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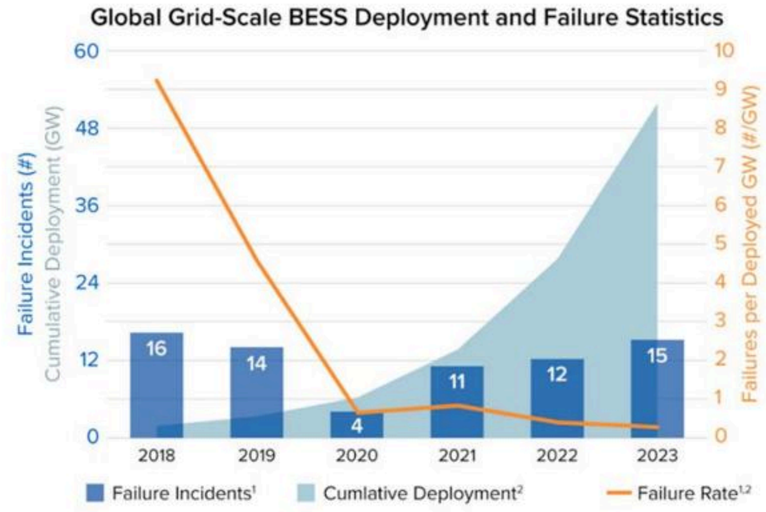
BESS Safety

Figure 12. Global grid-scale BESS failure rates from 2018-2023.



Courtesy EPRI and Wood Mackenzie.

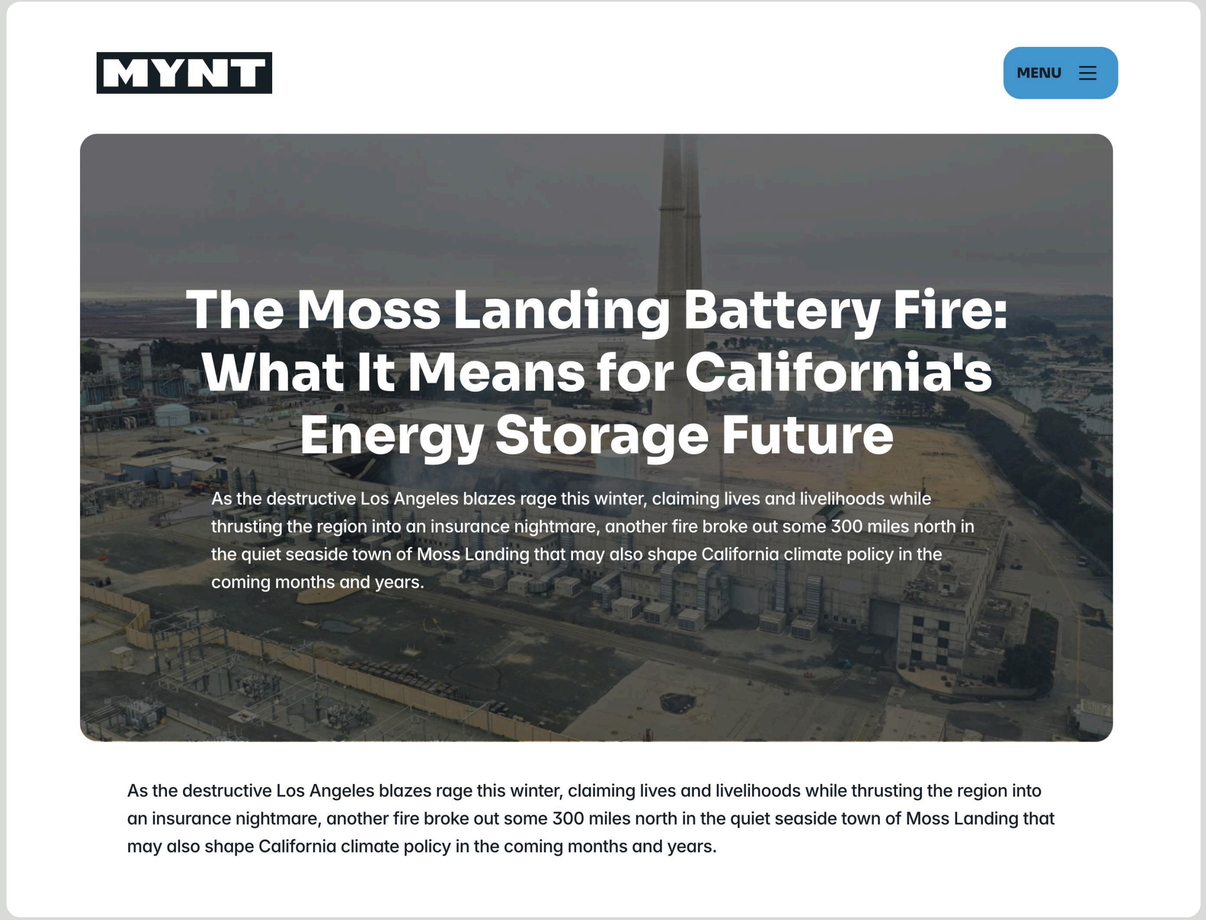
BESS Safety Overview

- All forms of energy storage and generation pose inherent risks that can managed and minimized.
- Early BESS technologies were more prone to failure, generating harmful air pollution and posing fire risks.
- Major safety advancements have been made in the past 5 years that have dramatically decreased failure rates while deployment has skyrocketed.

Safer By Design

LFP batteries have fundamentally different safety properties than older battery chemistries

- Unlike other lithium battery chemistries, LFP batteries do not produce oxygen when heated and thus do not create self-sustaining thermal events.
  - This is due to the iron phosphate-oxygen bond being stronger than the cobalt-oxygen bond, such that it can resist breaking and releasing energy (heat) and oxygen that fuels further combustion.
- LFP batteries operate at a lower, safer temperature.
- They utilize a non-flammable, non-organic electrolyte based on lithium salts.
- In the unlikely event of a fire, water is effective at extinguishing the flames and cooling the battery.



“Was there more that could have been done to make the Moss Landing Phase 1 battery system safer?

In short, yes; **there were at least three factors at play that increased the risk of catastrophic failure.** First, the battery that burned was the oldest of the four systems installed at the site and utilized a lesser-used, more fire-prone type of chemistry. Second, it was housed indoors in an old building; current industry standards call for large batteries like this to be sited outdoors on physically spaced concrete pads to prevent the fire from spreading. And third, the fire suppression system used has been implicated in starting all three previous fires experienced at this site since 2021, all of which were started by water leaking from pipes onto the battery cells directly or on other electrical equipment in the room (first, second, third).”

https://www.myntsystems.com/thewire/the-moss-landing-battery-fire-what-it-means-for-california-s-energy-storage-future

Emergency Response Best Practices

LFP batteries have fundamentally different safety properties
While a worst case scenario failure is far less severe than older battery models, it is still recommended to create an emergency response plan that follows these best practices:

- Identifies and assesses potential risks associated with BESS failure
- Maintains a reasonable log of operations and maintenance
- Establishes clear roles and responsibilities for operators, incident commanders, and first responders
- Sets strategies for rapid and effective communication, including familiarizing local first responders with site layouts, potential hazards, and emergency shutdown procedures, before any incidents occur

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Thank You