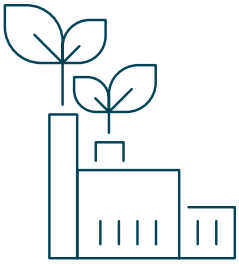
CANADA'S CLEANTECH INDUSTRY: CANADA'S LOW-EMISSION VALUE-ADDED SOLUTIONS FOR OIL AND GAS



Canadian entrepreneurs and academics are currently developing exciting technologies in all areas of low-emission value-added products.

This diverse group is composed of a variety of innovation activities to convert current hydrocarbon products into products of higher value, including:

- ✓ bitumen beyond combustion
- ✓ partial upgrading
- ✓ carbon capture utilization and storage
- ✓ hydrogen
- ✓ minerals

Each of these areas offers an opportunity for transformative change for Canada's energy system, and are supported by various networks and partnerships such as the Canadian Oil Sands Innovation Alliance (COSIA), Clean Resource Innovation Network (CRIN), Transition Accelerator and Alberta Innovates, which recently launched the $15-million Carbon Fibre Grand Challenge under the Bitumen Beyond Combustion program.

A HUB FOR CARBON CAPTURE UTILIZATION AND STORAGE TEST FACILITIES

Canada's valuable testing facilities in the field of carbon capture utilization and storage are garnering international interest. The Alberta Carbon Conversion Test Centre in Calgary, is currently home to 5 of 10 finalists in the Carbon XPRIZE, while Carbon Management Canada's Carbon Capture & Conversion Institute in Vancouver, British Columbia, and Containment & Monitoring Institute in Brooks, Alberta, have numerous research and innovation projects under way.

INNOVATION IN THE HYDROGEN VALUE CHAIN

Canada has a rich history in innovating toward a hydrogen economy, from the development of fuel cells to blue hydrogen technology development to in situ hydrogen production from bitumen. Initiatives like the Alberta Zero Emissions Truck Electrification Collaboration (AZETEC) and the Transition Accelerator are starting to bring together various technical and non-technical components to unleash the full opportunity of hydrogen fuels.

NOTEWORTHY CANADIAN CLEANTECH COMPANIES OFFERING LOW-EMISSION VALUE-ADDED SOLUTIONS

- **Quantiam Technologies**
  Nanomaterials, catalysts and catalyst coatings for energy applications
- **Industrial Climate Solutions Inc.**
  Compact, self-cleaning scrubber for CO_2 capture
- **Svante**
  CO_2 capture technology developer
- **Summit Nanotech**
  Lithium extraction technology developer
- **Titanium Corporation**
  Developing technologies to recover valuable minerals from tailings
- **Carbon Upcycling Technologies**
  Conversion of CO_2 into valuable advanced materials
- **Eavor Technologies**
  Clean and scalable baseload geothermal power generation
- **Wapahki Energy**
  Converts bitumen into solid pellets for environmentally safe transport

LOW-EMISSION VALUE-ADDED SOLUTIONS FOR OIL AND GAS

CANADIAN COMPANIES WORKING GLOBALLY

CLEANO2 › cleano2.ca

CleanO2 has developed carbon-capture technology for commercial buildings and the world's first residential carbon-capture device. The company's CARBiN-X platform comes in two sizes: a larger model for commercial buildings and a smaller version for private homes. Both devices are designed to fit inside mechanical rooms alongside existing furnaces. By using waste heat and carbon emissions from boilers and furnaces to produce soda and pearl ash, the CARBiN-X platform addresses both the carbon emissions associated with heating buildings (using natural gas) and the wasted heat loss. The company also safely sequesters carbon dioxide emissions in soap and detergent products.

E3 METALS › e3metalscorp.com

E3 Metals is an Alberta lithium company developing a critical mineral for electrification evolution. **E3 Metals** plans to produce "net zero" carbon lithium, an important factor for the growing lithium ion battery supply chain. Today, **E3 Metals** is scaling its proprietary direct lithium-extraction process with their partner, an international lithium producer. This process produces a lithium-enriched concentrate that will be upgraded using conventional processing to produce high-purity lithium products in Alberta for the growing electric mobility industry. A field pilot project has been funded with the goal of providing the design basis for a commercial production facility.

FRACTAL SYSTEMS › fractalsys.com

Fractal Systems is preparing for a commercial demonstration of their JetShear technology, which partially upgrades bitumen to reduce diluent requirements by 50% or more. The technology is applied in the field or terminal where heavy oil or bitumen is blended with diluent for transportation via pipeline or rail. For bitumen producers, use of this technology will materially reduce costs and environmental impacts associated with transporting the heavy oil to market, in addition to improving the quality of the end product and freeing up pipeline capacity.

CARBONCURE TECHNOLOGIES › carboncure.com

CarbonCure is the global leader in carbon utilization technologies for concrete. **CarbonCure** injects recycled carbon dioxide (CO_2) into fresh concrete during mixing. Once injected, the CO_2 converts into a mineral and becomes permanently embedded in the concrete. This CO_2 mineralization process enables production efficiencies and embodies carbon reductions in the built environment. **CarbonCure** is used in hundreds of concrete plants across North America and Southeast Asia, and more than 64,000 tonnes of carbon emissions have been saved since 2017. **CarbonCure**'s portfolio of carbon utilization solutions has the potential to reduce 500 megatonnes of carbon emissions annually.

CONNECT WITH US

The Canadian Trade Commissioner Service is a key resource for anyone interested in doing business with Canada. Our global network of trade offices and dedicated officers are available to connect you to Canadian companies and research organizations. For more information, we encourage you to contact one of Canada's trade commissioners located in your market. › **www.tradecommissioner.gc.ca**