

CLEAN RESOURCES

CLEAN TECHNOLOGY

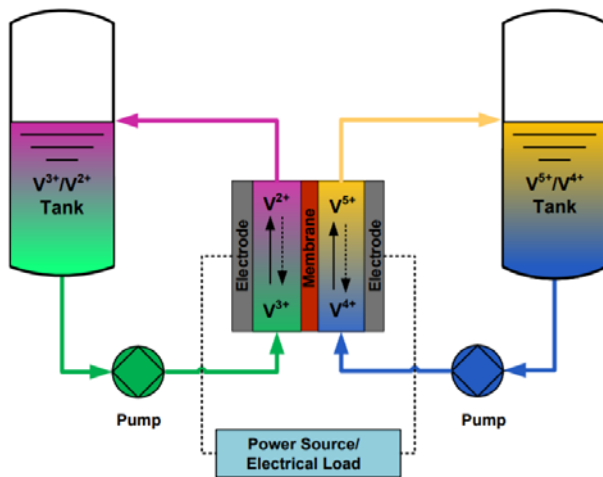
CCUS and Emerging Technologies/Critical Minerals

FUNDING DETAILS

Modified Redox Flow Battery Membranes for a Step Change Improvement in Energy Storage Technology

Low carbon electricity grids require cost-effective, flexible energy storage technologies to enable intermittent renewable sources, such as wind and solar, to be dispatched whenever electricity is needed. Redox flow batteries, which store energy in liquids, are a leading candidate for utility-scale electricity storage applications as they have a long life and flexible design. Although the cost of redox flow batteries is decreasing as the technology matures, there is a need for significant additional reductions in cost to enable widespread implementation.

In this project, a novel membrane technology is being developed and tested to increase the performance of redox flow batteries. The membrane technology is produced with low-cost materials and through a low-cost, scalable process. Both the low-cost production process and the increase in performance will enable battery companies to significantly reduce the cost of their system.



RECIPIENT:

Dr. Edward Roberts
University of
Calgary



TOTAL BUDGET:

\$544,060



PROJECT DATES:

FEB 2021 –
JAN 2023



PARTNERS:

University of
Waterloo Evercloak
Inc.



AI FUNDING:

\$307,000



PROJECT TRL:

Start: 4
End: 6

APPLICATION

Battery technologies are attractive for utility-scale electricity storage since they are flexible and provide fast response, ensuring reliable electricity supply. The membrane technology will be targeted for use in Vanadium redox flow batteries for use in stationary electricity storage applications including residential, commercial and utility sectors. The membrane technology can be fitted directly into existing commercial redox flow batteries or used in redox flow battery technologies under development.

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CCUS/Novel Metals and Materials

PROJECT GOALS

- Optimize the membrane technology using lab scale testing to enhance the performance of vanadium redox flow battery.
- Evaluate the impact of the membrane technology on the performance of lower cost, non-Vanadium redox flow battery technologies.
- Integrate the membrane technology into a commercial Vanadium redox flow battery.
- Scale-up the membrane technology to demonstrate the performance enhancement in a 5 kW, small commercial scale Vanadium redox flow battery.
- Achieve an increase in the power and energy density of the small commercial Vanadium redox flow battery by more than 50%.

BENEFITS TO ALBERTA

- Establishment of a successful university spinoff company to commercialize the membrane technology.
- Creation of new jobs to develop, demonstrate and commercialize the technology.
- Creation of new jobs for membrane manufacturing, business development and establishing a battery supply chain.
- Growth of Alberta's high tech, clean energy economy.
- Reduction of GHG emissions by enabling the transition to and increasing the efficiency of renewable generation.
- Enable residential energy storage, giving homeowners the opportunity to integrate increasingly low-cost solar panels, and low-cost electric vehicle charging.



3 Publications



4 Students
Trained



1-2 Patents



2-3 Project Jobs



60-100 Future
Jobs



1 New
Products/Service



1 Spinoff
Company



Enables GHG
Reductions



Market GHG
reductions will be

CURRENT
STATUS

JUN 2021

The project is currently underway, having commenced in February 2021.