Government of Canada | Gouvernement du Canada

Oil Sands

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

Water Management

All major energy production requires water

Water requirements for oil sands production vary depending on the technology used for extraction.

Water is used in oil sands extraction to help separate heavy crude oil, also known as bitumen, from the sand, clay and water that make up the oil sands. Water combined with natural gas, is also used to produce hydrogen, which is essential in some upgrading processes to convert bitumen into a lighter, synthetic crude oil.

Oil sands surface mining uses three to four barrels of new water to produce one barrel of bitumen, while the drilled, or in-situ, process uses just one barrel of new water.

Most of the water used is recycled

Most water used in oil sands development is recycled – approximately 75 percent for mining and more than 90 percent for drilled; however, some new water is required to make up for water losses. New water comes from a variety of sources including on-site drainage, collected rainwater, underground brackish aquifers and the local watershed, such as local rivers.

In-situ projects rely largely on groundwater for their water needs, with an ever-increasing amount being non-potable water. While in-situ operations do not generally use river water, mining operations withdraw their new water from the Athabasca River. The federal and provincial governments manage this water use by setting strict withdrawal limits from the river.

Less than 1 percent of the Athabasca River's annual flow is used by the oil sands

The Lower Athabasca River Water Management Framework ensures that during low flow conditions, withdrawals never exceed 10 percent of the natural river flow, and can never exceed three percent on an annual basis. To protect the river's ecosystem and maximize water re-use, production water is transferred to tailings ponds and then recycled back into the production process. The Alberta government has established performance standards to reduce the accumulation of tailings that result from the oil sands mining process.

In 2002, oil sands mining operations withdrew 121 million cubic metres (m^3) (32 billion gallons [gal.]) from the Athabasca River. By 2011, they used approximately 112 million m^3 (30 billion gal.) to produce 65 percent more oil. The Athabasca River Water Management Framework limits, monitors and adjusts the freshwater withdrawal from the river on a weekly basis. These limits maintain flows at or near natural levels taking into account real-time conditions.

Canada

Strict water usage regulations apply

Provincial regulations for water use include daily limits for withdrawals from area waterways, limits on the use of brackish water from underground aquifers, and the regular monitoring of surface water and groundwater. Industry and governments continue to develop ways to further reduce the amount of water used in the extraction process.

In Alberta, water use for commercial, industrial, agricultural, municipal and other purposes requires a licence from Alberta's Ministry of Environment and Sustainable Resource Development in order to use and divert water supplies. Allowed water uses are called allocations. Oil and gas water use includes both non-oil sands production and oil sands production. While irrigation and agriculture water allocation accounts for nearly 45 percent of Alberta's total water allocation, the oil sands industry accounts for only 7 percent.

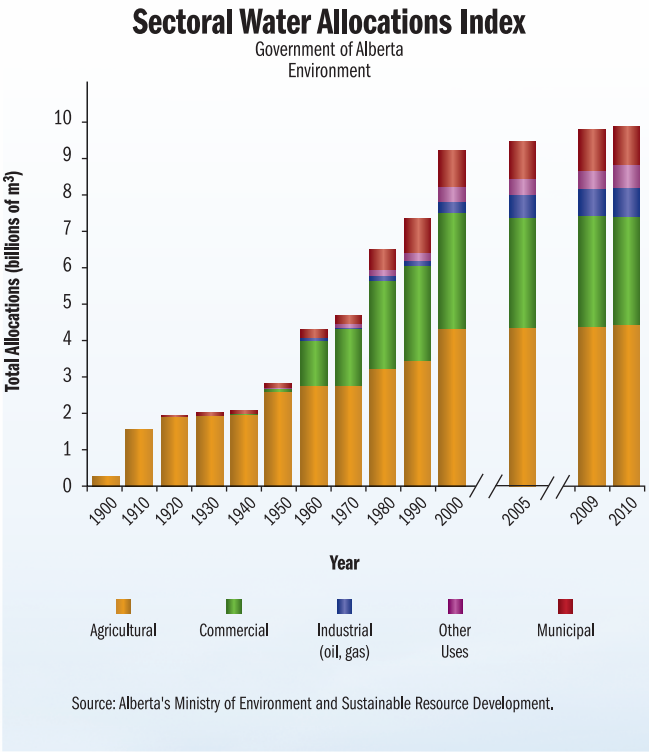
Rigorous water monitoring

The Government of Canada and Alberta established a joint oil sands monitoring program in early 2012. The program will be fully operational by 2015 and takes unprecedented steps to enhance the monitoring of air, land, water and biodiversity. The program improves the ability to detect changes in the environment and manage cumulative impacts.

Water monitoring improvements include monitoring more sites to increase the geographic coverage, sampling more frequently and sampling more substances.

New sediment monitoring, systematic sampling of snow and rainfall, and improved techniques for measuring contaminants on ice will help establish baseline and downstream conditions of potential contaminants throughout the system.

These steps will provide an improved understanding of the long-term cumulative effects of oil sands development.



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