

Fire safety priorities for battery energy storage systems

Battery Energy Storage Systems (BESS) are critical for integrating renewable energy, managing variability from solar and wind, and supporting net zero targets while enhancing UK energy security.

01.

Fire Detection, Alerting & Monitoring

Fire detection systems should be linked to on-site alarm sirens, control centres and the fire service for appropriate response. These should detect developing hazards such as fire, thermal runaway, cell venting or leakage through battery management systems, separate smoke detectors, heat sensors or off-gas detection.

02.

Fire Suppression

Consider fire suppression at both module and site level, depending on how fire spread is mitigated and the firefighting strategy for the facility. NFCC guidance highlights that water-based systems are the preferred medium for suppression of a fire involving battery cell modules. Gaseous suppression systems for electrical fires that do not involve cell modules may suffice but should be assessed as part of the wider suppression strategy.

03.

Water Supplies

Water supplies should provide a minimum of 1,900 litres per minute for at least two hours, depending on the size of the BESS installation. Any static water storage tanks designed to be used for firefighting should be located at least 10 metres away from any BESS container/cabinet.

04.

Equipment Location & Separation

Equipment should be provided with adequate separation to limit fire spread. Guidance on appropriate distance varies across guidance documents, and these are subject to change over time – typically 3m minimum but could be greater depending on unit/site design and size. Separation could be reduced depending on construction and/or fire resistance of BESS unit enclosures. Radiative heat flux assessments could also be considered.

05.

Access & Surrounding Areas

Vegetation should be limited within 10m of BESS units, which should be placed at least 25m from adjacent occupied buildings and site boundaries. If possible, adjacent buildings should be located upwind from the BESS site. NFCC recommends at least two separate access points suitable for a fire vehicle. The location of site access points should account for wind conditions, ideally located at opposing sides of the site.

Your trusted partners

At Sweco, we offer fire engineering services and consultancy support at varying design stages, tailored to projects which comprise of BESS installations. We help clients navigate site-specific fire risks, identify fire safety features, and provide clear recommendations aligned with planning guidance. Our expertise ensures each project meets regulatory expectations, supports safe operation, and delivers practical, site-specific solutions.

How Sweco can help

- ✓ **Battery chemistry/composition** – assessing risks and safety requirements
- ✓ **BESS unit layout and spacing** – optimising site design for safety and compliance
- ✓ **Access routes** – planning for maintenance and emergency response
- ✓ **Firefighting facilities and water supply** – specification and integration
- ✓ **Nearby communities and infrastructure** – impact assessment and mitigation

Find out more:

