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INNOVATION, TECHNOLOGY AND THE ENVIRONMENT — WHAT IS NOW PROVED WAS ONCE ONLY IMAGINED

HIGHLIGHTS

- Innovation and technology are not just associated with developing a new piece of equipment, although we often think of them that way. They are the sum of the parts from problem-identification to solution-implementation that can be as simple as an improved administrative procedure or as complex as the invention of an entirely new product.
- Cleantech is not divorced from Canada's strengths in natural resource development — a comparative advantage and significant source of economic activity and prosperity for the country.
- Cleantech is deeply integrated in the traditional Canadian industries which supply the world with essential building materials and energy.
- B.C. has a remarkable array of creative people who care about the impact of industrial and other human activity on the environment. This is evident in the actions and investments of companies. Several of these B.C. innovators are highlighted in this issue of the Business Council's *Environment and Energy Bulletin*.

CONTEXT

The idea embedded in the William Blake quote which appears as part of the title for this issue of the *Environment and Energy Bulletin* is the essence of our hopes for "technology" and the subtext of much of the conversation about cleantech. Against the backdrop of climate change, the animating goal is the absence or minimization of GHG emissions.

But more generally, the heart of any problem-solving exercise is innovation. It is about doing something better or differently and, often, in a creative way. It's not usually about a discrete piece of equipment, although this can be an outcome, but rather involves thinking critically, generating fresh ideas, conducting research, improving processes or revamping products and services. In short, innovation is the sum of skills, methods, processes and passion used to achieve a goal.

Profiled below are several companies active in B.C. who are leading in areas of materials management, energy production, and CO2 use and sequestration.

INNOVATION IN OUR OWN BACKYARD

Cement and Concrete

Concrete is one of the most ubiquitous building materials. It is used in all manner of infrastructure and buildings and is the second most consumed substance next to water. Cement is mixed with sand, gravel, and water to produce concrete.[1] In 2019, the total volume of cement produced globally stood at 3.8 billion tonnes — a threefold increase since 1995.[2] China accounts for most of this, followed by India, Vietnam, and the United States.[3]

With increasing urbanization and ongoing industrialization in developing countries, the market for concrete continues to grow. From a 2018 market value of almost US$450 billion, it is forecast to rise by 10% to US$650 billion by 2022.[4] In Canada and B.C., there are ~1,250 and 178 employers in the cement and concrete industries, respectively.

[1] The oldest known man-made concrete mix dates to around 500 BC.
[2] https://www.statista.com/statistics/1087115/global-cement-production-volume/.
[3] Major countries in worldwide cement production 2015-2019, Statista.
[4] https://markets.businessinsider.com/news/stocks/analysis-on-the-global-652-billion-cement-concrete-market-2019-2022-1028538145.

Total GDP in the cement/concrete sector is in the range of $4 billion for Canada and ~$400m for B.C.[5]

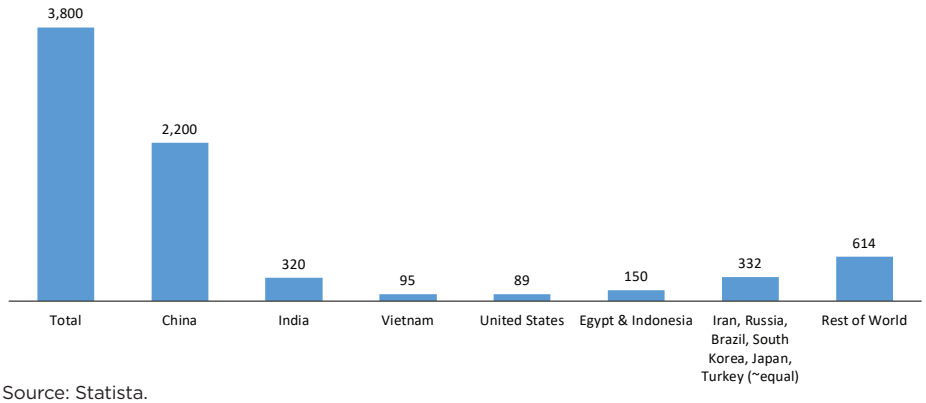
As a building material, cement is greenhouse gas (GHG) intensive. GHGs are generated from calcination, when calcium carbonate is heated and broken down to calcium oxide, thus-releasing CO2. GHGs also come from the use of fossil fuels in the transformation process.[6] Additional GHGs are produced from the transportation supply chain — getting products to market. Cement manufacturing is responsible for between 5% and 8% of global GHG emissions.

For B.C., cement and lime production represent about 2% of the province's total GHG emissions. This does not capture the secondary uses of products made of concrete. Reducing GHGs associated with the production and use of this major building material is an important goal.

B.C.'s two main cement manufacturers are Lafarge Canada and Lehigh Cement.[7] Both would like to see the full adoption of lower-carbon concrete using Portland Limestone Cement (PLC).[8] PLC generates up to 10% less CO2.

Still another B.C. company, CarbonCure,[9] can sequester CO2 by injecting it, in liquid form, into the mixing process. The resulting CO2 is chemically converted to a mineral, resulting in the use of less cement powder, a stronger final concrete product, reduced GHGs, and lower costs. While the quantum of CO2 captured is relatively small, this CarbonCure retrofit technology has the potential to sequester 2 million kg of CO2 from concrete produced annually in B.C. If adopted elsewhere, the technology would pave the way for much bigger GHG reduction: a quadruple word score and win for the B.C. economy and the world environment. We should be using our own innovative technologies and processes.

FIGURE 1: **2019 GLOBAL CEMENT PRODUCTION (TONNES) 2019**



Source: Statista.

Aluminium

Aluminium is another vital building material. The most abundant element in the earth's crust, it is the most widely used nonferrous metal. It is lightweight, 100%-recyclable and is used in innumerable consumer products — including packaging, cars, energy (both traditional and renewable fuels), construction, transportation, aerospace and defense applications, and much more. In fact, the opportunities for expanded use of aluminium are significant. For example, over its lifetime, every kilogram of aluminium that replaces heavier materials in a car or light truck can save a net 20 kilograms of CO2 emissions.

In 2019, global aluminium production was ~64,000,000 metric tonnes. China accounts for a staggering 60% of the total. North America produces about 6%, with Canada representing the majority (i.e., ~70%) of this and ranking 4th in the world.[10] Primary alumina and alumina production and processing amount to 1% of Canadian GDP,[11] although this does not include secondary use of the product in other industries. British Columbia, Ontario and Quebec are the major players in the Canadian sector,[12] with 1 smelter in B.C. and 9 in Quebec.

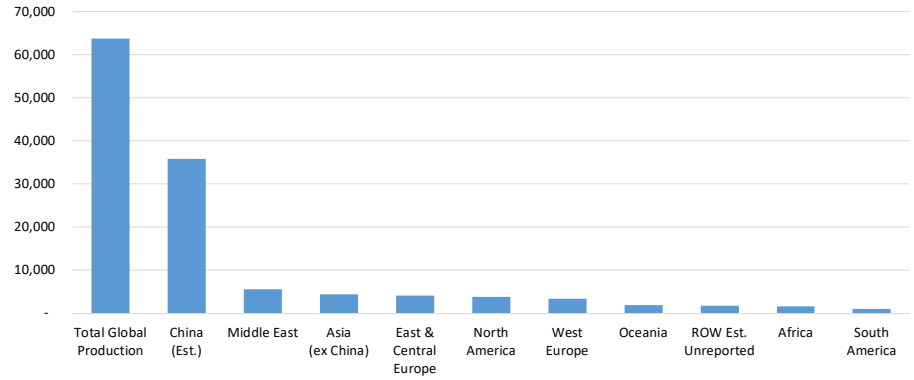
[5] https://www.ic.gc.ca/app/scr/app/cis/gdp-pid/3273.
[6] Cement is manufactured through a closely controlled chemical combination of calcium, silicon, aluminum, iron and other ingredients. These materials are heated at high temperatures and form a rock-like substance later ground into the fine powder commonly referred to as cement.
[7] There are other ready-mix companies who use the product.
[8] http://www.crhcanada.com/innovative-solutions/portland---limestone-cement.
[9] https://www.carboncure.com/technology.
[10] https://www.aluminum.org/sites/default/files/CanadaPrimaryProduction062019.pdf, https://www.nrcan.gc.ca/our-natural-resources/minerals-mining/minerals-metals-facts/aluminum-facts/20510#L2, https://www.aluminum.org/sites/default/files/USPrimaryProduction072019.pdf.
[11] Statistics Canada, Table: 36-10-0434-03.
[12] https://www.ic.gc.ca/app/scr/app/cis/performance/rev/3313.

Primary aluminium production is an energy-intensive process. It relies on electrolytic cells or pots during the electrolytic reduction of metallurgical alumina (aluminium oxide). Eighty percent of smelting greenhouse gas emissions are electricity-related. Aluminium is responsible for about 1% of global GHG emissions.

In Canada and British Columbia, emissions from this industry are considerably less than in other producing jurisdictions because in Canada zero emission hydroelectricity is the key energy source for the industry. The aluminium industry produces 1% of B.C.'s GHG emissions.

Often ignored by critics of mining is that Canada's smelters are among the most efficient/least GHG-intensive aluminium production facilities in the world. This is also why incremental GHG reductions at Canadian smelters are costlier to achieve — these plants are already energy- and GHG-efficient. For example, aluminium produced in the United States and Europe has about double the average GHG content compared to Canadian-produced aluminium. However, given the current GHG accounting system, in 2030 the United States and/or European smelters may be trading aluminium with credits even when their aluminium GHG content is 25% higher than that of Canadian smelters. The perverse result: GHG-intensive smelters may displace production from Canada's less-GHG-intensive smelters. This would seem to be an undesirable outcome, both globally and for Canada as an aluminium-producing country.

FIGURE 2: **GLOBAL ALUMINIUM PRODUCTION, 2019 (1000 METRIC TONNES)**



Source: World Aluminum Organization.

RioTinto

As an example of innovation and leadership in B.C. and Canada, in 2019 Rio Tinto's B.C. operation[13] was certified by the Aluminium Stewardship Initiative (ASI)[14] for producing aluminium to the highest international standard using responsible environmental, social and governance practices. The company invested $6 billion several years ago to modernize its Kitimat smelter, enabling increased production of aluminium with half as much greenhouse gases.

New Canadian aluminium technology[15] could very well lead to GHG-free aluminium — a significant win for Canada if we can only get out of our own way. We usually fail to recognize, promote, foster, and export Canadian creativity and continue to implement regulatory hurdles so onerous that new ideas and the investments to drive them are simply squashed or redirected to other jurisdictions.

Steelmaking and Metallurgical Coal

Steel is one of the most important modern engineering and construction materials. It is an alloy of iron and carbon and, like other substances, is used in every aspect of our lives from building products, appliances like refrigerators and washing machines, cargo ships, trains, planes and automobiles, surgical scalpels, and renewable energy infrastructure.

Steel is produced in either a blast furnace/basic oxygen furnace (BF-BOF) using iron ore, coal, and recycled steel, or an electric arc furnace (EAF) for recycled steel. Worldwide, 70% of steel is produced with the first method, requiring metallurgical (met)/coking coal as the fuel.

Like other materials, making steel is energy intensive. It takes about 0.6 tonnes (600 kg) of coke to produce 1 tonne (1000 kg) of steel.[16] For context, a typical wind turbine uses 185 tonnes of steel and 100 tonnes of coking coal.

[13] https://www.riotinto.com/Operations/canada/bc-works.
[14] https://aluminium-stewardship.org/asi-standards/chain-of-custody-standard/.
[15] https://www.elysis.com/en.
[16] https://www.worldcoal.org/coal/uses-coal/how-steel-produced.

Globally there has been a 9-fold increase in steel production since 1950, from 189 million tonnes to 1,808 tonnes. Canada ranks 18th as a producer, manufacturing 13 million tonnes in 2018. China dwarfs all others at 928 million tonnes, or 51% of global crude steel production and 49% of global steel use. Canadian metallurgical coal is highly sought-after for smelting because of its high quality, low sulfur and ash properties, and high caloric value.

Canada's total coal production runs near 67 million tonnes per year, or 0.87% of global output. Forty-nine percent of this is metallurgical coal, most of which is produced in B.C. Coal is in fact the province's most valuable mined commodity, representing 60% of all mined material in B.C.,[17] supporting ~26,000 local jobs in transport, equipment and other related sectors.[18] In 2019, the B.C. metallurgical coal industry generated ~US$5 billion in revenues and provided ~$715 million in public revenues for all levels of government.

Teck Resources is the leading participant in the sector and ranks as one of the biggest global mining companies with a head office in B.C.

Coal, in general, is seen as the least favourite of all fossil fuels from a GHG perspective. Yet critics often fail to differentiate between coking coal and brown coal used for electricity generation — B.C produces essentially none of the latter. Emissions from the B.C. coal sector are in the order of 2% of the provincial total as of 2017.[19] In fact, steel making coal in B.C. is already among the least carbon intensive in the world, with emissions per unit of production less than half of the world-wide industry average.[20] In addition, all of Teck's steel-making coal operations are covered by carbon pricing (B.C. has some of the highest carbon prices in the world).[21] At the same time, Teck recently announced a net zero target by 2050[22] and is using a variety of techniques— including creative problem solving, continuous process improvements, and new inventions — to reduce its GHG footprint. Our less carbon-intensive metallurgical coal is a critical part of a global steel market that continues to grow and has environmental attributes which are superior to those of competing jurisdictions. It therefore makes no sense, either for B.C. or for the global environment, to shrink the metallurgical coal industry here and encourage it to grow in other, less environmentally responsible jurisdictions. Yet that is the path that B.C. currently is taking.

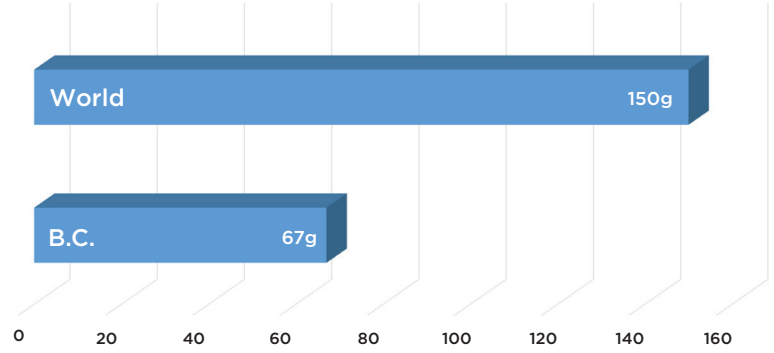
Energy

Energy use is an inextricable part of human civilization and human advancement. Our fuel is food and our off gases are CO2 and methane. But when we talk about energy in the context of greenhouse gases, we usually mean fossil fuels, their links to economic development, and what this means for the natural environment. This section looks at three energy subsectors and B.C. innovators in refining, electricity, and upstream oil and gas.

Refining

Oil fuels the global transport system. At present, there are few substitutes given its much prized flexibility and density. But oil is unusable out of the ground. It must be processed — refined to become the various products that are used in the most ubiquitous machine in the world, the internal combustion

FIGURE 3: **STEEL-MAKING COAL PRODUCED, B.C. AND GLOBAL AVERAGE COMPARED (CO2e GRAMS)**



Source: ICMM.

[17] British Columbia Geological Survey Ministry of Energy, Mines and Petroleum Resources, BCGS_IC2020-02 Circular.
[18] https://www.ic.gc.ca/app/scr/app/cis/businesses-entreprises/2121.
[19] 60% of 469 kt (mining) + 891 kt fugitive emissions.
[20] International Council of Mining and Metals (https://www.icmm.com/).
[21] https://bcbc.com/dist/assets/publications/b-c-s-current-carbon-pricing-system-neither-efficient-nor-fair-for-business/EEBv11n2.pdf, https://bcbc.com/insights-and-opinions/b-c-s-carbon-tax-an-update.
[22] https://www.teck.com/responsibility/approach-to-responsibility/sustainability-report/material-topics/energy-&-climate-change/.

engine (ICE) that is integral to planes, trains, automobiles, ships, and even space travel. Other oil products include home heating oil, lubricants, road asphalt, and petrochemical feedstocks which are transformed into various everyday consumer products.

Canada has 16 petroleum refineries. The country is also home to 78 fuel distribution terminals, 12,000 retail and commercial sites and more than 117,000 employees who produce an annual $10.2 billion in GDP. B.C has two refineries producing 67,000 barrels per day, or ~30% of the province's daily demand of 232,000 barrels per day. Parkland's refinery in Burnaby supplies 25% of the province's transportation fuel and 30% of YVR's jet fuel. Tidewater Midstream in Prince George is the second, smaller facility.[23]

Globally, oil is used primarily in the transportation sector and represents about 1/3 of total final energy consumption and a similar share of world-wide GHG emissions;[24] in B.C., the latter figure rises to 40% of emissions — the province's largest cumulative source.[25] As such, and regardless of progress on electric vehicle adoption, finding highly dense, portable substitute fuels is essential to reducing the province's GHG footprint over time.In this field, another B.C. company,

Parkland FUEL CORPORATION

Parkland, is leading the way. The firm is producing low-carbon fuels through a method called co-processing. Co-processing involves combining traditional crude oil with renewable feedstock, such as canola and tallow (and in the future, possibly forest residuals, wastewater biomass and carbon capture liquids). The outcome is the recycling of waste products to produce lower carbon intensity transportation fuel in a form indistinguishable at the gas pump from regular gasoline. And since there is no need for new internal combustion engine design or fleet requirements, considerable savings for consumers and businesses alike. While this will entail some modifications of refining infrastructure, it does not necessitate a wholesale rebuilding of the existing refining facilities. Full scale production, distribution, and use of lower carbon fuels is the aspiration. B.C. is leading by example and making old new through creative problem solving — innovation in the true sense of the word.

Electricity

The B.C. electricity system is the envy of the world — and Canada as a country is not that far behind. Electrification is seen by many experts as the most important global solution to GHG emissions. There are many benefits and challenges to achieving this, as we discussed in previous issue of this newsletter.[26]

If only we had a sun on earth, a.k.a. a fusion reactor. This would provide a big bang solution to at least part of the problem of climate change.

Fusion is the dominant reaction in the observable universe. Experimentation with the concept of fusion began in the 1950s.

Fusion is the energy source of the sun and stars. In the tremendous heat and gravity at the core of these stellar bodies, hydrogen nuclei collide, fuse into heavier helium atoms and release tremendous amounts of energy in the process.

Twentieth-century fusion science identified the most efficient fusion reaction in the laboratory setting to be the reaction between two hydrogen isotopes, deuterium (D) and tritium (T). The DT fusion reaction produces the highest energy gain at the "lowest" temperatures.

Three conditions must be fulfilled to achieve fusion in a laboratory: very high temperature (on the order of 150,000,000° Celsius); sufficient plasma particle density (to increase the likelihood that collisions do occur); and sufficient confinement time (to hold the plasma, which has a propensity to expand, within a defined volume).

At extreme temperatures, electrons are separated from nuclei and a gas becomes a plasma—often referred to as the fourth state of matter. Fusion plasmas provide the environment in which light elements can fuse and yield energy.

Source: ITER.

From an electricity generation perspective, this is the true holy grail — especially given the spatial requirements and intermittency of small-scale renewables. If it existed today it might be possible to quickly replace coal in the power generation system, where it continues to occupy a major position and is the main contributor to GHG emissions.[27] If adopted widely, fusion would be a true disrupter technology — and the world needs breakthroughs in technologies that will allow us to supply the power grid with clean energy even during windless days, cloudy weather, and nighttime.

[23] https://www.canadianfuels.ca/.
[24] World Energy Outlook 2019.
[25] https://bcbc.com/reports-and-research/are-electric-vehicles-really-the-answer.
[26] https://bcbc.com/dist/assets/publications/hail-electricity/EEBv11n3.pdf.
[27] World Energy Outlook 2019.

General Fusion, a B.C. based company, is part of the global research and development community in the fusion business. Their focus is different from the ITER tokamak project under construction in the south of France.[28] Its main differentiators are the use of liquid metal to absorb energy from the fusion reaction, the existing steam-powered piston technology, and the magnetized plasma, which is a free by-product of the process. Finally, the size. The French project is 500 MW and occupies a 180-hectare site; the General Fusion machine fits nicely inside a large warehouse and could have site specific commercial applications. B.C. clearly has the capacity and the passion to lead in this space. What we need is investment and trust in our creative potential.

Natural Gas

Like all materials, natural gas[29] must first be explored for, drilled, gathered, and shipped via pipeline before it can be consumed in residential, commercial, or industrial applications. This adds up to a lot of economic activity for both Canada and B.C., with over 5,500 businesses involved in the national natural gas supply chain making a sizable contribution to Canada's goods sector GDP. Natural gas is also an important component of B.C.'s goods sector GDP contributing in combination with a small amount of oil upwards of 10% of the province's goods GDP in 2018.[30]

According to the International Energy Agency, natural gas meets 23% of global primary energy demand, a share that rises to 25% in two of the Agency's three scenarios for the future. Canada is the third largest global natural gas producer on a volume basis, behind Russia and Norway. All of Canada's gas production is continental today and is shipped within Canada or the United States.

B.C. and Canada have significant marketable natural gas resources, estimated at about 16 trillion cubic meters (2015), primarily located in northeastern B.C and in Alberta. But like other hydrocarbons, over its life cycle of use natural gas generates GHGs, albeit far less so than coal. This is a prime reason why natural gas is seen as a fuel suitable in bridging to a lower carbon energy future. And it so happens that B.C. natural gas reserves, mostly in the Montney, also have less CO2e per unit of gas.[31]

Flaring and methane emissions venting are sources of GHG emissions in the natural gas sector and have attracted lots of attention. Importantly, the oil and gas sector is responsible for 3 of every 4 dollars spent on cleantech research in Canada.

Ovintiv – formerly Encana — is a leader in the industry in this area. They have replaced hundreds of gas pneumatic devices with cleaner technologies at well sites and converted the pneumatic driven devices at three compressor stations to clean instrument air instead of methane. They have another five B.C. compressor station retrofits planned in 2020 with instrument air control systems to improve performance and reduce emissions.

In addition, industry (including Ovintiv) is evaluating upstream clean technology development and demonstration focused on eliminating methane emissions at new well sites under normal operating conditions. The majority of Ovintiv's gas processing in the Dawson Creek area is handled by three gas processing plants— Saturn, Sunrise and Tower Plants — that use B.C.'s clean electricity, thus eliminating 860,000 tonnes of CO2e annually — equal to emissions from approximately 184,000 vehicles per year.

Since advances in innovation and technology often show up in the form of better practices rather than new products, Ovintiv examined and then changed how it trucks and ships water and produced liquids throughout most of its Dawson Creek development area by switching to multi-line pipeline networks. The outcome is fewer tailpipe emissions and less road traffic. Another win-win, leading to an appreciable reduction in GHG emissions since 2016.[32]

[28] https://www.iter.org/proj/inafewlines. A Latin term for "the way". A collaboration among 35 nations to build a large tokamak — a magnetic fusion device.
[29] Natural Resources Canada: Natural gas is a naturally occurring hydrocarbon. Hydrocarbons are a class of organic compounds consisting of carbon and hydrogen and include crude oil, natural gas and coal. Raw natural gas (before processing) is composed primarily of methane, and may also contain varying amounts of ethane, propane, butane, and pentane (commonly referred to as natural gas liquids [NGLs]). Raw natural gas may also contain non-energy components such as nitrogen, carbon dioxide, hydrogen sulphide and water. Most NGLs, and all the non-energy components, are removed in processing plants before the natural gas is marketable and placed into pipelines.
[30] Statistics Canada, Table: 36-10-0434-03. B.C. Goods GDP = $59,742 million; OG extraction, support and NG distribution = $6,049 million; 6049/59742 = 10%. The oil and gas sector represent about 21% of total goods producing GDP in Canada. Non-oil sands oil and gas represents about half of this.
[31] LNG Production in British Columbia: Greenhouse Gas Emissions Assessment and Benchmarking, May 2013. https://www2.gov.bc.ca/assets/gov/environment/climate-change/ind/lng/lng_production_in_british_columbia_-_ghg_emissions_assessment_and_benchmarking_-_may_2013.pdf.
[32] https://www.ovintiv.com/environment/.

The world will continue to need fossil fuels for decades to come to do certain kinds of work. Efforts by companies such as Ovintiv and others who source, process and ship these valuable commodities are important and represent often overlooked innovations.

CARBON CAPTURE AND STORAGE

Carbon dioxide and other air emissions are by-products of fossil fuel energy use. They are currently accumulating in the global atmosphere. Carbon capture and storage is a GHG emissions-mitigation measure that integrates with B.C.'s energy systems to recycle carbon into other forms of energy or to store it permanently deep underground. Carbon capture is a GHG mitigation option that's gaining favour in a world that's keen to reduce its GHG footprint.

Carbon capture gathers CO2 emissions either before, during, or after combustion and creates either a liquid or solid form for storage or reuse. The technology is not new. The U.S. has transported millions of tonnes of carbon dioxide annually by road tanker, ship and pipelines, primarily for use in oil recovery projects or storage in deep geological formations.

Canada is a CCS leader, with two of four worldwide industrial-scale operating CCS projects at the Saskatchewan Power Boundary Dam facility, capturing 90% of plant CO2 emissions,[33] and the Shell Quest project in Alberta, which stored 4 million tonnes of CO2 in its first four years of operations.[34] The main challenge with CCS is the cost. In the most recent annual EU report on Implementation of Directive 2009/31/EC on the Geological Storage of Carbon Dioxide, the authors note a "continuous lack of positive assessment for technical and economic feasibility for CCS retrofitting."[35] But like fusion, a viable cost effective and scalable CCS option, should one develop, would be a true game changer.

Carbon Engineering

Capturing emissions from large point sources can play a role in reducing industrial emissions. A B.C. company, Carbon Engineering (CE), has a different idea. Its Direct Air Capture (DAC) technology enables CO2 to be pulled directly out of the atmosphere at large scale for permanent sequestration or use in manufacturing fuels and other products. From its pilot facility in Squamish B.C., CE has captured CO2 from the air since 2015 and produced ultra-low carbon synthetic fuels since 2017. Today, CE is proceeding with the engineering of its first commercial facility in partnership with Oxy Low Carbon Ventures, a subsidiary of Occidental.

One of CE's commercial-scale facilities can capture one million tonnes of CO2 per year at a levelized cost of $94 to $232 per tonne of CO2 captured.[36] With the transportation sector also demanding increasing quantities of low-carbon and renewable fuels, CE's DAC technology could help address these growing needs. Overall, the technology represents a significant economic opportunity for B.C. and a market-based solution to help put the world on the path to a lower carbon economy. And, in theory, one could even imagine such a facility located beside major congested highways rather than on industrial sites, reminding us of our individual and collection contributions to GHG emissions.

Svante

Still another B.C. firm, Svante, has a solution that captures carbon from industrial flue gas emissions generated from the production of cement, steel, ammonia, aluminium, methanol and hydrogen. The company is currently testing the technology in B.C. (Lafarge)[37] and Saskatchewan (Husky Lloydminster).

[33] http://www.ccsassociation.org/why-ccs/industry-experience/.
[34] https://www.shell.ca/en_ca/about-us/projects-and-sites/quest-carbon-capture-and-storage-project.html.
[35] https://ec.europa.eu/clima/sites/clima/files/strategies/progress/docs/com_2019_566_en.pdf.
[36] https://www.cell.com/joule/fulltext/S2542-4351(18)30225-3.
[37] https://svanteinc.com/lafargeholcim-launches-carbon-capture-project-in-canada/.

CONCLUSION

There is innovation everywhere. The Cambridge dictionary defines it as: make changes in something established, especially by introducing new methods, ideas, or products. It requires thinkers, curiosity, an openness to different points of view, risk taking, experimentation, focus, and passion. Innovation also requires capital to pay for all of the associated work. Much of the action and behaviour associated with innovation precedes the development of a piece of equipment or the sale of a better technology. B.C. has an abundance of innovative people and companies that are doing great things in the climate and energy space. As Bill Gates has said, he "[wishes] there could be a single, magic bullet solution to this [GHG] problem, [but] there isn't one right now. What [is] required in the years ahead is a diverse and flexible mix of energy solutions—a Swiss army knife of energy tools—to support a future of renewable energy generation to meet our needs." As Thomas Edison said, there's a way to do it better, find it — and we are doing just that in B.C.

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