

Climate change and greenhouse gas emissions

- Alberta's climate change strategy ensures environmental protection while maintaining quality of life and allowing for sustainable economic growth.
 - Large emitters over 100,000 tonnes of greenhouse gases (GHGs) per year must meet mandatory reduction targets – Alberta is the only jurisdiction in North America with this requirement.
 - Emitters unable to meet the target must pay \$15-per-tonne into a clean energy technology fund (worth \$187 million as of April 2010), or purchase Alberta offset carbon credits.
 - Alberta has avoided more than 17 million tonnes of emissions to date.
- By 2050, the province will have reduced greenhouse gas emissions by 200 megatonnes. This is the equivalent of taking 42 million cars off the road.
 - That's equal to removing all vehicles on the U.S. west coast – California, Oregon and Washington states.
- Carbon Capture and Storage (CCS) will be responsible for 70% of the 200-megatonne reduction. In oil sands, the bulk of these reductions will occur in production and upgrading.
- A \$2-billion fund will advance CCS research and projects, equivalent to taking one million cars per year off the road.
- Electricity generation and transportation are Canada's main producers of greenhouse gas (GHG) emissions. These two sectors account for 45% of Canada's GHG emissions.
- Alberta's oil sands account for about 5% of Canada's overall GHG emissions and Canada is responsible for about 2% of global emissions. This means Alberta's oil sands contribute less than one-tenth of 1% of the world's GHG emissions.
- Crude oil is not a finished product; it all gets processed into fuel and other products.
 - GHG emissions from various crudes can be compared at numerous stages of their development -- production, refining, transportation and use, but it is only the lifecycle emissions, often referred to as 'well to wheels', that provide a comprehensive and comparable assessment of GHG emissions from crude oil.
 - A recent study by Jacobs Consultancy and Life Cycle Associated revealed that direct life cycle GHG emissions from oil sands crude average about 5% greater than the average of a variety of conventional crudes in the North American marketplace.
- Oil sands mining projects have reduced GHG emissions intensity by an average of 39% between 1990 and 2008 and are working towards further reductions.

Water

- Alberta has monitored water quality in the oil sands region since the early 1970s. Today, water monitoring has expanded to include staff who monitor, approve and ensure compliance of projects as well as consultants and multi-stakeholder groups that continuously assess water quality.
- As a result, government has excellent ambient water quality data, provided by long-term monitoring networks.
- Alberta has some of the most protective water quality guidelines including ultra-low limits on levels of toxins such as mercury. Management frameworks for groundwater are in progress.
- Industry is making progress in reducing water usage.
 - In 2002, oil sands mining operations used 114 million cubic metres of water. In 2007, they used about 64% of that amount of water to produce almost 50% more oil (bitumen). Water use by oil sands mining operations continues to decrease, despite significant increases in production.
 - Many in situ projects recycle up to 90% of the water used in their operations, and use deep-well saline water as an alternative to freshwater wherever possible.

- Monitoring stations downstream of mine sites show industrial contribution cannot be detected against historically consistent readings of naturally occurring compounds in the Athabasca River.
- Data indicates no increased concentration of contaminants in surface water as oil sands development has progressed.
- Strict limits are placed on industry water use through a Water Management Framework for the Lower Athabasca River. This leading-edge framework puts a week-by-week cap on how much water oil sands companies can remove, and is tied to the naturally fluctuating flow of the river.
- All existing and approved oil sands projects may withdraw no more than 3% of the average annual flow of the Athabasca River; 2008 usage was 0.7% of the long-term average annual flow.
- *Alberta Innovates – Energy and Environment Solutions*, through the Alberta Water Research Institute, is leading a number of research projects to better use and manage water resources in oil sands extraction and processing, including a \$15 million project with global technology leader GE Power and Water Process Technologies focused on re-use of industrial water in some oil sands operations.

Air

- Air quality is monitored 24 hours a day, 365 days a year at 16 stations across the region and is managed by requiring industry to adopt best technology, establishing ambient air quality objectives and monitoring by the Wood Buffalo Environmental Association (WBEA).
- Monitoring since 1995 shows improved or no change in long-term air quality for carbon monoxide, ozone, fine particulate matter and sulphur dioxide. Nitrogen dioxide, however, shows an increasing trend. Government also monitors hydrogen sulphide (H₂S) levels. If levels are high, the Alberta government can issue environmental protection orders.
- Air quality in the oil sands region is rated good – the highest quality level – 95% of the time.

Tailings ponds

- Tailings are a by-product of all mining operations. Tailings are made up of natural materials including water, fine silts, left-over bitumen, salts and soluble organic compounds.
- It takes time before space is available for reclamation, but the industry is now at the stage where some of the original ponds – like Suncor’s Pond 1 – are seeing considerable reclamation.
- The proposed design and location of a tailings pond is thoroughly reviewed to ensure it is suitable from environmental, resource conservation and economic points of view. All ponds are constructed with groundwater seepage-capture facilities, and are closely monitored.
- Effective bird deterrence is also an important part of government’s approval requirements for tailings ponds.
- Aggressive tailings management criteria by the Energy Resources Conservation Board include a mandated reduction in tailings and target dates for closure and reclamation of ponds, and specific enforcement actions if targets are not met.
- Alberta Innovates – Energy and Environment Solutions – initiated work on the Tailings Road Map and Action Plan to accelerate the development of a solution to reduce water into the ponds and return the ponds to solid and natural landscapes. This action plan is anticipated to be completed by December 31, 2011.
- Currently, processing of one tonne of oil sand produces 100 to 130 litres of fluid tailings.
- Alberta has allocated \$32 million to support clean energy research being driven by the University of Alberta, including \$7 million allocated specifically to support tailing research at the university’s School of Energy and the Environment.

Land Use and Reclamation

Under our province’s strict legislation, companies must reclaim Alberta’s land so it can be productive again.

- About 662 square kilometres of land has been disturbed by oil sands mining activity.
- In March 2008, the Alberta government issued its first reclamation certificate to Syncrude Canada Ltd. for the 104-hectare parcel of land known as Gateway Hill, north of Fort McMurray. It includes a rolling forested area with hiking trails and lookout points.

- As of December 2008, 67 square kilometres of land disturbed by mining, as part of an ongoing natural life-cycle of 40 years, was reclaimed or is undergoing active reclamation. Industry has planted more than 7.5 million tree seedlings towards reclamation efforts.
- Mine operators must provide a reclamation security bond to ensure requirements are met. As of March 31, 2010, government held about \$916 million in such bonds from the oil sands industry.
- Alberta's boreal forest covers 381,000 square kilometres (147,100 square miles). The maximum area available for oil sands mining operations is 4,800 square kilometres (1,854 square miles), about 1.25% of Alberta's boreal forest area.
- Alberta has committed to a cumulative effects approach that looks at the potential impacts of all projects within a region, rather than impact of a single project in isolation.
- The *Alberta Land Stewardship Act* supports the Land-use Framework, which has province-wide strategies including establishing monitoring systems, promoting efficient use of lands, reducing the impact of human activities and including Aboriginal people in land-use planning.

For more information, visit www.oilsands.alberta.ca

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