

ALBERTA INNOVATES CLEAN RESOURCES

ADVANCED HYDROCARBONS

INNOVATIVE HYDROCARBON PRODUCTION – PARTIAL UPGRADING

Institute for Oil Sands Innovation (IOSI) at the University of Alberta

IOSI at the University of Alberta is engaged in breakthrough and applied research on the mineable oil sands. The program covers bitumen extraction, aqueous tailings dewatering and consolidation, partial upgrading of bitumen and online instrumentation in the oil sands industry. Mineable oil sands deposits will account for a significant portion of oil production over the coming decades. The aim is to enable production with a much smaller footprint through rapid reclamation through new non-aqueous extraction technology & accelerated dewatering of aqueous tailings. IOSI accelerates innovations for technologies resulting into reduction of water consumption, energy use and GHG emission, and training of highly qualified personnel for the oil sands industry. An active partnership with Imperial Oil and Canada's Oil Sands Innovation Alliance (COSIA) ensures that industry perspective guides the development, selection, and execution of the research projects.

INSTITUTE FOR OIL SANDS INNOVATION AT THE UNIVERSITY OF ALBERTA

Breakthrough Energy Research | Advanced Environmental Technologies



FUNDING DETAILS



RECIPIENT:

University of
Alberta



PARTNERS:

Imperial, COSIA



TOTAL BUDGET:

\$25,050,000



AI FUNDING:

\$2,500,000



PROJECT DATES:

MAR 2018 –
APR 2023



PROJECT TRL:

Start: 1 – 3
End: 2 – 6

APPLICATION

IOSI has been considered a model of industry-government-academia joint research. Its mandate is to carry out breakthrough research that will lead to step-out technologies rather than incremental improvement of existing operations. All of the projects in four theme areas have direct implication on efficacy of oil sands operations as well as the capacity to impact our environment in a positive way.

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PROJECT GOALS

- **Research Excellence:** Develop a research ecosystem to support the discovery and commercialization of technologies that improves the oil sands efficiencies by decreasing fresh water usage and GHG emissions.
- **Training and Development:** Support the training and development of personnel for the oil sands industry. Graduation of over 50 graduate students (MSc and PhD) and postdoctoral fellows.
- **Publications:** Publication of over 50 journal papers on high quality science and engineering journals, and presentation of over 100 conference papers.
- **Technology and Commercialization:** Filing of 10 to 15 new patent applications. Research and innovation to support commercial operations, and new technologies in development.

BENEFITS TO ALBERTA

- Research in the “Extraction” Theme could lead to non-aqueous extraction processes that eliminates the need for fresh water and the associated energy consumption, reducing about 25% of the total annual GHG emissions from oil sands surface mining operations. Imperial Oil’s non-aqueous extraction pilot tests showed that the non-aqueous extraction process could reduce water consumption by 80%.
- Research on tailings covering both tailings processing and geotechnical aspects assists development of tailings flocculation and thickening technologies, and geotechnical consolidation and reclamation processes using local flora and fauna to promote water drainage and plant growth.
- IOSI’s research “Product Cleaning and Partial Upgrading” targets the removal of fine mineral solids from bitsol, and partial upgrading of bitumen to reduce or eliminate diluent use. This helps pipeline and transportation integrity and safety, and reduces environmental impact. It increases the value of Alberta bitumen and widens its market access.



50 Publications



77 Students
Trained



10 Patents



5 New
Products/Services



109 Project Jobs



1.4 - 7.0 kT/yr
Future GHGs

CURRENT STATUS

MAY 2020

Currently there are a total of 46 projects underway under the 4 research themes namely, Extraction, On-line Instrumentation for Oil sands, Product Cleaning and Partial Upgrading, Tailings Process Fundamentals. There are 4 Technology accelerator projects focused on rapid commercialization and fast results at higher TRL level.