

Turnkey C&I Energy Storage Solution Brief: Deploying 20ft Container ESS

TARGET PEAK SHAVING POSITIONING

As electricity tariffs for commercial and industrial (C&I) facilities continue to rise, demand charges increasingly dictate operational expenditure. The 20ft container ESS is engineered to address this challenge directly, providing a scalable, high-density energy storage platform for peak shaving and demand charge management. This turnkey solution enables facility operators to reduce maximum demand, shift energy consumption to off-peak periods, and maintain operational continuity during grid disturbances. With a modular architecture and integrated thermal management, the system delivers reliable performance across diverse industrial environments, from manufacturing plants to data centers and logistics hubs.



DEMAND RESPONSE LOGIC

The system employs an intelligent Energy Management System (EMS) that continuously monitors facility load profiles and grid conditions. When demand approaches a pre-set threshold, the EMS dispatches stored energy to shave peak loads, ensuring the facility never exceeds its contracted capacity. During low-demand periods, the system recharges from the grid or on-site renewable generation. This automated logic reduces demand charges without compromising critical operations. The EMS also supports time-of-use arbitrage, charging during off-peak windows and discharging during peak tariff periods, further enhancing return on investment.

CAPACITY RANGE

The 20ft container ESS is available in multiple capacity configurations to suit varying facility sizes and energy requirements. Standard configurations range from 500 kWh to 1.2 MWh per container, with the ability to parallel multiple units for MWh-scale deployments. The modular design allows for incremental expansion, enabling operators to start with a smaller investment and scale capacity as needs evolve. Each container integrates Tier-1 LFP battery racks, a bi-directional PCS, liquid cooling, and fire suppression systems within a compact, weatherproof enclosure.

CORE PARAMETERS

The system operates at a nominal DC voltage of up to 1500 V, maximizing efficiency and reducing balance-of-system costs. Round-trip efficiency exceeds 95% under standard operating conditions, ensuring minimal energy losses. The liquid cooling system maintains cell temperatures within a narrow band, optimizing performance and extending battery life. The container is designed for outdoor installation, with an IP54 rating and operating temperature range of -20°C to 50°C. Communication interfaces include Modbus TCP/IP, CAN, and Ethernet, facilitating seamless integration with existing SCADA and EMS platforms.

Parameter	Specification
Nominal Capacity	500 kWh / 1 MWh / 1.2 MWh per container
DC Voltage Range	1000 V – 1500 V
Round-Trip Efficiency	≥ 95%
Cooling Method	Smart Liquid Cooling
Cell Chemistry	Tier-1 LFP
Cycle Life	≥ 6,000 cycles @ 80% DoD
Operating Temperature	-20°C to 50°C

Ingress Protection	IP54
Communication	Modbus TCP/IP, CAN, Ethernet
Certifications	UL 9540, IEC 62619, CE, UN38.3

LFP CELL DURABILITY ASSURANCE

The system utilizes Tier-1 LFP (Lithium Iron Phosphate) cells, selected for their superior cycle life, thermal stability, and safety characteristics. These cells are rated for over 6,000 cycles at 80% depth of discharge (DoD), ensuring long-term reliability and low total cost of ownership. The advanced Battery Management System (BMS) performs active cell balancing and continuous state-of-health monitoring, mitigating cell degradation and maximizing pack longevity. The LFP chemistry is inherently resistant to thermal runaway, providing an additional layer of safety for indoor and outdoor deployments alike.

RECOMMENDED FACILITY LAYOUTS

The 20ft container ESS is designed for flexible deployment across a range of C&I sites. Recommended layouts include:

- Pad-mounted installation adjacent to existing switchgear, minimizing cable runs and installation costs.
- Integration with rooftop or ground-mounted solar arrays for behind-the-meter renewable self-consumption.
- Clustered configurations for large industrial parks, where multiple containers share a common AC bus and EMS.
- Co-location with EV charging infrastructure to buffer high-power charging loads and avoid demand spikes.

Each layout prioritizes accessibility for maintenance, adherence to local fire codes, and optimal airflow for thermal management. The container footprint is standardized for easy permitting and site preparation.

