

THE MOST SUSTAINABLE LONG-DURATION STORAGE CAPACITY AT THE LOWEST LCOS

ENERGY STORAGE FOR CRITICAL PROJECTS

Utilizing earth-abundant iron, salt and water for its electrolyte, and simple materials for battery components, the Iron Flow Battery (IFB) from ESS Inc. is a durable, environmentally-safe, long-duration storage solution that is ideally suited for:

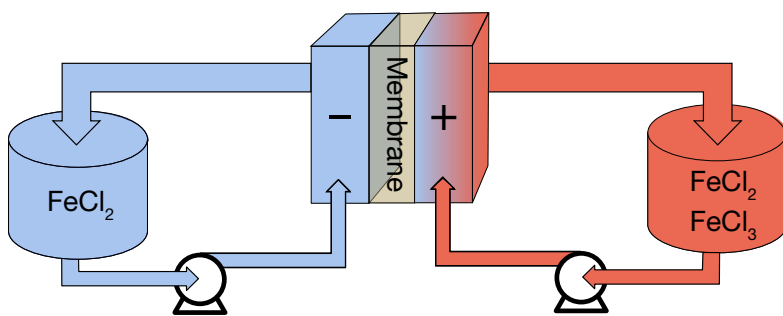
- time-shifting renewable energy on a daily basis,
- managing a facility's demand or TOU charges, and
- smoothing the intermittency of renewables on a constrained grid.

The IFB has a lifespan that exceeds 20,000 cycles, has low maintenance requirements, and an energy capacity of over 6 hours. It matches well with the 25-year life span of solar and wind projects, supporting those applications' low levelized cost of energy (LCOE) requirements.

Concurrent with serving these applications, the IFB's inherent quick-response power electronics can perform ancillary services such as voltage and frequency support on microgrids and utility-scale applications.

TECHNOLOGY

All-iron redox (reduction-oxidation) flow battery technology by ESS is based on the elegant simplicity of the electrochemical ferrous/iron plating reaction on the negative side and the ferrous/ferric redox reaction on the battery's positive side.



Negative side — plating side

Positive side — redox side



The IFB system installed within an advanced microgrid at Stone Edge Farm, Sonoma County, CA.

50kW/400kWh ENERGY WAREHOUSE™



Each ESS Iron Flow Battery system is built in a 40' long by 9'6" high customized shipping container housing. Separate containers can be stacked to conserve space.

FEATURES AND BENEFITS

- Cost-effective, made of Earth's basic elements
- Environmentally safe, non-toxic electrolyte
 - Non-flammable
 - No corrosive acids
 - No hazardous materials
 - No noxious fumes
- Long-duration storage (over 6 hours) smoothes renewables output, and reduces demand charges.
- Provides flexibility for power and energy use cases
- Long life, >20,000 cycles, low maintenance
- Transports preassembled anywhere worldwide
 - The electrolyte can be hydrated onsite



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50kW/400kWh All-Iron Flow Battery – Delivering 8+ hours of flexible energy storage

SPECIFICATIONS

FEATURE	DATA	Notes
Electrical		
Power	50 kW (AC)	150% rated power for 30 sec.
Energy Capacity	400 kWh	100% available
AC Interface	480 VAC, 3-phase	
Communications	Remote Monitoring 3rd Party Data/control	Proprietary interface Modbus interface
Mechanical		
Enclosed ISO Container		
Dimensions	40'L x 8'W x 9' 6"H	Turnkey AC system
Weight (Dry)	11,000 kg	
Weight (Wet)	37,000 kg	
Environmental		
Battery	Recyclable components	
Electrolyte	FeCl ₂ , KCl, H ₂ O	Non-flammable, non-corrosive
Operating Temperature	-5°C to +50°C	Can extend range with active temperature control
Warranty	Comprehensive 20-Year	With continuous extended Service Agreement
Certification	NRTL Field Certification UL	Meets AHJ requirements Pending
Performance		
Cycle Life	>20,000 cycles	To 100% DOD
AC/AC Peak Roundtrip Efficiency	>70%	80% DOD cycles
Response Time	Full power in <1 sec.	From standby, inverter limited



Each Iron Flow Battery and its AC electronic components are housed in a shipping container for transportability and protection from the elements.

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