



GridStar[®] Flow

Long-Duration, Large-Capacity Energy Storage



GridStar® Flow

Lockheed Martin. Your Mission is Ours.®

GridStar Flow is an innovative redox flow battery designed for long-duration, large-capacity energy storage applications. The patented technology is based on the principles of coordination chemistry, offering a new electrochemistry consisting of engineered electrolytes made from earth-abundant materials. These properties enable GridStar Flow to deliver durability, flexibility, and safety with a competitive total cost of ownership.

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.



CONTACT INFORMATION
www.lockheedmartin.com/energy
energy.info@lmco.com

APPLICATIONS

- Renewable generation bulk shifting (large amounts of energy for many hours)
- Large-scale transmission & distribution deferral
- Peaking unit replacement (traditionally combustion turbines or internal combustion engines)
- Day-head, real-time and ancillary market optimization
- Multi-day and portfolio optimization
- Resiliency, particularly in microgrids, islands, and military installations

ADVANTAGES

- Optimized for 6+ hours of flexible discharge
- Flexibility to switch between products to maximize revenue
- 100 percent depth-of-discharge with minimal degradation
- A design life of 20 years
- Ability to size energy and power independently
- Mildly alkaline, aqueous electrolytes that are safe (nonflammable, noncorrosive, stable)
- Competitive total cost of ownership

CELL STACK: Membranes • Electrodes • Bipolar plates

