Government of Canada | Gouvernement du Canada

Oil Sands

A strategic resource for Canada, North America and the global market

Global Leadership In Innovation

The oil sands are the third-largest proven deposit of crude oil in the world, underlying 142,000 square kilometres (54,827 square miles)[1] in western Canada. They consist of crude bitumen suspended in an ore that is a mixture of sand, clay and water. Raw bitumen, like other heavy oils, cannot be shipped because it is too thick for pipeline transportation. Bitumen is either diluted with lighter hydrocarbons or upgraded to allow it to flow through pipelines. Upgraders are similar to refineries and specialize in transforming bitumen into lighter crude oil.

Bitumen can be extracted using two methods. About 20 percent of the oil sands is within 75 metres (250 feet) of the surface and can be accessed through mining. The remaining 80 percent requires drilling technology to extract the bitumen. Generally, drilled (in-situ) oil sands production involves pumping steam underground to separate the bitumen from the sand and recovering the bitumen through wells.

Global leadership in innovation

Innovation in the oil sands is spurred by several factors: strict environmental regulation, industry collaboration, and strong government commitment to research and development. The oil sands industry has made significant progress in reducing its greenhouse gas (GHG) emissions per barrel of oil produced. In 2014, GHG emissions per barrel of oil sands were 31 percent below 1990 levels.[2] Oil sands facilities must continue to reduce their GHG emissions as part of Canada's commitment to emissions reductions.

Progress through innovation

New technologies continue to drive environmental performance in the oil sands. We are improving how we manage tailings ponds. New advances mean more water can be recycled and reused in oil sands operations, vegetation can be replanted sooner, and land can be reclaimed quicker.

New technologies are being piloted that reduce steam requirements for in-situ oil sands production, reducing GHG emissions and water use. These technologies use light hydrocarbons as alternatives to steam or radically new techniques such as heating bitumen through electricity to move the bitumen toward wells.

Oil sands mining research has focused on improving processes that separate bitumen from the sand. New techniques have reduced energy and water requirements for the extraction process.

Another major advancement is paraffinic froth treatment (PFT) – a chemical process that uses a paraffin solvent to treat produced bitumen prior to transporting it. The process improves the quality of bitumen from mining operations, allowing it to be shipped via pipeline without first being processed at a stand-alone upgrader, and reduces GHG emissions by roughly 6 percent relative to other mining projects.

Environmental regulation

Canada is a major oil producer with strong environmental regulations on oil production, which are spurring innovation. Strict regulations on water use ensure industry and governments continue to develop ways to further reduce the amount of water used in the extraction process. Provincial regulations include daily limits for withdrawals from waterways, limits on the use of water from underground aquifers, and mandatory monitoring of surface and ground water.

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[1] *ST98-2014: Alberta's Energy Reserves 2013 and Supply/Demand Outlook 2014-2023*

[2] Environment Canada, *National Inventory Report 1990-2014: Greenhouse Gas Sources and Sinks in Canada*

Canada

The Government of Canada is providing national leadership by joining with the provinces and territories to take action on climate change, put a price on carbon, and reduce carbon pollution. The government has committed to working with the provinces and territories to establish a pan-Canadian framework for clean growth and climate change.

In 2007 Alberta became the first jurisdiction in North America to have mandatory GHG emission reduction targets for large emitters across all sectors. In June 2015 the reduction targets were strengthened so that facilities that emit more than 100,000 tonnes of GHG emissions per year will have to reduce their emissions intensity by 20 percent per barrel by 2017. Companies unable to comply with the target through direct emissions reductions can use recognized offsets or pay a C$30/tonne fee by 2017 into its Climate Change and Emissions Management Fund. This fund has collected more than C$577 million as of April 2015, which is being invested in technologies and projects that will further reduce GHG emissions. More than 61 million tonnes of GHG emissions have also been reduced, from a business-as-usual scenario, since 2007.

In November 2015 the Government of Alberta released a far-reaching climate change policy that moves towards phasing out coal-generated electricity, implementing a new carbon price on GHG pollution, placing a hard-cap on oil sands GHG emissions and reducing methane gas emissions from oil and gas operations by 45 percent.

Support for research and development

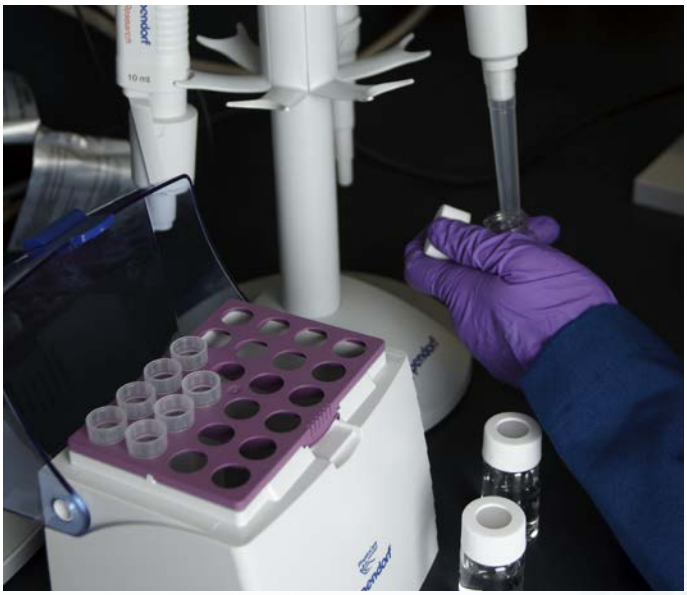
The governments of Canada and Alberta provide support for innovation in this sector. Canada has become a leader in carbon capture and storage technology through financial and technical support from both governments. In 2012, both governments announced a memorandum of understanding that will lead to the development of new and improved oil sands technologies, resulting in a smaller environmental footprint. They are also working with the University of Alberta through the Oil Sands Tailings Research Facility in Devon, Alberta.

Canadian industry working together

Thirteen oil sands companies, representing 90 percent of oil sands production, have joined together under the Canadian Oil Sands Innovation Alliance to share innovation and intellectual property. To date, member companies have shared 814 distinct technologies and innovations worth almost C$1.3 billion – an approach that is unparalleled in the world.[3]

Looking ahead

According to the International Energy Agency (IEA), oil will continue to play a dominant role in meeting the world's energy and transport fuel needs, even under the most stringent GHG reduction scenario modelling by the IEA. Through innovation, collaboration and a commitment to improving its environmental performance, Canada is leading the way in advancing technological improvements to environmental performance that will be critical to meeting this global challenge.



[3] Canada's Oil Sands Innovation Alliance website: www.cosia.ca/about-cosia

Aussi disponible en français sous le titre : Sables bitumineux : Leadership mondial en innovation

May 2016