

ENERGY STORAGE & SAFETY

Safety is a Critical Aspect of the Entire Electrical System, from Power Lines to Your Outlets

Safety is fundamental to all parts of California's electric system, including energy storage. Each component of the electric system presents risks – from transformers and gas lines to power plants and transmission lines – and their safe operation is critical to provide the electricity that keeps our lights on, refrigerators running, homes air-conditioned and heated, and businesses operating. Energy storage is no different.

- Using best practices and the proper design and operations, battery energy storage facilities can mitigate risks and maintain safety while supporting reliable, clean electric service.

Energy Storage is an Increasingly Important Component of California's Electric Grid Infrastructure

In 2018, California committed to requiring the state's utilities to source all electricity from renewable and zero-carbon resources by 2045. Battery storage serves as a vital component to meeting that target. Energy storage serves as a leading technology for enhancing grid reliability and keeping electricity costs low. The summer of 2024 was the hottest ever recorded in California, but the tenfold increase in energy storage from 2020 to 2024 allowed the state to get through the summer without blackouts or calls for customers to conserve energy for grid stability. Energy storage can also mitigate the impact of power outages by providing backup power during emergencies.

Battery Energy Storage Uses Technologies We Rely on Every Day

Batteries are present in every part of our lives, from mobile phones to laptops to electric vehicles – even toothbrushes and lawnmowers.

- Energy storage projects that power the electric grid, homes, and businesses utilize the same core technology as the battery that powers the phone in your pocket, just on a larger scale.

Energy Storage Systems Are Held to Several National Safety Standards

Because we rely on batteries in many ways, the technology has some of the most well-established safety features. **All energy storage projects built today must meet rigorous codes and standards to be permitted.**

- Every energy storage project integrated into California's electrical grid must comply with **national fire protection standards** that are frequently updated to incorporate the best practices for hazard mitigation tools and strategies. State and local governments ensure energy storage facilities are installed and operated in compliance with their current standards.

Energy Storage Projects Use Numerous Strategies to Maintain Safety

Energy storage facilities use established safety equipment and strategies to ensure that risks associated with installing and operating the battery systems are appropriately mitigated. **At every stage, from manufacturing to installation to operation, battery technologies and storage facilities use a variety of strategies to keep them safe.** These strategies can include:

- **Pre-Installation Standards & Testing:** All modern batteries are designed and manufactured to adhere to and pass standard safety tests before operation. These safety standards and performance tests help to ensure that the technologies deployed in energy storage facilities comply with the highest global safety standards.
- **Proper Temperature Management:** All energy storage projects have thermal management systems, such as fans, ventilation, and heating and cooling equipment, to maintain safe operating temperatures for the batteries.
- **Sensors that Regulate Temperature:** All projects have sensors that track battery temperatures and enable storage facilities to turn off batteries if they get too hot or cold. A battery management system manages the charging and discharging of batteries similar to the system in your phone or computer.
- **Safety Equipment:** Energy storage facilities include equipment and systems that detect and suppress fires, vent gases, and incorporate fire-proof barriers. This safety equipment includes well-established tools deployed at all types of facilities across our electrical system.
- **System & Component Certification:** The Occupational Safety and Health Administration's (OSHA) Nationally Recognized Testing Laboratories (NRTL) provide screening, testing, and evaluation for battery energy storage technologies and components. Many energy storage technologies are also contained within certified enclosures designed to house them safely.
- **24/7 Monitoring by Trained Personnel:** Energy storage facilities are monitored 24/7 by trained personnel prepared to maintain safety and respond to emergencies.
- **Emergency Response Plans:** All energy storage operators develop and maintain emergency response plans to ensure that, if there were an event, it is handled safely and according to best practices. Energy storage developers work with local fire departments and first responders to train and share information about risks, response plans, and safety measures.

Relying on these measures, energy storage facilities are operated with a safety record consistent with the other technologies we rely on every day for electric service.

Collaboration Between Energy Storage Companies and Public Safety Personnel is Essential

Energy storage companies and fire professionals collaborate frequently throughout the project's development and lifetime operation. Regular and transparent communication, training, and site visits foster partnerships that enhance coordination and maintain safety during the life of an energy storage facility. **The energy storage industry is committed to proactively engaging with local fire departments. Energy storage developers and operators engage in early, frequent, and ongoing communication with the local fire departments for every project.**

Battery Energy Storage Safety Incidents are Rare

As of the end of 2024, California has deployed more than 13,000 megawatts (MW) of energy storage, including over 190 utility-scale facilities and over 200,000 customer-sited systems. Although there have been a few high-profile battery storage fires in California, the risk of a fire-related incident at a BESS site is incredibly rare. There have been 10 incidents, ranging in impact, in California since large-scale storage facilities have come online. The industry continually works to improve safety and strategies for hazard mitigation and emergency response to minimize the likelihood and severity of these events.

- No injuries have occurred due to battery energy storage fires in California.
- Air monitoring conducted near the battery storage facilities during overheating or thermal runaway incidents has never found any level of air emissions that are of concern to public health.

State and Local Jurisdictions Regulate Battery Energy Storage Facilities

The California Fire Code includes National Fire Protection Association standards that provide mandated requirements for the design and installation of battery energy storage facilities. These standards include requirements for site configuration metrics, hazard mitigation analyses, emergency response plans, and transmittal of details of all safety systems to the regulating government authority. Other regulations include, but are not limited to, the following:

- Senate Bill 38 (Chapter 377, 2023) requires battery energy storage developers to work with the Authority Having Jurisdiction (AHJ) to develop emergency response and evacuation plans for BESS facilities should an incident occur.
- Senate Bill 1383 (Chapter 725, 2022) extended the California Public Utilities Commission's (CPUC) current authority to inspect battery energy storage resources. The CPUC initiated an update to General Order 167-B (GO 167B) in 2024, with final resolutions to be adopted in March 2025. This updated regulation will allow CPUC inspectors to require energy storage owners and operators to comply with new maintenance and incident reporting requirements. It also gives the CPUC inspection authority over these systems.

Energy Storage is Essential for Maintaining a Reliable Grid

Battery energy storage systems play a crucial role in maintaining a reliable electrical grid in California. The thousands of megawatts (MW) of energy storage deployed since 2020 have played a critical role in preventing grid emergencies. However, much more energy storage is needed.

Thousands of additional megawatts of battery energy storage will be necessary in the next few years to meet load growth from electric vehicles, data centers and other electrification efforts. At the same time, more energy storage will be needed to retire the state's remaining nuclear and coastal gas-fired power plants.

About CESA

California Energy Storage Alliance (CESA) is a 501c(6) membership-based advocacy group committed to advancing the role of energy storage in the electric power sector. At 70+ members strong, CESA is the definitive voice of energy storage in California and the West. CESA's mission is to advocate for energy storage as a key resource to achieve a more affordable, efficient, reliable, safe, and sustainable electric power system for all Californians.

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