



BATTERY ENERGY STORAGE SYSTEMS (BESS)

WHAT IS “ENERGY STORAGE”?

Energy storage is the capture of produced energy, stored for use at a later time to help minimize imbalances between energy production and energy usage. Batteries are a form of energy storage.

WHAT TYPE OF BATTERY IS COMMONLY USED FOR ENERGY STORAGE?

Although there are different kinds of battery chemistries, lithium-ion batteries (similar to the ones in phones and laptops) have been the most commonly used technology for both residential and utility applications in the United States because they offer the best combination of safety, reliability, price, and operational efficiencies.

WHAT IS THE VALUE OF LARGE-SCALE BATTERY STORAGE?

The electric grid functions by continuously matching supply and demand for electricity. Demand for power fluctuates over time, which means the grid requires significant flexibility to manage those fluctuations. Adding battery energy storage to the electric grid provides that flexibility to offer energy for use at times when generation is not otherwise available.

- **BOLSTER GRID RESILIENCE**

Batteries can help deploy power during times of high electricity demand, which can happen during periods of extreme temperatures. They may also shorten customer outage time and provide backup power during grid outages.

Batteries can also help support the grid during intermittent weather patterns where energy sources such as wind or solar may have certain windows to generate clean, renewable energy – i.e., cloudy weather, calm winds, rain & snow, shortened days, etc.

- **PROVIDE GRID STABILITY**

Energy storage can create a more stable power grid with increased flexibility and less frequent interruptions to the power supply.

- **SUPPORT GRID SUSTAINABILITY**

When paired with renewables, which have variable production, batteries can help allow for more renewables on the grid by allowing power to be used at different times than production.

- **STRENGTHEN GRID FLEXIBILITY**

Batteries are particularly valuable because they can respond quickly to changes in energy demand, turning on and off in fractions of a second.



WHY ARE BATTERY STORAGE SYSTEMS PAIRED WITH SOLAR FARMS?

While solar does not need to be paired with batteries to be beneficial and cost effective, co-location (having both on the same site) can be advantageous. 36% of solar projects connected to the grid in 2020 were paired with batteries (Lawrence Berkley National Laboratory). Of the 14.5 gigawatts of battery storage capacity planned to come online in the US from 2021-2024, 63% of it will be co-located with solar power plants (Energy Information Administration).

The predictability and regular generation patterns of solar arrays effectively pair well with battery storage because battery systems are limited in the length of time they can discharge power before needing to recharge. Having a ready source of energy from the solar arrays and a 24/7 ability to dispatch that energy from the batteries results in an optimized, large-scale project.

ARE BATTERIES SAFE?

Yes. Lithium-ion batteries have been in use for over thirty years, and when properly designed, built, and operated to industry safety standards, they present no abnormal safety risks.

ENCLOSURES The purpose of a battery enclosure is to protect batteries from the elements, including heating, cooling, and other weather events, and to ensure that in the unlikely event of failure, damage to the system is contained. Containerized battery storage units are generally sealed, automated, and constantly monitored.

FIRES Preventative features exist to reduce the risk of fire, including, a management system that continuously monitors sensors for temperature, voltage, and current at the individual battery module level. This technology automatically shuts down the string of batteries if failure is a risk or if communication with the sensors is lost.

Battery Energy Storage Systems incorporate a fire suppression system which typically consists of a fire alarm, smoke and heat detectors, heat activated sprinkler system, fire rated insulation, strobe lights, and horns. HVAC systems are also incorporated in the battery systems to keep the batteries from experiencing overheating. The HVAC system will keep the batteries cool during the summer and at an appropriate temperature during the winter, to optimize battery production and system operations.

NOISE The noise emitted from utility batteries is less than or equal to most electrical transformers and are designed to comply with applicable sound limits. Batteries themselves emit virtually no noise; the ambient noise comes primarily from cooling or heating systems.

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