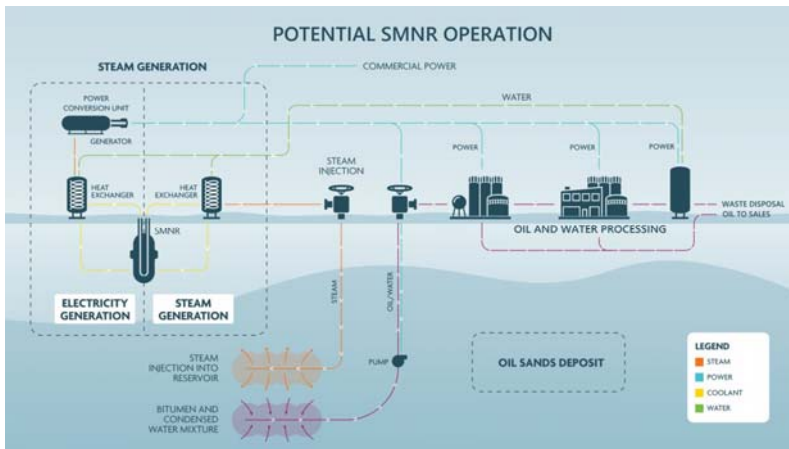


SMNR Feasibility Study – SAGD Integration

This feasibility study will examine the potential of using heat generated by a small modular nuclear reactor to produce net-zero greenhouse gas emission steam and electricity at oil sands facilities. The team conducting the work has steam-assisted gravity drainage (SAGD) and nuclear expertise. The study will:

- Assess the development, operation, and lifecycle of one or multiple small modular nuclear reactors (SMNRs) within oil sands facilities, including costs and an economic impact assessment.
- Evaluate technology characterization and integration with SAGD facility systems, such as electricity and heat demand.
- Provide a regulatory and environmental review with a framework for requirements.
- Develop a preliminary project and construction execution approach with a high-level development plan.



RECIPIENT:
Cenovus Energy



PARTNERS:
TC Energy



TOTAL BUDGET:
\$1,400,000



AI FUNDING:
\$466,666



PROJECT DATES:
**MAY 2022 –
MAR 2023**



PROJECT TRL:
**Start: 5
End: 5**

APPLICATION

SMNRs may provide a cost-competitive and safe solution to replace natural gas-fired boilers on a large scale to reduce overall emissions. These boilers currently produce steam for injection into oil sands reservoirs to soften bitumen and allow it to be pumped to the surface. The study will include generalized SAGD criteria for broad application. The feasibility assessment will identify risks and costs to support initial deployment opportunities, including in the SAGD and utilities sectors, while also potentially in remote communities, oil sands mining, and other industrial heat applications.

PROJECT GOALS

This study anticipates providing further insights into one of the technological solutions under assessment to address the oil sands industry's ambition of reaching net-zero emissions from operations by 2050.

The goals of the study are:

- Develop the knowledge base of SMNR technology
- Assess whether these reactors can be feasibly deployed at an oil sands operation in Alberta
- Develop knowledge about broader applications, benefits to the economy
- Update information to share with potential stakeholders and the public, including an awareness of the commitment to explore the alternative pathways to net zero.
- Leverage Alberta's strengths and leadership to grow the clean technology sector

BENEFITS TO ALBERTA

The knowledge generated could:

- Inform decisions by Alberta businesses and project developers that could significantly reduce future emissions and contribute to diversifying energy generation
- Policy and regulation development based on the regulatory review and economic impact assessment
- Eventual commercial use of SMNRs in multiple industries as an alternative energy source, demonstrating Alberta is a leader in clean energy technology
- Assist in achieving a net zero electricity grid utilizing emission free technology for base load and dispatchable generation
- Reduce barriers for remote and less advantaged stakeholders to move towards participation in nuclear commercialization
- Start to address the goals for Alberta outlined in the joint interprovincial *A Strategic Plan for the Deployment of Small Modular Reactors*



1 Publication

CURRENT STATUS

MAY 2022

Agreement execution was achieved in May; consultancy support for the feasibility study is being secured through a diligent request for proposal process. Initial work will be focused in on technology characterization and SAGD process design as well as initiating work on sections related to regulatory, environment, and stakeholder strategy and planning, and risk identification.