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James Li is director ESS for Sungrow Europe (Photo: Sungrow)

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Renewable energy is the main protagonist in the world's sustainability story. Unlike fossil fuels, it can be sourced in every country and is the most economically sustainable form of energy to power our future. But few protagonists can fulfil their destiny without the support of other actors.

Enter stage, battery energy storage systems (BESS), a critical player in alleviating the reliability, grid stability and infrastructure bottlenecks that are characterising the transition to renewables. By storing electricity in batteries for later use, the technology can address key challenges while having a compound positive effect on the large-scale integration of renewables.



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The global BESS market has experienced remarkable growth in recent years, following a steady introduction in the 2010s. It almost tripled in 2023 in response to the mass deployment of renewables around the world, reaching a capacity of over 90GW, and according to BloombergNEF forecasts is on track to grow at an annual rate of 21% until 2030. The pledge at COP29 to increase global energy storage capacity to 1.5TW only adds more wind to its sails.

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As with any transformative innovation, there are complex challenges. Some of these, such as regulatory complexity, require policy action. Others, such as safety,

require technological improvements driven by the private sector and, sometimes, a little myth-busting to alleviate fears.

As safety is fundamental to unlocking BESS' potential, let's explore the key concerns surround it, the reality, and what the industry is doing about it.

Concern 1: 'Thermal runaway' events and fire risk

Myth: the widespread deployment of BESS has led to a surge in battery fires and safety incidents.

Reality: the data tells a different story. While US energy storage deployments grew 18-fold between 2017 and 2022, battery storage failure incidents actually decreased by 97% between 2018 and 2023, according to EPRI research. While lithium-ion batteries can experience thermal events if damaged or poorly managed, such incidents are extremely rare in modern installations.

In addition, the energy storage sector has made remarkable progress in thermal management. At Sungrow, our recent world's largest [burn test](#) on a 20MWh BESS demonstrated this evolution in safety technology.

Concern 2: Toxic gas emissions

Myth: BESS fires pose an uncontrollable toxic gas risk to surrounding communities.

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Reality: while thermal events can release gases, modern BESS installations are designed to manage these risks effectively. Moreover, BESS plays a crucial role in enabling more renewables on the grid, contributing to better air quality overall.

Today's BESS facilities incorporate sophisticated ventilation systems that prevent gas buildup and maintain optimal temperatures. Early warning systems equipped with smoke and gas detectors provide critical alerts, while thorough staff training ensures swift, effective responses to any incidents. Recent burn tests have demonstrated this capability, with containers preventing fire spread for over 25 hours – providing crucial time for emergency response in real-world situations.

Concern 3: Emergency response and management

Myth: BESS incidents cannot be effectively controlled once they begin.

Reality: modern BESS installations incorporate multiple layers of safety systems and protocols that make incidents both preventable and manageable. The industry's approach has evolved from simple fire suppression to comprehensive safety management.

Advanced cooling systems and thermal barriers work together with specially-engineered fire suppression systems, creating multiple layers of protection. These technological advances are supported by rigorous operational protocols, including regular maintenance checks that help identify and address potential issues before they escalate. Staff undergo thorough training to ensure they can respond swiftly and effectively to any incidents, while compliance with stringent safety standards like NFPA 855 provides a robust framework for facility operation.

A safer, smarter, cleaner future

The BESS sector remains – as it always will be – committed to continuous improvement. At Sungrow, our research and development efforts are focused on refining battery chemistry and system design to further reduce risk. We also recognise that collaboration across the industry enables the sharing of best practices, fostering transparency and accountability.



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Most importantly, public trust will be a key component of the industry's success. This means better communication with partners and communities and first responders to ensure that everyone understands the safety measures in place. This proactive approach will ensure that BESS facilities operate as secure, reliable partners in the global and local energy transition.

In this way, BESS is not only a solution for today's energy challenges but an essential actor in our clean energy future, where safety and innovation work hand in hand to power a safer, smarter and cleaner world.

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