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ENERGY STORAGE

Recent California Energy Storage Battery Fire Draws Renewed Attention to Storage Safety Issues

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Recent California Energy Storage Battery Fire Draws Renewed Attention to Storage Safety Issues

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A recent fire at a battery storage facility in California is bringing fresh attention to safety issues tied to energy storage as the technology grows in deployment across the U.S.

The fire occurred in September 2022 at Pacific Gas & Electric's (PG&E) Moss Landing battery storage facility in California. The fire was isolated to a single battery pack at the facility, according to the County of Monterey, Calif.

PG&E in April announced the commissioning of its 182.5-megawatt (MW) Tesla Megapack battery energy storage system – known as the Elkhorn Battery – located at its Moss Landing electric substation in Monterey County.

The Elkhorn Battery system was designed, constructed, and is maintained by both PG&E and Tesla, and is owned and operated by PG&E.

An [editorial \(https://www.santacruzsentinel.com/2022/09/23/editorial-battery-fire-at-moss-landing-a-stark-reminder-of-new-technology-risks/\)](https://www.santacruzsentinel.com/2022/09/23/editorial-battery-fire-at-moss-landing-a-stark-reminder-of-new-technology-risks/) in California's Santa Cruz Sentinel newspaper said that while the move to energy storage will continue, the Moss Landing fire "was also a reminder that battery blazes are becoming increasingly common and destructive – and safety measures, including fire drills, for residents around storage facilities will have to be put in place and widely disseminated."

Arizona Also Experiences Incidents With Storage Fires

California is not the only state where energy storage facilities have experienced fires.

In neighboring Arizona, investor-owned Arizona Public Service (APS) in 2020 released the findings of an investigation into an incident that occurred at an APS battery storage site in 2019.

Around 5 p.m. on April 19, 2019, there were reports of smoke from the building housing the energy storage system at APS's McMicken site in Surprise, Ariz.

Hazardous Material units and first responders arrived on scene to secure the area. Approximately three hours after the reports of smoke and shortly after the door was opened, the site experienced a catastrophic failure. Injured first responders were transported to area hospitals.

An investigation led by APS, with first-responder representatives, the system integrator, manufacturers and third-party engineering and safety experts, was conducted to determine the cause of the incident and identify lessons that can be applied to future battery energy

storage systems.

The investigation involved a number of key stakeholders, and APS commissioned several forensic experts and nationally recognized research institutions. Once the investigative work was completed, APS chose DNV GL to combine various forensic and expert inputs into the single, consolidated report.

Among other things, the [report said \(https://www.aps.com/-/media/APS/APSCOM-PDFs/About/Our-Company/Newsroom/McMickenFinalTechnicalReport.ashx?la=en&hash=50335FB5098D9858BFD276C40FA54FCE\)](https://www.aps.com/-/media/APS/APSCOM-PDFs/About/Our-Company/Newsroom/McMickenFinalTechnicalReport.ashx?la=en&hash=50335FB5098D9858BFD276C40FA54FCE) that the suspected fire “was actually an extensive cascading thermal runaway event, initiated by an internal cell failure within one battery cell in the BESS [battery energy storage system].”

In August 2019, an Arizona utility regulator [raised questions \(https://www.publicpower.org/periodical/article/concerns-about-li-ion-battery-safety-wake-fires\)](https://www.publicpower.org/periodical/article/concerns-about-li-ion-battery-safety-wake-fires) about the safety of certain lithium-ion batteries, following fires at APS battery storage facilities.

In a letter to her fellow commissioners, commission staff and other interested parties, Commissioner Sandra Kennedy, of the Arizona Corporation Commission, said the types of lithium ion chemistries used at those facilities “are not prudent and create unacceptable risks.”

Along with the April 19 fire, Kennedy's letter also cited a November 2012 fire at an APS storage facility at its Elden substation.

More recently, a fire broke out at an energy storage facility in Chandler, Ariz., in April 2022. The incident occurred at the Dorman battery storage system, a 10 MW, 40 megawatt-hour stand-alone battery storage system in Chandler. The BESS is interconnected with and provides service to the Salt River Project. It is owned by AES Corp.

The investigation “into what happened at Chandler is still underway. We expect a determination in the coming weeks,” said AES spokesperson Gail Chalef on Sept. 26.

Standards for Energy Storage Systems

A key player in addressing concerns about energy storage technology safety issues is the National Fire Protection Association (NFPA).

"NFPA is keeping pace with the surge in energy storage and solar technology by undertaking initiatives including training, standards development, and research so that various stakeholders can safely embrace renewable energy sources and respond if potential new hazards arise," it notes [on its website. \(https://www.nfpa.org/News-and-Research/Resources/Emergency-Responders/High-risk-hazards/Energy-Storage-Systems\)](https://www.nfpa.org/News-and-Research/Resources/Emergency-Responders/High-risk-hazards/Energy-Storage-Systems)

NFPA's safety standard, [NFPA 855 \(https://catalog.nfpa.org/NFPA-855-Standard-for-the-Installation-of-Stationary-Energy-Storage-Systems-P20704.aspx\)](https://catalog.nfpa.org/NFPA-855-Standard-for-the-Installation-of-Stationary-Energy-Storage-Systems-P20704.aspx), "provides insight into mitigating risks and helping to ensure all installations are performed appropriately, taking into account vital life safety considerations," NFPA states. The standard "offers comprehensive criteria for the fire protection of ESS installations based on the technology used in ESS, the setting where the technology is being installed, the size and separation of ESS installations, and the fire suppression and control systems in place."

And cities are proactively taking steps to address storage-related safety issues. The New York City Fire Department in 2019 adopted a final rule related to energy storage systems.

The Fire Department adopted the rule to establish standards, requirements and procedures for the design, installation, operation and maintenance of outdoor stationary storage battery systems that use various types of new energy storage technologies, including lithium-ion, flow, nickel-cadmium and nickel metal hydride batteries. The rule does not govern indoor battery installations.

Among other things, the rule sought to address fire safety concerns associated with new battery technologies by setting testing standards and establishing an equipment approval process for manufacturers.

"Establishing testing standards, and in particular, requiring full-scale testing of battery system components and pre-engineered products, will enable manufacturers to identify fire safety issues and eliminate them or engineer mitigating measures in the design," the Fire Department said. "The evaluation of the performance of battery system components or products in this manner will also allow the Fire Department to eliminate or expedite its approval process for specific installations," it said.

Virginia County Holds Off on Battery Storage Project Decision

Concerns over battery storage fires and safety prompted the James City County Board of Supervisors in Virginia to recently defer a decision on a proposed battery storage facility in the county.

At issue is a 22.35-MW lithium ion battery storage project proposed by Calvert Energy LLC.

At the Oct. 11, 2022 board meeting, several members of the James City County Board of Supervisors raised questions related to fire and safety issues involving the project.

Brian Quinlan, President and CEO of Calvert Energy, noted the NFPA standard for batteries "and this system is designed to meet or exceed the containment requirements for battery storage, which basically means that the fire is contained within the container, so it won't burn through the container walls."

The Calvert Energy project also includes blowout panels, he noted. This means that "gases won't build up and cause an explosion." In addition, there is also dry chemical fire prevention "built into the unit itself as well, so there's a number of different levels of fire protection built into the system."

The board voted to defer a decision on the project to its Nov. 8 meeting.

RFQ in Massachusetts Addresses Storage Fire Training

The City of Boston in late 2021 issued a request for qualifications (RFQ) to provide comprehensive engineering, design, and construction services in connection with the installation of a rooftop photovoltaic (PV) array, a commercial-scale battery energy storage system (BESS) and a residential-scale battery energy storage system at the Boston Fire Department's Fire Training Academy on Moon Island, in Quincy, Mass.

The RFQ said that at a minimum the BESS "shall meet and fully satisfy the Standard for the Installation of Stationary Energy Storage Systems established by the National Fire Protection Association (NFPA 855), including any underlying standard adopted by and incorporated into NFPA 855, such as UL 9540A."

The RFQ notes that the project is intended to complement the Boston Fire Department's curriculum for firefighting trainees: in particular, to provide those trainees with an opportunity to become familiar with working examples of PV and BESS technologies.

Joseph LaRusso, Energy Efficiency and Distributed Resources Finance Manager in the City of Boston's Environment Department, told Public Power Current that the city has completed evaluating the qualifications statements that were submitted in response to the RFQ, and the city is currently negotiating the terms of an energy services agreement (ESA) with the firm that submitted the highest-ranked proposal.

The city plans to release the name of that company once the terms of the ESA have been successfully negotiated and the contract is awarded.

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