

ALBERTA INNOVATES CLEAN RESOURCES

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FUNDING
DETAILS

Field Trial of Hydrogen Storage in Canadian Bedded and Domal Salts

The University of Alberta (UofA) team will collaborate with two Canadian operating companies, two service companies, Canadian Nuclear Laboratories, and Cold Lake First Nations for field trials of hydrogen storage in bedded and domal salts—the first of its kind in Canada that will make data available to the public domain. New wellbores are planned to be drilled, completed, and tested with high-pressure hydrogen in Alberta and Newfoundland with strategic potential for large-scale hydrogen production and storage.



RECIPIENT:
University of Alberta – Hassan Dehghanpour



PARTNERS:
Keyera, Vortex, Sanjel, Remedy, Canadian Nuclear Laboratories, Cold Lake First Nations



TOTAL BUDGET:
\$3,169,000



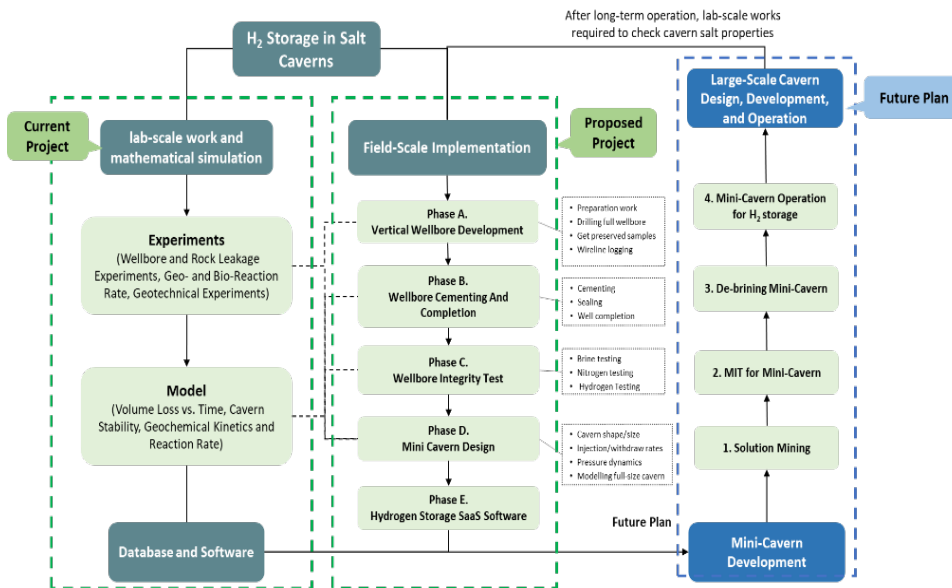
AI FUNDING:
\$1,214,000



PROJECT DATES:
MAR 2024 –
MAR 2026



PROJECT TRL:
Start: 4
End: 6



APPLICATION

The proposed technology will develop standards and regulations regarding subsurface hydrogen storage and new cementing protocols for sealing the cavern roof and caprock against hydrogen leakage. The protocols and testing results will be published to allow open access to the technical challenges and solutions for the development of full-scale hydrogen storage caverns. This project will generate the knowledgebase that can be used by Canadian researchers and engineers to develop similar caverns in Alberta and other parts of Canada, which will become an essential part of future cavern-storage projects.

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PROJECT GOALS

The overall objective is to develop guidelines, codes, and standards by using the field and laboratory testing results to make the required modifications to CSA Z341 standards. This includes optimizing hydrogen cavern design, development, and operation. The short-term objectives are as follows:

- Scaling up the laboratory results for field operations.
- Comparing domal versus bedded salts for hydrogen storage.
- Developing field pilot tests.
- Testing effective additives for cementing hydrogen wells.
- Developing guidelines to design hydrogen caverns.
- Updating CSA Z341 amendment for subsurface hydrogen storage.
- Developing a software for design and operation of hydrogen storage caverns.

BENEFITS TO ALBERTA

The successful completion of this project will lead to the development of the first field-scale testing facilities for hydrogen storage in Alberta. This can be an essential step for the development of Canada's "Energy Storage Hub" in Alberta. The field trial is a crucial milestone for large-scale renewable energy storage. The project can help for

- Developing standards and regulations regarding subsurface hydrogen storage and unlocking significant opportunities for the expansion of the hydrogen economy in Alberta.
- Creating extensive job opportunities in the new economic sectors of instrument manufacturing, and services including lab testing, software licensing, and field implementation.
- Reducing land footprint, safety risks, and GHG emissions related to large-scale energy storage operations.
- Creating social awareness by providing a knowledge base from field and laboratory tests of hydrogen storage.



17 Publications



15 Students
Trained



3 Patents



30 Project Jobs



200 Future Jobs



4 New
Products/Services



3 Spinoff
Companies



50 kt/yr Project
GHGs Reduced



420 kt/yr Future
GHGs Reduced

CURRENT
STATUS

APR 2024

The project has commenced and is focused on laboratory testing and preliminary field activities.