eea Electricity Engineers' Association

CONSULTATION DOCUMENT

APRIL 2026

Battery Energy Storage Systems (BESS) Operational Safety Guideline

FIRST PUBLISHED: APRIL 2026 - INDUSTRY CONSULATION

HEALTH + SAFETY
——
ASSET MANAGEMENT
——
PROF DEVELOPMENT
——
NCLW + LIVE WORK

CONSULTATION DOCUMENT

CONSULTATION DOCUMENT

Battery Energy Storage Systems (BESS) Operational Safety Guideline

Issued and published by the Electricity Engineers’ Association of New Zealand (Inc.) (EEA).

First published: April 2026 – FOR INDUSTRY CONSULTATION

ISBN (PDF): 978-1-0670105-4-6

CONSULTATION DOCUMENT

CONSULTATION DOCUMENT

Copyright

Copyright is owned by the Electricity Engineers' Association of New Zealand (Inc.) (EEA), PO Box 5324, Wellington.

All rights reserved. No part of this work may be reproduced or copied in any form or by any means (graphic, electronic, or mechanical, including photocopying, recording, taping or information retrieval systems) without the written permission of the copyright owner.

Disclaimer

This guide is recommended as good practice by electricity supply industry representatives, but it is not a substitute for legislative or other regulatory requirements. If there is uncertainty on what guidelines or legislative requirements should apply in any particular situation, specialist advice, including legal advice, should be sought.

The Electricity Engineers' Association of New Zealand (Inc.) and the electricity supply industry representatives involved in preparing this guide, accept no liability or responsibility for an error or omission contained in this guide, or any injury, loss, damage (including indirect or consequential loss or damage), or any other claim from any reliance on, or failure to rely on, the contents of this guide.

This guide has been prepared by representatives of the electricity supply industry to provide guidance on safety practices for use by the industry.

This guide has been prepared on the basis that the users will be appropriately trained, qualified, authorised, and competent.

Status of Examples and Case Studies

Examples, including sample processes, or case studies in this guide are included to assist with consideration of health and safety issues. The examples or case studies are not a comprehensive statement of matters to be considered, nor steps to be taken, to comply with any statutory obligations pertaining to the subject matter of this guide.

Preface

The content of this guide will be monitored and revised periodically. Suggestions for changes should be sent to admin@eea.co.nz Electricity Engineers' Association, P O Box 5324, Wellington, 6145.

CONSULTATION DOCUMENT

Purpose

Battery Energy Storage Systems (BESS) are becoming a vital part of New Zealand's electricity landscape, supporting the integration of renewable energy, providing grid stability, and enabling energy resilience. These systems, however, present unique electrical, chemical, and fire hazards that demand thorough understanding and rigorous safety measures. This guideline provides comprehensive instructions for electrical workers in the operation, maintenance, and decommissioning of BESS in residential, commercial, industrial, and utility-scale settings.

The aim of this document is to help electrical workers comply with New Zealand standards, protect themselves and others from harm, and ensure reliable and efficient system performance throughout the lifecycle of BESS installations.

Background

Battery Energy Storage Systems (BESS) represent a transformative technology in the evolving energy landscape, supporting the integration of renewable energy sources, improving grid stability, and enhancing energy resilience. While widely deployed internationally, BESS installations are still relatively new within New Zealand's infrastructure context.

As adoption grows across residential, commercial, and utility-scale applications, there is a clear need to establish consistent guidelines that align with New Zealand's regulatory frameworks, environmental conditions, and best practice safety standards. Lessons from international experience underscore the importance of proactive planning, robust safety design, and clear operational protocols to mitigate risks such as thermal runaway, electrical hazards, and system failures.

This guideline provides a foundational reference for asset owners, and electrical workers involved in BESS operations across New Zealand. It draws upon global standards while contextualising them to meet local legislative requirements and industry expectations regarding workplace health and safety.

Scope

This guideline applies to the maintenance of stationary Battery Energy Storage Systems (BESS) in New Zealand and to workers undertaking tasks on, or working in the vicinity of, operational BESS installation.

This Guide must not to be used for project planning, installation or as regulatory guidelines. It covers systems already being used in residential, commercial, industrial, and utility-scale applications. Most safety management systems in NZ already have robust guidelines from Worksafe NZ or other entities.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

There are various types of batteries used across different applications, each with unique characteristics and safety considerations. These include batteries housed in shipping containers, those with exposed bus bar, and those integrated into electric vehicle (EV) charging systems. Additionally, batteries used by homeowners for energy storage or backup power present their own set of risks and handling requirements. Understanding the differences between these battery types is essential for ensuring safe installation, maintenance, and disposal practices***. Follow the manufacturers guidelines for installation methodology.***

To manage the risks associated with batteries, applying the hierarchy of control is crucial. This includes mitigating arc flash hazards, ensuring proper maintenance procedures, and implementing safe systems of work. Equally important is fostering knowledge and competency among workers to handle battery-related tasks safely. Ultimately, maintaining health and safety standards protects not only the individuals performing the work but also the public who may be affected by battery-related incidents.

Compliance with relevant New Zealand standards, regulations, and WorkSafe NZ guidelines including Road Transport, Maritime, Fire and Emergency and Public safety.

Excluded from this guideline are:

– Mobile energy storage systems (e.g., electric vehicles or portable battery units).
– Batteries used solely for backup power (e.g., UPS systems in IT environments).
– Home solar and battery systems.

This guideline is intended to complement, not replace, statutory obligations under the Electricity Act 1992, Health and Safety at Work Act 2015, Building Act 2004, and Fire and Emergency New Zealand (FENZ) requirements.

Acknowledgements

The EEA is indebted to members of the working group and the many industry people and companies who provided comments and contributed to the development of this document.

CONSULTATION DOCUMENT

Content

Copyright i

Disclaimer i

Status of Examples and Case Studies i

Preface i

Purpose ii

Background ii

Scope ii

Acknowledgements iii

Content iv

Introduction 1

Definitions and Abbreviations 2

1. Regulatory and Standards Framework 3

    1.1 Building fire 3

    1.2 NZ regulatory completeness 3

    1.3 Battery Technologies and Configurations 4

    1.4 Solar Photovoltaic (PV) Technologies 4

    1.5 Risks and Hazards 4

    1.6 Personal Protective Equipment 5

    1.7 Signage 5

2. Risks and Hazards – Solar Installations as part of the BESS operations 6

    2.1 Site Selection, Design, and Installation 6

    2.2 System Components and Safety Features 7

3. Safe Work Practices 8

    3.1 Permits and Part 6 Approvals 8

    3.1 Work on Connected Electrical Equipment 8

4. Emergency Preparedness and Response 9

    4.1 Incident Communications 9

    4.2 Detection / Alarms 9

    4.3 Firefighting strategy update 9

5. Maintenance and Inspection 10

    5.1 Arc flash 10

    5.2 Regulatory checks 10

6. Decommissioning and Recycling 11

6.1 Transport compliance ... 11
6.2 Maritime operations in NZ ... 11
7. Training and Continuous Improvement ... 11
Appendix A References and Standards ... 12
Appendix B Additional international standards ... 14
Appendix C One-page ERP Summary for Fire and Emergency New Zealand (FENZ) ... 15

CONSULTATION DOCUMENT

CONSULTATION DOCUMENT

Introduction

Battery Energy Storage Systems (BESS) are technologies designed to store electrical energy in batteries for later use. They play a critical role in New Zealand's transition to renewable energy and in achieving net-zero emission targets.

However, the rapid deployment of BESS introduces new risks for workers, highlighting the crucial need for clear safety guidance.

While BESS offers substantial benefits, it also presents significant hazards, particularly in systems using high-capacity lithium-ion batteries. These risks include fire, thermal runaway, electrical faults, chemical leaks, arc flash and mechanical damage, all of which can escalate into serious incidents that the worker may be exposed to without proper safeguards.

Safety concerns are shared both by communities near current or proposed BESS sites and by professionals in the electrical industry who are responsible for maintaining operating and working near these systems.

As a worker you must:

- Use safe systems of work
- Only perform tasks you are qualified for and have the competency to carry out
- Take responsibility for your own health and safety obligations as well as that of other people
- Cooperate with your employer to meet health and safety obligations and reduce risks

This guide explores these responsibilities, offering best practices to help asset owners, employers and workers develop effective worker safety procedures. By doing so we can support the growth of BESS installation while safeguarding people, infrastructure and the environment.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

Definitions and Abbreviations

Battery Energy Storage System (BESS)	A system consisting of batteries and associated equipment used to store electrical energy for later use. A BESS typically includes battery modules, battery management systems, inverters, protection systems, and associated control equipment.
Battery Management System (BMS)	An electronic system that monitors and manages battery operation, including voltage, current, temperature, and state of charge, and protects the battery from operating outside safe limits.
Flow Battery	A type of electrochemical energy storage system in which energy is stored in liquid electrolytes that circulate through the battery system and are separated by a membrane.
Preliminary Notice	A notification provided to the relevant electricity network operator advising of a proposed connection or modification of distributed generation equipment in accordance with the Electricity Industry Participation Code.
Thermal Management System (TMS)	A system used to regulate battery temperature within safe operating limits using cooling, heating, or ventilation methods.
Thermal Runaway	An uncontrolled self-heating reaction within a battery cell where increasing temperature accelerates chemical reactions, potentially leading to fire, explosion, or release of toxic gases.
AS/NZS	Australian/New Zealand Standard
BMS	Battery Management System
EPA	Environmental Protection Authority
ERP	Emergency Response Plan
GHS	Globally Harmonised System of Classification and Labelling of Chemicals
HSNO	Hazardous Substance and New Organisms
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods Code
PV	Photovoltaic
TMS	Thermal Management System
UPS	Uninterruptible Power Supply

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

1. Regulatory and Standards Framework

1.1 Building fire

For grid-scale sites, hydrant provision and firefighting water supplies should be confirmed in accordance with *SNZ PAS 4509:2008 Firefighting Water Supplies Code of Practice*.

Fire detection and alarm systems should comply with NZS 4512:2021, and automatic fire sprinkler systems with NZS 4541:2020, where installed.

Building fire safety design should also consider the relevant provisions of the *New Zealand Building Code Acceptable Solution C/AS2 (Protection from Fire)* for buildings other than Risk Group SH

1.2 NZ regulatory completeness

BESS installations in New Zealand must adhere to specific national and international standards to ensure safety and reliability.

The key standard for battery system installations is AS/NZS 5139:2019, which outlines safety requirements for battery systems used with power conversion equipment.

Electrical work must also comply with AS/NZS 3000:2018 (the Wiring Rules) and, depending on system configuration, may also require compliance with AS/NZS 4777 Inverter requirements for grid connection, including anti-islanding protection and voltage/frequency response, for grid-connected inverters, and AS/NZS 4509 for stand-alone power systems. Installations must meet the requirements of the New Zealand Building Code and relevant fire safety codes, as well as manufacturer instructions. All other Regulations, NZ Standards, WorkSafe, and EEA Guidelines or must be followed when doing works on or near operational BESS installations.

Under the Electrical Safety Regulations, only licensed electrical workers are authorised to carry out prescribed electrical work on of BESS, where voltages exceed 50 V AC or 120 V DC. This includes installation, modifications, or maintenance. Workers must be trained not only in safe electrical practices, but also in the specific hazards, technology, and emergency response procedures relevant to BESS installations.

Grid-connected systems also require approval from the network operator before commissioning, and company's may need to submit a Preliminary Notice, provide detailed technical specifications to meet the network's compliance requirements and seek approval to connect under Part 6 of the Electricity Industry Participation Code.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

1.3 Battery Technologies and Configurations

BESS use a variety of battery technologies, each with specific characteristics, benefits, and risks. Lithium-ion batteries are the most common in modern grid-scale installations due to their high energy density, compact size, and quick response capabilities. These batteries, however, are sensitive to heat, mechanical damage, and overcharging, which can lead to dangerous runaway thermal events. Other batteries like Flow batteries, such as vanadium redox or zinc-bromine systems, store energy in liquid electrolytes contained in external tanks. They are stable over time, suitable for long-duration storage, and less prone to fire risks, though they occupy more space than lithium-ion systems.

BESS installations can be factory-assembled modular systems, which arrive enclosed and ready for installation, or custom configurations where batteries, inverters, and control components are integrated on-site. These are not yet available in NZ.

1.4 Solar Photovoltaic (PV) Technologies

Solar installations in New Zealand typically use crystalline silicon PV modules, either monocrystalline or polycrystalline, which convert sunlight into DC electricity. (a separate Guideline will be made available for solar installations that is operational) Monocrystalline modules offer higher efficiency and compact design, while polycrystalline panels are generally more cost-effective. Thin-film technologies, although less common, may be used in specific applications where flexible, lightweight, or semi-transparent modules are advantageous.

PV arrays are usually mounted on rooftops or ground-mounted structures, with system design influenced by site orientation, shading, and structural considerations. In utility-scale solar farms, modules are often mounted on fixed-tilt racking or single-axis trackers to optimise energy production.

When integrated with BESS, solar generation enables greater self-consumption, load shifting, and resilience. PV modules connect to inverters, which convert DC power to AC for grid connection or local use. Safety considerations include proper DC cable routing, isolators, surge protection, and adherence to AS/NZS 5033 (PV arrays) and AS/NZS 4777 (inverters).

1.5 Risks and Hazards

Working with BESS involves significant risks that requires careful management. The electrical risks include high DC voltages that can cause severe electric shock or electrocution and the potential for arc flash incidents due to short circuits. Batteries can retain charge even after disconnection from AC power, meaning they remain hazardous unless fully isolated and/or discharged.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

Fire and explosion risks arise from battery chemistries, particularly lithium-ion, which can undergo uncontrolled thermal runaway if damaged, overcharged, or exposed to high temperatures. This condition produces intense heat, flames, and toxic gases. Other battery types also produce flammable gases during normal operation, which can accumulate and ignite if ventilation is inadequate.

Chemical risks include exposure to corrosive or toxic electrolytes, which can leak from damaged casings or during failure. Such leaks can contaminate the environment and pose direct harm to workers. Mechanical risks, such as heavy battery modules falling or being dropped, and psychological stress from confined or high-risk environments, should also be considered.

1.6 Personal Protective Equipment

PPE Compliance with AS/NZS 5139:2019 is essential. This standard outlines the necessary personal protective equipment (PPE) and signage requirements to manage the unique hazards posed by lithium-ion technology. PPE must be selected based on a risk assessment that considers arc flash potential, toxic gas release, and fire hazards. Common PPE includes arc-rated clothing, insulated gloves, eye protection, and respiratory protection when working in enclosed or poorly ventilated areas.

1.7 Signage

Signage must clearly indicate the physical, health, and environmental hazards associated with lithium-ion batteries, such as electricity flammability, chemical instability, and toxic emissions. Labels should include GHS pictograms, signal words (e.g., “Danger”), hazard statements, and precautionary measures. These signs must be placed on visible locations near the battery installation and on access points to battery rooms or enclosures.

HSNO signage must also be installed at every entrance to the site.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

2. Risks and Hazards – Solar Installations as part of the BESS operations

Working with solar PV installations involves a distinct set of risks that require careful management. The electrical risks include high DC voltages generated whenever panels are exposed to sunlight. PV strings remain live even after disconnection from AC supply, creating a continuous risk of electric shock or arc flash if proper isolation and shading procedures are not followed.

Fire risks arise from faulty DC isolators, damaged cables, or inverter malfunctions, which can cause arcing and ignite surrounding materials. Poorly maintained vegetation or combustible structures near arrays can increase the likelihood and impact of fires.

2.1 Site Selection, Design, and Installation

The location and design of a BESS installation are critical to ensuring its safety and performance. Systems should be installed in spaces that minimise exposure to extreme temperatures, moisture, dust, and mechanical damage. Installations in habitable rooms should be avoided unless the BESS is specifically certified for indoor use. Outdoor enclosures must have adequate weatherproofing and a minimum ingress protection (IP) rating of IP54 (an electrical enclosure is protected against solid objects larger than 1mm (like tools and wires) and from low-pressure water jets from any direction), be resistant to tampering, and restrict access by unauthorised persons or animals.

Sufficient ventilation is essential to prevent the build-up of heat and flammable gases, and clearances around the installation must meet both the manufacturer's recommendations and the standards in AS/NZS 5139. The design must include clear labelling of all circuits, switches, isolators, and emergency shutdown procedures. AC and DC wiring must be segregated and appropriately marked. Fire-resistant materials and protective barriers should be used where required, and the installation should maintain clearances from combustible materials and vegetation, creating an Asset Protection Zone around outdoor systems.

For solar PV installations as part of the BESS site, site selection and design must consider roof structure, orientation, tilt angle, and shading to optimise performance and safety. Rooftop systems must be installed on structurally sound buildings, with penetrations sealed to maintain weather tightness. Ground-mounted solar should incorporate secure fencing, controlled access, and appropriate separation from combustible vegetation. There must be a specific emergency plan for the solar installation separate from that of the BESS. Follow the manufacturers guidelines and Solar guidelines from the appropriate authority.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

All PV arrays must comply with AS/NZS 5033, including requirements for clear labelling, cable routing, isolator placement, and fire safety provisions. DC cabling should be protected against UV, mechanical damage, and wildlife interference. Where trackers or ground structures are used, compliance with structural design standards (AS/NZS 1170 series) is required. Adequate spacing between rows of panels must be maintained for safe access, ventilation, and fire protection.

2.2 System Components and Safety Features

A BESS installation comprises several critical components. The battery modules or cells are controlled by a Battery Management System (BMS), which monitors voltage, temperature, current, and state of charge, and can isolate the batteries if unsafe conditions arise. A Thermal Management System (TMS) keeps the batteries within safe operating temperatures, using either liquid or air cooling, and may also include heating to maintain performance in cold environments.

Inverters and chargers convert energy between AC and DC forms, and all circuits are protected by correctly rated fuses, circuit breakers, and DC isolators. Other safety features include fire detection and suppression systems, explosion venting panels or active ventilation, and emergency shutdown mechanisms such as a Fast Stop (F-Stop), which can rapidly disconnect non-critical components and isolate the system in case of a fault.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

3. Safe Work Practices

3.1 Permits and Part 6 Approvals

Where the installation of BESS affects grid export capability or inverter settings, the installer must confirm the network operator's requirements and, where relevant, the Part 6 distributed generation approval status before commissioning.

Prior to commencing any work on an operational BESS, electrical workers must familiarise themselves with the system's design, perform a site-specific risk assessment, and ensure all energy sources are isolated using lockout/tagout procedures by means of the manufacturers safety documentation and the Site Safety Management plan (SSMP). A Safe Work Method Statement should be prepared, and appropriate personal protective equipment (PPE) must be worn, including insulated gloves, arc-rated clothing, face shields, and respirators if handling damaged batteries. Consideration should be given to a specific Arc Flash Safety plan and the Emergency plan. All work must be done using EEA Publications and SM-EI available on the *EEA website*.

During work, care must be taken to avoid creating sparks or short circuits, and insulated tools and protective barriers should be used when handling live components. The work area should be kept clear of flammable materials and water sources. Once work is complete, the system should be tested and recommissioned following the manufacturer's instructions, and all labels, signage, and diagrams must be updated to reflect any changes.

General work tasks must follow the Worksafe NZ guidelines and Codes of Practice. A list of these can be found under the References and Standards section. The system must have a testing schedule.

3.1 Work on Connected Electrical Equipment

Working on electrical equipment connected to BESS involves unique risks due to the presence of high-voltage equipment, interconnected systems, and energy storage modules. Safety practices must ensure that all personnel are protected from electrical hazards. This section outlines the key worker safety requirements when interacting with connected BESS equipment.

Any equipment that is to be worked on shall be isolated, proven de-energised, earthed and an access permit shall be issued, approved live work procedures shall be used.

If the BESS is not under operational control of the permit issuer an assurance is required as part of the permit issue process. More information on this can be found in the EEA SM-EI.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

4. Emergency Preparedness and Response

4.1 Incident Communications

Establish isolation zones, upwind positioning, continuous gas monitoring (H2, CO, HF) and thermal monitoring. Include re-ignition watch protocols post-incident.

4.2 Detection / Alarms

Ensure detection, alarm and firefighter interfaces comply with NZS 4512:2021; consider sprinkler or water mist protection based on a risk assessment aligned to NZS 4541:2020 and C/AS2. Confirm hydrant performance and hardstands to SNZ PAS 4509:2008.

4.3 Firefighting strategy update

For lithium-ion events, prioritise isolation, monitoring and cooling, large volumes of water may be required to cool adjacent cells and prevent propagation. Clean-agent or Class D extinguishers alone are not adequate for Li-ion cells; water can be used for cooling where safe, with runoff control and gas monitoring (e.g., HF). Coordinate with FENZ pre-incident plans.

Every BESS site must have an Emergency Response Plan (ERP), tailored to its specific hazards and approved by relevant authorities. The ERP should include clear procedures for dealing with fires, explosions, chemical spills, electrical shocks, and medical emergencies. Workers should be trained in these procedures, and roles and responsibilities must be clearly assigned.

For lithium-ion battery incidents, prioritise isolation, monitoring and cooling, often using large volumes of water to cool cells/modules and prevent propagation with runoff control and gas monitoring (e.g., HF/CO). Select extinguishers only for associated Class A/B fires; clean-agent/Class D agents alone are not sufficient for Li-ion cells. Coordinate tactics with FENZ pre-incident plans.

After an incident, the system must not be recommissioned until all hazards have been eliminated, and the site has been inspected and cleared by a competent authority.

These plans must be shared with the local FENZ, all other Emergency services, local Councils and any other authority (Harbour Master, Ports Authority, Coast Gard, Environmental Protection agency (EPA), New Zealand Transport Authority (NZTA) etc, that might be a stakeholder in the area of the specific BESS.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

5. Maintenance and Inspection

5.1 Arc flash

Where applicable, perform an arc-flash risk assessment in accordance with EEA's Arc Flash Guide and maintain arc-rated PPE and labelling consistent with EEA SM-EI and site electrical safety rules.

5.2 Regulatory checks

Include periodic verification that hazardous substances controls (storage, segregation, GHS labels/SDS) remain compliant with HSWA (Hazardous Substances) Regulations 2017 and EPA Notices. Maintain records of emergency response drills with FENZ and update the ERP post-exercise.

BESS installations require regular maintenance to remain safe and reliable. Monthly inspections should include visual checks of enclosures, labels, and cables, as well as a review of BMS logs and alarms. Fire detection and suppression systems should be tested six monthly, and ventilation systems checked quarterly. Battery string voltages and resistances should also be measured annually to detect degradation.

All maintenance activities should be documented, and any defects or anomalies corrected promptly. Preventative maintenance not only ensures compliance but extends the life of the system and reduces the likelihood of failures.

Any area that might be Heights or Confined space must follow Worksafe NZ guideline and Standards for work these spaces.

Any area that might have Asbestos present (old building or sheds) must have an Asbestos Management plan.

Any Hazardous Substances or Danegerous goods must be handled as per the specific Regulation and must have a management plan.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

6. Decommissioning and Recycling

At the end of its operational life, a BESS installation must be safely decommissioned according to an approved Decommissioning Management Plan. The system must be fully isolated and discharged, and all components removed by trained personnel. Batteries or Solar panels must be handled as hazardous materials and transported to certified recycling or disposal facilities. Many manufacturers offer take-back programs to recover valuable materials and minimise environmental impact.

End-of-life batteries can still pose significant risks of fire, leaks, and residual charge, so appropriate PPE, containment measures, and approved transport procedures (Land and Sea) must be followed. The site should be rehabilitated and restored in accordance with regulatory and environmental requirements.

6.1 Transport compliance

When transporting end-of-life or damaged batteries, ensure compliance with: Land Transport Rule:

- Dangerous Goods 2005 (UN3480/3481), IATA DGR (2026 guidance for air, including ≤30% SoC rules), and
- IMDG Code (Amendment 42-24) for sea freight.

Damaged / Defective or waste batteries must follow special packing instructions (e.g., P908/P909) and have UN 38.3 test summaries where applicable.

6.2 Maritime operations in NZ

Where movement by vessel is required, consult Maritime NZ guidance on lithium-ion batteries on vessels and coordinate with carriers on IMDG compliance.

7. Training and Continuous Improvement

Given the rapid evolution of BESS technologies and standards, ongoing training and professional development are essential. Workers should regularly attend manufacturer-led training, industry workshops, and emergency response drills. Lessons learned from incidents and near misses should be shared and integrated into updated procedures. Keeping abreast of new standards, technologies, and best practices ensures that electrical workers remain competent and confident in managing BESS and Solar installations safely and effectively.

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

Appendix A References and Standards

This guideline was developed based on a combination of New Zealand and international standards, guidelines, and best practices.

The primary references and standards used include:

WorkSafe Queensland	BESS safety page
Energy Safe Victoria	Bess Guidance
Maritime NZ	Lithium-ion batteries on vessels (guidance)
NZTA	Land Transport Rule: Dangerous Goods 2005
IMDG	Lithium batteries guidance (Amendment 42-24)
IATA	Battery Guidance Document 2026
NFPA	Energy Storage Systems Safety Fact Sheet
US EPA	Battery Energy Storage Systems: Safe Installation & Incident Response (2025)
AS 2067:2016	Substations and high voltage installations exceeding 1 kV a.c.
AS 3011.2:2019	Secondary batteries installed in buildings (sealed cells)
AS/NZS 5139:2019	Safety of battery systems
AS/NZS 5033:2021	PV arrays
AS/NZS 4777.2:2020 (with Amd 2:2024)	Inverter requirements
Electricity Industry Participation Code	(Network Connections) Amendment 2026 (NZ Gazette)
Electricity Industry Participation Code	Part 6 Distributed Generation (Nov 2024)
SNZ PAS 4509:2008	Firefighting Water Supplies Code of Practice
NZS 4541:2020	Automatic fire sprinkler systems
NZS 4512:2021	Fire detection and alarm systems (sponsored access)
NZ Building Code C/AS2	Protection from Fire (latest edition)
EPA Hazardous Substances (Hazardous Property Controls) Notice 2017	consolidated Apr 2021
HSWA (Hazardous Substances) Regulations 2017	Regulations

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

WorkSafe	Electricity (Safety) Regulations 2010 overview & 2025 amendments
Electricity (Safety) Regulations 2010 (as at 15 Jan 2026)	Regulations
Electrical installations: Safety of battery systems for use with power conversion equipment	AS/NZS 5139:2019
Australian/New Zealand Wiring Rules.	AS/NZS 3000:2018 (Wiring Rules)
Grid connection of energy systems via inverters.	AS/NZS 4777.1 & 4777.2
Stand-alone power systems.	AS/NZS 4509.1 & 4509.2
New Zealand Building Code and relevant fire safety codes.	New Zealand Building Code
Clean Energy Council	Clean Energy Council Installer Guidelines.
WorkSafe New Zealand:	Battery Energy Storage Systems Guidance.
Battery Energy Storage Systems	
Department of Mines, Industry Regulation and Safety.	A Guide for Electrical Contractors
Queensland Renewable Energy Council, 2024	BESS Factsheet
European Association for Storage of Energy.	EASE Guidelines on Safety Best Practices for Battery Energy Storage Systems, 2025
Manufacturer	Manufacturer technical manuals and safety data sheets
WorkSafe	Preventing falls from heights (August 2013) |
WorkSafe	Confined spaces: planning entry and working safely in a confined space
WorkSafe	Vehicles and mobile plant
WorkSafe	Excavation safety
WorkSafe	Electricity

COPYRIGHT © Electricity Engineers' Association

Appendix B Additional international standards

Referenced for best practices include:

IEC 62933-1 & 62933-5-2	Safety and testing requirements for electrochemical BESS
UL 9540 and 9540A	Safety standards for energy storage systems
NFPA 855	Fire safety standard for stationary energy storage systems.

These documents represent the current best practices and regulations at the time of writing. As technologies and standards continue to evolve, workers are encouraged to consult the latest versions of these standards and engage in ongoing professional development.

This guideline is intended as a living document and should be reviewed and updated periodically to incorporate new insights, technologies, and regulatory changes.

CONSULTATION DOCUMENT

COPYRIGHT © Electricity Engineers' Association

CONSULTATION DOCUMENT

Appendix C One-page ERP Summary for Fire and Emergency New Zealand (FENZ)

Site	– Address: [Insert address] – GPS: [lat, long]
24/7 Contacts	– Incident Controller [name, mobile] – Electrical Authorised Person [name, mobile] – Asset Owner [name, mobile]
Access	– Gate reference – after-hours access method – muster points – traffic management plan reference.
Single-line diagram and isolation	– Reference drawing no. [ID] – AC/DC isolators – ESS master stop (F-Stop) location – inverter AC disconnection points
Battery system	– Technology/chemistry – total energy (MWh) and max DC voltage – enclosure type (container/room) and ventilation method
Fire strategy	– Primary objective is containment and preventing propagation – Cool affected/adjacent units with water where safe to do so – monitor HF/CO – Use detectors/alarms per NZS 4512 and suppression systems per NZS 4541 where installed
Gas/toxic hazards	– Monitor HF, HCN, CO – establish isolation zones and stay upwind – Control and contain run-off – notify environmental authority if required
Hydrants/water	– Hydrant locations/flows and hardstands (SNZ PAS 4509) – Hose lay routes – nearest static water
Re-ignition watch	– Thermal monitoring and patrols for ≥24 hours after knockdown or until temperatures stabilise
Comms and notifications	– FENZ – Police (if traffic management needed) – EPA/WorkSafe (if notifiable) – network operator (if export is affected)

COPYRIGHT © Electricity Engineers' Association