

LFP Batteries in BESS

Lithium-ion batteries comprise several variations, each optimized for distinct applications based on chemistry, energy density, cycle life, safety, and cost. Until recently, battery energy storage systems (BESS) primarily utilized heavy-metal chemistries adopted from the electric vehicle industry (eg: Nickel Manganese Cobalt). However, for improved safety and environmental characteristics, modern lithium-ion BESS facilities typically incorporate Lithium Iron Phosphate (LFP) batteries. A summary of the key differences between these lithium-ion variants is described below.

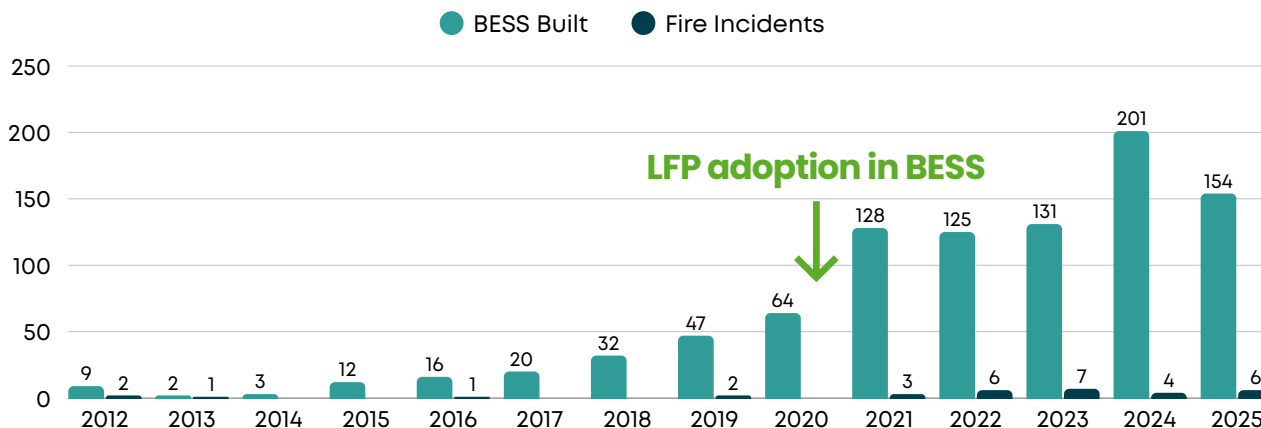
NMC vs LFP Batteries in Battery Energy Storage Systems (BESS)

Nickel Manganese Cobalt (NMC) batteries were commonly used when BESS began being installed from 2012–2020. The Cobalt in NMC batteries has a high power density, meaning the batteries can have a higher voltage in a smaller footprint – making them a great fit for electric vehicles. However, NMC batteries heat up as they are charged, and their Cobalt releases oxygen when it reaches 150–210°F. The combination of increased temperature while oxygen is being released escalates the likelihood of a fire during a thermal runaway event at a relatively low temperature.

Beginning in 2020, **Lithium Iron Phosphate (LFP)** batteries began to be widely adopted in BESS within the United States. These batteries have a lower power density relative to NMC, and the possibility of a thermal runaway event is reduced because LFP batteries are capable of operating at higher temperatures without material degradation. In the unlikely event of thermal runaway, the possibility of a fire is significantly reduced because LFP batteries do not release oxygen when they degrade.

By adopting LFP technology, and fine-tuning **rigorous testing of batteries and their containers**, emergency events have become extremely rare as technology, integration, and operations have improved.

BESS Constructed in USA vs Fire Incidents



BESS Constructed Source: Cleanview. Battery Storage Projects in the U.S. <https://cleanview.co/battery-storage-projects/us>

Fire Incident Source: EPRI. BESS Failure Incident Database. https://storagewiki.epri.com/index.php/BESS_Failure_Incident_Database

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BESS Fires in the News

When BESS fires have happened, they garner media attention. Understandably, the Moss Landing BESS fire in 2025 in Monterey County, CA gained significant media attention because it was one of the largest battery fires in the world. The technology, battery placement, and battery management strategies were not compliant with current BESS standards, and are far from the practice of how Accelergen manages its BESS projects. The table below details some of the discrepancies.

Differences between Accelergen BESS projects & Gateway Energy Storage Moss Landing

	Accelergen BESS	Gateway Energy Storage’s Moss Landing BESS
Battery Type	Lithium-iron phosphate (LFP) batteries	Nickel manganese cobalt lithium-ion (NMC) batteries
Storage Container	Outdoors, in separate containers that are actively managed	Indoors a 1950's decommissioned power plant; only monitored
Placement & Spacing	Spaced in compliance with 2026 NFPA 855 regulations to prevent thermal runaway	Stacked on multiple floors, creating many batteries in close proximity
Testing Requirements	Batteries and storage containers	Only batteries

Spector, J. 27 January 2025. “Why we don’t need to worry too much about the latest grid battery fire.” Canary Media. <https://www.canarymedia.com/articles/energy-storage/moss-landing-fire-reveals-flaws-in-the-battery-industrys-early-designs>

NFPA 855, UL 9540, and BESS Regulations

The **National Fire Protection Association (NFPA)** provides suggested fire safety guidance in the U.S. and has been helping to provide fire safety strategies for more than 125 years. **NFPA 855** was last updated in 2026, and provides federally regulated guidance on safety standards for energy storage safety.

The **Underwriters Laboratory (UL) 9540 and 9540A** sets standards for energy storage systems and equipment, including standards on charging and discharging procedures, fire protection, and test methods for BESS. UL 9540A was revised in 2025, and the standards are included in 2026’s NFPA 855 requirements.

NFPA 855 requirement highlights:

- Hazard mitigation analysis (HMA)
- Emergency operations plan
- Emergency response plan
- Details of all safety systems
- Results of fire and explosion testing, including large-scale fire testing (LSFT)

Industry best practice to manage BESS fires:

- Combines explosion prevention + fire containment.
- BESS fires burn out in a controlled fashion while protecting nearby equipment as needed.
- LSFT confirms that adjacent battery enclosures are not at risk of catching fire. Avoiding possibility of contaminated runoff & eliminating risks associated with stranded energy and reignition.¹

1. American Clean Power. NFPA 855: Improving Energy Storage System Safety. https://cleanpower.org/wp-content/uploads/gateway/2024/01/NFPA855_Safety_240111.pdf