First Draft Assumptions of PJM Effective Load Carrying Capability Model

July, 2020

ELCC Assumptions

Load Modeling Assumptions

- Hourly load shapes based on weather years from period 2012 – 2018
- Weights for each weather year in period 2012 – 2018 derived from weather scenarios in 2020 PJM Load Forecast (see Load Modeling section for more details)
- Monthly load uncertainty based on 2020 PJM Load Forecast using multivariate normal distributions and 1,000 scenarios for each weather year (see Load Modeling section for more details)

Resource Modeling Assumptions

Thermal Resources (Capacity)

- Fleet based on 2019 Reserve Requirement Study (RRS)
- Performance metrics (EEFORd, Planned Outage Factor, Mean Time to Failure, Mean Time to Repair) based on GADS data from period 2015 – 2019
- Forced Outages modeled using Monte Carlo (see Resource Modeling section for more details) and 1,000 scenarios
- Planned Outages scheduled to levelize reserves throughout delivery year
- Ambient Derates consistent with 2019 RRS
- Winter Peak Week forced outages consistent with 2019 RRS

Thermal Resources (Energy)

- Not modeled

Intermittent Resources (Capacity)

- Deployment levels based on vendor forecast.
- Actual and putative hourly output shapes of existing resources during period 2012 – 2018.
- Putative hourly output shapes of planned resources during period 2012 – 2018.
- Curtailments of existing resources are captured to the extent they occurred in the period 2012 – 2018.

Limited Duration Resources (Capacity)

- Deployment levels based on vendor forecast and interconnection queue information.
- Hourly chronological dispatch (see Resource Modeling section), after available thermal and intermittent resource output has been accounted for, so that output (discharging) of resource is enough to prevent loss of load (if possible) in conjunction with full hourly amount of DR deployed.
- Charging is performed in an hourly chronological fashion avoiding triggering a DR call due to the additional load in the system.
- More capable resources (e.g., longer-duration Energy Storage Resources) are dispatched before less capable resources

Limited Duration Resources (Energy)

- Not modeled

Hybrid Resources (Capacity)

- Deployment levels based on vendor forecast and interconnection queue information
- Putative hourly output shapes used for intermittent portion of hybrid

Hybrid Resources (Energy)

- Not modeled

Demand Resources (Capacity, i.e., Load Management)

- Deployment levels based on 2020 PJM Load Forecast
- Hourly chronological dispatch, after thermal, intermittent and limited resources have been dispatched, respecting window of availability.

Demand Response (Energy, i.e., Economic Demand Response)

- Not modeled.

Loss of Load Expectation (LOLE) Calculation

Start by selecting a candidate 50/50 load (a candidate solved load, in RRS parlance). Use that 50/50 load to scale the load scenarios in each of the weather years.

For each scenario in each of the weather years, chronologically determine dispatch of limited duration resources (see Dispatch section for more details) and the hourly margin between available capacity and load. If the margin is less than 0, such hour has a Loss of Load event.

Tally the number of days with loss of load in each of the scenarios for each weather year.

Calculate the average number of days with loss of load for each weather year.

Combine the weights for each weather year and the average number of days with loss of load for each weather year (from previous step) by calculating the weighted sum. This is the LOLE value from using the candidate 50/50 load.

If the LOLE is greater than 0.1 days/year, reduce the value of the 50/50 load and repeat the steps above. If the LOLE is less than 0.1 days/year, increase the 50/50 load and repeat the steps above.

Iterate until the LOLE equals 0.1 days/year.