

# CLEAN RESOURCES

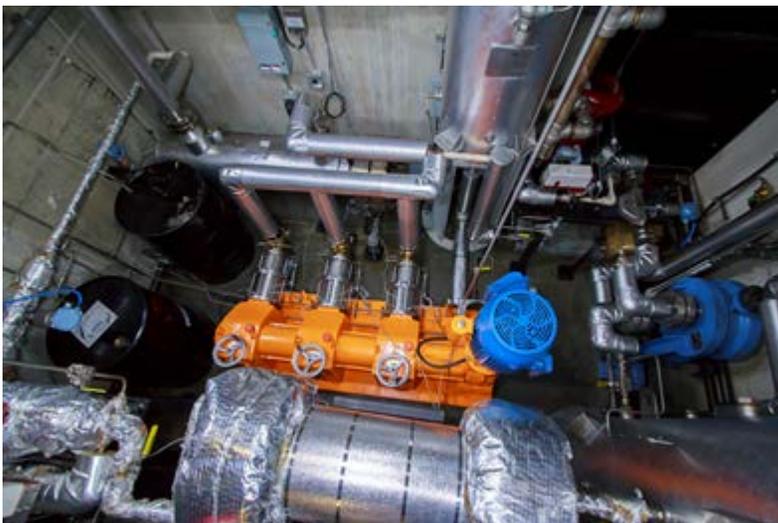
## ADVANCED HYDROCARBONS

CLEANER HYDROCARBON PRODUCTION – RECOVERY TECHNOLOGIES

### FUNDING DETAILS

## EVALUATING THE BENEFITS OF SOLVENTS AND FLOW CONTROL DEVICES FOR THERMAL PRODUCTION

Combining Flow Control Device (FCD) technologies with in-situ bitumen recovery processes, utilizing pure solvent, steam and solvent, or an optimized SAGD process involving injection of Non-Condensable Gas (NCG), has the potential to significantly reduce Alberta's greenhouse gas (GHG) emissions. However, optimizing the integration of these technologies will require an understanding of the complex thermal-hydraulic behavior of these devices that would occur in these unique operating conditions. To determine which devices are ideal for these processes, this project will aim to perform full scale testing of a wide variety of FCDs, which may include devices currently available on the market for conventional applications, devices designed for steam assisted gravity drainage (SAGD) or already in SAGD applications, or new device architectures specific to the above-listed recovery processes.



#### RECIPIENT:

C-FER Technologies



#### PARTNERS:

Suncor Energy  
Imperial Oil  
Cenovus Energy  
Canadian Natural



#### TOTAL BUDGET:

\$2,930,700



#### AI FUNDING:

\$1,162,000



#### PROJECT DATES:

March 2019 –  
June 2021



#### PROJECT TRL:

Start: 4-6  
End: 7-9

## APPLICATION

SAGD operators will be the primary users of this new testing facility for the foreseeable future. Operators will likely wish to conduct additional testing once this project is complete. Vendors will supply FCDs for testing during this initial test program but are expected to also participate in their own testing once this test program is complete.



# ALBERTA INNOVATES CLEAN RESOURCES

## ADVANCED HYDROCARBON

### CLEANER HYDROCARBON PRODUCTION – RECOVERY TECHNOLOGIES

#### PROJECT GOALS

- The main objective of this project is to establish an industry accessible and independently operated new test facility for evaluating the performance of FCDs under operating conditions including:
  - pure solvents
  - solvent assisted SAGD
  - SAGD with late-life Non-Condensable Gas (NCG) injection
- The existing FCD testing facility at C-FER will be upgraded to safely accommodate solvents as test fluids, including propane, butane, and diluent
- C-FER will conduct hydraulic characterization testing of various FCDs, either commercially available devices, prototype devices, or even simple flow control element architectures or "shapes", resulting in data to assist operators in selecting and implementing the best technologies for these various processes and will also assist vendors with identifying ways to optimize their device designs for the various recovery processes

#### BENEFITS TO ALBERTA

The parties who should benefit from this program include:

- SAGD Operators: will better understand the ideal technologies for their fields, which should lead to more environmentally friendly oil recovery (i.e. reduced GHG emissions and water consumption) and improved project economics
- The People of Alberta: to whom this research should help to provide long-term employment security for thousands of Albertans, stable royalty income for the province, and help to improve the public image of the Alberta oilsands
- FCD Vendors: who will use the test learnings to better understand FCD performance and enable them to further optimize FCD designs
- C-FER Technologies: who will operate a new, one-of-a-kind test facility, which could attract future applied research and testing work from around the world. It is expected that this test facility will help to keep a team of employees working for up to 5 years.



1-3 Publications



Up to 26,000 kT/yr  
Future GHGs



1-3 New Products



1-10 Project Jobs



100-200  
Future Jobs

#### CURRENT STATUS

#### December 2019

The Industry Participants and C-FER worked together to finalize the project goals (including some scope expansions), a preliminary testing plan, and determine which FCDs may be tested over the course of the project. In addition, C-FER (with Participants' support) completed the needed detailed design work for the upgraded facility that will be used to guide the procurement and construction of the new facility that will occur under Phase 2 of the project.