

HOUSEPLANSDIRECT TECHNICAL GUIDES

BATTERY STORAGE SYSTEMS EXPLAINED

A complete guide to capacity, power, coupling, controls, backup, siting, safety and commissioning



A domestic battery coordinated with solar PV, inverter, metering, consumer unit, grid connection and household loads.

NINE-PART PUBLICATION EDITION

Capacity · Power · AC coupling · DC coupling · Controls · Backup · Siting · Safety · Commissioning

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About this guide

This guide explains domestic electrical energy storage systems (EESS) for low-rise housing in England. It is intended for clients, designers, electricians, solar installers, energy assessors and site teams who need to coordinate batteries, power conversion equipment, solar PV, metering, consumer units, grid connections, controls, backup supplies, siting, fire precautions, commissioning and maintenance. Project electrical design, risk assessment, current regulations, network approval and manufacturer instructions take precedence.

SCOPE Project electrical design, fire-risk assessment, structural checks, network approval, product data, commissioning results, Building Control decisions and manufacturer instructions take precedence. Figures are explanatory and must not be scaled.

Part 1 – Introduction: What Is a Battery Storage System?

Storing electrical energy so it can be used at a more useful time

A domestic battery storage system converts electrical energy into stored chemical energy and later returns it through power conversion equipment to selected loads, the whole dwelling or the public network. It may charge from solar PV, the grid or another permitted source. The battery modules, battery-management system, inverter, protection, metering, controls, cables, isolators, enclosure, grid interface and user settings form one coordinated system.



Figure 1 – Principal battery-storage components connected to solar PV, the grid and household loads.

1.1 Principal components

Component	Purpose
Battery modules	Store electrical energy within permitted voltage, current and temperature limits.
Battery-management system	Monitors cells and controls safe charge, discharge and shutdown.
Power conversion equipment	Converts between battery DC and installation AC; may also manage solar PV.
Protection and isolation	Controls fault, overcurrent, residual-current, surge and safe-isolation risks.
Metering and controls	Measure energy flow and schedule import, export, charge, discharge and reserve.

1.2 Benefits and limitations

- Can increase use of on-site solar generation and reduce peak-period grid import.
- May provide selected-load or whole-home backup when specifically designed for island operation.
- Usable savings depend on tariffs, load profile, losses, degradation, controls and export terms.
- Stored energy remains an electrical and fire-safety consideration even when the grid supply is isolated.