Preliminary ELCC Class Ratings for Period 2027/2028 through 2035/2036

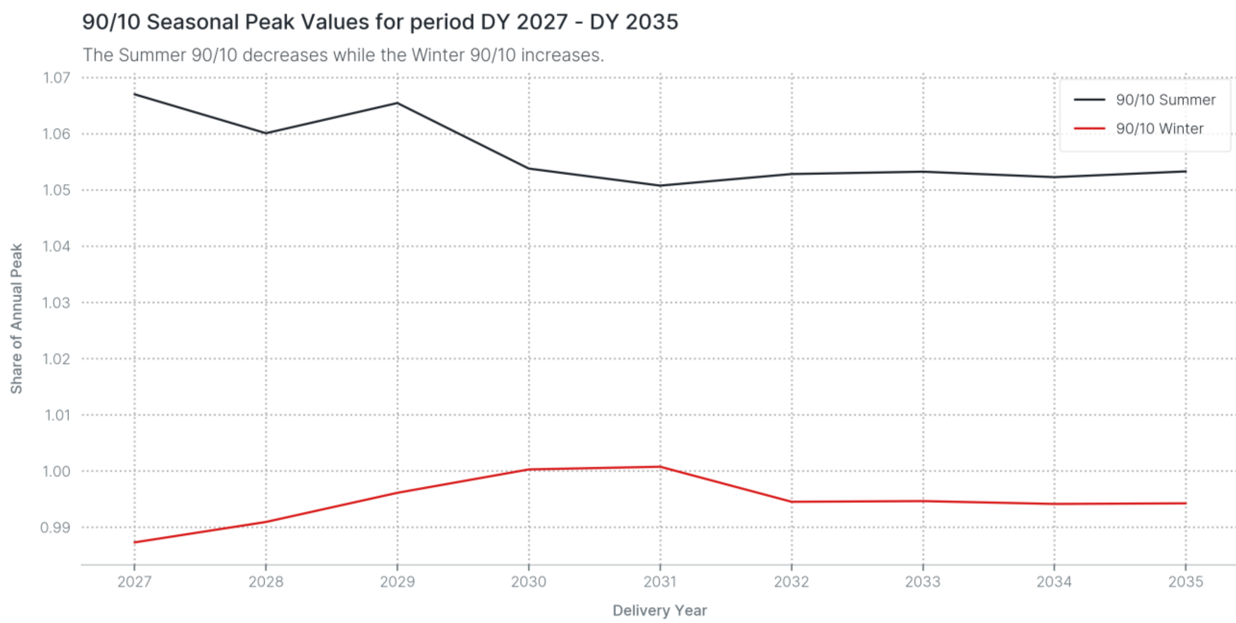
The analysis for all Delivery Years in the study period was performed by calibrating the system to meet PJM's LOLE criterion of 1 day in 10 years for the RTO, translated in annual terms as 0.1 days/year. This was accomplished by iteratively changing the solved annual peak load until the system in each Delivery Year meets an LOLE of 0.1 days/year, consistent with the Reserve Requirement Study.

Please note that the assumptions and projected resource portfolios used in this analysis and the resulting preliminary ELCC Class ratings will likely differ from the official results used in the auctions for such Delivery Years. This includes the 2027/28 Delivery Year where differences in inputs include the projected resource portfolio, which will be based on the existing fleet, retirement notices, and submission of NOIs (Notices of Intent to offer) from planned generation rather than the vendor forecast in the official run, as well as an updated estimate of Demand Resources winter performance shape.

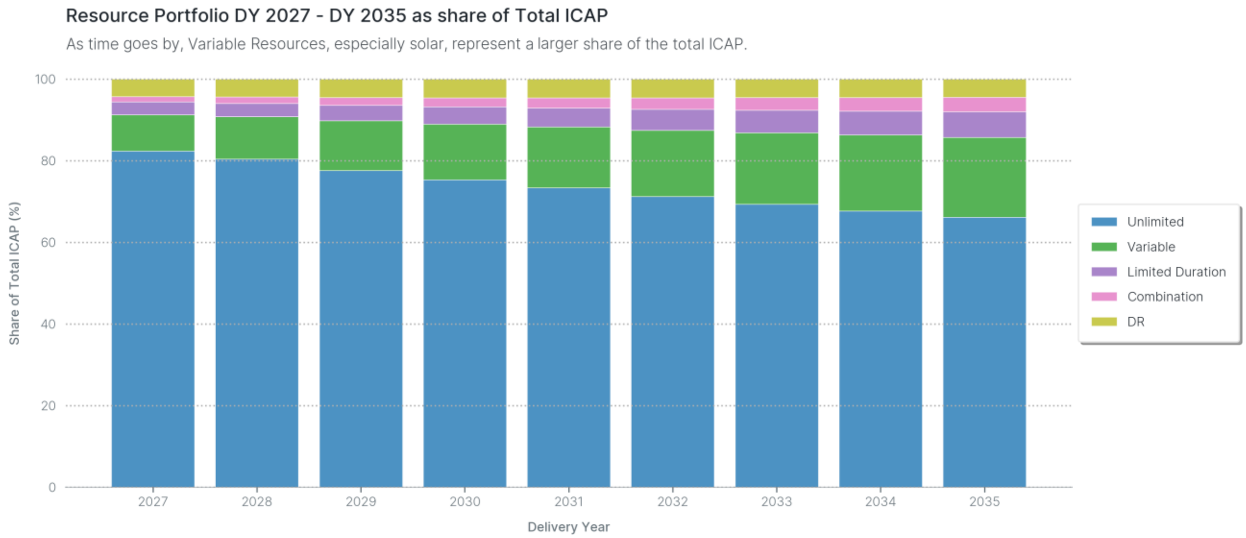
Inputs

To understand the published ELCC Class Ratings for the period 2027/2028 (DY 2027) through 2035/2036 (DY 2035), it is necessary to understand two of the key inputs that significantly impact the patterns of risk observed throughout the period.

a) Extreme seasonal peak values. The 2025 PJM Load Forecast includes increasing extreme winter loads and decreasing extreme summer loads, which result in upward pressure on winter risk for the PJM system. The graph below shows the 90/10 seasonal peak values for the period DY 2027 – DY 2035 as a share of the respective 50/50 annual peaks. For the winter values, there is an increasing trend between DY 2027 and DY 2031 while for the summer values there is a decreasing trend in the same period. The values for both seasons stabilize after DY 2031.

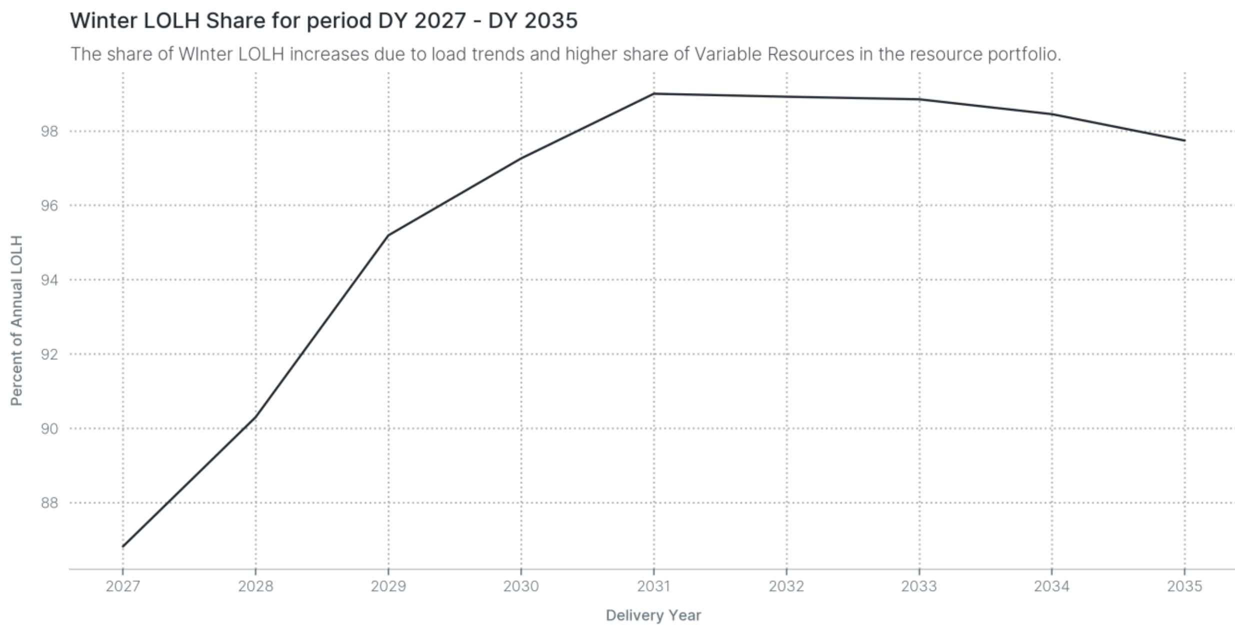


b) Resource Portfolios. The resource portfolio for each Delivery Year was developed using a forecast of resource additions and retirements produced by a vendor. The graph below shows that the ICAP share of Unlimited Resources decreases throughout the 10-yr period while the ICAP share of Variable Resources increases (the majority of the forecasted additions are solar resources). The gradual change in resource portfolio throughout the study period puts upward pressure on winter risk for the PJM system as Unlimited Resources retire and are replaced to a large extent by solar resources.



Outputs

The combination of the above two inputs in the analysis produces an increase in system risk as shown in the graph below. The winter LOLH share starts at about 85% in DY 2027, consistently increasing until DY 2031 where the winter LOLH reaches a level close to 99%. After DY 2031 the winter LOLH plateaus at 98%-99%.

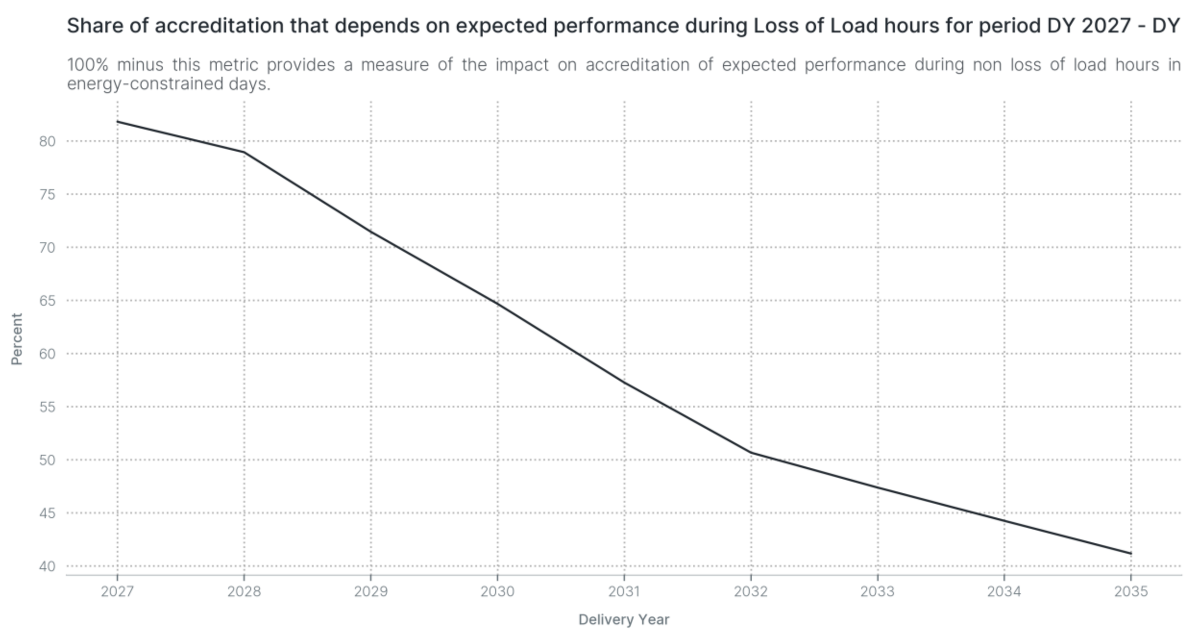


In addition to the trend of increasing winter risk observed for the study period, there is another trend that has an impact on some of the ELCC Class Ratings. The ELCC Class Ratings are calculated based on the EUE reduction that a marginal addition of each class produces compared to the **EUE reduction produced by a marginal addition of perfect capacity**. An analysis of the EUE reduction produced by the marginal addition of perfect capacity shows that the EUE reduction is caused by: i) perfect capacity output during loss of load hours and ii) perfect capacity output during certain non-loss of load hours.

- The EUE reduction due to perfect capacity output during loss of load hours is simple to understand: if there was a loss of load hour in the base 1 in 10 case and the amount of unserved energy in the hour was, say, 1,000 MW, then after adding 100 MW of perfect capacity in that hour, the new unserved energy in the hour will be 900 MW.

- The EUE reduction due to output during certain non-loss of load hours, on the other hand, is less straightforward to understand because the EUE reduction is generated by perfect capacity output during non-loss of load hours that enables other resources, specifically storage (via charging), to produce more output during loss of load hours. For example, when the model is simulating a multi-day polar vortex event, and storage is depleted by the end of the first day, if the load remains high overnight, storage will not be able to recharge, and will face the second day of the event depleted. After adding a marginal amount of perfect capacity during, say, 2am-5am, those perfect capacity MWs will enable the charging of storage resources, and now the storage resources will be able to produce non-zero MWs during the second day of the polar vortex event, reducing the overall system EUE.

The graph below shows the share of the EUE reduction due to the addition of perfect capacity that is triggered by output during loss of load hours. It can be observed that it starts very high at the beginning of the period (DY 2027 at more than 80%) while it gets reduced drastically as the system faces more winter risk and more energy-constrained days (in DY 2035 it is only 41%).



This graph is relevant to understand the decrease in ELCC Class Ratings for ELCC Classes that are not modeled as able to charge storage. In other words, the importance of enabling the charging of storage for accreditation purposes consistently increases as the system faces more winter risk and more energy-constrained events.

Another model output that is key to understand the changes in some of the ELCC Class Ratings is the historical resource performance patterns that drive the system risk in each Delivery Year of the study period. The two tables below show the top 5 historical performance patterns that drive system risk in DY 2027 (left-hand side table) and DY 2035 (right hand side table).

Historical Performance Pattern Day	LOLH Share in DY 2027
2014-01-07	35.1%
2022-12-24	23.1%
2014-01-08	7.0%
2022-12-25	4.3%
2022-12-23	3.4%

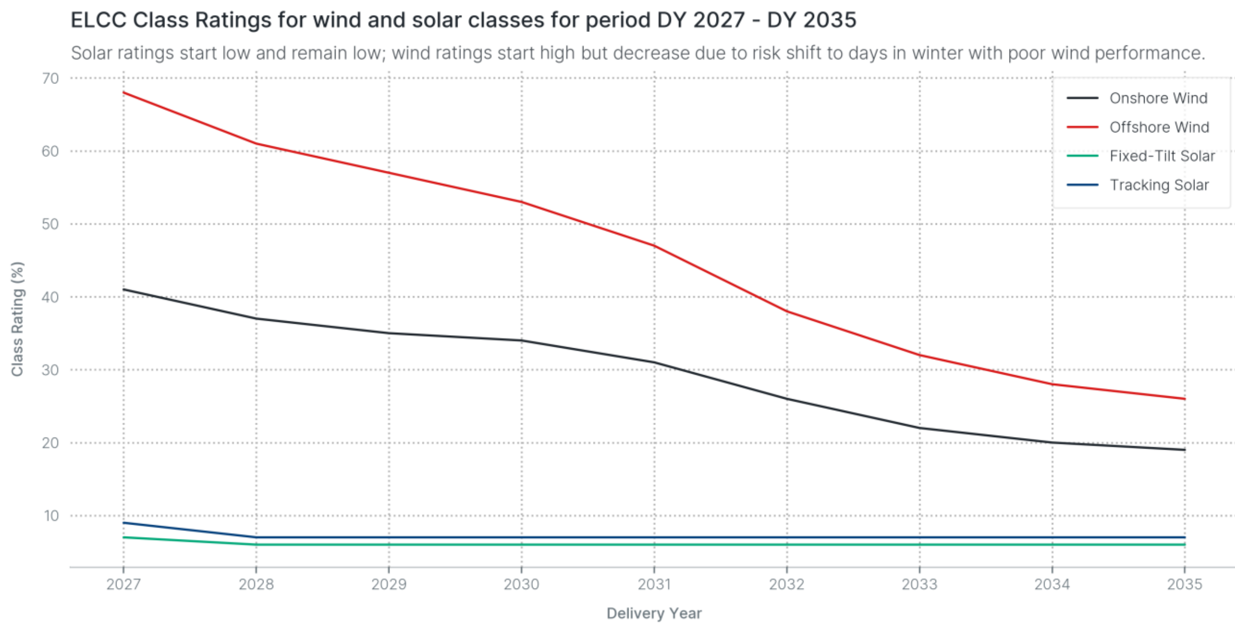
Historical Performance Pattern Day	LOLH Share in DY 2035
2022-12-26	34.0%
2014-01-08	25.2%
2014-01-07	14.5%
2019-01-31	5.8%
2014-01-22	5.3%

As the resource portfolio changes in the study period, the performance patterns that drive risk in the model also change. This occurs because classes that performed well (i.e. onshore wind) on 2014-01-07 did not perform as well on, say, 2014-01-08. As the wind share of ICAP increases in the resource portfolio, the historical performance pattern of 2014-01-07 will drive less risk in the model while the historical performance pattern of 2014-01-08 will drive more risk in the model. In other words, as wind makes up a larger share of the resource portfolio in the future, the types of events that winter risk is observed on the system tends to shift towards those days that see high correlated unavailability of the wind fleet.

ELCC Class Ratings

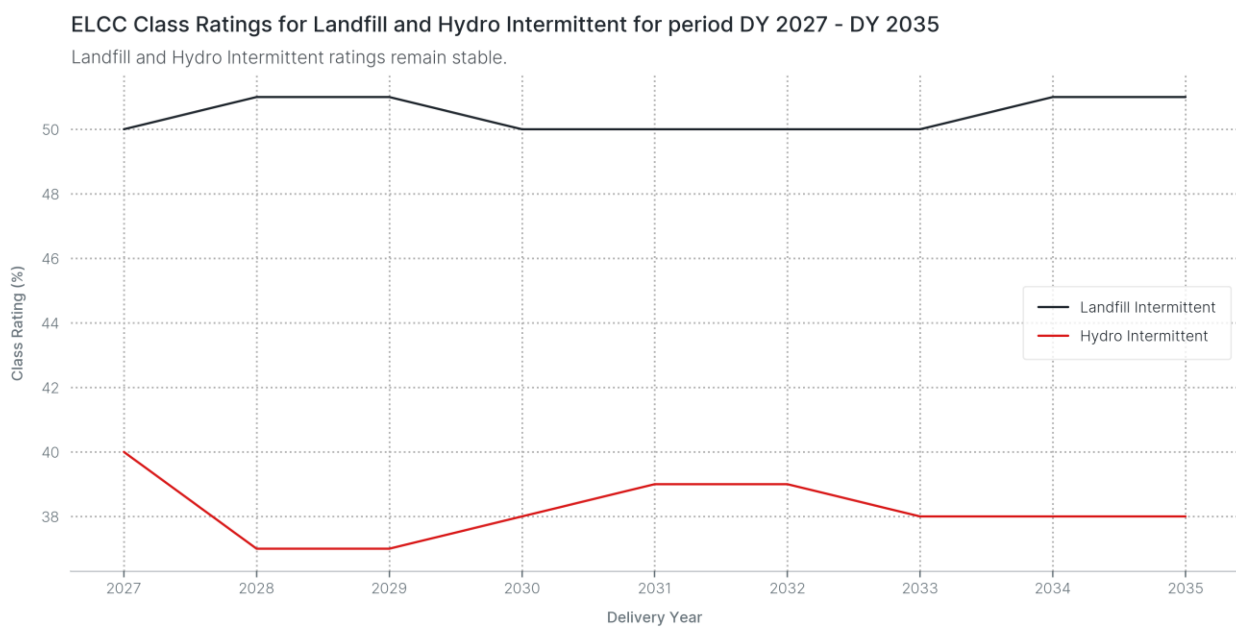
Wind and Solar Class Ratings:

- The ratings for the two solar classes remain stable at low values during the entire period due to the high level of winter risk
- The ratings for the two wind classes decrease significantly due to a gradual shift in winter historical performance patterns driving the winter risk in the model (as shown in the above tables)



Landfill Intermittent and Hydro Intermittent Class Ratings:

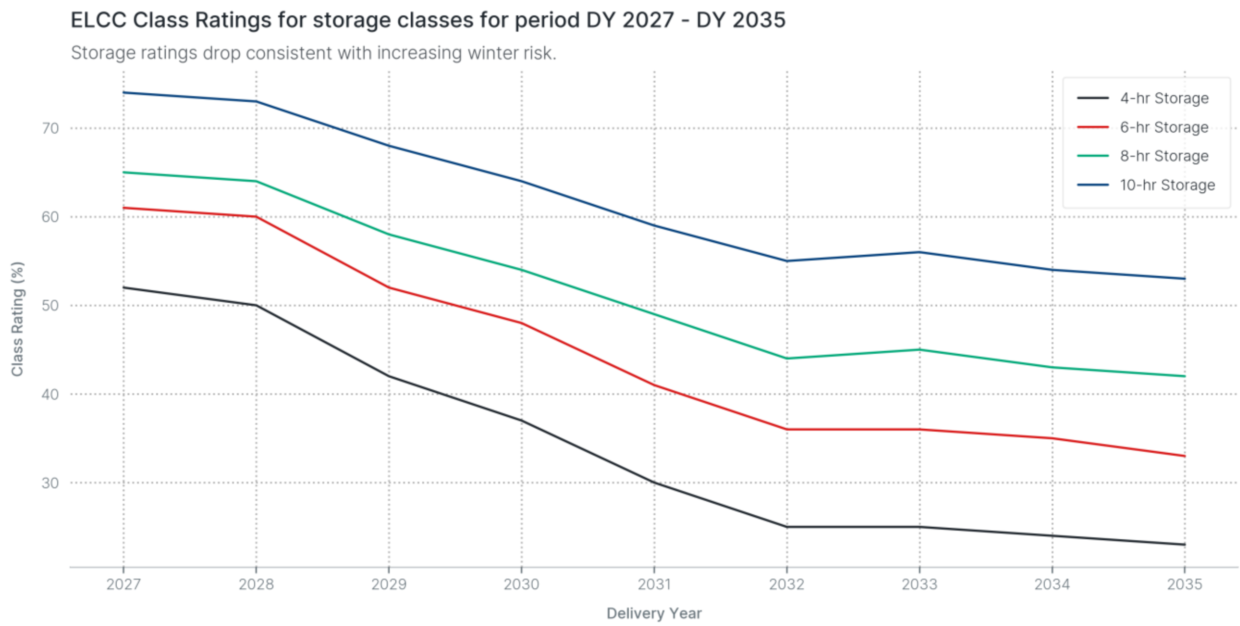
- The ratings for these two classes remain rather stable in the study period due to their output not being as volatile as that of other classes.



Storage Class Ratings:

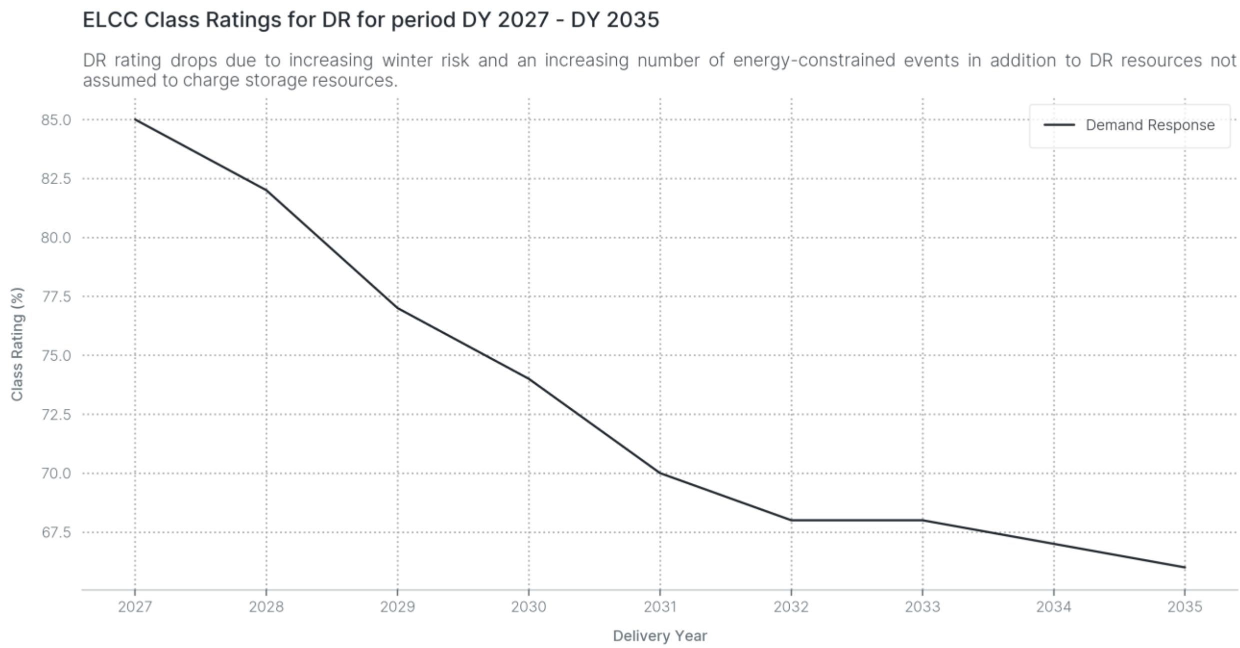
- The ratings for the storage classes drop consistently throughout the study period due to increasing winter risk. Winter risk periods tend to last multiple hours due to flat load shapes and the protracted duration of Unlimited Resources' forced outages under cold weather, which is not conducive to sustained good performance by storage resource for the entire duration of the risk events.

- In addition, storage resources cannot charge other storage resources during winter energy-constrained events in the model and, as shown in the graph at the bottom of page 3, the ability to charge storage towards the end of the study period becomes more important for accreditation purposes.



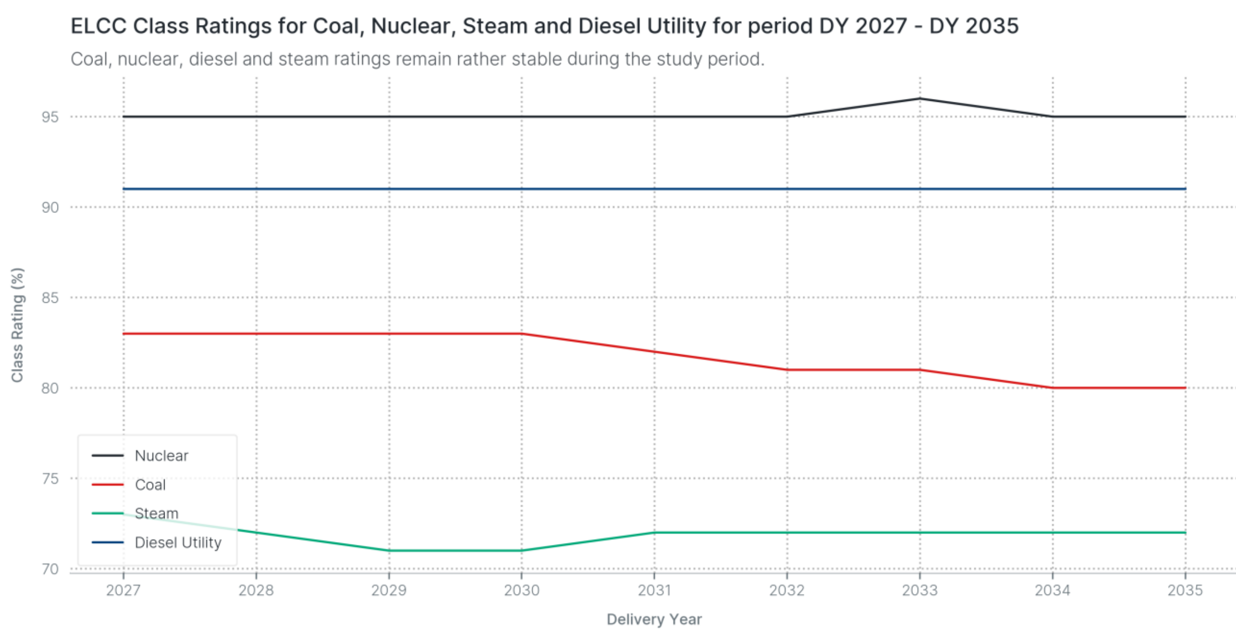
Demand Response Class Rating:

- The ratings for the storage classes drop consistently throughout the study period due to increasing winter risk. The reduction capability of DR in the winter period is assumed to be less than during the summer period.
- Similar to the storage case described above, DR resources are not assumed to be deployed to charge storage resources and, as shown in the graph at the bottom of page 3, the ability to charge storage towards the end of the study period becomes more important for accreditation purposes.
- Note that the values above for DY 2027 (and also for all other DYs) use the Demand Resources winter performance shape that was used in the 26/27 BRA ELCC run. For the official 27/28 BRA ELCC run, an updated Demand Resources winter performance shape will be used. The old and new DR winter performance shape can be found on slides 9 and 11 at https://www.pjm.com/-/media/DotCom/committees-groups/subcommittees/raas/2025/20250624/20250624-item-3---update-on-inputs-for-upcoming-fpr-elcc-run.pdf.



Nuclear, Coal, Steam and Diesel Utility Class Ratings:

- The ratings for these classes remain rather stable in the study period due to their winter output not being as volatile as that of other classes.



Gas Class Ratings

- Overall, the ratings for the gas classes see some increase (for Gas Combined Cycle and Gas Combustion Turbine Dual) and a larger increase (for Gas Combustion Turbine) due to a gradual shift in winter historical performance patterns driving the winter risk in the model. The performance patterns that drive the risk towards the end of the study period show slightly better gas performance than the performance patterns that drive the risk at the beginning of the study period.