New York ISO
Independent System Operator

Modelling Improvements for Capacity Accreditation: Start-up Time

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Agenda

- Background
- Existing Upward-Flexible Fleet Startup Times
- Approach of other ISOs to use start-up times for Capacity Accreditation
- Open Questions
- Consideration
- Appendix

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Background

Background

- As part of the 2022 Improving Capacity Accreditation project, certain resource operating features and limitations not modeled 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

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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

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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

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Existing Upward-Flexible Fleet Startup Times

Existing Fleet Startup Times

- This table shows the approximate amount of ICAP available in different start-up time segments
  - This analysis excluded Intermittent Power Resources, LCROR Hydro, and Nuclear units

Approximate Existing Summer DMNC MW by Startup Time

Startup Time	Incremental MW	Total MW
<= 30 minutes	12,600	12,600
30 min- 1 hour	1,400	14,000
1- 2 hours	1,800	15,800
2 - 4 hours	2,200	18,000
4 – 8 hours	1,200	19,200
8 - 16 hours	4,900	24,100
16 - 24 hours	3,800	27,900
> 24 hours	2,000	29,900

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Approach of other ISOs to use start-up times for Capacity Accreditation

Approach of other ISOs to use start-up times for Capacity Accreditation

MISO: For any hour, where the sum of the Resource's Start-Up Time and Start-Up Notification Time Offers exceeds 24 hours, the Resource's Resource Adequacy credits are set to zero

PJM: Units should have a startup notification time of less than 6 days. Once the units are alerted, their startup time should be no more than 48 hours

ISO-NE: Long start-up times prevent resources from showing up for the grid when New England needs them most. So, they are working to incorporate startup times to alter capacity accreditation

Details in Appendix

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Open Questions

Open Questions

- Is long start-up notification time a resource adequacy issue or an operations/energy market issue?
- What types of uncertainties are we looking to reduce by incorporating start-up times for capacity accreditation?
- Should start up time be explicitly accounted for in MARS, handled outside of MARS as an input derate, or handled through other mechanisms, such as qualifications for eligibility to sell capacity?

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Consideration

Consideration

- **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**
  - Adding functionality to MARS to support this is likely to be a large, costly effort with a multi-year implementation

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Questions?

Appendix

MISO[1]

Seasonal Accredited Capacity Calculation:

- Annual Average Offered Capacity (AAOC) will be determined for each Resource and utilized in the Seasonal Accredited Capacity calculation as applicable
- The AAOC for a Resource is calculated by averaging Hourly Emergency Maximum Limit, or Targeted Demand Reduction Level, during the Annual RA Hours identified for each 12-month period within the three (3) most recent periods beginning September 1st and ending August 31st
- For any Annual RA Hour where a Resource is offline and the sum of the Resource's Start-Up Time and Start-Up Notification Time Offers exceeds 24 hours, the Resource's Hourly Emergency Maximum Limit, or Targeted Demand Reduction Level, will be set to zero (0)

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PJM[2]

Unit Startup Notification:

- The purpose of the Unit Startup Notification procedure is to place units in a state of readiness so they can be brought online within 48 hours for an anticipated shortage of operating capacity, stability issues or constrained operations for future periods
- Alerted unit(s) must be in the state of readiness (i.e., able to be online within 48 hours) in the lesser of (submitted notification time + startup time or 6 days) minus 48 hours
- After reaching the state of readiness, if PJM subsequently calls the unit(s) to come online, the unit must be online within 48 hours. Failure to do so will result in a forced outage. PJM will evaluate system conditions daily to determine when to release unit(s) from the state of readiness or call units to come online

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ISO-NE [3]

- On average, the seven coal, oil, and biomass units included in the report took between seven to 23 hours to start up. Merrimack Station in New Hampshire, New England's largest remaining coal plant, took between 12 to 14 hours to start
- Long start-up times prevent resources from showing up for the grid when New England needs them most
- On December 24, 2022, ISO-NE had just a few hours to prepare for an unpredicted energy shortage caused by Winter Storm Elliot. That day, 8,500 MW of available generation sat on the sidelines unable to start up in time to alleviate the energy strain
- Failing to consider a unit's ability to respond rapidly to emergencies favors polluting fossil fuel plants and disadvantages reliable, clean energy sources like battery storage

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References

[1] MISO. (2022). *MISO FERC Electric Tariff Seasonal Accredited Capacity Calculation-SCHEDULE 53*. MISO. Retrieved April 7, 2023, from https://www.bing.com/search?q=miso%2Bschedule%2B53&cvid=847dd9a55410487e907502f759eb579f&aqs=edge.0.0j69i11004.5845j0j1&pglt=2083&FORM=ANNAB1&PC=U531

[2] PJM. (2018). *PJM Manual 10*. PJM. Retrieved April 7, 2023, from https://www2.pjm.com/-/media/training/nerc-certifications/gen-exam-materials-feb-18-2019/manuals/pre-scheduling-operations.ashx

[3] Potomac Economics. (2022, June). *2021 ASSESSMENT OF THE ISO NEW ENGLAND ELECTRICITY MARKETS*. ISO-NE. Retrieved April 7, 2023, from https://www.iso-ne.com/static-assets/documents/2021/10/2022_awp_final_10_08_21.pdf

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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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