



66kV 275kV 33kV 11kV 132kV 400kV

CASE STUDY  
**16156**

# Auchterraw BESS

50 MW/100 MWh Energy Storage facility with 14 battery bays providing a total capacity of 61.6 MVA

## Project Facts and Figures

- ▶ Battery bays: 14
- ▶ Battery capacity: 61.6 MVA
- ▶ Total capacity: 50 MW power/100 MWh storage
- ▶ DNO building: Brick and block construction
- ▶ Permanent welfare: Containerised facilities including EV charging
- ▶ Two BESS buildings:
  - Control Room (SCADA, LVAC, CCTV, battery backup, metering)
  - 33 kV Switchroom (16 circuit breakers and associated protection)
- ▶ Perimeter: 4 m acoustic fencing



## Introduction

Powersystems was responsible for the complete design and delivery of the Civil and EBoP package, including public road upgrades, site access road construction, compound development, civil foundations and buildings, landscaping, earthing, installation of batteries, transformer skids, PCS units, switchgear, backup supplies, network communications, and full commissioning activities required for grid connection.

The Auchterraw BESS is a 50MW/100MWh energy storage facility comprising 14 battery bays, each containing 22-24 CATL battery cubes, with dedicated transformer skids and PCS units per bay. The installation provides a total capacity of 61.6MVA, connecting into the Fort Augustus 400 kV grid substation.

As a trusted NERS accredited contractor with over 49 years of experience, Powersystems acted as Principal Contractor under CDM, overseeing all civil, electrical, and commissioning activities.



## Powersystems Partnerships

The Auchterraw site was delivered in partnership with RJ McLeod, a leading civil engineering contractor. Powersystems managed all major civil construction works, including public road improvements, site access development, and key infrastructure installation. This collaborative approach ensured seamless integration of the BESS into the national grid while maintaining full regulatory compliance.

The combined expertise of the two contractors played a significant role in supporting Scotland's and the UK's wider renewable energy strategy.



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## Project Development

As the UK transitions from fossil fuel generation to renewable energy, the electricity network faces increasing variability. Battery storage installations such as Auchteraw BESS are essential for providing system flexibility, storing surplus renewable energy, and responding rapidly to fluctuations in supply and demand.

With national renewable targets continuing to grow, the demand for large scale energy storage is increasing. The successful delivery of this project demonstrates Powersystems' commitment to supporting the UK's net-zero ambitions and advancing innovation in grid scale energy storage.



## Top Five Environmental Risks and Mitigation Measures

### 1. Weather Conditions

The remote Highland location presented significant winter challenges. Daily weather assessments were undertaken, and adverse weather procedures implemented. Snow plough attachments and gritting supplies were kept on site, and a designated team ensured safe access prior to main site activities.

### 2. Fuel and Oil Spillages

Drip trays were used under small plant and during refuelling. Spill kits were positioned across the site and highlighted during inductions. Absorbent pads were used to control drips during refuelling operations.

### 3. Dust Control

Works were screened with appropriate barriers and signage. Contractors followed dust control procedures, and cutting/grinding activities adhered to RAMS requirements. A water bowser was used when necessary to suppress dust on the access road.

### 4. General Waste Management

Segregated skips for general waste, wood, metal, plastics, and concrete washout ensured responsible disposal. All work areas were kept clean, tidy, and free of debris.

### 5. Packaging Waste from Equipment Deliveries

Due to international shipping, BESS equipment arrived with substantial packaging. Additional skips were rapidly deployed to ensure all materials were disposed of correctly.

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## Scope of Works and Key Design Considerations

Powersystems was commissioned to design and deliver all Civil and Electrical EBoP works, including:

- ▶ Public road improvements
- ▶ Site access and compound construction
- ▶ Civil foundations, buildings, and battery groundworks
- ▶ Earthing systems
- ▶ 33 kV cable installation and substation infrastructure
- ▶ Auxiliary transformer installation
- ▶ Supply and installation of all key BESS equipment from Trina, including 316 CATL battery cubes, PCS units, and 14 transformers

Key design considerations centred around safety, with a focus on fire suppression, real time monitoring, and public protection.

## Major Components Designed, Installed, and Commissioned

- ▶ Civil compound and road improvements
- ▶ Electrical system design and commissioning
- ▶ 33 kV cable installation, termination, and testing
- ▶ 16 way 33kV switchboard
- ▶ LVAC control equipment
- ▶ 33 kV switchroom and control buildings
- ▶ Main earthing system
- ▶ SCADA integration
- ▶ Fibre optic cabling and testing
- ▶ Control, small power, and communications systems
- ▶ DNO building
- ▶ Full commissioning and energisation
- ▶ Five year service and maintenance agreement

## Project Timings

The project began with mobilisation in October 2023. Key milestones included:

- ▶ May 2024: Delivery of first battery cubes (over 300 installed across 5 weeks)
- ▶ July 2024: Completion of the DNO building and arrival of BESS transformers and PCS units
- ▶ July 2024: 33 kV and LV cable installation nearing completion
- ▶ August 2024: VLF testing scheduled following termination works

Powersystems' efficient installation processes ensured rapid progress across all phases.

## Client Objectives

The client sought to deliver flexibility services and reduce constraint costs on the Scottish grid. The BESS supports grid stability by storing excess renewable generation and releasing it when required, contributing directly to UK net zero ambitions.

## How Powersystems Helped

As Principal Contractor, Powersystems led the full civil and electrical scope, enabling the 50 MW system to integrate smoothly into the national grid. Located north of the B4 transmission boundary, the project supports constraint management and enhances grid resilience.

Key contributions included:

- ▶ Electrical design
- ▶ Switchgear and transformer installation and commissioning
- ▶ HV testing
- ▶ Cable design, supply, containment, and installation

## Design Works

The design team ensured detailed, accurate, high quality engineering outputs. Close collaboration with civil partners ensured seamless interfaces and efficient installation. The team also supported electrical protection coordination and grid connection integration.



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## Installation Works

Over 300 battery cubes arrived from late May 2025 onwards, with precise preparation enabling fast and efficient installation. Meticulous alignment and anchoring ensured repeatable, high quality installation.

## Commissioning Works

Powersystems aimed to complete all electrical installation by August 2025, preparing the site for final Field/SSE commissioning.

## Energisation Works

The Auchteraw BESS facility successfully entered commercial operation in July 2025.

## Environmental Impact

The project underwent:

- ▶ Full Environmental Impact Assessment (EIA)
- ▶ Ecological assessments (otters, badgers, bats, great crested newts)
- ▶ Air quality assessments
- ▶ Fire safety design in accordance with best practice standards

## Community Engagement

Engagement included:

- ▶ Distribution of information flyers and online resources
- ▶ Installation of acoustic fencing to minimise noise and visual impact
- ▶ Use of local businesses, subcontractors, and accommodation

## Results

The project was completed on time and within budget. While SSEN experienced connection delays, Powersystems maintained a small on site team to support the client and manage complex third party interfaces safely and efficiently.

## Environmental Benefits

- ▶ Supports carbon reduction by enabling greater use of renewable energy
- ▶ Acoustic fencing and landscaping reduce visual/noise impact and enhance biodiversity
- ▶ Provides a stable renewable powered electricity source, improving grid reliability

## Economic Benefits

- ▶ Reduces grid constraints and supports efficient renewable energy flow
- ▶ Strengthens the local economy through investment and local supply chain use
- ▶ Helps lower energy costs by reducing peak demand pressures
- ▶ Enhances system resilience and flexibility

## Future Prospects

Following the successful delivery of Auchteraw BESS, FIELD awarded Powersystems a subsequent project, marking the beginning of a long term partnership.

## Challenges and Lessons Learned

- ▶ Harsh Highland weather and remote location required robust planning
- ▶ Early control of supplier interfaces ensured smooth logistics and avoided congestion on restricted access roads

## Documentation and Resources

- ▶ Full photographic documentation from start to completion
- ▶ Comprehensive Health & Safety and O&M packages delivered in both hard copy and digital formats
- ▶ Project visible via updated Google Maps imagery west of Fort Augustus



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