

## Flow battery project to power ships

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By Nick Flaherty

A European project is using a vanadium flow battery for an electric power system for ships

Conoship in the Netherlands and Vega Reederei in Germany are using technology from Vanadium Corp in Canada in a Special Purpose Vehicle (SPV) company.

The new company will develop a next-generation redox flow-battery stack based on a high-energy-density vanadium electrolyte that is specifically formulated for marine applications.

Flow batteries have a lower power density but use scalable tanks to provide power over a long period. This works well for marine applications and the project aims to extend the established Vanadium Redox Flow Battery (VFRB) technology into this area.

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Vanadium Corp will contribute new flow-battery designs, a high-energy-density electrolyte formulation, manage research and development, and provide its network of manufacturing partners to Conoship for the marine engineering designs to integrate the more compact redox flow-battery into the propulsion systems of marine vessels and ships. VEGA will arrange project financing, contribute fleet operations expertise, and conduct field testing of the marine battery prototype.

Vanadium Corp has been working with the German-Australian Alliance for Electrochemical Technologies for the Storage of Renewable Energy (CENELEST) on the technology since 2017. Cenelest combines expertise in redox flow battery systems from the Fraunhofer ICT (Institute for Chemical Technology) in Germany and the University of New South Wales (UNSW) in Australia. This is developing a new electrolyte, V-Br, with an energy density up to three times higher than current electrolyte

formulations. This separate project aims to demonstrate a cell in Q1 this year but will be key to the marine project.

“Greenhouse gas reduction is exceptionally challenging for the shipping industry. The industry’s 2050 climate goal of halving greenhouse gas emissions from 2008 levels can only be achieved with the accelerated construction of Zero-Emission Ships and novel solutions,” said Adriaan Bakker, CEO of VanadiumCorp.

“We are at the forefront of VRFB innovation with CENELEST that could facilitate the electrification of both stationary and mobile applications. Vanadium is the only renewable metal in energy storage, and we plan to produce it with our 100% owned green technology as green fuel in energy storage that can be scaled to any size,” he said.

The next generation VRFB Battery design and the new high energy electrolyte solves the challenge of high-energy-density not met by conventional VRFBs, says Bakker. Solving the energy-density challenge allows the SPV designs to scale to large capacities and vastly extend energy storage beyond lithium-ion’s typical 4-8 hour operating time.

The first phase of the project will be managed by VanadiumCorp GmbH, under the direction of Chief Technology Officer, Dr. G. Y. Champagne. A multidisciplinary engineering team, located in Germany, Netherlands, and North America is focusing on VRFB system architecture, components & parts design and other required tasks leading up to delivering VRFB cells and stacks of incremental sizes for testing to local R&D partners near the VanadiumCorp GmbH plant. R&D partners will also conduct some specific lab-level material and electrolyte tests to support the engineering work and integration of the VRFB in marine vessels.

Over 2,000 ships were built based on Conoship designs, operating all around the world.

[www.conoship.com](http://www.conoship.com); [www.vanadiumcorp.com](http://www.vanadiumcorp.com); [www.vega-reederei.de](http://www.vega-reederei.de)