New York ISO
Independent System Operator

# Modelling Improvements for Capacity Accreditation: Start-up Time

Zach T. Smith, Manager, Capacity Market Design

## ICAPWG

July 27, 2023

# Agenda

- Background
- Generators with Long start-up time
- Considerations
- Recommendation
- Next Steps

New York ISO

# Background

# 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

New York ISO

# Background: Start-up Times

- Startup time is defined as the amount of time required to ramp from offline state to lower operating limit (LOL)/min. generation
- Startup time for a given unit may vary based on how long the unit has been offline. This analysis displays the greatest possible startup time
- Inflexible units such as steam turbines with long startup lead times may provide less reliability value than more flexible units, because they may be unable to start in time when needed

New York ISO

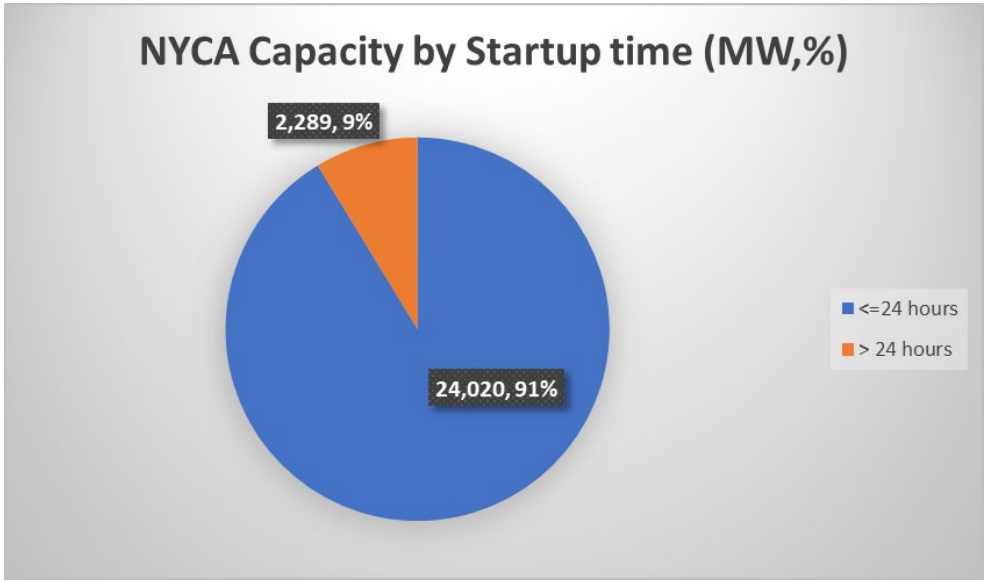
# Background: Start-up Times & Resource Adequacy

- **Start-up duration and notification requirements have not historically been, nor currently are, captured in the IRM/LCR model**
- **However, MARS treats these units as if they are always available if not in an outage state. Hence, capacity value of these resources may be overvalued as net load uncertainty increases due to rising deployment of intermittent resources and variable load**
- **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

New York ISO

# Generators with Long start-up time

# Generators with Long Startup Time




*Non-flexible units, such as Nuclear and Intermittent Power Resources were excluded from the analysis

New York ISO

# Considerations

# Considerations

- Provide efficient incentives to investors to decide whether to retire a resource by aligning its capacity payments with resource's reliability impact
- MARS is not designated to consider unit commitment separately from dispatch. Hence, MARS cannot accurately estimate reliability value of inflexible units such as generators with long startup notification times

New York ISO

# Considerations

- The 8-hour Peak Load Window for the Summer Capability Period is HB 12 through HB 19. During a peak-load window, all resources not in an outage should be available for being called upon.
- Resources with start-time greater than 24 hours cannot be scheduled for a noon start on the following day since DAM Schedules and LBMP posted by 11 a.m.

New York ISO

# Considerations

- Units with startup time under 24 hours are not a resource adequacy concern as NYISO has operating and dispatch control on those units in that 24 hour-window. There is no need to differentiate between those resources, in the capacity market, based on their start time.

New York ISO

# Recommendation

# Recommendation

- Our recommendation is to not explicitly include start up notification time for resource adequacy.
- Instead require all ICAP suppliers to commit to reach lower operating limit (LOL)/min. generation with no more than 24 hours notice during forecasted peak load events i.e., days when demand* is equal to or greater than 90%# of forecasted seasonal ICAP peak.

*according to 2-day ahead baseline (50-50) forecast

# NYISO is still evaluating the appropriate threshold

New York ISO

# Forecasted peak load events*

| Year | Number of days | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NYCA | | G-J | | NYC | | LI | |
| | Summer | Winter | Summer | Winter | Summer | Winter | Summer | Winter |
| 2018 | 5 | 9 | 1 | 21 | 1 | 24 | 4 | 6 |
| 2019 | 4 | 0 | 0 | 16 | 1 | 21 | 5 | 5 |
| 2020 | 4 | 0 | 1 | 0 | 0 | 0 | 12 | 0 |
| 2021 | 5 | 1 | 3 | 1 | 2 | 0 | 9 | 0 |
| 2022 | 3 | 6 | 4 | 6 | 4 | 3 | 11 | 9 |

* days when demand is equal to or greater than 90% of forecasted seasonal ICAP peak

New York ISO

# Forecasted Seasonal Peak load

Seasonal peak load (2018-2022)

| Locality | Capability Period | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Winter 2017-18 | Summer 2018 | Winter 2018-19 | Summer 2019 | Winter 2019-20 | Summer 2020 | Winter 2020-21 | Summer 2021 | Winter 2021-22 | Summer 2022 | Winter 2022-23 |
| NYCA | 24,365 | 32,903 | 24,269 | 32,383 | 24,123 | 32,296 | 24,130 | 32,330 | 24,025 | 31,766 | 23,893 |
| G-J | 10,662 | 15,918 | 10,427 | 15,883 | 10,464 | 15,695 | 10,503 | 15,411 | 10,494 | 15,125 | 10,251 |
| NYC | 7,704 | 11,539 | 7,526 | 11,607 | 7,606 | 11,477 | 7,621 | 11,199 | 7,610 | 10,906 | 7,422 |
| LI | 3,440 | 5,376 | 3,362 | 5,240 | 3,365 | 5,228 | 3,393 | 5,249 | 3,270 | 5,138 | 3,180 |

90% of Seasonal peak load (2018-2022)

| Locality | Capability Period | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Winter 2017-18 | Summer 2018 | Winter 2018-19 | Summer 2019 | Winter 2019-20 | Summer 2020 | Winter 2020-21 | Summer 2021 | Winter 2021-22 | Summer 2022 | Winter 2022-23 |
| NYCA | 21,929 | 29,612 | 21,842 | 29,145 | 21,711 | 29,066 | 21,717 | 29,097 | 21,623 | 28,589 | 21,504 |
| G-J | 9,596 | 14,326 | 9,384 | 14,295 | 9,418 | 14,126 | 9,453 | 13,870 | 9,445 | 13,613 | 9,226 |
| NYC | 6,934 | 10,385 | 6,773 | 10,446 | 6,845 | 10,329 | 6,859 | 10,079 | 6,849 | 9,815 | 6,680 |
| LI | 3,096 | 4,838 | 3,026 | 4,716 | 3,029 | 4,705 | 3,054 | 4,724 | 2,943 | 4,624 | 2,862 |

# Next steps

# Next steps

- Return to an August ICAPWG to continue discussions

New York ISO

# Questions?

# 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

New York ISO