



**GRIDSTAR™ FLOW
ENERGY STORAGE**

LOCKHEED MARTIN



GRIDSTAR™ FLOW ENERGY STORAGE SYSTEM

Lockheed Martin Energy is pioneering a new flow battery designed to provide **affordable, durable, and safe long-duration (>4 hours) energy storage** for utility and industrial applications.

Applications:

- Large-scale renewables integration
- Transmission and distribution asset deferral
- Large-scale industrial energy management
- Utility reserve capacity and peak power
- Microgrid support

Advantages

Long discharge duration and deep charge-discharge cycles

Low total cost of ownership

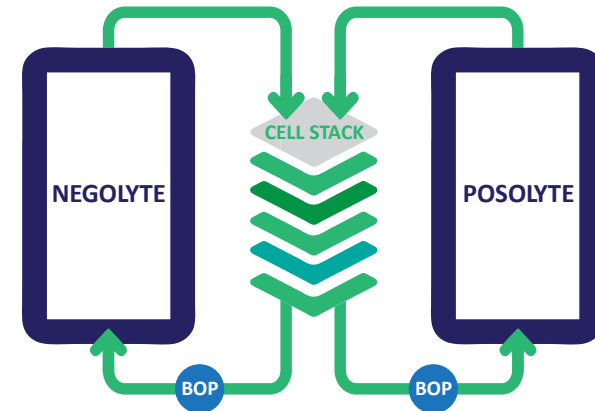
Long useful life

System-level safety and siteability – non-flammable battery chemistry

Full Lockheed Martin warranty

Contact Information:

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CELL STACK:	ACTIVE MATERIALS:	BALANCE OF PLANT (BOP):
<ul style="list-style-type: none">• Membranes• Electrodes• Bipolar plates	<ul style="list-style-type: none">• Redox-active compounds (Posolyte, Negolyte)	<ul style="list-style-type: none">• Pumps, tanks, piping• Control & power conversion hardware

Coordination Chemistry Flow Battery (CCFB)

Flow batteries differ from sealed batteries (e.g., lead acid, lithium-ion) in that they separate the power and energy portions of a battery system and allow each to be independently sized. Energy is stored in a liquid electrolyte which is flowed through a stack of electrodes.

Lockheed Martin's GridStar™ Flow system is based on our proprietary battery chemistry comprising metal ligand coordination compounds. The chemistry combines low-cost, earth abundant transition metals with commodity chemical ligands to optimize battery performance and affordability.

GridStar™ Flow systems are designed to exhibit lower system cost, higher efficiency, and longer useful life than currently available long-duration batteries.

