



The operation of renewable and storage resources is different from that of traditional thermal generators typically powered by nuclear, coal, natural gas, fuel oil or other fuels. Renewables and storage have high operational flexibility but are unable to maintain output at a stated capacity on a consistent basis because either their supply of energy (sun, wind, water) varies or the resource becomes exhausted during the operating day (storage).

As more variable and limited-duration resources are incorporated into the grid, the method of gauging how much capacity the system needs to remain reliable must evolve to account for those resources.

### Measuring the Reliability of Renewable Resources

To recognize the unique operating characteristics and contributions of renewable and storage resources, PJM and its stakeholders adopted an approach called the Effective Load Carrying Capability (ELCC).

The ELCC method allows PJM to measure how much capacity may be provided by renewable and storage resources while ensuring resource adequacy.

PJM's ELCC method was accepted by the Federal Energy Regulatory Commission in July 2021.

### ELCC Goes Into Effect in the 2023/2024 Delivery Year

ELCC sets the capacity value of all renewables and storage resources that offer into the capacity market and went into effect for the 2023/2024 Delivery Year.

In general, a resource that contributes a significant level of capacity during high-risk hours (i.e., hours with very high electricity demand and low wind or solar output) will have a higher capacity value under ELCC than a resource that delivers the same capacity during low-risk hours. These risk hours may vary as the resource mix changes (e.g., more wind and solar is installed) and hours of high demand evolve (e.g., wide-scale electric car charging at night).

PJM's ELCC methodology also considers the simultaneous reliability contribution of all resources and recognizes both complementary and opposing interactions among resources expected to provide capacity in a given delivery year.

For example, increasing one intermittent resource alone, such as solar, leads to saturation, reducing the resource's capacity contribution. Solar paired with an energy storage resource, however, could have a higher combined contribution.

Aug. 4, 2022

#### Key Points

- Unlike renewables and storage, thermal generation can output at a stated capacity on an ongoing basis without interruption.
- Traditional models that gauge how much capacity should be awarded to a generator to ensure reliability are geared toward thermal resources.
- A system with increased variable resources will require new approaches to adequately assess the reliability value of each resource and the system as a whole.
- The Effective Load Carrying Capability (ELCC) approach allows PJM to gauge how much capacity it may accept from providers of renewables and storage resources while ensuring resource adequacy.
- ELCC was accepted by FERC in July 2021 and will start with the 2023/2024 Delivery Year.

