

## ARCTIC 3 Mining Hot Water Production

July 2016 - March 2020

### Challenge:

Replace or supplement conventional commercial-scale hot water production approaches necessary for oil sands mining and extraction processes, in order to reduce the associated greenhouse gas emissions. Hot water is currently produced through contact with steam produced in natural gas-fired boilers.

- Commercial-scale hot water production: 1000 – 10,000<sup>^</sup>3
- Temperature required: 20-90 °C

**Challenge Sponsor:** COSIA & Alberta Innovates

**Challenge Facilitators:** Delphi Group and Tessellate

**Budget:** \$1,200,000

**Finalist:** Combustion and Energy Systems Ltd.

### Semi-Finalists:

#### Inproheat Industries Ltd.:

- Industrial energy solutions for foundry, chemical and alloy materials, low GHG emission, high efficiency combustion solutions, heat transfer & rotating equipment
- Proposal centered around the use of submerged combustion to heat up the water

#### Combustion and Energy Systems Ltd.:

- Leading global supplier of custom designed, proprietary and patented condensing heat recovery and energy efficiency systems for industrial and institutional clients worldwide
- Submitted a patented heat recovery system that condenses exhaust gas

### Environmental Benefits:



**30,000 Tonnes/Year**  
GHG reduced



**150,000 M3/Year**  
Fresh water saved

### Outcomes:

Both Inproheat Industries and Combustion and Energy Systems yielded solutions that met the requirement for heating water, and yielding efficiency gains that translate into reduced CO2 emissions. However, Combustion and Energy Systems' technology was preferred since it allowed the heated liquid to remain uncontaminated by the flue gas.



#### Energy Savings

**18 - 24**  
MW per Year



#### Payback

**10**  
Years

### Conclusion:

Combustion and Energy Systems' technology advanced to full commercial installation. The field trial is underway and being managed by Imperial Oil.

