

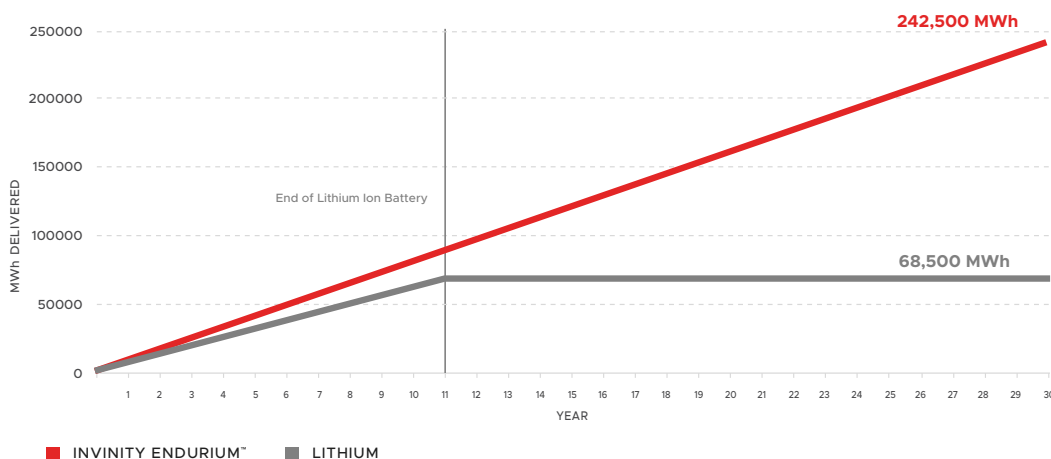


INVINITY ENDURIUM™ ENERGY STORAGE SYSTEM

Invinity's Endurium™ is an evolution of our proven modular vanadium flow battery technology, engineered for greater energy density, simplified maintenance, and greater economic value. At its foundation is a String of four Endurium™ Modules — a UL certified flow battery that stores 1.35 MWh of usable energy and can be fully discharged in 3 hours, or as long as 18 hours based on the application. Strings are connected together into Arrays sized to optimally pair with the inverter. Endurium™ Arrays can be combined to create 100 MW+ solutions that deliver unmatched throughput and flexibility.

- **MORE THROUGHPUT** Non-degrading chemistry delivers throughput superior to most stationary storage today.
- **MORE SAFETY** Zero risk of thermal runaway; exceptional personnel safety for crews & first responders.
- **MORE FLEXIBILITY** Adaptability to a wide range of duty cycles, with no warranty limits on cycle count.
- **MORE SUSTAINABILITY** 99% of components are recyclable; vanadium electrolyte reusable at battery EOL.
- **MORE LIFETIME** Suitable for 30+ years of constant cycling, matching the lifespan of solar & wind assets.
- **MORE INSIGHT** Unparalleled visibility to system performance to understand and optimize asset performance.

CUMULATIVE ENERGY DELIVERED OVER TIME



Assumptions: 12 MWh capacity installed, 2 cycles per day, 100% DoD per cycle, 365 days a year. Lithium out of warranty/EOL @ 60% capacity. We charitably assume the lithium system can meet this duty cycle: its actual degradation is likely to occur much faster.

SCALABLE
3-100+
MW POWER

3-18
HOUR DISCHARGE

UNLIMITED
CYCLES

UNLIMITED
THROUGHPUT

NON
FLAMMABLE

30+
YEAR LIFESPAN

STRING SPECIFICATION

COMPONENTS

4x Vanadium Flow Battery Modules, 1x String Control Unit, Inter-String cabling

PERFORMANCE ¹	2 Power Blocks	3 Power Blocks
Max DC Power	300 kW	375 kW
Max Usable Energy ²	1310 kWh	1370 kWh
Discharge Durations at Constant Power	4h @300 kW 8h @160 kW 10h @130 kW 12h @110 kW	4h @310 kW 8h @170 kW 10h @140 kW 12h @120 kW
Max DC RTE	74%	75%
Max Total RTE	69%	70%
DC Response Time	<15 ms from On; <1 min from Off	
Voltage Range	800–1280 VDC	
Max DC Current	400A	

OPERATING CAPABILITIES

Duty Cycle	Continuous at Max Power. No rest period
Lifetime Cycles	Unlimited for 30+ years
Depth of Discharge	0-100 %
Cooling System	Forced Air
Communications	Modbus TCP/IP
Annual Energy Degradation	<0.2%

REQUIRED UTILITIES

Auxiliary Supply	3Φ, 380-480 VAC
Auxiliary Loads (Average/Max) ³	7 kW / 45 kW

CERTIFICATIONS AND STANDARDS (Expected in 2025)⁴

Certifications	CE, UL 1973, UL 9540A, Sub Assembly under UL 9540
Standards	NFPA, IEC 62933-5-2, IEC 62485, IEC 62932-2-2

ENVIRONMENTAL

Ambient Operating Temperature	-10°C to 45°C / 14°F to 113°F
Relative Humidity	5-95%
Maximum Elevation	2000 m / 6600 ft
Protection Class	IP 54

FOOTPRINT

String Footprint (inc/service access)	8.7m x 10.9m / 28 ft x 36 ft
Area	93.7 m ² / 1008 ft ²
Energy Density	96 MWh/Acre

BATTERY MODULE DIMENSIONS (4 PER STRING)

Dimensions	6.1 m x 2.4 m x 2.6 m 20 ft x 8 ft x 8.5 ft
Mass	27,500 kg / 61,000 lbs

NOTES: 1 Performance values are for operation with electrolyte at 35°C. DNV IE Study available under NDA. Contact Invinity for more information.
 2 Usable DC capacity varies depending on discharge profile.
 3 Aux load excludes cooling fans, which are temperature dependant.
 4 Only the core list of codes and compliance is provided. Contact Invinity for the compliance status of codes not referenced.

CONFIGURABLE ARRAY

Example of a double-stacked, 10-String, 13.5-MWh DC Array, capable of delivering Max Power of 3 MW DC for 4 hours. Strings are connected in parallel to form Arrays sized to optimize the battery power with the inverter power.



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