

**MILLIGAN**  
ENERGY CENTER

FREQUENTLY ASKED QUESTIONS ON  
**BATTERY ENERGY STORAGE SYSTEMS**



## General Q&A

### How is energy storage useful of 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 real-time balance of power supply-and-demand, creating more reliable, stable, and productive power grids for our country.

### 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 co-located 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 energy from DC back into AC.

### Is energy storage technology safe?

Yes. Energy storage has been a part of our electricity grid since the 1930s and has a safety record that is similar or better than other electricity generation, distribution, or management methods. Energy storage facilities have multiple layers of automatic protection systems and are typically enclosed by fencing, which prevents children and the general public from coming into contact with the installations, thus preventing unsafe conditions.

### Is energy storage clean?

Energy storage has no direct emissions, requires no pipelines, and recycles electricity. Its systems typically require a minimal footprint. It recycles electricity. But energy storage will also help cut emissions as it takes more of the load off traditional generation or allows it to operate in a more efficient manner.<sup>1</sup>

## Technical Q&A

### How do these batteries compare to the batteries in my phone or computer?

All batteries accept, store, and release electricity on demand. Batteries use chemistry, in the form of chemical potential, to store energy.

The batteries used for grid-scale applications are similar to the lithium-ion batteries in your phone or laptop computer, except they are much larger and monitored closely on a 24/7 basis by trained professionals. Grid-scale battery systems utilize the same types of battery cells found all around us, but are incorporated into a state-of-the-art grid-scale resource. Grid-scale batteries are rechargeable, and the

### Will batteries be added to a solar system at start of construction, or later?

Battery storage may be installed either at the time a solar energy facility goes into operation or at a later time to an existing solar system.

## How does energy or battery storage work with solar?

The solar panels absorb the energy created by the sun, creating DC electricity. The battery charges in times of excess energy production and discharges when energy is needed. Energy storage helps to balance the grid, creating a more reliable and stable transmission and distribution system. Clean, reliable energy is delivered to commercial, industrial, and residential customers.

## What maintenance do batteries need? How often?

Annual maintenance involves visual inspections, various system checks and tests, cleaning, and adjustment as required.

## What type of batteries will be used?

Generally, all projects will use lithium-ion batteries, which are sealed rechargeable batteries ideally suited for decades worth of use. Grid-scale battery systems utilize the same type of battery cells found all around us incorporated into a state-of-the-art grid-scale resource. These rechargeable batteries are monitored closely on a 24/7 basis by trained professionals. Their heavy-duty design allows the grid-scale battery systems to be charged and discharged daily for decades.

## What type of enclosure will be used?

The type of enclosure varies by manufacturer. Typically, they are housed in an enclosure similar to a 40' ISO shipping container or smaller. Some may be smaller module-type units that measure 5ft x 5ft x 7ft.

## Fire & Safety Q&A

### How does the battery's control system help prevent fires?

All energy storage systems come equipped with a battery management system (BMS) that continuously monitors sensors for temperature, voltage, and current at the battery module level. If the sensors determine a failure is at risk of occurring, the BMS will automatically shut down the battery and alarm until the issue is resolved. The sensor groups also issue a failsafe 'heartbeat' signal, ensuring the system will shut down if communication to the sensors is lost.

### If a fire does take place, what measures are taken to help minimize the extent of fires?

I. In most instances of a fire in a containerized battery system, fire water will be applied to the exterior of the container by the fire department to reduce the heat of the container and minimize the possibility of fire spread. Full details of approach will be included in the emergency response plan and fire safety plan.

II. In addition, battery installations incorporate some form of flammable gas detection / elimination / ventilation equipment. These sensors act to detect, eliminate, and/or ventilate flammable gases from the container atmosphere.

III. In instances where self-contained outdoor enclosures are utilized, the enclosures are tested per UL-9540a and equipped with relief mechanisms as required. Additionally, fire suppression can be employed to further reduce damage to internal components.

IV. Fire suppression equipment, including water-based suppression, is required for all battery installations that can be entered by personnel (such as buildings). If required, these systems will be designed to meet all applicable local and national codes.

### **How will our local fire department be prepared or trained to handle a fire situation at a battery storage system?**

An emergency response plan will be developed which will provide detailed response procedures. This plan will be reviewed by the local Fire Marshall and fire department, and training will be conducted to familiarize the local responders with this plan.

### **In the event of a fire, what is contained in the water used to extinguish the fire? Is foam used or some special extinguisher fluid?**

Water used for fire suppression/cooling to address battery fires is normal fire water piped from city/town sources, hydrants, or other typical fire water sources such as well water or water on fire trucks. No special foam or liquid is required.

While also not required, inert non-toxic “clean agent” non-water-based automatic fire suppression such as FM-200 or NOVEC 1230 may be used in select locations within the building/containers/racking on some systems as additional countermeasures to limit internal damage.

### **Do batteries leak?**

Lithium-ion cells do not leak electrolytes during normal operation like some ‘flooded’ lead-acid batteries used in substations and UPS equipment. Lithium-ion battery modules will only leak if they experience catastrophic failure. Most of the leakage will be in the form of gasses, and the volume of liquid electrolyte will be trace amounts of volume compared to that found in the more common flooded lead-acid batteries. These gases and liquids are contained within the energy storage container with safety measures incorporated to deescalate the situation.

### **Does an energy storage system create noise?**

The energy storage equipment will be designed to be consistent with local noise requirements. The noise emitted is no higher than most electrical transformers or HVAC condensers.

Once the construction phase of the energy storage system is complete and the facility is operational, the primary source of noise will be fans associated with the inverter and battery cooling systems and will be similar to the sound emitted from commercial rooftop HVAC units.

## Decommissioning Q&A

### How long do batteries last?

Batteries can last twenty years or more depending on their usage. They will undergo some degree of degradation over their lifetime, where they will experience reduced capacity—similar to how a cell phone battery loses charge capacity over time.

### What happens to them at the end of life?

At the end of life, batteries are removed from the system and recycled in accordance with applicable requirements.

### Will there be a decommissioning plan?

Many permitting requirements include a decommissioning plan as well as a decommissioning bond.

<sup>1</sup> American Clean Power, "Resources-Thought Leadership-FAQs-Is energy storage clean," *EnergyStorageAssociationArchive.org*, 2023, <http://energystorageassociationarchive.org/resources/thought-leadership/faqs/>