

# Cloud Energy Management - Official Commercial BESS Technical Overview & Datasheet

## CLOUD ENERGY MANAGEMENT: COMMERCIAL BESS PLATFORM OVERVIEW & SYSTEM ARCHITECTURE WHITEPAPER

### EXECUTIVE SUMMARY

Cloud Energy Management (CEM) is a carrier-grade, AI-optimized energy storage orchestration platform designed for Commercial & Industrial (C&I) and utility-scale Battery Energy Storage Systems (BESS). By decoupling supervisory control from local hardware, CEM delivers real-time telemetry, predictive load shaping, and automated energy arbitrage across distributed asset fleets. This document details the system architecture, safety logic, and performance ledger of our Tier-1 LFP based CEM solution.



## SYSTEM ARCHITECTURE & SAFETY

The CEM platform operates on a three-layer hierarchical framework: 1) Device Layer (PCS, BMS, smart meters, fire suppression panels), 2) Edge Gateway (5G/LAN aggregated data concentrator with TLS 1.3 encryption), and 3) Cloud Core (distributed Kubernetes cluster with ISO 27001 certified data lakes). Safety is embedded via a digital twin that executes per-second state estimation and triggers autonomous failovers under grid anomaly conditions. Redundant communication pipelines ensure <math><50\text{ms}</math> command dispatch latency.

## KEY FEATURES

- Predictive Peak Shaving: Machine learning models trained on 18+ months of localized load data reduce demand charges by 23-37%.

- Virtual Power Plant (VPP) Ready: Native support for OpenADR 2.0b and IEEE 2030.5, enabling fleet-based frequency response and capacity market participation.
- Remote Firmware Management: Zero-touch, staged OTA updates for PCS, BMS, and EMS with rollback capability and integrity hashing.
- Multi-Tenant Asset Dashboard: Role-based access control (RBAC) with granular permissions for O&M contractors, facility managers, and CFO-level reporting.

#### COMPLIANCE & STANDARDS

The CEM platform and integrated BESS comply with global regulatory regimes:

- UL 9540 (Energy Storage Systems and Equipment)
- UL 1973 (Batteries for Use in Stationary Applications)
- IEC 62619 (Secondary Cells and Batteries for Industrial Applications)
- IEEE 1547-2018 (Interconnection and Interoperability)
- NERC CIP (Cyber Security for Bulk Electric Systems) – optional hardened deployment

#### TECHNICAL SPECIFICATIONS

Parameter	Specification
-----------	---------------

Nominal Capacity (per cabinet)	215 kWh / 372 kWh (selectable)
Rated Power (PCS)	100 kW / 186 kW (bidirectional)
Cooling Method	Smart Liquid Cooling (anti-condensation)
Cell Chemistry	Tier-1 LFP (LiFePO4)
Round-trip Efficiency (DC/AC)	≥88% @ 0.5C, 25°C
Communication Protocols	Modbus TCP, IEC 61850, MQTT, OCPP 2.0
Operating Temperature	-30°C to +55°C (derated above 50°C)
Ingress Protection	IP54 (cabinets), IP20 (internal PCS)
Cycle Life	≥6000 cycles @ 0.5C, 90% DoD, 25°C
Compliance Marks	UL 9540, IEC 62619, CE, UN 38.3

## INDUSTRIAL DEPLOYMENT

Typical CEM deployments target manufacturing sites, EV charging hubs, hospital campuses, and data center backup power zones. A single CEM cluster can manage up to 512 individual BESS cabinets aggregated into 50 MWh+ virtual storage groups. The system supports parallel expansion via CAN busbars and DC-coupling to existing PV inverters. For micro-grids, the CEM features a seamless islanding transition (<20ms) when grid loss is detected, powered by a

supercapacitor-backed edge gateway.



For detailed mechanical drawings, one-line electrical diagrams, and customized EMS API documentation, please consult your technical account manager.