

Energy storage system grid connection certificate - Turnkey C&I Energy Storage

Solution Brief: Deploying Energy storage system grid connection certificate

TURNKEY C&I ENERGY STORAGE SOLUTION BRIEF: DEPLOYING ENERGY
STORAGE SYSTEM GRID CONNECTION CERTIFICATE

EXECUTIVE SUMMARY

This document provides a comprehensive technical overview and performance datasheet for the advanced Energy Storage System (ESS) grid connection certificate platform, designed for Commercial & Industrial (C&I) applications. This solution is engineered to deliver peak shaving, demand response, and backup power capabilities, ensuring seamless integration with existing electrical infrastructure while maximizing operational efficiency and return on investment. The platform leverages Tier-1 LFP cell technology and intelligent liquid cooling to guarantee superior safety, longevity, and round-trip efficiency, all backed by a full suite of international grid connection and safety certifications.



SYSTEM ARCHITECTURE & SAFETY

The ESS grid connection certificate system architecture is built around a modular, containerized design that simplifies deployment and scalability. The core components include high-capacity battery racks, a bi-directional Power Conversion System (PCS), a sophisticated Battery Management System (BMS), and an Energy Management System (EMS). Safety is paramount, with a multi-layered protection strategy encompassing active cell balancing, real-time temperature monitoring, gas detection, and a comprehensive fire suppression system. The outdoor-rated IP54 enclosure ensures reliable operation in diverse environmental conditions, while the inherent stability of LFP chemistry provides a robust defense against thermal runaway, significantly reducing risk and ensuring compliance with the most stringent international safety standards.

KEY FEATURES

- Certified Grid Connection: Fully certified for grid interconnection with a comprehensive certificate package, ensuring compliance with regional and national grid codes for fast and smooth project permitting.
- High Efficiency: Delivers a peak efficiency of >90% in AC-AC conversion, maximizing energy arbitrage and reducing operational costs.
- Scalable Capacity: Supports parallel expansion from 215kWh to multi-MWh configurations, allowing for customized capacity that grows with business needs.
- Smart Liquid Cooling: Intelligent liquid cooling system maintains optimal battery temperature, improving cycle life by up to 20% and ensuring consistent performance in extreme climates.
- Advanced Safety Systems: UL 9540A tested and certified, with multi-level protection including active cell balancing, gas detection, and an integrated fire suppression system.
- Seamless Integration: Offers multiple communication protocols (Modbus TCP, IEC 61850, CAN bus) for seamless integration with existing site EMS, solar PV, and EV charging infrastructure.

COMPLIANCE & STANDARDS

The ESS grid connection certificate platform is designed to meet and exceed the most rigorous international standards. This commitment to compliance ensures that the system can be deployed globally with confidence, simplifying the regulatory approval process and providing assurance to stakeholders.

- Grid Connection: IEC 61727, IEEE 1547, VDE-AR-E 2510-2, G99
- Safety: UL 9540, UL 9540A, IEC 62619, IEC 62477
- EMC: IEC 61000-6-2, IEC 61000-6-4
- Environmental: UN 38.3 (Transport), RoHS, REACH
- System Certifications: CE, UKCA, CEC Listed (Australia)

TECHNICAL SPECIFICATIONS

This section details the core technical parameters of the Energy Storage System. For specific project requirements, consult with our engineering team for a tailored configuration.

- Battery Chemistry: Tier-1 Lithium Iron Phosphate (LFP)
- Nominal Capacity: 215 kWh (per base cabinet)
- Usable Capacity: 200 kWh (90% DOD)
- Rated Power: 100 kW AC (continuous)
- Peak Power: 110 kW AC (for 10 seconds)

- System Voltage Range (DC): 600 ~ 900 Vdc
- AC Voltage: 400 V / 480 V (3-phase + N + PE) @ 50/60 Hz
- Round-trip Efficiency (AC-AC): > 90% @ rated power, 25°C
- Cooling Method: Smart Liquid Cooling (Ethylene Glycol/Water mix)
- Operating Temperature: -20°C to +50°C (with derating above 45°C)
- Relative Humidity: 0 ~ 95% (non-condensing)
- Altitude: < 3000 m (derating above 2000 m)
- Enclosure Rating: IP54 (outdoor)
- Fire Suppression: Aerosol or Novec™ 1230 gas system
- Communication: Modbus TCP, IEC 61850, CAN bus (optional)
- Dimensions (W x D x H): 2200mm x 1350mm x 2400mm (approx.)
- Weight: Approx. 2500 kg

Parameter	Specification
Nominal Capacity	215 kWh (per cabinet)
Rated Power	100 kW AC
Usable Capacity	200 kWh (90% DOD)
Round-trip Efficiency	> 90% @ rated power, 25°C
Cooling Method	Smart Liquid Cooling
Cell Chemistry	Tier-1 LFP
Enclosure Rating	IP54 (outdoor)
Operating Temperature	-20°C to +50°C

AC Voltage	400 V / 480 V (3-phase)
Dimensions (W x D x H)	2200mm x 1350mm x 2400mm
Weight	Approx. 2500 kg
Safety Certifications	UL 9540, UL 9540A, IEC 62619
Grid Connection Standards	IEC 61727, IEEE 1547, G99
Communication Protocols	Modbus TCP, IEC 61850, CAN bus

INDUSTRIAL DEPLOYMENT

Deployment of the ESS grid connection certificate system is designed for simplicity and speed. The containerized, plug-and-play design minimizes on-site construction and reduces commissioning time. Typical applications include:

- Peak Shaving: Reducing demand charges by discharging stored energy during peak tariff periods.
- Load Shifting: Storing low-cost off-peak electricity for use during high-cost on-peak hours.
- Renewable Integration: Smoothing the output of solar PV or wind generation to improve grid stability.
- Backup Power: Providing reliable emergency power during grid outages,

ensuring business continuity.

- Microgrid Support: Acting as a primary energy source or grid-forming element within an islanded microgrid.

System monitoring and control are managed via the integrated EMS, which includes a user-friendly touchscreen interface and cloud-based remote monitoring capabilities. This allows for real-time performance tracking, predictive maintenance, and data-driven optimization, ensuring maximum asset utilization and a superior return on investment.

