

## **BACKGROUND: OVERVIEW OF PROJECTS**

Sustainable Development Technology Canada (SDTC) has teamed up with Alberta Innovates (AI) and Emissions Reduction Alberta (ERA) for a total of 11 joint funding projects (four with ERA and seven with AI).

### **ERA-SDTC JOINT FUNDING OPPORTUNITY**

ERA and SDTC jointly made \$40 million available to help small and medium-sized businesses create jobs and reduce Greenhouse Gas (GHG) emissions through the advancement of clean technologies that are applicable in Alberta. ERA and SDTC contributing \$22.6 million to advance four successful projects that are valued at more than \$39.6 million. It is estimated there is potential for these technologies to produce cumulative market emissions reductions of more than 300,000 tonnes by 2030.

#### **Purlucid Treatment Solutions Inc.**

Today, in situ bitumen recovery requires steam to heat bitumen. While water is recycled and reused, the process is extremely energy intensive, requiring pumping, cooling and then reheating of the recycled water. Purlucid's technology employs a number of innovations, including replacing part of the energy-intensive process with a novel membrane filter to remove contaminants from water before it returns to the boiler. This will reduce GHG emissions because the technology allows water treatment to occur at a higher temperature, so water doesn't need to be cooled and then reheated to the degree reheating is necessary today.

#### **Mariner Partners Inc.**

Mariner Partners is leading the development of data analytics and process automation to improve the energy efficiency of large commercial buildings. Large buildings have complex systems to manage heating, cooling, ventilation, lighting and other building functions. Mariner Partners' Energy Optimization Software (EOS) reduces GHG emissions and energy costs by optimizing the way building conditions are maintained. For example, it minimizes required operating times for boilers, reduces simultaneous heating and cooling, and improves overall building efficiency. The technology will be tested at a number of sites including the Kaye Edmonton Clinic and the Fort Saskatchewan Community Hospital.

#### **Calscan Energy Ltd.**

Pneumatic devices are the largest source of oil and gas methane emissions in Alberta. Valves, controllers and pumps at well sites run using pressurized methane that is released directly to the atmosphere. Alberta-based Calscan Energy aims to change this with the development and scale-up of their Near Zero Emission Well Control System. The solar-electric system eliminates all pneumatic equipment and is designed for reliable winter operations at remote off-grid well sites and incorporates a solid acid fuel cell (SAFC) that is powered by industrial grade on-site methanol. If it is successful, the solar-fuel cell hybrid power system would also eliminate the need for expensive small-scale propane or natural gas generators that are commonly used to power communication systems and auxiliary equipment at remote sites.

**Acceleware Ltd.**

Acceleware will complete a commercial scale pilot test of its patent pending RF XL electromagnetic heating technology that has the potential to significantly reduce oil sands production costs, while also reducing GHG emissions and eliminating external water use. This game changing technology uses radio waves to heat the water already present in the reservoir to efficiently mobilize heavy oil and bitumen. RF XL requires no chemicals or solvents, no external water, requires a smaller surface footprint, and can reduce GHG emissions by 50-100%. Project developers estimate the potential exists for capital and operating cost reductions in the range of 70 and 40 per cent respectively when compared to Steam Assisted Gravity Drainage (SAGD).

**ALBERTA INNOVATES-STDC JOINT FUNDING OPPORTUNITY**

Alberta Innovates and SDTC combined their strengths and interests to support clean technology and innovation through a joint funding opportunity in water technology. The funding opportunity offered a streamlined “one-window” Federal/Provincial Call for Proposals from Canadian small and medium enterprises (SMEs). The two government organizations were looking for companies developing and demonstrating new and innovative water technologies. The goal: to accelerate commercialization of water related technologies in key areas that benefit Alberta and Canada. The competition had \$8 million available, with a maximum of \$1 million per project from the Funders. Approximately \$6.2 million will be awarded through this call.

**Saltworks Technologies Inc.**

Saltworks’ ElectroChem water treatment product is an advancement of electro dialysis, the second most widely used membrane desalination system in the world. Saltworks’ ElectroChem system employs novel membranes that can withstand the harsh hydrocarbon environment, demonstrating a first in the world recycling of produced water by this method. The system recycles Enhanced Oil Recovery produced waters for re-injection, lowering polymer and chemical costs to save money while also reducing wastewater disposal and freshwater withdrawal. It will also treat saline wastewaters and brines from a variety of industries across Canada to recover freshwater. The project includes the design, build and pre-test of a field pilot plant. It also includes on site testing of the pilot plant for 60 days to prove treatment objectives and confirm the design, operating needs, economics, benefits, and lessons learned for full-scale commercial dispatch.

**SewerVUE Technology Corp.**

SewerVUE’s Technology deploys high frequency pipe penetrating radar antennas inside asbestos cement pipes to directly measure thickness, map defects, and detect voids outside the pipe. It provides a complete condition assessment of the pipe and its surroundings. A dedicated AC pipe scanner would be able to deploy from a standard opening into a live main, and report to the surface in real time via fiber optic tether. The technology is currently proven and has been deployed in large diameter gravity sanitary sewer and water pipes. The AC Pipe scanner could survey 4-km of pipe per day. With 10,932-km of target pipe in Alberta, and 10 AC Pipe Scanner systems, all of Alberta could be scanned in just 275 working days.

**Forward Water Technologies**

Forward Water Technologies (FWT) has developed a forward osmosis (FO) process using low energy inputs to drive the thermo-chemical draw solute re-cycling process allowing for markedly improved economics in the treatment of saline waste streams. This proprietary advancement in FO technology can significantly reduce wastewater disposal and simultaneously provide a fresh water stream that can be recycled into operations leading to both a reduction in total water costs and environmental footprint. Results from pilot trials will demonstrate the commercial readiness of the technology.

**Ground Effects Environmental Services Inc.**

Ground Effects Environmental (GEE) has developed its ElectroPure Technology (EPT) using electrocoagulation (EC) and advanced oxidation processes (AOP) to eliminate priority pollutants which restrict re-use of produced water, such as high H<sub>2</sub>S levels, silica, oil & grease, and suspended solids. The EPT applies ozone and direct current (DC) through select electrodes to the contaminated wastewater, destabilizing the contaminants and allowing for their destruction or removal. The technology offers several economic, environmental, and physical footprint benefits over oil sands water treatment methods in use today and is anticipated to have application for many industrial and municipal wastewater streams as well. The main objective is to build a 1000 m<sup>3</sup>/day demonstration EPT system at a thermal in situ facility and test it for 3-6 months.

**Agar Canada Ltd.**

This project will use a combination of technologies to provide a robust online analyzer that can detect parameters of interest (oil and silica) at the appropriate detection limit. Proposed technology is a combination and variation of multiple technologies offered by Agar, Luxmux and NDT Ultrasonics. Each of the companies have distinct sensors and systems operating at different portions of the electro-magnetic spectrum (EM) for online analysis of parameters in industrial water. The proposed technology will allow upsets in water treatment to be detected in real time, enabling operators to adjust the water treatment process as needed.

**Fossil Water Corporation**

A modular treatment technology for hydraulic fracturing applications to increase the recycling of flowback and produced water while reducing costs. The proposed technology includes combining and advancing a number of water treatment technologies. Increased reuse of flowback and produced water will reduce fresh water demand. It is anticipated that at full market penetration, as much as 50,000,000 m<sup>3</sup> of fresh water use will be eliminated worldwide.

**waterStrider Treatment Inc.**

waterStrider treats water from fracking, so it can be reused by production. waterStrider employs a series of treatment steps, each with significant improvements over common practice in industrial wastewater treatment, and each with a degree of overlapping capability to robustly remove contaminants under constantly changing conditions. waterStrider's innovation can be affordably constructed, operated, and maintained under field conditions by non-specialist but trained operators. Each of the technology steps operate at commercial scale in other industries, however, have not been applied commercially for this application or in this combination.

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