



Telephone Lake Project and Northern Alberta Oil Sands

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Alberta Oil Sands Overview

The oil sands comprise more than 98% of Canada's 173 billion barrels of proven oil reserves. According to Natural Resources Canada, oil sands reserves are spread in 3 distinct areas of northern Alberta that cover a total area of 140,200 km². The 3 areas are:

- Athabasca deposits (largest reserves)
- Cold Lake deposit
- Peace River deposit

In 2013, oil sands were recorded to produce 1.95 million barrels per day. According to Canadian Association of Petroleum Producers (CAPP) it is estimated that the oil sands will produce 4.8 barrels per day by 2030.

Currently there are 58 oil sands project in Alberta that are valued at \$5 million or greater, which account for an approximate total value of \$109.3 billion.

Exploration and Development

For the first time in 2012, in situ oil sands production exceeded traditional open-pit oil sands mining in Alberta. In situ (Latin for "in place") favors the usage of wells rather than traditional use of trucks and shovels to extract oil from the sands.

In 2013, 53% of Alberta's oil sands volumes were produced using in situ methods, establishing a trend of greater reliance on in situ production in the future, as 80% of proven bitumen reserves are too deep underground to recover through open-pit mining.

There are two commercial methods of in situ:

- Cyclic Steam Simulation (CSS)
 - High-pressure steam is injected into directional wells drilled from pads for a period of time, then the steam is left to soak in the reservoir for a period, melting the bitumen, and then the same wells are switched into production mode, bringing the bitumen to the surface.
- Steam Assisted Gravity Drainage (SAGD)
 - Parallel horizontal well pairs are drilled from well pads at the surface. One is drilled near the top of the target reservoir, while the other is drilled near the bottom. Steam is injected into the top well, a steam chamber forms, and the melted bitumen flows into the lower well via gravity and is pumped to the surface using artificial lift.

Both SAGD and CSS are used in the Cold Lake and Peace River deposits, while SAGD is the preferred in situ technology in the Athabasca deposit. The technologies combined currently produce over 1 million barrels per day.

Telephone Lake Project

The Alberta Energy Regulator approved the Telephone Lake Project in November 2014. Formerly named Borealis, Telephone Lake is one of the emerging oil sands projects in development by Cenovus Energy.

- Estimated cost of the project is approximately \$1 billion.
- Located in northern Alberta near the Telephone Lake and approximately 90 km northeast of Fort McMurray.
- Expected initial production capacity of 90,000 barrels per day (bpd) which is expected to be developed in two 45,000 bpd phases with expected total production capacity in excess of 300,000 bpd over its operational life of approximately 40 years.
- The Telephone Lake project is estimated to contain approximately 2.6 billion barrels.
- Full-scale development of the site is expected to begin in 2015.
- This project is 100% owned by Cenovus Energy.

Major part of Telephone Lake is its steam-assisted gravity drainage (SAGD) pilot that has demonstrated company's success in removing an underground layer of non-potable water sitting on top of the oil sands deposit. Cenovus believes that the dewatering experiment will enhance project economics and reduce the impact on the environment. Approximately 70% of the top water was removed during the dewatering pilot and replaced with compressed air, which Cenovus expects will improve the steam to oil ration (SOR) of the project allowing for extraction of more bitumen. Cenovus uses electric submersible pumps to bring oil to the surface, and most of the water is then recycled.

Similar Projects

Cenovus Energy is developing another emerging oil sands project on par with Telephone Lake:

Grand Rapids Project:

- Estimated cost approximately \$2 billion.
- Located in the Greater Pelican Region, approximately 300 km north of Edmonton.
- Successful execution of a pilot SAGD project in December 2010.
- The Alberta Energy Regulator approved the project in March 2014.
- Scheduled to begin development in 2015.
- The Telephone Lake project is estimated to contain approximately 1.5 billion barrels.
- Estimated to have 40-year life with the production capacity of 180,000 bpd, developed in multiple phases.
- This project is 100% owned by Cenovus Energy.

Cenovus has 2 industry-leading oil sands projects in northern Alberta that utilize the SAGD technology: Foster Creek and Christina Lake.

Foster Creek Project:

- Estimated cost approximately \$2 billion.
- Located approximately 330 km northeast of Edmonton on a Cold Lake Air Weapons Range.

- Cenovus' largest project and is considered among the best commercial and technical SAGD project in the industry.
- Began commercial operation in 2001 and currently producing approximately 150,000 bdp.
- There are 5 phases currently producing at Foster Creek with 3 more under construction.
- Expected production capacity of 295,000 bpd by 2019 and as much as 310,000 bpd with future optimization.
- Largest commercial SAGD project in Alberta to reach royalty payout status (cumulative revenues exceed cumulative allowable costs).
- This project is 50% owned by ConocoPhillips.

Christina Lake Project:

- Estimated cost approximately \$2.7 billion.
- Located approximately 120 km south of Fort McMurray.
- Began production in 2000 and currently producing 138,000 bpd with an expected total gross production capacity of 310,000 bpd.
- There are 5 phases currently producing at Christina Lake with 3 more under construction.
- Considered one of the most efficient SAGD operations in the industry, with a steam to oil ration (SOR) of 1.8 in 2013 (uses less water and burns less natural gas to produce steam).
- This project is 50% owned by ConocoPhillips.

Key Oil Sands Projects Under Development

- Frontier Oil Sands Mine - Phase 1 and 2
 - Estimated cost – \$14.5 billion.
 - Company - Teck Coal Ltd.
 - Municipality of Wood Buffalo.
 - Proposed construction to start in 2016.
- Fort Hills Oil Sands Mine
 - Estimated cost – \$13.5 billion.
 - Company - Fort Hills Energy Corp (Suncor Energy/Total E&P Canada Ltd/ Teck Resources Ltd.).
 - Municipality of Wood Buffalo.
 - Under construction 2013-2017.
- Kearl Lake Oil Sands Project Phase 2 of 2
 - Estimated cost – \$8.9 billion.
 - Company - Imperial Oil Ltd.
 - Municipality of Wood Buffalo.
 - Under construction 2011-2014.
- North West Bitumen Upgrader Phase 1
 - Estimated cost - \$8.5 billion.
 - Company - North West Redwater Partnership (Canadian Natural Resources Ltd. / North West Upgrading Inc.).
 - Municipality of Redwater.
 - Under construction 2013-2017.
- Aspen Oil Sands Project
 - Estimated cost - \$7 billion.
 - Company - Imperial Oil Ltd.

- Municipality of Wood Buffalo.
- Proposed. Planned construction 2017-2020.

Opportunities

- Maintenance Repair and Operations (MRO) – over \$30 billion in 2013.
- Specialty mining and extraction equipment/services for Alberta's oil sands.
- Exploration and drilling services; refinery equipment.
- Pipeline construction equipment.
- Environmental remediation technology and services such as faster treatment of tailings, barrier walls to control seepage and off-stream water storage capacity.
- Safety and security equipment and services.

For More Information

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