

CLEAN RESOURCES

CLEAN TECHNOLOGY

RENEWABLE AND ALTERNATIVE ENERGY – ELECTRICITY GENERATION

FUNDING DETAILS

Geothermal Power from Co-Produced Fluids and Hydrocarbon Reservoirs Throughout the Western Canadian Sedimentary Basin

Conventional oil processes produce a mix of oil and hot water. The hot water is typically reinjected back into the oil reservoir, however, if some of the heat was extracted before reinjection, that heat could be used for electricity production or direct heating applications. This process is called geothermal co-production.

This project will use computational methods, laboratory experiments, pilot-scale field tests, and economic assessments to de-risk geothermal co-production opportunities within Alberta. Experiments will be performed to determine the properties of geothermal fluids, test the responses of reservoir rocks to flow of varying temperature, and predict the geochemical hazards associated with various co-produced fluid geothermal scenarios. Results from this project's experiments will significantly reduce the technical uncertainty of deploying geothermal co-production power on a commercial scale.



RECIPIENT:

University of
Alberta – Dr.
Jonathan Banks



PARTNERS:

Razor Energy
Alberta Geological
Survey



TOTAL BUDGET:

\$2,665,000



AI FUNDING:

\$950,000



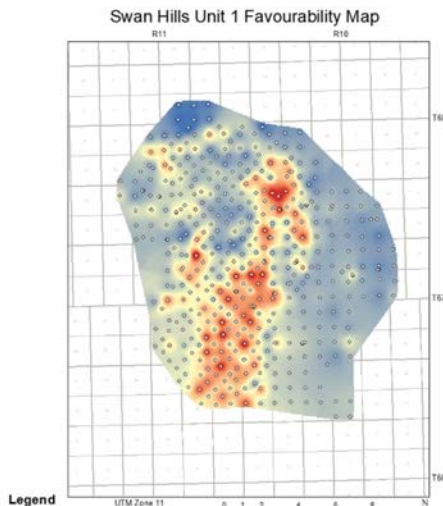
PROJECT DATES:

DEC 2018 –
DEC 2021



PROJECT TRL:

Start: 3
End: 3



APPLICATION

This project aims to understand the geothermal potential within existing oil and gas production throughout the Western Canadian Sedimentary Basin. Geothermal potential will be determined by mapping oil and gas opportunities across the basin, then combined with reservoir models and individual wellhead production capabilities. Together with Razor Energy, optimal methods of refurbishing oil and gas fields for geothermal energy production will be explored. The models and database developed through this project will help industry, government, and researchers quantify the opportunity for geothermal co-produced power in Alberta.

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PROJECT GOALS

- To identify all oil and gas fields in the Western Canadian Sedimentary Basin with geothermal co-production potential.
- To quantify the geothermal power potential of these fields based on reservoir volume and individual wellhead production models.
- To analyze the geochemistry of geothermal brines throughout the Western Canadian Sedimentary Basin.
- To understand the geochemical risks associated with brine circulation in a geothermal setting.
- To optimize various geothermal well designs.
- To estimate the economic costs and benefits of refurbishing oil and gas fields for geothermal energy production.
- To produce the first edition of the Geothermal Atlas of the Western Canadian Sedimentary Basin.

BENEFITS TO ALBERTA

Geothermal energy co-production has the potential to:

- Provide low-carbon emission heat and electricity to Albertan homes, businesses, and industry.
- Reduce the environmental impacts and costs of oil and gas production.
- Prolong the operating lifetime of existing oil and gas infrastructure.
- Create diversified business opportunities for Alberta's oil-field service providers.
- Develop Albertan global export technologies.
- Reduce the overall technical and economic risks of geothermal energy production throughout the Western Canadian Sedimentary Basin.



60 Publications



18 Students
Trained



3 Project Jobs



75-100 Future
Jobs



2 Patents Under
Development



Enabler of Future
GHG Reductions

CURRENT STATUS

DEC 2021

The project is now complete. The first edition of the Geothermal Atlas of the Western Canadian Sedimentary Basin, focused on the Swan Hills region of Alberta, is now complete. Future editions, produced by the Alberta Geological Survey (AGS), will cover the entire basin.

The geothermal atlas covering the Swan Hills region will be available to the public in Spring 2022.

The final report will be available in June 2022.