

Alberta's Oil Sands 2008

Alberta's oil sands are abundant, accessible, and affordable sources of crude oil. With the continuing decline of conventional North American crude oil reserves, the focus is turning towards oil sands exploration, development, and production. According to the Energy Resources Conservation Board (ERCB), production averaged 1.31 million barrels per day (bpd) of bitumen in 2008 from which 653,000 of synthetic crude oil were produced. Oil sands production currently represents 45 percent of Canada's total crude output. By 2015, oil sands production is expected to account for 65 percent of Canadian crude oil output and 17 percent of North America's output.

What are Oil Sands?

- Oil sands are crude deposits that are substantially heavier (more viscous) than other crude oils. Oil sands consist of sand, bitumen, mineral rich clays and water. Bitumen is a product of the oil sands that requires upgrading to synthetic crude oil or dilution with lighter hydrocarbons to make it transportable by pipelines and usable by refineries.

Oil Sands Reserves

- Alberta has huge deposits of oil sands that underlie 140,200 square kilometres (54,131 square miles) of the province. These deposits are separated into three regions: Peace River, Athabasca (Fort McMurray area), and Cold Lake (north of Lloydminster).



- These oil sands deposits contain approximately 1.7 trillion barrels of bitumen in-place, of which 170 billion barrels are proven reserves that can be recovered using current technology.

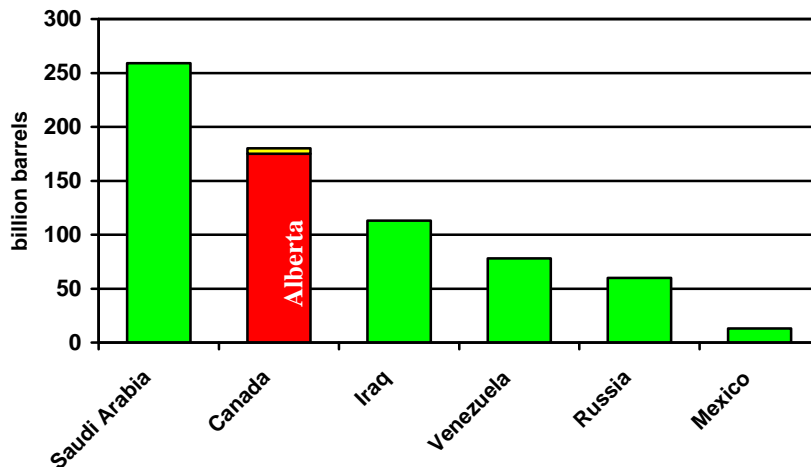
Alberta's Crude Oil Reserves – end of December 2008

	Conventional Oil (billion barrels)	Oil Sands (billion barrels)
Initial Volume In-Place	67.8	1,731
Remaining Established	1.5	170
Remaining Ultimate Potential	19.7	315

Source: ERCB

- As of June 2009 there are approximately 5,012 oil sands (mineral rights) agreements with the Province totalling approximately 82,542 square kilometres (31,870 square miles). Close to 41 percent of possible oil sands areas are still available for leasing.

Proven World Reserves



Oil Sands Production -- Current & Projected

In 2008, oil sands bitumen production averaged 1.31 million bpd. Of this total, 59 % or 772,900 bpd was upgraded and sold as synthetic crude oil and distillates, while 530,000 bbls/d of non-upgraded bitumen was exported to markets outside of the province. Projections based on announced projects indicate production of bitumen growing to 3 million bpd by 2018.

Oil Sands Production Methods

- There are two types of oil sands production methods: mining and in-situ.
- Oil sands mining is an open pit mine operation. Oil sands are moved by trucks and shovels to a cleaning facility where the material is mixed with warm water to remove the bitumen from the sand. Today, all operating oil sands mines are linked with upgraders that convert the bitumen to synthetic crude oil.
- For oil sands reservoirs too deep to support economic surface mining operations, some form of an in-situ or "in place" recovery is required to produce bitumen. In-situ oil sands production is similar to that of conventional oil production where oil is recovered through wells. The ERCB estimates that 80 per cent of the total bitumen ultimately recoverable will be with in-situ techniques. In general, the heavy, viscous nature of the bitumen means that it will not flow under normal conditions. Numerous in-situ technologies have been developed that apply thermal energy to heat the bitumen and allow it to flow to the well bore. These include thermal (steam) injection through vertical or horizontal wells such as cyclic steam stimulation (CSS), pressure cyclic steam drive (PCSD) and steam assisted gravity drainage (SAGD). Other technologies are emerging such as pulse technology, vapour recovery extraction (VAPEX) and toe-to-heel air injection (THAI).
- There are reservoirs in the oil sands where primary or "cold" production is possible. The bitumen in these areas will flow to the well bore when co-produced with sand through the use of progressive cavity pumps, the same technology that is used in conventional heavy oil production. This type of production technology is commonly called cold heavy oil production with sand (CHOPS). While this bitumen is lighter than the bitumen found in mineable and other in-situ reserves, it is heavier than conventional heavy oil.
- In general, oil sands mines are found in central Athabasca deposits (around Fort McMurray). In-situ production is used in the Cold Lake, south Athabasca and Peace River deposits.

Government Framework

- The oil sands mineral rights in approximately 97 percent of Alberta's 140,200 square kilometers (54 thousand square miles) of oil sands area are owned by the provincial Crown and managed by the Alberta Department of Energy. The remaining 3 percent of the oil sands mineral rights in the province are held by the federal Crown within Indian reserves, by successors in title to the Hudson's Bay Company, by the national railway companies and by the descendants of original homesteaders through rights granted by the federal Crown before 1887. These rights are referred to as "freehold rights".
- The Departments of Environment and Sustainable Resource Development administer complementary environmental policies. The ERCB regulates oil and gas activities in the province.
- The Alberta Department of Energy is responsible for administering the legislation that governs the ownership, royalty and administration of Alberta's oil, gas, oil sands, coal, metallic and other mineral resources. The Department's main objective is to manage these non-renewable resources to ensure their efficient development for the greatest possible benefit to the province and its people.

