

Battery Energy Storage Fire Safety - Frequently Asked Questions

1. Battery Energy Storage (BESS) fires are increasing in number

Globally, the number of BESS facilities and total installed storage capacity is increasing rapidly - from 30GWh in 2020 to 300GWh in 2025. Conversely, the number of BESS fires is decreasing - from a high of 16 in 2018 to 8 in 2024 - and the incident rate has fallen by 98% - from 1.5 incidents per GWh of installed capacity in 2018 to 0.03 in 2024.¹ There are a number of factors behind the fall in incidents including manufacturing and design improvements and a shift to Lithium Iron Phosphate (LFP) batteries which are less susceptible to thermal runaway than earlier battery chemistries. The Warley Energy Hub would use batteries that meet the latest safety standards at the time of construction.

2. There is a good chance that over 40 years there will be a fire at every BESS facility

This isn't supported by the data. Industry analysis from the US, where BESS have been operating for longer and in greater numbers, suggests a failure rate of 0.06 incidents per 100,000 operating hours². This includes the higher failure rates seen in earlier projects so the incident rate for a new project will be lower. For context, there are 0.16 aviation accidents per 100,000 operating hours and 8.23 motoring accidents.

3. A BESS fire would quickly spread to the whole facility

A key element of the BESS safety guidelines³ published by the UK's National Fire Chief Council (NFCC) is ensuring that there is adequate spacing between individual battery units to prevent a fire in one BESS unit propagating to adjacent units. The NFCC guidelines were published in 2022 and included in the UK's National Planning Policy Framework in 2023. The effectiveness of this approach was demonstrated in a recent BESS fire in Tilbury UK. The fire was contained to a single BESS unit with no risks to the local community. The Warley Energy Hub would be built in compliance with NFCC guidance.

4. A BESS fire will burn for days

There have been BESS in the US that have burnt for days. These facilities used older battery technology - NMC - and predated current safe design guidelines - such as the NFCC guidance - so battery units were stacked together inside buildings which increased the chance of fire propagating between BESS units. UK guidelines ensure that a fire would be contained to a single battery unit and would be unlikely to burn for more than 24 hours.

¹ Electric Power Research Institute (EPRI) maintains a database of BESS incidents globally. Accessible at https://storagewiki.epri.com/index.php/BESS_Failure_Incident_Database

² Orennia, Cool Under Pressure: Battery Safety Performance, 27 May 2025, <https://orenna.com/insights/cool-under-pressure-battery-safety-performance>

³ NFCC, Grid Scale Battery Energy Storage System planning – Guidance for FRS <https://nfcc.org.uk/wp-content/uploads/2023/10/Grid-Scale-Battery-Energy-Storage-System-planning-Guidance-for-FRS.pdf>

5. *Containing a BESS fire requires millions of gallons of water*

The reference to millions of gallons of water comes from BESS fires in the US that predated current safe design guidelines. The NFCC guidelines recommend that fire services take a controlled burn approach to managing a BESS fire. Water is not applied directly to the unit that is on fire which is allowed to burn out. Water is only applied to the outside of adjacent BESS units if monitoring data from these units suggests that there is a risk of the fire propagating. This reduces water requirements and minimises the possibility of firefighting water being contaminated as it doesn't come into contact with battery cells. NFCC guidance recommends 228,000 litres of water, which would be provided for in two tanks at the facility; London Fire Brigade has reviewed water provisions and has no objection.

6. *A BESS fire will produce clouds of toxic smoke that can be harmful to local residents and wildlife*

Air quality monitoring at past incidents in the UK and abroad⁴ has shown that toxic gases are contained within the facility and air quality in neighbouring areas remains at safe levels. We have also conducted plume modelling studies using accurate data on gas volumes captured from large scale fire tests of BESS units. It showed that the immediate dangers from toxic gases are restricted to five metres from a battery unit. At 25 metres from a fire, within the Warley Energy Hub site boundary, toxicity levels have reduced below UK workplace short term exposure limits. The nearest home is 300 metres from the site.

7. *Water run off from a BESS fire will contaminate local water supplies*

The controlled burn strategy recommended by the NFCC minimises the chances that water will enter the BESS unit that is on fire. Further, while lithium-ion battery fires produce chemical byproducts, studies show that their solubility in water is low. This is supported by data from past BESS fire incidents⁴ where environmental sampling was conducted - water and soil samples did not reveal hazardous contamination levels requiring remediation. As a further mitigation measure, the Warley Energy Hub would have a water containment system that would prevent fire water from entering local water courses.

8. *Local fire stations don't have the equipment or knowledge to respond to a BESS fire*

Standard fire appliances would attend a fire and no specialist equipment is required. BESS fire training is being delivered through courses such as the NFCC's Lithium-Ion Batteries learning module for Firefighters. If the Warley Energy Hub application is approved, levels of preparedness and knowledge at local fire stations would be evaluated as part of emergency response planning and additional training delivered if required. Fire Services would also have access to digital fire information panels on the site providing live information on conditions within battery units to allow them to assess an incident from a safe distance.

⁴ Fire & Risk Alliance, Assessment of Potential Impacts of Fires at BESS Facilities, 25th April 2025, https://cleanpower.org/wp-content/uploads/gateway/gateway/2025/04/Safety-Executive_Summary_04-25-25.pdf