ALBERTA INNOVATES

CLEAN ENERGY

ADVANCED HYDROCARBONS

CLEANER HYDROCARBON PRODUCTION – RECOVERY TECHNOLOGIES

Solvent Driven Process (SDP) Pilot Project

FUNDING DETAILS

The pilot project tested an oil sands extraction technology using a solvent-driven process (SDP). This involved co-injecting solvent together with steam into a well at Cenovus Energy's Foster Creek operation after approximately one to two years of steam-assisted gravity drainage (SAGD). Unlike in previous solvent pilots conducted by Cenovus, the majority of the steam-solvent mix in this pilot was solvent (between 50 and 95 per cent by weight). The steam heated the solvent to about 100 – 190°C, and the heat and solvent sustained steam chamber growth in the reservoir. Among other things, the pilot project was intended to evaluate the reduction in steam requirements with the goal to develop a technology that potentially can lower the average steam-to-oil ratio (SOR), the amount of steam needed to produce one barrel of oil, significantly and with that, water treatment costs and carbon dioxide (CO2) emissions associated with steam generation.

RECIPIENT:
Cenovus FCCL Ltd.

PARTNERS:
NRCan

TOTAL BUDGET:
$21,184,000

AI FUNDING:
$2,000,000

PROJECT DATES:
January 2017 – December 2019

PROJECT TRL:
Start: 7
End: 8

APPLICATION

SDP has the potential to lead to increased market competitiveness and environmental performance resulting from more efficient bitumen production and lower energy costs, all while lowering water use and greenhouse gas emissions (GHG). Specifically, if SDP were to be deployed commercially, the average SOR and related GHG emission intensity of in-situ oil sands operations have the potential to be reduced significantly.

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PROJECT GOALS

- Conduct a pilot at Foster Creek, one of Cenovus's two producing oil sands projects in northeastern Alberta.
- Develop a technology that can potentially lower the SOR associated with oil sands production significantly.
- Achieve at least a 20% reduction in the average SOR and associated GHG emissions intensity 18 months after the completion of the pilot. A lower average SOR potentially contributes to lower capital and operating costs, smaller surface footprint, lower energy usage, lower emissions intensity and less water usage.
- Investigate the efficiency of steam and solvent co-injection in terms of the amount of oil recovered.
- Achieve reductions in the average SOR by decreasing the amount of steam used while maintaining oil production rates similar to SAGD

BENEFITS TO ALBERTA

- SDP, if commercialized and adopted broadly, has the potential to be an effective solution to increase operational efficiency and reduce emissions intensity.
- Foster Creek's SOR was 2.8 in 2019. The average monthly SOR during the SDP pilot was 0.4, resulting in emissions reductions of about 90% for the pilot.
- The potential for replication increases the environmental benefits proportional to the deployment rate.
- While Cenovus has no current plans to commercialize a solvent-driven process, a hypothetical example running one pad with eight well pairs on SDP for approximately five years would result in average carbon dioxide (CO_2) savings of about 0.5 MT.

1 New Process

1 - 10 Students Trained

1 - 10 Project Jobs

12.2 kT/yr Project GHGs Reduced

~90% reduction in GHGs

CURRENT STATUS

December 2019

The portion of the project supported by Alberta Innovates funding is complete. Cenovus Energy continues to operate the pilot to gain additional learnings. The final report will be available to the public in December 2021.