Foresight

Smart Policy Series

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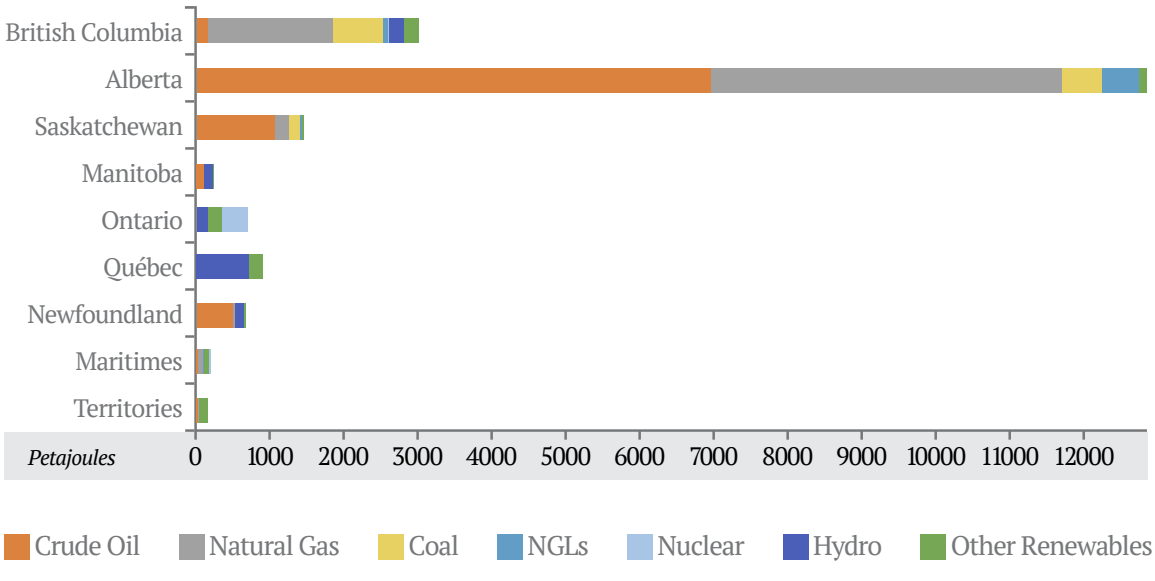
INCENTIVIZING LOW CARBON PATHWAYS FOR OIL & GAS

INCENTIVIZING LOW-CARBON PATHWAYS FOR OIL & GAS

In 2017, Canada's energy sector directly employed more than 276,000 people and indirectly supported over 624,000 jobs and accounted for 11%[1] of the country's nominal GDP. The Oil & Gas industry makes up a share of this percentage, particularly as the country is the fourth largest producer and exporter of oil and fifth largest producer and exporter of natural gas in the world. Adhering to environmental performance and standards in GHG emissions, tailings management, water and energy efficiency and carbon capture is necessary to maintain a longer term sustainable economic outlook for the industry. Cleantech plays a significant role in mitigating these environmental impacts.

Exploration, extraction, processing, refining and transportation of Oil & Gas products takes place throughout Canada. These products range from crude oil, refined petroleum, hydrocarbon gas liquids and natural gas. To give you a quick snapshot of this expansive industry,[2] Alberta is the largest oil and natural gas producer and home to vast deposits of oil sands. In 2017, a total of 2.7 million barrels per day were produced from oil sands, 446,000 barrels of conventional oil produced and 10.4 billion cubic feet per day of marketable natural gas produced. British Columbia is the second largest producer of natural gas with a number of 4.7 billion cubic feet produced per day in 2017. A recently approved Liquefied Natural Gas terminal in Northern BC will export LNG overseas. Saskatchewan is the second largest producer of crude oil. In 2017, Canada exported energy products to 145 countries, with the U.S. accounting for 91% of energy exports by value ($102.2 billion).

GRAPH 1 Primary energy production, excluding Uranium, from each Province in 2016.[3]



1 nrcan.gc.ca/energy/facts/energy-economy/20062

2 capp.ca/canadian-oil-and-natural-gas/industry-across-canada

3 nrcan.gc.ca/energy/facts/energy-economy/20062

GHG's resulting from intensity of processes to extract oil and gas put the sector as one of the highest emitters of carbon in Canada, accounting for 26% of total emissions in 2016.[4] Nevermind, that in upstream use, once the refined oil and gas is either burned for electricity, transport and heating, even more carbon is emitted. This is certainly true for transport, which is the second highest emitter of emissions in Canada and in 2016 accounted for 25%. Overall, the country is one of the top ten global emitters of carbon.[5] Given Canada's commitments to clean energy as part of the UNFCCC process to reduce GHGs by 30% below 2005 levels by 2030,[6] how can we bridge this gap to prevent the Canadian economy being underpinned by carbon intensive industries in the future?

THE LINK BETWEEN OIL & GAS AND CLEANTECH

Market forces are creating change leading to what we call the 'Energy Transition'. This future will be shaped by end-use demand, policy, finance and availability of clean technology solutions.

Globally, end-use of energy from oil and gas production is shifting, and thus presents a challenge to the industry for future demand of their products. Right now, fossils fuels remain the backbone of economies and will continue to be for the near future as we transition towards a clean energy pathway. Oil & Gas analysts Wood McKenzie recently mentioned in a report[7] that by 2035 renewables will likely meet 20 percent of global power demand, up from today's 7 percent. The combination of wind, solar and electric vehicles will displace about 100 billion cubic feet of oil per day, creating an "unstoppable" shift for companies and countries around the world. Oil majors are beginning to recognize that renewable generation and electric transportation will be disruptive to their business model, and we are seeing shifts in their business as a result.

Insights from Foresight

According to a Bloomberg article, major oil company BP Inc, predicts electric vehicle sales will surge by an eye-watering 8,800 percent between 2017 and 2040, making it an attractive business for oil companies as demand for gasoline and diesel are forecast to slow. [8]

[4] canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html

[5] canada.ca/en/environment-climate-change/services/environmental-indicators/global-greenhouse-gas-emissions.html

[6] nrcan.gc.ca/energy/facts/electricity/20068

[7] greentechmedia.com/articles/read/energy-transition-to-reach-point-of-no-return-by-2035

[8] bloomberg.com/news/articles/2018-07-02/big-oil-utilities-are-lining-up-for-an-electric-vehicle-war

Insights from Foresight

Royal Dutch Shell bought New Motion, the owners of Europe's largest electric vehicle charging networks.[9]

Insights from Foresight

Shell opened the country's first publicly accessible hydrogen fuelling station in Vancouver.[10]

On the finance side, there is increasing investment in cleantech, even from the Oil & Gas industry. Oil majors are also beginning to make investments in clean energy, and have doubled the number of acquisitions, project investments & venture capital stakes,[11] to 44 in 2016 from 21 in 2015, according to Bloomberg New Energy Finance. In the last 15 years, they've completed 428 transactions and spent $6.2 billion building stakes in clean energy companies. Large solar generation is of strategic interest as well as offshore wind projects.

Insights from Foresight

BP invested $200m US for a 43% stake in Europe's biggest solar developer LightSource in 2017.[12]

Insights from Foresight

Statoil ASA developed the world's first floating wind farm off the coast of northern Scotland.[13]

[9] newmotion.com/en_GB/about-us/press-room/newmotion-welcomes-acquisition-by-shell-one-of-the-world-s-leading-energy-providers

[10] cbc.ca/news/canada/british-columbia/hydrogen-fuel-pump-opens-in-vancouver-1.4709016

[11] about.bnef.com/blog/big-oil-is-investing-billions-to-gain-a-foothold-in-clean-energy/

[12] bp.com/en/global/corporate/media/press-releases/bp-alternative-energy-announcement-december-2017.html

[13] bbc.com/news/uk-scotland-41652707

This activity is mostly taking place in Europe, the Canadian industry should take note and learn. Investment for clean technology in Canada is mostly sourced from government Federal and Provincial funds. For instance, Sustainable Development Technology Canada and the Government of Alberta (through Emissions Reduction Canada and Alberta Innovates) have jointly funded $28.8 million for cleantech businesses.[14] A portion of these solutions are relevant to the oil and gas industry.

As for regulation, policy instruments in the form of carbon pricing and standards are incentivizing the industry to change its behaviours to either prevent or pay for emissions pollution. The Pan-Canadian Framework initiated in 2016 outlined a benchmark for pricing carbon pollution. They plan to levy a tax of $20 on every tonne of greenhouse gas emissions starting in 2019, rising by $10 each year to $50 a tonne by 2022. In addition, standards are beginning to enforce reduced emissions for light duty vehicles impacting gasoline consumption.[15] These improvements result from additions to the Passenger Automobile and Light Truck Greenhouse Gas Emissions Regulations under the Canadian Environmental Protection Act, 1999.

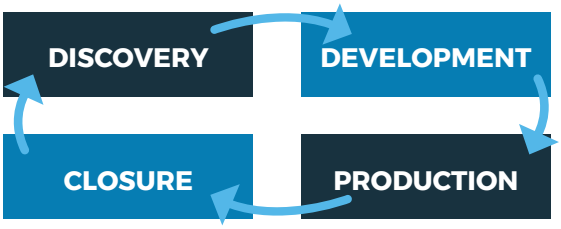
CLEANTECH PRODUCTS ON THE MARKET TODAY FOR THE OIL & GAS INDUSTRY

And finally, the last piece of the story. Cleantech solutions available on the market today prevent water wastage, maximise energy efficiency, manage mine tailings (see the Mining publication for spotlight on Tailings Management) and reduce GHG emissions from the extractive and refining processes. The Oil & Gas industry should be large customers of cleantech and in fact are already taking leadership by taking part in COSIA, the Canada's Oil Sands Innovation Alliance. This alliance of oil sands producers is focused on accelerating the pace of improvement in environmental performance in Canada's oil sands through collaborative action and innovation, with a strategic focus on GHGs, land, water and tailings.

Together, COSIA and Foresight have supported challenges as part of the ARCTIC Innovation Challenge programme to match cleantech innovation to solve common problems in the industry. These challenges focussed on Mining Hot Water Requirements and Waste Heat. Below are examples of cleantech solutions applicable to all stages of the industry, including those that took part in the ARCTIC Challenge.

[14] sdtc.ca/en/news/governments-canada-alberta-invest-cutting-edge-clean-technologies-encourage-clean-growth/

[15] neb-one.gc.ca/nrg/ntgrtd/mrkt/snpsht/2018/07-03vhclmssns-eng.html



Discovery

Accelware[16] based in Calgary, develops energy-efficient ways to explore for oil deposits by using software solutions for seismic data processing and imaging.

Development

Vancouver based company, Dark Vision,[17] has developed a new ultrasound-based imaging technology used to image the inside of oil and gas wells. With a clear picture of the inner working of their wells, oil and gas operators can make smart decisions that reduce operating costs, increase production, improve well integrity and minimize environmental impacts. The imaging system is able to image through opaque fluids that have inhibited the widespread use of cameras and optics as a downhole diagnostics tool.

Production

- AMSEnergy,[18] winner of the ARCTIC Waste Heat Challenge with COSIA and Foresight, has a Heat Pipe Heat Exchanger (HPHX) technology designed to reduce costs and greenhouse gases and increase energy efficiency by capturing and re-purposing heat lost during oil sands production.
- The company, Combustion & Energy Systems,[19] was winner of the Mining Hot Water Challenge supported by COSIA and Foresight. Their Condensing Economizer technology is designed to capture waste heat from flue gas stacks of natural-gas fired industrial boilers. A full-scale field demonstration could improve efficiency resulting in an annual reduction of 30,000 tonnes of CO2e and 150,000 m3 of water.
- WaterStrider Treatment Inc,[20] is developing a new process to treat water recovered during oil and gas production.

WHERE DO WE GO FROM HERE?

At Foresight, we work closely with industry and recognize their needs as their business models evolve . We support cleantech innovators that can transform the Oil & Gas sector to reduce their GHG emissions, manage mining waste, create efficient processes for water and energy and store carbon.

16 acceleware.com/oil-and-gas
17 darkvisiontech.com
18 amsenergy.com
19 combustionandenergy.com
20 waterstrider.org