BUNYAN
ENERGY CENTER

FREQUENTLY ASKED QUESTIONS ON

Battery Energy Storage Systems (BESS)



General Q&A

Why are batteries needed?

As the U.S. energy landscape evolves to more renewable energy sources, such as wind and solar generation, including energy storage will play an essential role in stabilizing the grid. The electric grid matches supply and demand at every moment to function reliably. Energy storage systems store excess energy in times of low demand to be used later, especially during peak demand hours and emergency or grid outages.

Why is energy storage important?

Energy storage fundamentally improves the way we generate, deliver, and consume electricity. Energy storage helps during emergencies like power outages from storms or equipment failures and accidents. But the game-changing nature of energy storage is its ability to balance power supply and demand instantaneously – within milliseconds – which makes power networks more resilient, efficient, and cleaner than ever before.[1]

How is energy storage useful on a grid scale?

Energy storage is needed on a grid scale for three main reasons:

1. When charged with renewable energy like solar, energy storage delivers firm, flexible, clean energy and capacity.
2. Energy storage can store energy in times of excess production and discharge that energy when it is needed.
3. Energy storage provides a real-time balance of power supply and demand, creating more reliable, stable, and productive power grids.

What are the main benefits of utility-scale energy storage systems?

Energy storage systems can improve the reliability of the electricity grid to help keep the power on for residents and businesses during extreme weather conditions.

Adding more energy storage to the U.S. electricity grid can help to keep electric costs down for consumers.

More energy storage helps ensure the U.S. electricity grid remains reliable.

How does an energy storage system work?

In the most basic explanation, an energy storage system charges by taking AC power from the grid or colocated generation facility and converting it to DC power to store in batteries. The system will automatically stop charging once the battery is at full charge. When there is an energy need on the grid, the system discharges energy back to the grid by converting the electricity from DC back into AC.

Is energy storage technology safe?

Energy storage has been a part of our electricity grid since the 1930s and has a safety record that is similar to, or better than, other electricity generation, distribution, or management methods. Energy storage facilities have multiple layers of protection and monitoring systems in place to help mitigate any unsafe conditions. Additionally, these facilities are secured with perimeter fencing around the entire site to prevent unauthorized access.

Is energy storage clean?

Energy storage has no direct emissions, requires no pipelines, and recycles electricity. Its systems typically require a minimal footprint. Energy storage help cut emissions as it takes more of the load off traditional generation or allows it to operate in a more efficient manner.[1]

Why here?

1. We site energy storage facilities to maximize benefits to the grid and to customers.
2. Stand-alone storage facilities are typically closer to the electrical load and/or connected to the bulk transmission system (transmission lines/substations) in order to service energy users efficiently.

Technical Q&A

Are they sustainable?

Energy storage batteries have a useful life of approximately 20 years and will require re-powering later in the project life cycle. The original batteries will be removed and recycled for continued use in other applications.

How efficient is battery storage?

Battery efficiency is a key metric used to select batteries for a project; the batteries we use have a round trip efficiency of 90-95% or greater (5-10% losses when charging and discharging the batteries). There may also be additional losses when charging and discharging the battery due to other system component losses.

Are battery systems cost-effective?

Battery energy storage costs continue to decline as the production and supply chains increase efficiencies. Energy storage is at an attractive cost to utilities and other energy users, as evidenced by large increases in grid-scale energy storage installations over the last several years. Energy storage system costs are expected to continue to fall, thus leading to an increased number of installations throughout the U.S.

What are the different types of battery storage installation layouts?

Energy storage installations will either utilize outdoor containers or dedicated-use buildings. For the outdoor container design, batteries will be installed in climate-controlled outdoor containers, with multiple containers daisy-chained to central inverters. An alternate higher-density system will utilize a dedicated use climate-controlled building(s) that will house multiple aisles of batteries in an open-rack configuration connected to inverters outside of the building. There are advantages to both systems depending on local codes and site considerations, but the bulk of the systems to date have been pre-engineered containerized systems.

How are they protected from outside elements?

Outdoor enclosures are designed with outdoor ratings such as NEMA 3R / IP66 to prevent water ingress. These systems are also designed with appropriate anchor bolts and latching to comply with various wind ratings per the local building code, based upon ASCE 7. This is the same code other commercial and industrial facilities are designed to.

How much electricity do they produce?

They produce the same power (MW) as equivalent solar facilities. The energy (MWh) produced is based upon the power and duration: energy = power x time. The nameplate energy rating will generally be based upon a 1- to 4-hour duration, depending on the projected-use case. For example, a 50 MW x 4-hour system can deliver 200 MWh in a single charge.

Will I see lower electricity bills?

Energy storage can lead to cost savings in two primary ways. The first is by lowering the overall cost of providing electricity. The second is by allowing customers to avoid premium pricing (or "peak demand"). Industry insiders call this saving money on "both sides of the electric meter." But broader energy storage deployment can save consumers money in additional ways. Shorter outages for residents after a storm or an equipment failure can help save not only money but lives. And fewer outages overall lead to less economic losses.[1]

What makes lithium-ion iron phosphate batteries safer than other battery chemistries?

The chemical structure of lithium-ion iron phosphate batteries (LFP) is stronger than other battery chemistries. LFP batteries hold together firmly under high temperatures and do not release oxygen from their chemical bonds very easily. This means LFP batteries are significantly less likely to ignite or experience "thermal runaway" if they are damaged or exposed to extreme heat.

Additionally, LFP batteries do not contain cobalt or nickel in their chemistry. This removes supply chain questions about the origins of cobalt and nickel. Iron and phosphate are also readily abundant and low cost materials, which keeps LFP technology affordable.

Other battery technologies such as lithium nickel manganese cobalt (NMC) and lithium nickel cobalt aluminum (NCA) have higher energy densities but also degrade faster and are subject to thermal runaway. In general, LFP batteries are ideal for grid-scale use because of their stability and durability.

What maintenance do batteries need? How often?

Regularly scheduled maintenance involves visual inspections, various system checks and tests, cleaning, and adjustment as required. In general situations, an operations team remotely monitors a site 24 hours a day, 7 days a week. Large-scale storage projects could have tens of thousands – if not hundreds of thousands – of sensors and datapoints (actual count on specific projects to be determined) that provide a comprehensive and real-time line of sight into the health of the system.

Does an energy storage system create sound?

Yes, energy storage systems produce some sound, primarily from cooling fans and electrical equipment.

However, facilities are typically designed to comply with all applicable local noise regulations.

During normal operations, the main sources of sound are the substation transformer and fans used to cool the inverters and battery units. These sounds are comparable to those produced by common equipment such as residential HVAC units or electrical transformers and are generally consistent with typical background noise in developed areas.

Noise levels are typically at the highest during construction, which is temporary. Once operational, facilities are expected to maintain compliance with state or local noise standards at nearby homes and other sound receptors.

Fire & Safety

What about thermal runaway and fires? What is the likelihood of a battery fire?

Lithium-ion iron phosphate cells rarely experience failure leading to fire. Modern codes and standards such as NFPA-855 and UL-9540a require several independent preventative features in order to minimize the risk of fire. With these features in place and fully operational, the likelihood of a fire is reduced even further. These features include a battery management system, remote monitoring, gas detection, ventilation, and in some installations, fire suppression. All of Savion's battery storage projects are designed to comply with the requirements of NFPA-855.[2]

How common are battery storage system fires?

According to research and assessments completed by the American Clean Power Association (ACP, 2025), the significant majority of BESS sites across the U.S. are operating in a safe and secure manner. Battery fires at BESS sites are rare.

Batteries in the US have been developed in a way that monitors, alerts, contains, and extinguishes expediently and with no impact to air quality. And the industry is committed to working with fire experts and local communities to ensure this standard.

- The risk of a fire-related incident at a BESS site is incredibly rare. There have been 23 incidents in the last 10 years at U.S. operating energy storage facilities (EPRI). *This coincides with energy storage deployment growing by more than 25X since 2018.
- Past incidents demonstrate that fires are contained within the facility, and air quality in neighboring areas remains at safe levels.
- Energy storage developers work with local fire departments and first responders for training and to share information about risks, response plans, and safety measures.

What does a developer do to work with the local fire protection personnel to prepare for a new energy storage system?

Emergency signage, emergency operations plans, and training are provided in conjunction with local fire services to ensure the hazards are communicated and planned for. An emergency response plan will be developed which will provide detailed response procedures. This plan will be reviewed by the local fire marshal and department, and training will be conducted to familiarize local responders.

Impacts

What positive impacts will an energy storage facility have on the local community?

Energy storage facilities provide positive impacts to the local economy through increased tax revenues to local governments, the creation of new jobs (during the construction phase), and landowner royalties. At the same time, energy storage facilities do not strain public infrastructure, schools, or emergency services, making energy storage facilities a true silent revenue generator that benefits the entire community over several decades.

Decommissioning

Will there be a decommissioning plan?

Yes, the Public Utilities Commission requires a detailed decommissioning plan as well as cost study by an independent third-party that establishes the decommissioning bond to ensure proper end-of-life management.

[1]American Clean Power, "Resources-Thought Leadership-FAQs-Why is energy storage important," EnergyStorageAssociationArchive.org, 2023, http://energystorageassociationarchive.org/resources/thought-leadership/faqs/

2 Electric Power Research Institute, Inc., "Insights from EPRI's Battery Energy Storage Systems (BESS) Failure Incident Database," EPRI.com, 2024, https://www.epri.com/research/products/000000003002030360