

CLEAN RESOURCES

ADVANCED HYDROCARBONS

CLEANER HYDROCARBON PRODUCTION – RECOVERY TECHNOLOGIES

FUNDING DETAILS

Acceleration Development of a DME Bitumen Recovery Process

Preliminary research indicates that the DME Bitumen Recovery Process at an operating temperature of 80°C has oil production rate and recovery factor comparable to SAGD. This process requires 70% less heat and at least 90% less water than SAGD. The large-scale physical model experiment proposed in the project will generate performance results of the DME recovery process resembling what would occur in field. These results and the numerical simulation model tuned with the experimental results and the supporting fluid phase behavior testing, will be used to optimize and to advance the DME Recovery Process to field application.



RECIPIENT:
InnoTech Alberta



PARTNERS:
AACI



TOTAL BUDGET:
\$ 1,150,375



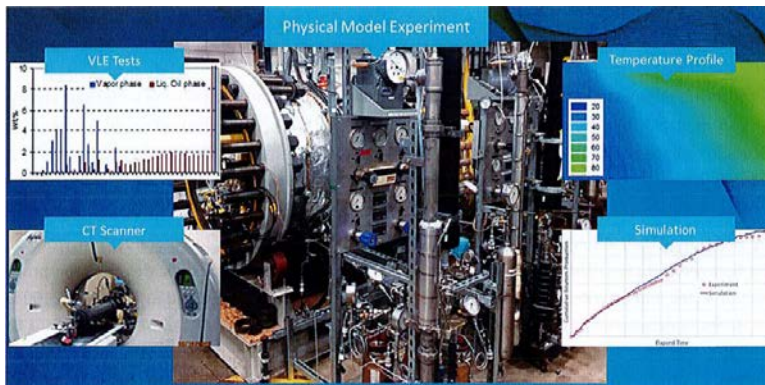
AI FUNDING:
\$ 505,000



PROJECT DATES:
NOV 2020 –
NOV 2022



PROJECT TRL:
Start: 4
End: 6



APPLICATION

The DME Bitumen Recovery Process has the potential to achieve economic production rates, more than 50% GHG emission reduction and possibly eliminate make-up water as compared to the SAGD process for the oil sands extraction in Alberta. The DME demand from oil sands development would stimulate investment in facilities to synthesize DME from natural gas, creating additional value for Alberta's natural gas resource. DME is also a super clean-burning diesel substitute for heavy equipment.



ALBERTA INNOVATES CLEAN RESOURCES

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PROJECT GOALS

- Conducting the large-scale physical model experiment of the DME Recovery Process to achieve performance similar to SAGD:
 - chamber advance rate of 5 – 8 cm/day
 - 92% oil production rate of SAGD
 - achieve 95% DME recovery
 - achieve 50% de-asphalting in the produced oil
- Conducting the supporting phase behavior and solvent mass transfer measurements
- Developing a credible simulation model for the DME Recovery Process by matching the experimental data of production rates and temperature development with the measured phase behaviors and mass transfers
- Optimizing the oil production rate of the DME Recovery Process through the addition of less than 5wt% water to the injected DME by simulations
- Identifying suitable non-SAGDable resources for the DME Recovery Process by simulations

BENEFITS TO ALBERTA

- The DME Bitumen Recovery Process offers a path to increase operational efficiency, reduce environmental impact and free up pipeline capacity
- The environmental benefits are a product resulting from unique operating conditions of the DME Recovery Process, which is operated at low temperature and recycled formation water use
- The GHG emissions are expected to be reduced by 42% or ~30 kg CO₂e/bbl compared to SAGD
- Construction of DME Plants in Alberta will provide added value to Alberta's natural gas resources



2 Publications



10 Project Jobs



5,900 Future Jobs



1 New
Product/Service



1,270 kt/yr Future
GHGs Reduced

CURRENT STATUS

JUN 2022

Building on previously conducted 2D experiments and simulation work, this project has developed a 3D semi-field scale physical model with a field condition sandpack to evaluate the DME recovery process performance. Measurements were taken that included chamber advance rate, oil production rate, recovery factor and in-situ partial de-asphalting. This data, in addition to other measurements, will be used to develop numerical simulation approaches for future DME field performance predictions.