



Alberta's Clean Energy Story.




our story

Located in Western Canada, Alberta is a province rich with a beautiful environment, abundant natural resources, a strong economy and a stable political system. We Albertans are proud of our home, and know we share responsibility to protect our planet. We are doing our part to move the world towards a clean energy future.

The challenge we all face is how to get there. The global demand for energy needed to drive cars, spur economic growth and improve living conditions continues to grow. We must continue to develop renewable and alternative forms of energy while being more efficient with the energy we already produce and use.

The world will continue to rely on fossil fuels for some time to come, so it is crucial that the world gets its energy from regions that take environmental and humanitarian responsibilities seriously and work to improve how fossil fuels are developed and used. With the world's third largest proven oil reserves, Alberta is front and centre in these efforts.

Our efforts and lessons learned are useful around the world as we all work towards the same goal – a sustainable, global energy future.

 **global energy demand**
WILL INCREASE BY 36 PER CENT BY 2035. MORE THAN HALF OF
THIS GROWTH IN DEMAND WILL STILL BE MET BY FOSSIL FUELS.
(source: International Energy Agency)



cleaner energy

Jurisdictions around the world are looking for more environmentally sustainable ways to extract energy, produce it and use it to power our day-to-day lives. Alberta is no different.

Our greatest opportunity to further Alberta's clean energy story will come from technology. Many clean energy technologies are already proven and simply require a better way to deploy them on a large scale. Some remain to be proven, while others have yet to be imagined.

Alberta is also increasing the share of renewables in our own electricity mix – currently about 13 per cent – through strategic investments in technology and programs that nurture a growing renewable industry in the province. Alberta is already one of the top wind power producers in Canada.

The guiding principle to our actions is the need to balance environmental protection, economic growth and a high standard of living for Albertans.

REDUCING GREENHOUSE GAS EMISSIONS

Alberta is the only jurisdiction in North America with mandatory greenhouse gas emission reduction targets for large emitters across all sectors.

Our program includes a price on carbon, a regulated carbon offset market and a clean energy technology fund worth over \$257 million (as of April 2011).

We are achieving real results with more than 23 million tonnes of reductions to date. These steps are only our first. Alberta will ensure our industry operates under a comparable level of effort to our competitors. We will continue to push for policies that reduce emissions at the source.

Climate change is fundamentally an energy issue – and we are all energy consumers. Ultimate success relies on curbing global consumption while reducing emissions at all stages, from production to use.

CARBON CAPTURE AND STORAGE

Alberta's \$2-billion commitment to this clean energy technology will result in a collection of projects, pipelines, storage and financing that is unique in the world.

As carbon capture and storage is a global strategy to reduce greenhouse gas emissions, there are tremendous opportunities for those who have knowledge and experience they can provide to others around the world.

ALBERTA INNOVATES

Alberta Innovates is the province's strategic hub for research and technology innovation. It coordinates the efforts of government, post-secondary institutions, industry and funding organizations that are committed to working cooperatively to reduce environmental impacts of energy development. All non-proprietary knowledge is shared to help speed up clean energy technology development worldwide.

investing in research and technology

THE ALBERTA GOVERNMENT RECENTLY INVESTED \$57 MILLION DIRECTLY INTO CLEAN ENERGY RESEARCH:

- \$25 MILLION TO THE UNIVERSITY OF ALBERTA FOR ITS PARTNERSHIP WITH THE HELMHOLTZ ASSOCIATION OF GERMAN RESEARCH CENTRES, WHICH IS EMPHASIZING RESEARCH IN THE OIL SANDS
- \$25 MILLION TO CARBON MANAGEMENT CANADA, WHICH IS HOUSED AT THE UNIVERSITY OF CALGARY, TO REDUCE CARBON EMISSIONS IN CANADA'S FOSSIL FUEL ENERGY SECTOR
- \$7 MILLION TO THE UNIVERSITY OF ALBERTA FOR TAILINGS RESEARCH UNDERWAY AT ITS SCHOOL OF ENERGY AND THE ENVIRONMENT



the oil sands

Alberta is home to the third largest proven reserve of oil in the world – the majority being in the oil sands. Oil sands, sometimes referred to as tar sands, is a natural mixture of sand, water and bitumen (a thick, heavy crude oil). Oil sands production involves separating the bitumen from the sand and then upgrading and refining into a variety of consumer products.

BENEFITS

About 1.6 million barrels of raw crude bitumen are produced every day in the oil sands. That number is expected to more than double within the decade. Alberta is one of the few non-OPEC regions in the world that can accommodate significant growth in oil production to help meet continued and growing consumer demand.

Oil sands development brings with it tremendous benefits to the people of Alberta and Canada. Royalties, tax revenue, jobs and investment translate into valuable government services and wealth for our citizens. For example, forecasts show the oil sands industry will provide 450,000 jobs across Canada annually for the next quarter century (Canadian Energy Research Institute).

CHALLENGES

The size and nature of the oil sands does present significant challenges. At first, the challenge was how to extract the resource – both technically and economically. As the industry has matured, the challenge has become focused on making operations more efficient and more environmentally sustainable.

Government and industry are taking action to overcome the challenges. Alberta's oil sands industry continues to operate under some of the most stringent regulations and standards in the world that hold industry accountable for environmental performance at all times.

CONTINUOUS IMPROVEMENT

Regulation alone will not get us to where we want to be. We must continue to develop new technology, innovate and commit to constant improvement. We know there remains a lot of work ahead of us. For example, some of the challenges facing oil sands development are to find new and better ways to:

- > more quickly reclaim land once a site is no longer active;
- > further reduce the volume of fresh water used, while increasing the share of recycled and non-potable water;
- > decrease the size of tailings ponds, while furthering new processes that will eliminate the need for large-scale ponds; and
- > increase energy efficiency and lower greenhouse gas emissions per barrel of production.

Government, industry and academic and research centres are committed to working through these challenges. The oil sands has always been about innovation and the innovation will continue even though some solutions will not be developed overnight. The past two decades show remarkable gains in production efficiency, with fewer emissions, less energy, and less water needed to produce a barrel of oil sands-derived crude. This trend will continue.

To learn more about oil sands development, as well as the actions being taken to ensure their responsible development, read Alberta's oil sands fact sheets.

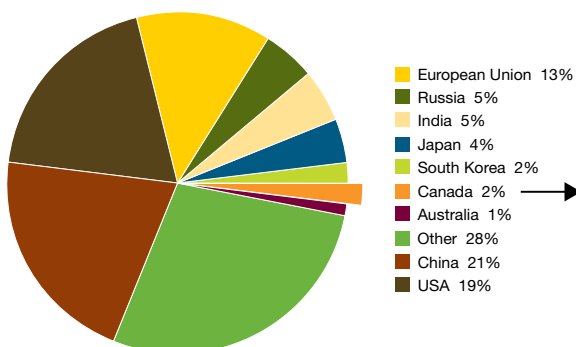
economic impact

EVERY DOLLAR INVESTED IN THE OIL SANDS CREATES ABOUT \$9 WORTH OF ECONOMIC ACTIVITY WITH ONE-THIRD GENERATED OUTSIDE ALBERTA – IN CANADA, THE U.S. AND AROUND THE WORLD.

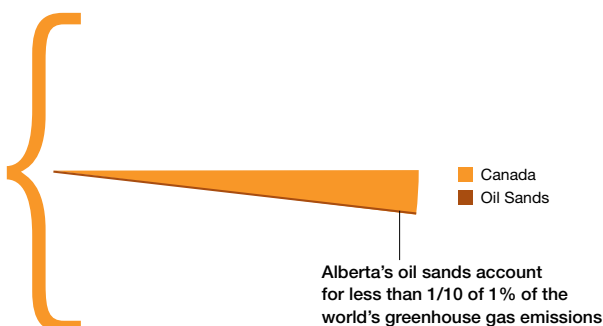
OIL SANDS DEVELOPMENT IS EXPECTED TO GENERATE MORE THAN \$307 BILLION IN TAX REVENUE ACROSS CANADA OVER THE NEXT 25 YEARS.

(source: Canadian Energy Research Institute)

Global Sources of Emissions – 2007



Source: Carbon Dioxide Information Analysis Centre, US Department of Energy





the end game

Clean energy is one of the biggest challenges of our time. Overcoming the obstacles will require efforts from all of us around the world. We'll have to change the way we think about and use energy, alter our consumption patterns, and consider our responsibilities in a global context.

Alberta believes we will get there by establishing realistic targets and regulations today, and investing in clean energy technology for tomorrow.

alberta's goal

TO BE A RESPONSIBLE WORLD-CLASS ENERGY SUPPLIER; AN ENERGY TECHNOLOGY CHAMPION; A SOPHISTICATED ENERGY CONSUMER; AND A SOLID GLOBAL ENVIRONMENTAL CITIZEN.

alberta facts

- > Population: 3.69 million
- > GDP: \$291.7 billion
- > Key industries: energy, agriculture, forestry, manufacturing, information and communication technologies, tourism
- > Proven oil reserves: 170.8 billion barrels (3rd globally)
- > Oil production: 1.8 million barrels/day (1.6 million barrels/day from oil sands)
- > Natural gas production: 5 trillion cubic feet/year
- > Energy exports value: \$46 billion per year
- > Greenhouse gas emissions: 244 Mt (2008)
- > Oil sands emissions: 41.9 Mt (2009) – 15% of Alberta, 6.5% of Canada, < 0.1% of world
- > Taxes: lowest overall regime in Canada



This map shows that, while the oil sands underlie a 142,200 km² area in north and eastern Alberta, the surface mining area is limited to a 4,800 km² region directly north of Fort McMurray – 715 km² of which has been disturbed by oil sands operations to date.

In situ oil sands operations – where bitumen is separated from the sand underground and pumped to the surface – are situated throughout the three deposits, and account for about 80 per cent of the accessible resource.