



MODERNIZATION SOLAR

# All-iron liquid flow battery energy storage





## Overview

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Can iron-based aqueous flow batteries be used for grid energy storage?

A new iron-based aqueous flow battery shows promise for grid energy storage applications. A commonplace chemical used in water treatment facilities has been repurposed for large-scale energy storage in a new battery design by researchers at the Department of Energy's Pacific Northwest National Laboratory.

What is an iron flow battery?

In the 1970s, scientists at the National Aeronautics and Space Administration (NASA) developed the first iron flow batteries using an iron/chromium system for photovoltaic applications. Over the next decade, these unique systems, which combine charged iron with an aqueous liquid energy carrier, were improved upon for large-scale energy storage.

Are all-liquid flow batteries suitable for long-term energy storage?

Among the numerous all-liquid flow batteries, all-liquid iron-based flow batteries with iron complexes redox couples serving as active material are appropriate for long duration energy storage because of the low cost of the iron electrolyte and the flexible design of power and capacity.

How much does an all-iron flow battery cost?

Benefiting from the low cost of iron electrolytes, the overall cost of the all-iron flow battery system can be reached as low as \$76.11 per kWh based on a 10 h system with a power of 9.9 kW. This work provides a new option for next-generation cost-effective flow batteries for long duration large scale energy storage.



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### New Flow Battery Chemistries for Long Duration Energy Storage ...

Sep 27, 2024 · Abstract: Flow batteries, with their low environmental impact, inherent scalability and extended cycle life, are a key technology toward long duration energy storage, but their ...

### Aqueous iron-based redox flow batteries for large-scale energy storage

May 31, 2025 · By offering insights into these emerging directions, this review aims to support the continued research and development of iron-based flow batteries for large-scale energy ...



### Low-cost all-iron flow battery with high performance ...

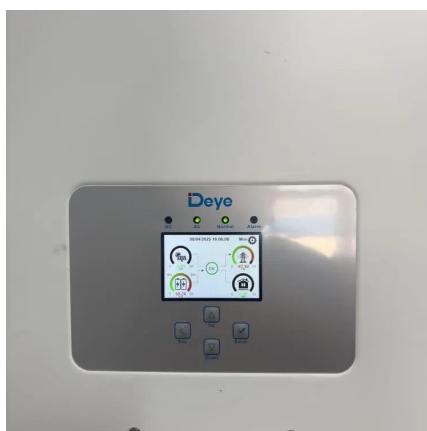
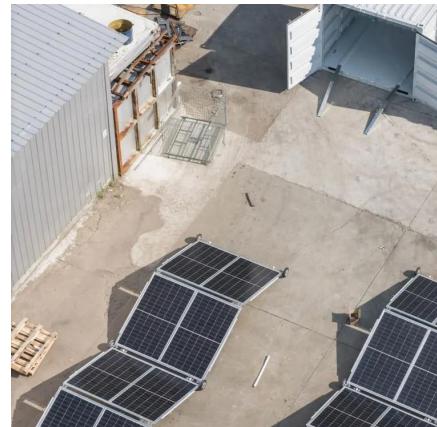
Feb 26, 2024 · Keywords: Long-duration energy storage All-iron flow battery Iron-based complexes High performance Gluconate sources and increasing the penetration of these ...

### New all-liquid iron flow battery for grid energy storage

Mar 25, 2024 · Iron-based flow batteries designed for large-scale energy storage have been around since the 1980s, and some are now commercially available. What makes this battery



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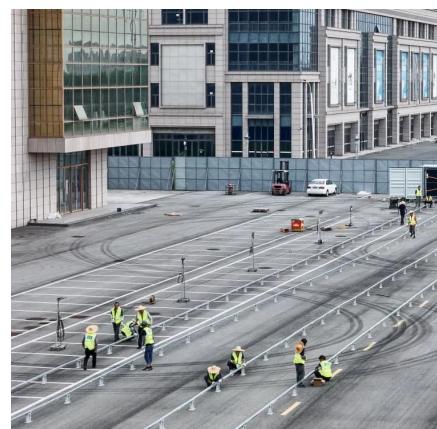
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