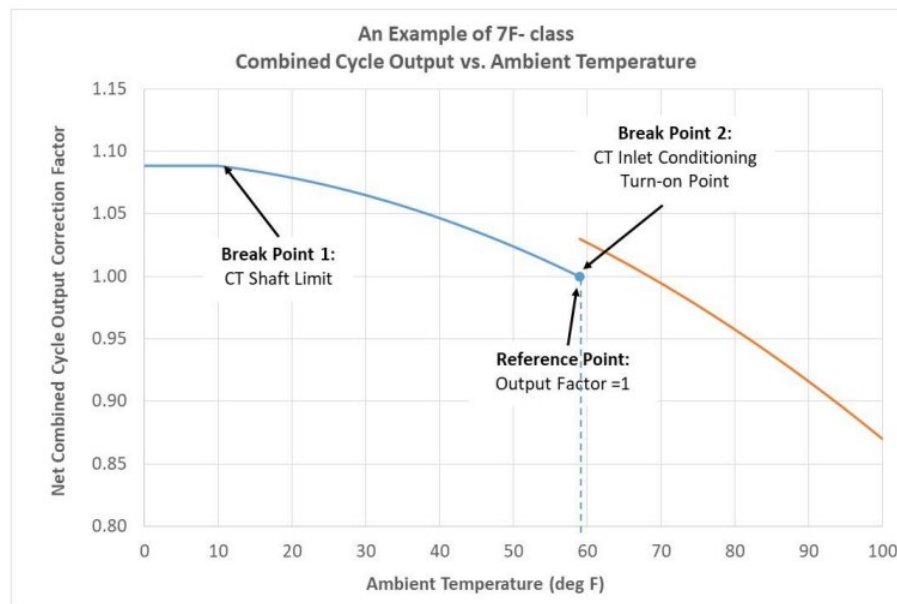
Next Steps

- Requesting feedback from Market Participants on temperature adjustment methodology
- Requesting feedback from CLR owners on sunseting the program
- NYISO to further develop:
 - Methodology for setting output adjustment reference points (ambient)
 - Proposed changes to Tariff and Attachment M of ICAP Manual
 - Additional analysis on emergency capacity
- Targeting August to report additional analysis back to stakeholders

Appendix

Ambient Temperature Adjustment

- Break points lead to multiple output factor equations in expressing the relationship between output ratio and the ambient temperature over the full ambient temperature range



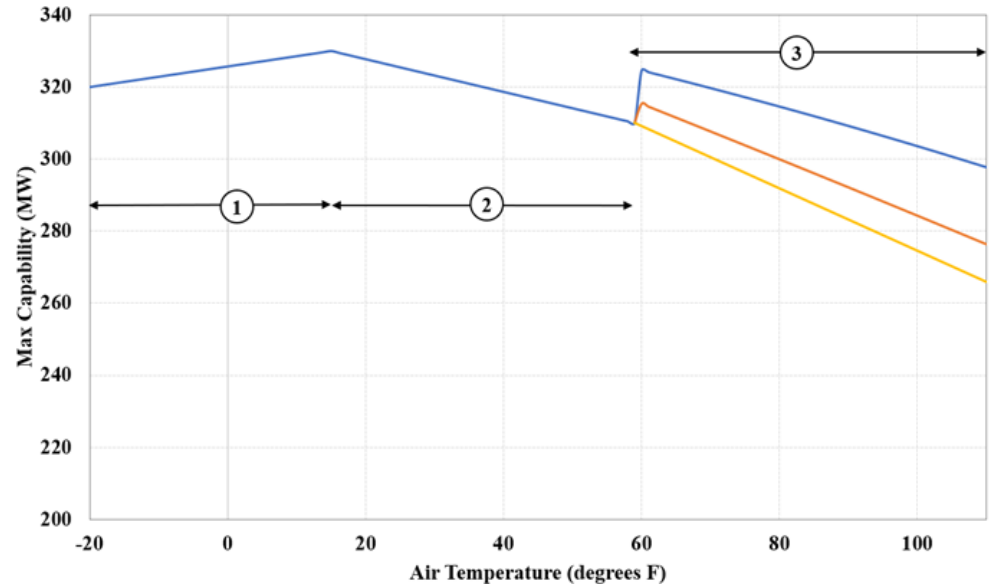
Source: NYISO ICAP Manual, Attachment M

Temperature and Humidity Curve

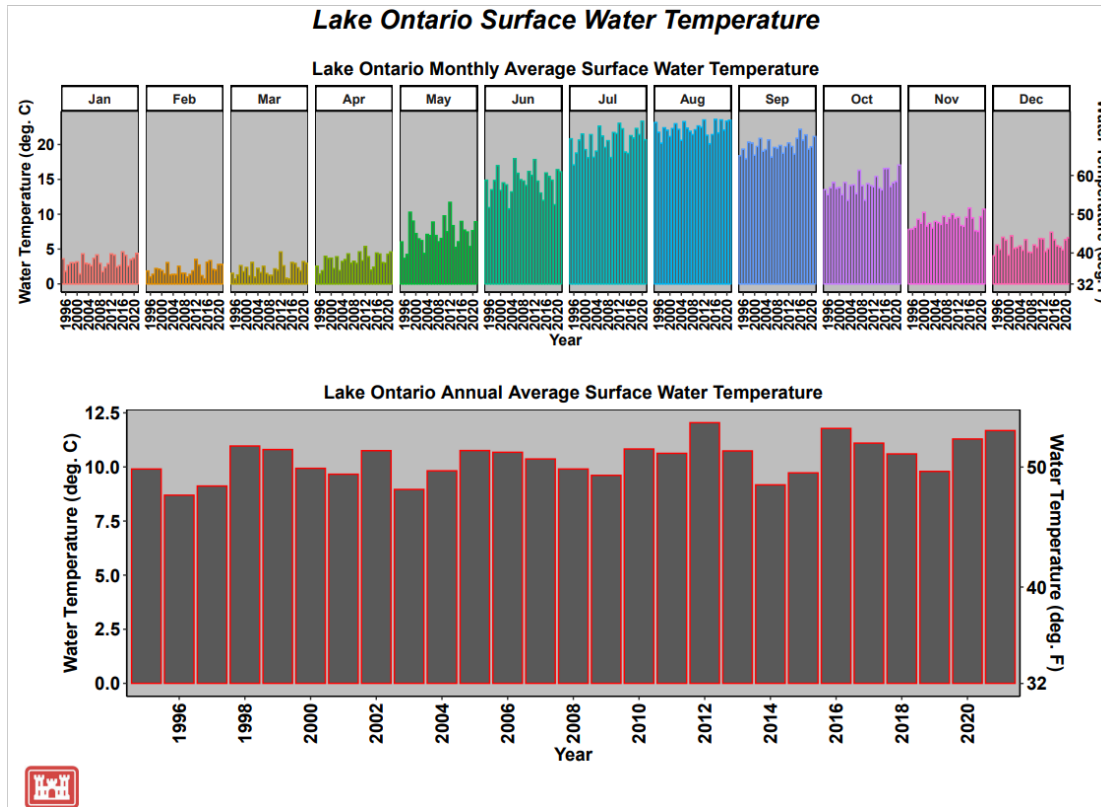
- In this example the unit's output is adjusted as function of both air temperature and relative humidity (RH). In area 3 of the curve the unit turns on an evaporative inlet cooler to boost output. The three curves represent output at 20% RH, 60% RH and with the inlet cooler turned off.

(Curve provided by MMU)

Capability Curves for Air Temperature & Relative Humidity dependent units



Example: Monthly Water Temperature



R Graphics
Output
(army.mil)



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