

Organic SolidFlow Battery Technology for Scalable Long-Duration Energy Storage

Solid active materials combined with flow battery architecture enable scalable and cost-efficient stationary storage.

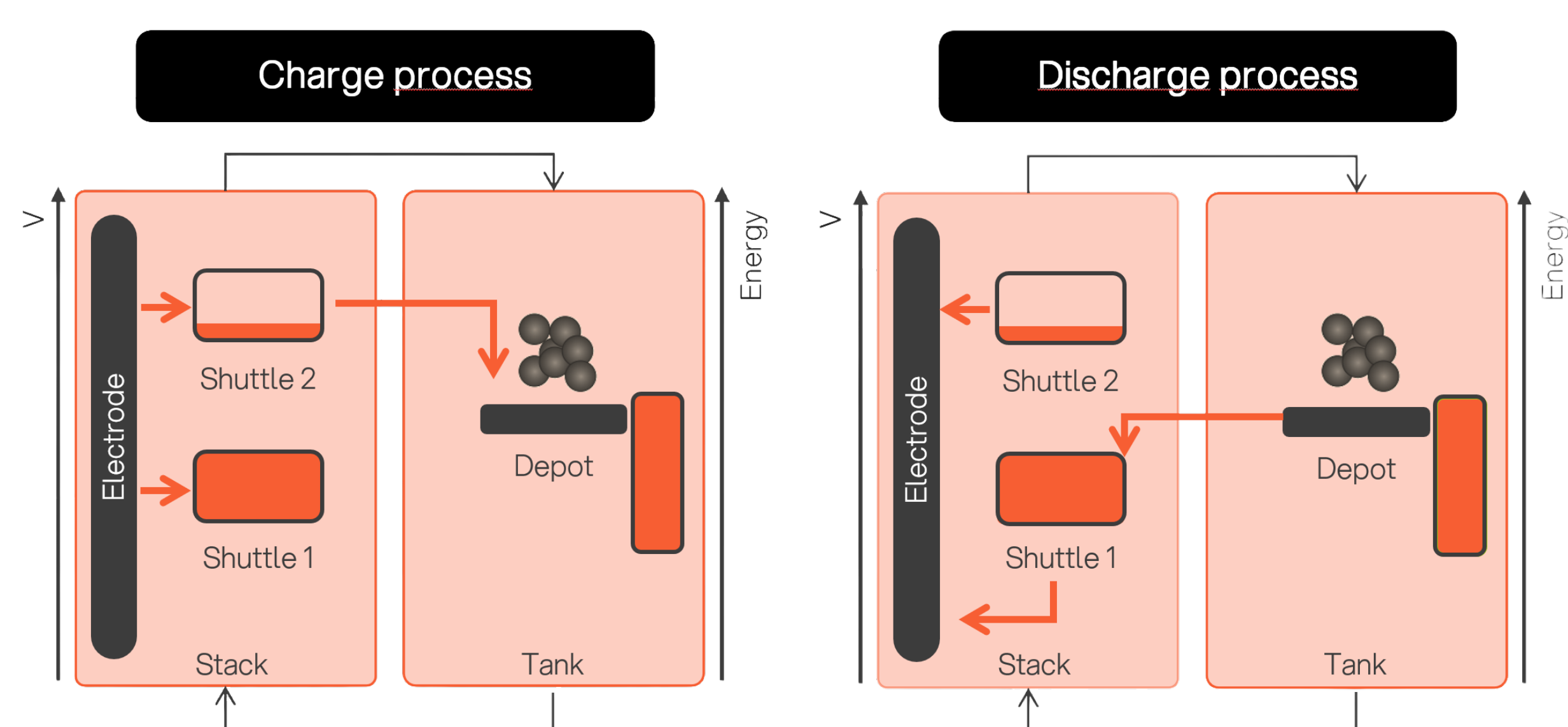
Phillip Timmer



Company Introduction

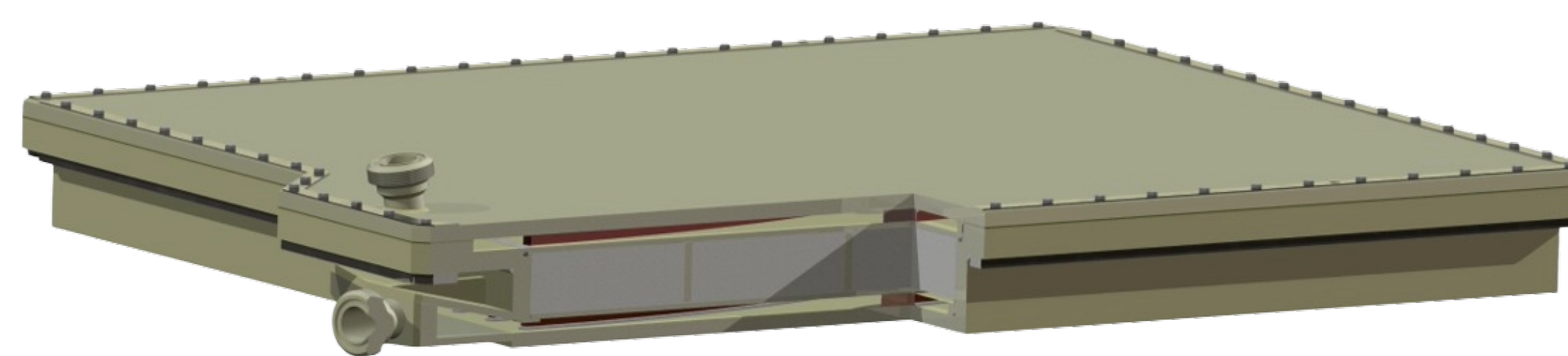
CMBLU Energy develops Organic SolidFlow battery systems for safe, scalable and cost-efficient long-duration energy storage. Based in Germany, the company combines solid active materials with flow battery architecture to enable independent scaling of power and capacity. Its non-flammable, resource-conscious technology is designed for stationary applications such as renewable energy integration, grid flexibility and industrial storage.

SolidFlow Technology



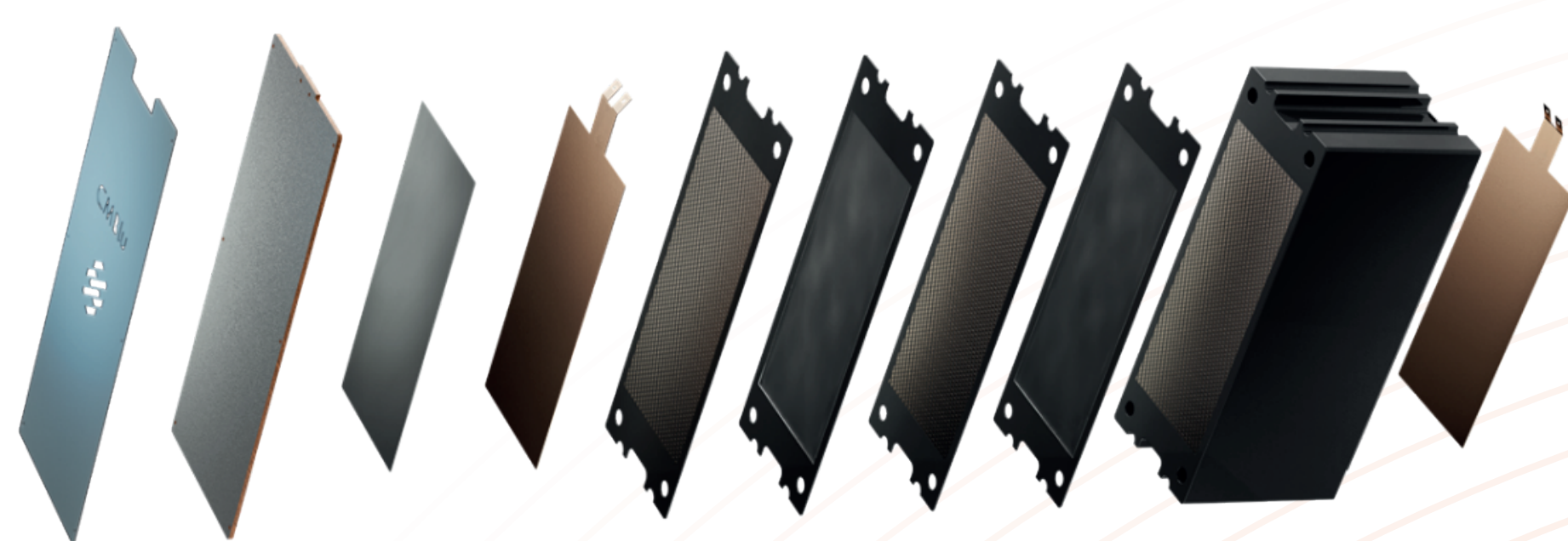
SolidFlow technology uses shuttle molecules to transfer electrons between the electrodes and solid storage materials inside the depot tanks. This combination enables 400% higher energy density and combines it with the flexibility and scalability of a liquid-based flow system.

Tank as a performance critical component



In SolidFlow technology, the tank is more than a storage vessel: it acts as a mixed-phase chemical reactor where liquid shuttle molecules interact with solid active material. Its design directly affects system performance. Flow path, pressure drop, residence time and usable volume must be carefully balanced to achieve high reaction rates while limiting pumping losses and mechanical stress. Optimized tank design supports efficient material utilization, stable operation and lower system-level energy losses.

Proprietary stack design for cost-efficient scaling



- CMBLU's proprietary stack design is developed for efficient scaling and tailored operation with SolidFlow electrolytes.
- Its flow-by geometry with a narrow 1.1 mm gap supports low electrical resistance while maintaining low pressure drop.
- A fully welded construction eliminates conventional seals, enabling efficient production, reducing potential failure points and supporting long service life.
- The stack materials are recyclable, avoid rare or conflict materials and can be locally sourced, strengthening both cost efficiency and supply chain resilience.

How SolidFlow drives LCOS reduction

SolidFlow reduces LCOS by combining long asset life, compact footprint and flexible system sizing. With a targeted lifetime of 20 years, storage durations from multi-hour to days and efficiency of 75%, the system is designed for high-utilization applications where lifetime energy throughput is critical. Energy capacity scales through the tanks, while power scales through the stack, avoiding unnecessary oversizing. An expected footprint of 2.64 m²/MWh supports high site utilization, especially where space is constrained. Non-flammable, CE-marked technology further reduces integration complexity, while modular scalability enables projects up to the GWh range.

Result: lower levelized cost of storage (LCOS) of down to 5 ct/kWh through higher space utilization, longer service life, compact deployment and independent power/capacity scaling.