

US Department of Energy Cites Flow Batteries as the Best Choice for Large Scale, Economic Energy Storage

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TORONTO, Aug. 22, 2024 - [Sparton Resources](#) (TSX-SRI-V), ("the Company"), is pleased to report today that the US Department of Energy ("DOE") has, after an extensive study, selected flow batteries as the best option for long duration and low-cost energy storage.

Sparton's interest in the flow battery industry is a 9.975% interest in [VRB Energy Inc.](#) held through Sparton's 90% interest in VanSpar Mining Inc. Full information regarding the history of the Company's VRB Energy investment is available in its various news releases and corporate filings available at www.sedar.com, and on the Sparton website at www.spartonresources.com.

DOE Report

On August 16, 2024, The US Department of Energy's (DOE's) Office of Electricity, published a comprehensive report on different options for long-duration energy storage (LDES) costs, with flow batteries having been shown to the best rate between costs and performance.

The 51-page document (*Achieving the Promise of Low-Cost Long Duration Energy Storage*) contains cost comparisons between 10 LDES technologies, from electrochemical energy storage to chemical energy storage, mechanical energy storage and thermal energy storage.

The 10 LDES evaluated included: Flow batteries (FB), lithium-ion batteries (LIB), lead-acid batteries (PbA), hydrogen storage, sodium-ion batteries (NAIB), electro-chemical double layer capacitors (Supercapacitors/EDLC), zinc batteries, compressed air storages (CAES), pumped storage hydropower (PSH) and molten salt storage (TES).

Flow batteries were shown to have the best rate between costs and performance according to today's technological status, as low as \$0.06/kWh, which is close to DOE's \$0.05/kWh target. Lithium-ion batteries hold the second place with \$0.07/kWh, followed by zinc battery varieties, e.g. ZnMnO₂, with \$0.08/kWh followed by the first ever rechargeable battery, the lead-acid battery with \$0.09/kWh.

Sodium-ion batteries are still in an early stage with \$0.26/kWh, but their commercial potential is high, when new electrolytes and even anodeless batteries are developed, according to the report. Supercapacitors suffer from low energy density and high self-discharge rates. From a cost-point perspective, they are expensive, at \$0.34/kWh.

The DOE established the "Long Duration Storage Shot" protocol in 2021, evaluating various energy storage technologies to achieve 90% cost reduction by 2030 for technologies providing 10+ hours duration of energy storage.

It has also evaluated the top three potential innovations for each technology's potential to reach the \$0.05 level and also the costs for R&D for the next 10 years. The R&D range stretches from \$90 million for supercapacitors to \$1 billion for lithium-ion batteries.

On average, the top 10% of innovation portfolios can reduce LCOS by 12-85% to \$0.03/kWh-\$0.26/kWh across storage technologies, the report stated. New materials, electrolytes, membranes and other

components must be ramped up quickly to production to achieve critical mass and to reduce overall system costs targets. Standardisation is recommended as a key element to reducing development and deployment costs for lead-acid, flow and zinc batteries.

The DOE did not address in detail the issues of safety and recyclability in its study. Both of these considerations clearly are very positive factors for the application of flow batteries over alternatives.

Source: Best Battery Briefing, Energy Storage Publishing Limited mailings@bestmag.co.ca, August 19,2024.

Vanadium Redox Flow Batteries Safety

Flow batteries are recognized as the safest alternative for large-scale long-term energy storage. They are also fully recyclable.

UL 1973 is an internationally recognized global standard for commercially available battery energy storage.

VRB Energy has received the UL 1973 safety certificate for the Gen3 VRB-ESS®, a major achievement, as it is the only battery system currently available that is certified at the UL 1973 Standard for its 1-Megawatt Hour power module. This unit is the basic VRB Energy building block.

About UL 1973

The UL 1973 certificate addresses major battery issues such as safety, reliability and operating uses. Included in this certification are testing protocols involving materials, vibration tests, high temperature operation, over charging, short circuiting, and physical drop tests.

The work was undertaken by VRB Energy with the CSA Group, formerly the Canadian Standards Association and the safety testing done using the International Organization for Standardization ("ISO") protocols 13849-1, and 13849-2 2012 standards.

About VRB Energy

VRB Energy is a fast-growing, privately held clean technology innovator. The company has developed the most reliable, longest-lasting vanadium flow battery in the world, with more than 500 megawatt-hours installed or in development worldwide, and more than 1,000,000 hours of demonstrated performance. The UL Certification sets it apart from other energy storage system providers.

VRB Energy's vanadium redox battery systems store energy in liquid electrolyte in a patented process based on the reduction and oxidation of ionic forms of the element vanadium. This is a repeatable process that is safe, reliable, and non-toxic. The electrolyte can be recycled at end-of-life, dramatically improving lifecycle economics and environmental benefits compared to lithium-ion and other battery types.

VRB Energy is majority-owned by Ivanhoe Electric, a North American, minerals exploration and development company that also invests in minerals-dependent, high-growth emerging technologies. Ivanhoe Electric is a global leader in developing innovative commercial applications for exploration technologies and is focusing on development of electric metal producing projects in North America and elsewhere.

Source: www.vrbenergy.com

Commentary

"Sparton is delighted to see this important recognition of the acceptance of flow battery technology by a well-respected US government organization like DOE, ", stated A. Lee Barker, Company CEO. "We believe

vanadium Redox flow batteries are clearly superior to lithium-Ion batteries and other types, for grid scale energy storage applications, and infinitely safer. The UL 1973 Safety Certification for VRB Energy's cell stacks will also provide global recognition of the Gen3 VRB-ESS® system and provide VRB Energy with a very strong marketing tool for new business going forward. This DOE accreditation should provide large battery buyers with a clear understanding of the financial overall benefits of flow batteries over other types".

About Sparton

Sparton is a mineral exploration Company currently focused on exploring gold projects near producing mines on or near the major gold producing trends in northeastern Ontario and northern Quebec where it holds interests in three exploration prospects. The Bruell Property, which hosts a new gold discovery, is now owned 75% by [Eldorado Gold Corp.](#), the owner of the nearby producing Lamaque Mine, to the west. The Oakes and Pense Properties, near Matachewan and Englehart, in Ontario, are in close proximity to Alamos Gold's producing Young Davidson Mine and the prolific Kirkland Lake producing area.

The VRB Energy equity share holding is a keystone in the Company's value base.

The full version of the DOE report may be viewed at:

<https://www.energy.gov/sites/default/files/2024-08/Achieving%20the%20Promise%20of%20Low-Cost%20Long%20Duration%20Energy%20Storage.pdf>

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