

OIL SANDS The Resource



our challenge

Experts say the world will be dependent on carbon-based fuel for the foreseeable future. With the 3rd largest proven reserves of oil in the world, Alberta must help meet the global demand while ensuring sustainable and responsible extraction.

our actions *

Alberta is working with industry and other partners to ensure we continue to develop the oil sands resource responsibly, while constantly improving our regulations and investing in more efficient technology to further reduce the impact of development.

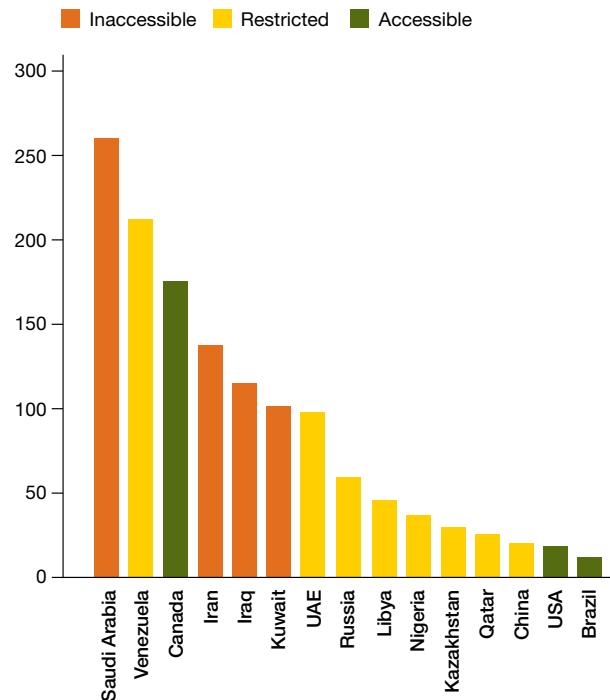
what are oil sands?

- > Oil sands are a natural mixture of sand, water, clay and a type of heavy oil called “bitumen”.
- > Bitumen must be removed from the sand and water before being upgraded into crude oil and other petroleum products.
- > Bitumen will not flow unless heated or diluted – at room temperature, it acts much like cold molasses.
- > The oil sands are also referred to by some as “tar sands”, as bitumen can have a similar consistency to tar, a human-made product.

reserves and production

- > Alberta has proven oil reserves of 170.8 billion barrels, consisting of bitumen (169.3 billion barrels) and conventional oil (1.5 billion barrels).
- > Alberta’s oil sands produce about 1.6 million barrels of oil per day.
- > Half of all Canadian crude production is from Alberta’s oil sands.

Foreign Company Access to Proven Oil Reserves 2010
(billions of barrels)



Source: Oil & Gas Journal, 2011

extraction

- > Extraction of the oil sands is done by surface mining or in situ, depending on the proximity of the resource to the surface. Surface mining extracts deposits less than 75 metres; in situ extracts deep underground deposits.

Surface mining	In situ
> Shovels extract the sand; trucks move it to cleaning facility	> Bitumen is heated underground with steam and pumped to the surface
> 3 per cent of total oil sands surface area	> 97 per cent of total oil sands surface area
> 20 per cent of oil sands reserves	> 80 per cent of oil sands reserves
> 2 to 4 barrels of fresh water per barrel of oil produced	> Average of 0.5 barrels of fresh water per barrel of oil produced
> Tailings ponds used to store wastewater from the extraction process	> No tailings ponds required



production and refining

- > Mined product is upgraded to synthetic crude oil. Bitumen recovered through in situ is usually mixed with a lighter material to allow it to be shipped for processing at other locations.
- > The bitumen shipped via pipeline is either sent directly to markets across the U.S. and Canada for upgrading or to Edmonton for upgrading and then shipped as synthetic crude oil.
- > Synthetic crude oil is also refined in Edmonton and made into marketable products like fuel oil, gasoline, ethylene, and propylene.
- > Currently in Alberta, three facilities in the Fort McMurray area and one near Fort Saskatchewan upgrade about 65 per cent of Alberta's crude bitumen production.

strategic considerations

- > Only 13 per cent of the world's oil is accessible to private investment – the rest is controlled by national governments. Of this accessible oil, 51 per cent is found in Alberta's oil sands.
- > Alberta's oil sands reserves are enough to meet Canada's current oil demand for almost 400 years.
- > Alberta provides more crude oil to the United States than any other country, including Saudi Arabia, Mexico or Venezuela.

role of technology

- > Oil sands industry was built on technology and technology remains the key to unlocking the resource in a sustainable manner.
- > Early technology – from bucketwheel to truck and shovel – have given way to advanced steam injection processes and new improved ways to treat fine tailings.
- > Future technologies like carbon capture and storage will ensure continued success and responsible extraction.