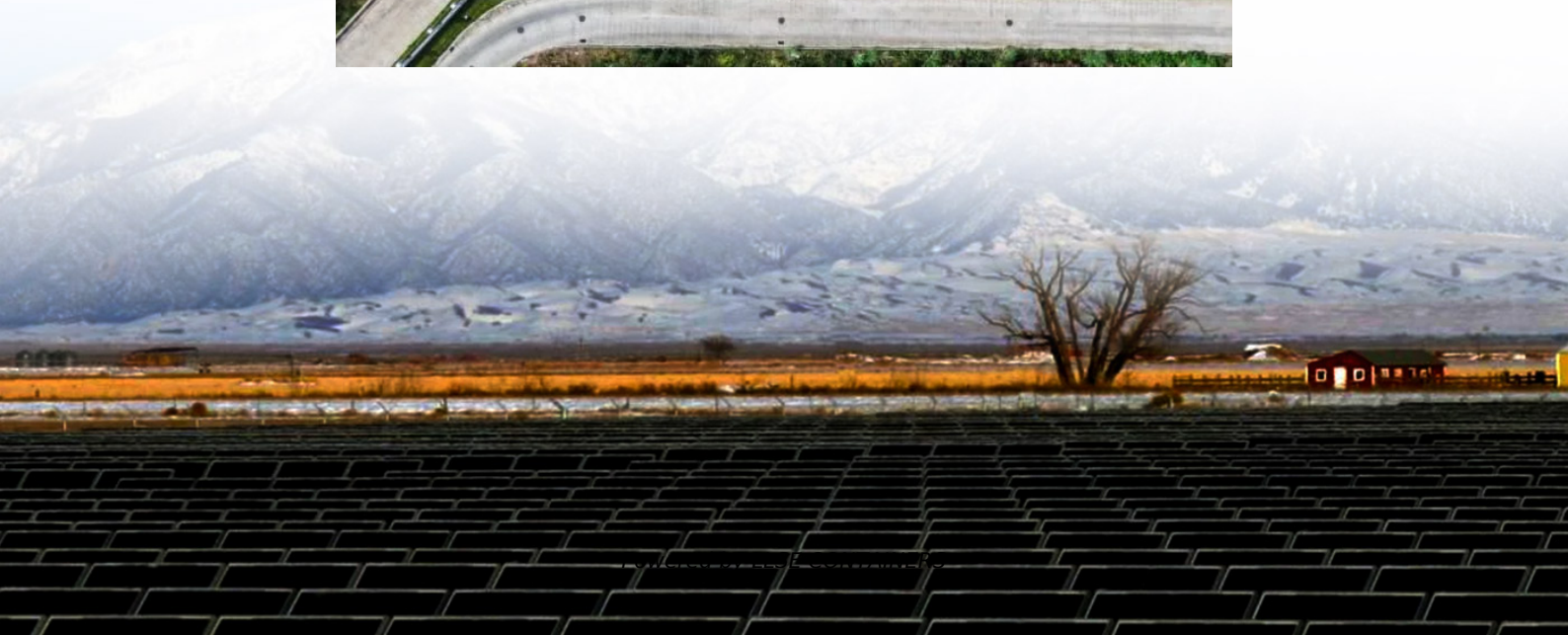


# **Liquid flow battery operating voltage**





## Overview

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Bromide is changed into bromine during charging, creating a voltage of 1.08 V at the positive electrode and -0.77 V at the negative electrode thanks to zinc plating. Can a flow battery be replaced with a liquid metal?

Conventional flow batteries have aqueous solutions on both sides, and thus are constrained in voltage by water splitting ( $\sim 1.5$  V). Replacing the negative side with a liquid metal would yield a much higher voltage flow battery, benefiting energy density, power density, and efficiency. As a room-temperature liquid metal, Na-K is attractive.

What are the characteristics of a flow battery?

A very important characteristic of a flow battery is that its electrolyte is stored in different external storage tanks. The energy storage capacity can be controlled by controlling the capacity of the storage tanks. The electrolyte in the storage tanks is circulated between the tank and the stack to achieve charge/discharge reactions.

What is the energy density of a flow battery?

The flow battery exhibits a high cell voltage of 3.53 V, resulting in a high energy density of approximately 33 Wh/L. Pre- and post-cycling battery analysis confirmed the absence of crossover of the active materials. Fig. 1: Chemical formulas and redox voltages of organic redox materials.

How efficient is a flow battery?

This flow battery also demonstrates 81% of capacity for 100 cycles over  $\sim 45$  days with average Coulombic efficiency of 96% and energy efficiency of 82% at the current density of 1.5 mA/cm<sup>2</sup> and at a temperature of 27 °C.



## Liquid flow battery operating voltage

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