ALBERTA INNOVATES

CLEAN ENERGY

CLEAN TECHNOLOGY

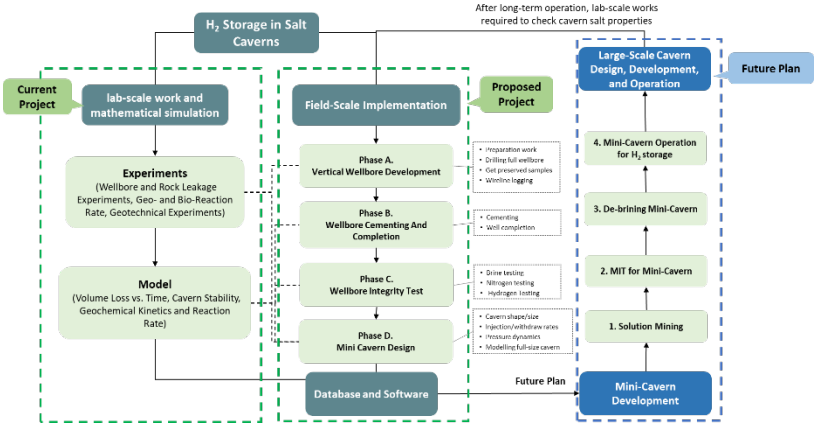
HYDROGEN

FUNDING DETAILS

Field Trial of Hydrogen Storage in Canadian Bedded and Domal Salts

University of Alberta, with support from Alberta Innovates, has collaborated with industry partners and research institutions on Canada's first field trial of hydrogen storage in both bedded and domal salt formations, with all data made publicly available.

Alberta is the largest hydrogen producer in Canada, and with current roadmaps, the need for reliable, large-scale hydrogen storage is inevitable. Salt caverns in the province have long been used for storing hydrocarbon products. Given the existing expertise and infrastructure for cavern development in Alberta, this approach is considered the preferred technology for hydrogen storage.



RECIPIENT:
University of Alberta

PARTNERS:
Keyera Corporation
Vortex Energy
Remedy Energy Services

TOTAL BUDGET:
$3,169,000

AI FUNDING:
$714,000

PROJECT DATES:
APR 2024 – MAR 2026

PROJECT TRL:
Start: 4
End: 6

APPLICATION

In this project, the University of Alberta investigated the feasibility of hydrogen storage in Canadian salt caverns through integrated laboratory studies and field-scale activities. Core samples and pressure-testing data from new wellbores were analyzed to evaluate field-scale hydrogen containment in salt caverns. The findings will support the design of full-scale hydrogen caverns in Canadian bedded and domal salts and provide a practical pathway for large-scale hydrogen storage to enable expanded production and use. The results will also inform updates to codes and standards for improved regulation of underground hydrogen storage.

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PROJECT GOALS

- Determining the field-scale feasibility of hydrogen storage in Canadian salt caverns.
- Obtaining the necessary laboratory and field data, along with mathematical models, to support the design, regulation, and development of hydrogen-storage salt caverns.
- Developing a robust testing facility and protocols to evaluate hydrogen flow and its interactions within salt rocks.
- Scaling up laboratory findings to inform the optimal design of salt caverns for hydrogen storage.
- Developing software to identify optimal locations ("sweet spots") for salt cavern development.

BENEFITS TO ALBERTA

- Accelerating Alberta's transition into a leading hub for hydrogen production and storage in Canada
- Fostering the development and expansion of emerging economic sectors in Alberta, including clean electricity generation, hydrogen-powered transportation, and the production, storage, and export of hydrogen derivatives such as ammonia
- Creating substantial employment opportunities and attracting significant investment to the province
- Reducing carbon emissions across the energy sector
- Disseminating key findings through publications and workshops

Potential for long-term storage and economic feasibility is being explored

50-200 Future Jobs

2 New Products/Services

Up to 6 Mt CO2e/y Potential Reduced

CURRENT STATUS

MAR 2026

The project successfully achieved its proposed objectives, directly trained more than ten HQP, developed a unique laboratory testing facility, created software for determining optimal locations for salt cavern development, and conducted field-scale activities, including drilling and completing wellbores, pressure testing, and passive seismic surveys, to provide data that enhances the software's accuracy in identifying suitable sites for salt cavern development.