



FUEL FACTS: BATTERY STORAGE

Batteries are flexible energy resources that support a reliable, resilient, and affordable electrical grid.

Did You Know?

- There are many types of energy storage. The most common battery technologies in use include lithium, sodium-based, and lead-acid.
- Batteries can often serve as a back up to renewable energy sources to reduce the variability of their output.
- The duration of energy storage in batteries is increasing with technology. Current utility-scale batteries can store energy 4 to 5 hours.

WHAT IS BATTERY STORAGE?

Batteries are a form of energy storage and serve an important role to meet consumer's energy needs. Batteries can be used for many purposes including grid voltage support to enhance resilience or preserve reliability, as a transmission asset. Also, batteries can be used as a capacity resource that supplies energy directly to the grid.

Batteries are more agile and have a fast response time and can be located much closer to demand centers. Whereas most electricity is used as it's generated, battery technology allow utility-scale batteries to store electricity in to be used later.

HOW ARE BATTERIES USED FOR ELECTRICITY?

RTOs, like MISO and PJM have incorporated batteries into the bulk electric system as well as on distribution systems and serve multiple functions:

- **Transmission and distribution infrastructure deferrals.** If peak demand is fore-casted to exceed available resources over time, new distribution or transmission is also likely necessary. Batteries can bridge that investment gap and be added to the grid in strategic locations to provide needed capacity at a lower cost.
- **Firm capacity.** Grid system operators must ensure there is adequate capacity to be available 24/7/365, especially during peak demand periods. As the percentage of renewable energy increase, grid operators require increased system flexibility. Energy storage provide grid operators a way to keep resources stable when wind or other renewable resources are not available. Storing surplus capacity in batteries provides the ability to later dispatch energy when demand is high.
- **Operating reserves.** Energy stored through batteries is dispatched to the grid to meet current electricity demands. Batteries provide rapid response when demand is high or when there are mechanical failures. Batteries support reliability.
- **Arbitrage.** When electricity is generated and stored in batteries during low-cost periods, then dispatched when demand is higher. This approach is useful as wholesale energy prices fluctuate throughout the day or an operational period.

To learn more about energy storage, check out learn.pjm.com/energy-innovations/energy-storage.aspx

