Alberta's oil sands

FACTS ABOUT

The Resource

ALBERTA is blessed with a beautiful natural environment and abundant globally valuable natural resources. We will protect our air, land and water while responsibly developing these natural resources.

The resource

- Alberta's heavy oil resources are a growing contributor to the world oil supply and a stable, secure energy source for domestic and international markets.
- Alberta has proven oil reserves of 171.3 billion barrels.
  - This is enough oil to meet Canada's current oil demand for almost 400 years.
  - The oil sands are the second-largest proven crude oil reserve in the world, next to Saudi Arabia.
- As of September 2010, there are 91 active oil sands projects in Alberta. Of these, five are mining projects; the remaining projects use various in situ (in place) recovery methods.
- Oil sands are located in three major areas beneath 140,200 square kilometres of northeastern Alberta. The majority of this resource can be developed only through in situ recovery. To date, about 602 square kilometres of land has been disturbed by oil sands mining activity.
  - To put that in perspective, the oil sands are located in an area about the size of Lake Superior and Lake Huron, with the amount of land disturbed for mining smaller than the City of Toronto.
  - Or, the oil sands area is roughly the size of Florida, with the amount of land disturbed for mining roughly equivalent to the size of the Kennedy Space Centre.
- The total mineable area is 4,800 square kilometres, of that 1,352 square kilometres has been approved for surface mining as of January 2009. Under Alberta law, any disturbed land must be reclaimed.

Recovering the resource

- There are two types of oil sands extraction methods: surface mining and in situ recovery.
- Oil sands are composed of bitumen, a heavy viscous form of oil attached to sand and water. The bitumen needs to be separated from the water and sand prior to being upgraded into a lighter crude oil and numerous other petroleum products.
- Surface mining requires an open-pit mine operation, similar to many coal, iron ore, copper and diamond mine operations. Oil sands are dug up and moved by trucks to a cleaning facility where the material is mixed with hot water to separate the bitumen oil from the sand.
- For deeper oil sands reservoirs an in situ recovery method is used to produce bitumen through wells similar to that of conventional oil production.
  - 80% of recoverable bitumen can only be produced using in situ methods.
  - In situ operations result in much less land disturbance and are able to reclaim areas much sooner than surface mines. In situ projects also eliminate the need for tailings ponds.
  - The majority of in situ operations use steam-assisted gravity drainage (SAGD). This involves pumping steam underground through a horizontal well to liquefy the bitumen, which is then pumped to the surface through a second well.

Production

- From 2000-2009, an estimated $102 billion was invested in oil sands projects in Alberta.
- There is more than $140 billion in oil sands projects underway or proposed through 2012.
- In 2009, Alberta oil production was about 1.9 million barrels per day of crude oil (1.5 million from oil sands). Of this, about 1.5 million barrels per day was exported to the U.S., supplying 15% of its crude oil imports.
  - With total exports to the U.S. of 1.9 million barrels per day in 2008, Canada is the largest crude oil supplier to the U.S., ahead of Saudi Arabia, Mexico and Venezuela.
- Alberta's remaining oil sands production was distributed within Alberta and to the rest of Canada. More than half of the crude oil received by Ontario comes from Western Canada.

Processing the resource

- Oil sands are produced in the Fort McMurray, Peace River and Cold Lake areas.
- Mined product is usually upgraded to synthetic crude oil. Bitumen recovered through in situ methods is usually mixed with a lighter material to allow it to be shipped for processing.
- The bitumen shipped via pipeline is either sent directly to markets across the U.S. and Canada for upgrading and refining or to the Edmonton area for upgrading and then shipped as synthetic crude oil to other markets.
- Synthetic crude oil is also refined in the Edmonton area and made into marketable products like fuel oil, gasoline, ethylene and propylene.
- Alberta is working to expand its value-added, upgrading, refining and petrochemical industries, as well as potential markets for Alberta's growing bitumen oil supply.

What products are made using oil?

- The most common uses of oil are for heating or fuel.
- Hydrocarbons derived from oil, when mixed with other substances, create products such as:
  - plastics made from alkenes;
  - lubricants for machinery;
  - polyolefin wax is used in food packaging, candles and earplugs;
  - sulfur or sulphuric acid, used in manufacturing steel and fertilizer; and
  - asphalt, used in road construction.
- Some products from oil used in our daily lives:
  - synthetic fabrics
  - plastic dishes
  - TVs
  - perfume
  - sneakers
  - Velcro
  - carpet
  - computers

Planning for the future

- In February 2009, Alberta released a 20-year strategic plan for Alberta's oil sands to address the economic, social, environmental, research and innovation, and governance needs of Alberta's oil sands regions.
- This innovative strategic plan will form a new provincial and regional approach to managing the oil sands regions.
- It contains a number of priority actions, and builds on existing Alberta government policies, programs and initiatives, especially the *Provincial Energy Strategy* and *Land-use Framework*.
- Upon release of the *Land-use Framework* in December 2008, the Lower Athabasca Regional Plan, which overlaps a large part of the oil sands, was identified as an immediate priority.
- It's important that clean technology be used in all aspects of life and industry. So Alberta is encouraging the development of greener communities, buildings and modes of transportation. We're managing our valuable water resources better, and we're improving our methods of waste management too. We support renewable energy development—from wind and solar to biomass and biofuels—and are working to promote markets for and encourage use of these resources and technologies.