

**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 Alberta government has committed \$2 billion to reduce greenhouse gas (GHG) emissions through Carbon Capture and Storage (CCS). This process captures carbon dioxide (CO<sub>2</sub>) and stores it in geological formations deep inside the earth.
- CCS is a technology that will be used in the oil sands upgrading process, but will also be applied to any high-volume producer of GHGs.
- CCS projects are being pursued around the world in a variety of countries including Norway, the United Kingdom, the United States and Australia.
- The Intergovernmental Panel on Climate Change fully supports CCS technology as does the International Energy Agency.
- In Alberta, porous sedimentary rock formations beneath non-porous formations are ideally suited for the injection and safe and secure underground storage of CO<sub>2</sub>.
  - Porous rock acts like a sponge and absorbs the liquid CO<sub>2</sub>, while the non-porous rock above ensures the CO<sub>2</sub> stays put.
- Stored CO<sub>2</sub> will be monitored by experts to ensure there is no leakage or impact on either public safety or the environment.

## Enhanced oil recovery

- Experience in Canada and around the world has shown that CCS can be done safely and produce positive environmental results.
  - In North America, a successful CCS project pipes CO<sub>2</sub> from Beulah, North Dakota to Weyburn, Saskatchewan where it is injected into depleting oil fields. This practice is known as Enhanced Oil Recovery (EOR).
  - Since 2000, about 18 million tonnes of CO<sub>2</sub> have been injected which will help produce an additional 160 million barrels of oil from an existing field, using infrastructure already in place.
  - An international team of scientists has detected no leakage of CO<sub>2</sub> after extensive monitoring.
- Alberta's oil and gas industry has been using EOR successfully for decades to extract tough-to-reach oil from reservoirs.
- Alberta's CCS Development Council estimates that 1.4 billion barrels of otherwise untapped oil could be produced from existing conventional reservoirs in Alberta with CCS.
  - The council estimates that at \$75/barrel of oil, this could generate between \$11 billion and \$25 billion in provincial royalties and taxes.

## Projects in Alberta

- Alberta is taking the lead in advancing CCS technology and developing actual steel-in-the-ground applications that can be shared with other jurisdictions.
- Projects developed with support from the Alberta government's \$2-billion CCS funding program will help the province be at the forefront of developing clean energy technology. These projects also support the *Provincial Energy Strategy*.
- Four project proponents have signed letters of intent for funding from the \$2-billion CCS funding program. The companies are now working with government to secure final agreements.
- Two CCS projects specific to the oil sands are being developed.
  - The Quest oil sands upgrader project (Shell, Chevron and Marathon) in Alberta's Industrial Heartland near Fort Saskatchewan will capture and store up to 1.2 million tonnes of CO<sub>2</sub> per year. The CO<sub>2</sub> will be injected 2,300 metres below the earth's surface underneath cap rock. The Government of Alberta is investing \$745 million in the project. This could be the first bitumen upgrader fitted for CCS.
  - Enhance Energy and North West Upgrading will construct a 240-km CO<sub>2</sub> pipeline system that will greatly increase the capacity for future carbon capture and storage projects in the province. One of the initial sources of CO<sub>2</sub> will come from the North West Upgrader once it is built. It will upgrade bitumen from Alberta's oil sands. The Government of Alberta is investing \$495 million in the project. The pipeline will be designed to carry up to 14 million tonnes of CO<sub>2</sub> per year.
- Two CCS projects – related to other areas of energy development – are also in the works in Alberta.
  - Project Pioneer at the Keephills 3 facility (involving TransAlta, Alstom, Capital Power, and Enbridge) will be the first major CCS project to involve coal-fired power generation. It will prevent one million tonnes of carbon dioxide from entering Alberta's atmosphere each year. The Government of Alberta is investing \$436 million in the project. It could be the prototype for how to best retrofit other coal plants in Alberta and around the world.
  - Swan Hills Synfuels will access deep coal seams through the in situ coal gasification process. It will turn the coal into a clean synthetic gas called syngas. CO<sub>2</sub> will be capture off this process and used for enhanced oil recovery (EOR). The syngas will be used in power generation. The Government of Alberta is investing \$285 million in the project. When burned, syngas emits fewer GHGs than natural gas.
- Once all projects supported through Alberta's CCS program are fully developed, they are expected to reduce GHG emissions by five million tonnes per year beginning in 2015.

## New CCS Legislation

- The provincial government passed legislation that will guide how large-scale CCS projects will proceed in Alberta. This makes Alberta the first province in Canada to introduce comprehensive legislation for this greenhouse gas reduction technology.
- The Carbon Capture and Storage Statutes Amendment Act, 2010, clarifies ownership of pore space, the tiny holes in porous rock deep underground where carbon would be stored.
- Under this legislation, the Alberta government accepts long-term liability for injected carbon dioxide once the operator provides data showing that the stored CO<sub>2</sub> is contained.