

Clean Coal Technology: Gasification

Far from being an “old fashioned” fuel, coal can and will play a vital role in the continued growth and prosperity of the province, and support Alberta’s commitment to reduced environmental impacts and action on climate change.

New technology to convert coal into a cleaner source of energy will lead to increased efficiency compared to conventional coal-fired electricity generation, reduce emissions to levels typical of natural gas and provide a reliable supply of hydrogen, chemicals and fuels for value-added industries.

At the forefront of improving how coal can be used more responsibly is gasification technology. Gasification, a process in which steam and oxygen are used to turn coal into a synthetic gas, is an established clean coal technology. However, it has yet to be demonstrated as cost-effective and reliable for Alberta’s type of coals and other carbon feedstocks.

Coal – Fueling Alberta Tomorrow

Alberta’s coals contain twice the energy of all the province’s other energy resources, including conventional oil, natural gas and oil sands. While these sub-bituminous coals are cleaner burning due to lower sulphur and lower mercury content than coals in many other jurisdictions, they have lower heat value.

Coal gasification is more efficient than conventional coal-fired processes. The technology is also well suited to significantly reducing the emissions of nitrous oxides, sulphur oxides, particulate matter, and mercury, the pollutants that cause smog and soot. Other benefits include reducing by about half the cost of capturing the carbon dioxide (CO₂), the major greenhouse gas and eliminating altogether toxic solid waste.

Currently about half the electricity generated to meet the needs of Alberta homes and businesses is coal-fired. Alberta is home to one of Canada’s most efficient coal-fired electrical power facilities in Canada, EPCOR and TransAlta’s Genesee 3 plant, which was completed in 2005. However, there is more work to be done.

Maximizing the use of coal has the potential to:

- Help Alberta companies remain competitive.
- Increase the value of coal and other lower-value hydrocarbons such as petroleum coke, biomass and bitumen bottoms.
- Position Alberta as a leader in adapting and integrating technologies that achieve near-zero emissions, and minimize environmental impacts on land, air and water.

Balancing Energy Needs and Environmental Responsibility

The Alberta government is committed to striking the balance between meeting energy needs and protecting the environment. It does this through initiatives supported by the Alberta Energy Research Institute (AERI).

For the past several years AERI has been working with industry, universities, and federal and provincial research agencies on projects to test and evaluate the gaps to identifying and adopting the best, most environmentally sound gasification technology for Alberta coals.

Currently, AERI is supporting 10 multi-year Clean Carbon/Coal projects, worth \$18.5 million of which AERI is contributing \$6.4 million. AERI’s involvement ensures that learnings can be shared among various companies looking to adapt and integrate the findings of this research into projects in Alberta.

The main focus is on developing an environmentally responsible, reliable and economic alternative to using natural gas-fired generators to meet Alberta’s growing electricity demand. Other benefits include developing a competitive alternative to natural gas in the upgrading and refining of bitumen, and as a feedstock for the chemical industry.

The capacity to capture, store and use CO₂ is also a key advantage to advancing gasification in Alberta. Together with complementing the province’s climate change action plan, the availability of CO₂ supports enhanced oil and gas recovery while helping reduce the volume of water used in oil recovery.