

Energy Commission Issues Battery Energy Storage System (BESS) Safety Guidelines

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The Energy Commission (EC) has issued the Battery Energy Storage System (BESS) Safety Guidelines (GP/ST/No.62/2026), which came into operation on 15 May 2026.

The Guidelines establish Malaysia's first dedicated safety framework for lithium-ion BESS. Their release comes as battery storage is increasingly embedded in utility-scale solar projects, commercial and industrial energy solutions and wider grid modernisation initiatives. Developers, equipment suppliers, contractors, operators and financiers will therefore need to ensure that projects involving BESS comply with a range of technical, testing and operational requirements.

The immediate practical question for each party is whether existing project documents, procurement strategies and operational procedures already meet the benchmark the Guidelines now establish or whether gaps need to be addressed.

Why This Matters?

Although many of the technical requirements in the Guidelines will already be familiar to industry participants, their formal adoption under section 50C of the Electricity Supply Act 1990 (ESA) has two important consequences.

First, the Guidelines create a single point of regulatory accountability where obligations were previously dispersed across general electrical safety legislation, technical standards and project-specific specifications.

The EC, lenders, technical advisers and project counterparties now have a common framework against which compliance will be assessed, whether during EC inspections, contractor prequalification exercises, technical due diligence reviews or project financing processes.

Second, where EPC contracts, supply agreements and O&M agreements require compliance with applicable laws and regulations, the Guidelines are likely to introduce new compliance obligations without any amendment to the underlying contract. Parties should review the compliance-with-laws provisions in existing agreements to assess whether the Guidelines fall within scope.

Regulatory And Competency Requirements

The Guidelines operate alongside the ESA, the Electricity Regulations 1994 and other applicable requirements. Electrical works must be carried out by registered electrical contractors, while plans, drawings and specifications must be prepared by competent persons as required by law. Compliance with local authority requirements, particularly those relating to transportation, fire safety and installation locations, is also mandated.

Developers should ensure that EPC contracts and O&M agreements clearly allocate responsibility for maintaining contractor registrations and appointing competent persons, including BESS service providers engaged for operations, monitoring or maintenance functions. Electrical works carried out by unregistered contractors may contravene the ESA directly, exposing not only the contractor but the project owner or developer to regulatory risk.

International Standards Become The Baseline

The Guidelines formally adopt internationally recognised standards governing battery systems, power conversion systems, thermal safety, functional safety and grid integration. These include IEC 62933, IEC 62619, IEC 63056, IEC 62116, NFPA 70, UL 9540A, UN 38.3 and MS IEC 62305, together with related standards addressing anti-islanding protection, communication systems and ingress protection.

Failure to comply with the referenced standards will now constitute a failure to meet minimum regulatory requirements, with potential implications for project approvals, insurance coverage, lender technical sign-off and commissioning.

Particular attention should be paid to UL 9540A and UN 38.3. Where equipment is sourced from manufacturers whose primary markets do not require UL certification which is common across the Asian battery supply chain, test report availability should be confirmed during vendor qualification, not left to the procurement stage. The absence of supporting documentation may affect procurement timelines, commissioning programmes and technical due diligence sign-off.

UN 38.3 is especially relevant for transportable battery systems and requires testing against transportation-related hazards such as vibration, impact and mechanical stress before batteries may be transported.

Technical Evaluation And Safety Controls

The Guidelines require key components, battery systems, battery management systems (BMS), power conversion systems (PCS) and energy management systems (EMS) to undergo technical evaluation against applicable safety and performance standards. Procurement contracts should expressly require suppliers to provide compliant test reports and supporting certification as contractual deliverables. The absence of such documentation at the time of Site Acceptance Testing (SAT) or project handover may create a technical compliance gap capable of delaying commissioning and regulatory sign-off.

At the system level, grid-connected BESS installations must incorporate anti-islanding protection to prevent back-feeding into a de-energised network during a grid outage. For systems designed to operate in islanded mode, additional measures are required, including transfer switches or circuit breakers and clear permanent signage identifying the operating mode of the system.

The Guidelines also prescribe requirements relating to electrical isolation, earthing arrangements, working safety clearances and enclosure protection. Outdoor installations must generally achieve a minimum IP54 rating. Because utility-scale BESS installations commonly operate well above the prescribed voltage thresholds, clearance requirements should be addressed during the design phase, retrofitting additional clearances or modifying enclosure layouts after procurement can be costly and disruptive.

Utility-scale developers should also verify that anti-islanding settings are calibrated consistently with applicable Grid Code requirements, including fault ride-through obligations. Misalignment between protection settings and grid connection requirements may create compliance issues during commissioning.

Thermal Runaway And Fire Safety

Given the fire risks associated with lithium-ion batteries, the Guidelines place considerable emphasis on thermal management and fire prevention. BESS installations must incorporate appropriate ventilation and temperature-control measures, including HVAC systems where necessary. Thermal runaway mitigation measures must be implemented, and thermal runaway testing must be conducted in accordance with UL 9540A or as otherwise required by the relevant fire and safety authorities.

Outdoor installation is preferred. Indoor installations remain permissible provided that appropriate fire protection measures are in place and all relevant Fire and Rescue Department requirements are satisfied. Developers considering indoor installations should engage with the relevant Fire and Rescue Department authorities at an early stage, as fire protection requirements may affect building design, floor loading, ventilation specifications and overall project costs in ways that are difficult to address once construction has commenced.

Given increasing global scrutiny of battery fire risks, thermal runaway testing requirements should be addressed during equipment selection rather than shortly before commissioning.

Testing And Commissioning

The Guidelines require testing both before and after installation. Factory Acceptance Testing (FAT) verifies that equipment complies with design specifications before deployment. Following installation, SAT must be carried out to verify compliance with applicable technical requirements, including testing of protective devices, grounding systems, insulation, isolation, disconnection switches and anti-islanding functionality. A SAT certificate documenting all tests performed must be produced and retained, separately from the statutory certificates described below.

In addition, the Supervision and Completion Certificate (Form G) and Test Certificate (Form H) prescribed under the Electricity Regulations 1994 must be signed by the appointed competent person and retained by the owner. These are statutory compliance documents, not internal project records. Gaps in the compliance record, missing FAT reports, unsigned Form G or Form H, absent UL 9540A test reports or incomplete SAT certificates are the kind of items that can delay financial close, trigger conditions precedent under financing arrangements or complicate future refinancing exercises. Assembling this documentation is therefore a project management issue as much as a regulatory one.

Maintenance And Operational Safety

The Guidelines impose continuing obligations throughout the operational life of a BESS installation. Maintenance work may only be carried out under a valid Permit to Work system and must be performed by a competent person or by persons acting under the competent person's supervision and control. O&M agreements should address continuity of competent person oversight, including arrangements for periods of absence or unavailability, to avoid situations where urgent maintenance cannot lawfully proceed.

Operators must maintain appropriate personal protective equipment, clear safety notices and warning signs, including signage relating to electrical hazards, arc flash risks, battery identification and emergency contacts. Maintenance records must be retained, periodically updated and made accessible to relevant personnel. Beyond regulatory compliance, such records may become important in the context of warranty claims, insurance coverage and future disputes concerning equipment condition and performance.

Grid-connected And Off-grid Systems

Grid-connected BESS installations are subject to additional requirements relating to AC-side and DC-side protection, anti-islanding measures, protection at the point of connection and lightning protection in accordance with MS IEC 62305.

The Guidelines distinguish between end-user and utility-scale grid-connected installations, with utility-scale systems subject to more stringent Grid Code-aligned protection and SAT requirements. Developers should confirm which category applies to their project at an early stage.

Off-grid systems remain subject to many of the same safety requirements, although certain grid-related protection obligations do not apply. For developers integrating battery storage with renewable energy projects, these requirements should be considered alongside Distribution Code obligations and project-specific grid connection requirements.

Practical Implications

The immediate priority for each party is to determine whether existing project specifications, procurement strategies, testing procedures and operational controls meet the benchmark the Guidelines now establish. For developers and EPC contractors, the focus should fall on component certification, UL 9540A testing, anti-islanding and thermal runaway controls, and FAT and SAT documentation. For asset owners, the priority is maintenance procedures, competent person appointments and PTW arrangements. For lenders and technical advisers, the Guidelines should be incorporated into due diligence frameworks, with particular attention to the statutory compliance documents, Form G, Form H, SAT certificates and UL 9540A test reports that will now form part of the project compliance record.

Compliance reviews conducted during the design and procurement stages will provide greater flexibility and lower remediation costs than reviews undertaken after installation or commissioning has commenced.

Conclusion

The immediate question for every party involved in a BESS project is whether current arrangements meet the regulatory baseline the Guidelines now establish. The areas most likely to attract scrutiny from the EC, lenders, technical advisers and project counterparties are component certification and UL 9540A testing, FAT and SAT documentation, competent person appointments, and anti-islanding and thermal runaway controls.

Early compliance reviews may help avoid procurement delays, commissioning issues, regulatory exposure and financing concerns later in the project lifecycle.

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