A Brief on Clean Technology in Canada:
Submitted to the House of Commons Standing Committee on Environment and Sustainable Development

Introduction

On behalf of Pathways Alliance, we are pleased to submit this briefing on Clean Technology to the House of Commons Standing Committee on Environment and Sustainable Development. We appreciate the opportunity to provide an overview of our industry's role in the ongoing research, development and use of clean technologies to help reduce global greenhouse gas emissions and reduce harm to the environment.

While many new and exciting energy technologies are under development, oil is predicted to remain the primary source of energy for decades to come (International Energy Association, 2022a).

As recent geopolitical tensions have shown, there is a vital need to ensure greater security and stability of the world's energy supply, which includes oil and gas (International Energy Association, 2022b). We believe it is important energy is produced by stable, democratic countries that are committed to addressing climate change. Canada has an opportunity to help provide for global energy security and be a leader in producing cleaner energy (BMO Capital Markets, 2020; White, 2022).

That is why Canada's oil sands industry continues to make major investments in developing clean technologies that will raise the bar on its environmental stewardship and generate environmental and economic benefits for all Canadians. These investments will enhance the clean technology industry in Canada, creating new jobs while also preserving current energy sector jobs as the industry transitions to net zero energy production (BMO Capital Markets, 2020; Delphi Group et al., 2021; Foresight Canada, 2021).

Global Perspective

In 2020, BMO Capital Markets published an extensive study (BMO Capital Markets, 2020) that looked at the changing face and nature of the Canadian oil industry and how our oil industry ranks against global competitors, particularly with respect to Environmental, Social and Governance (ESG) performance. A few notable quotes gleaned from this study are summarized below for perspective:

"Canada ranks #1 for its environmental, social, and governance practices among the worlds top oil reserve holders, and #2 overall among the largest 20 oil producing countries."

"Canada's oil sands amount to a mere 0.1% of global emissions; a complete shut-down of the sector would accomplish nothing."

"Alberta's oil sands industry has shown the most improvement in GHG intensity over the past decade, while heavy R&D and innovation efforts should lead to further gains ahead. Alberta is quickly becoming recognized as one of the world's growing centres for "cleantech" development, which is strongly in support of these efforts. Finally, it is important to recognize that Alberta is already a global leader in climate policy, regulation and disclosure, as one of very few oil jurisdictions guided by oversight on emissions."

About Pathways Alliance

Pathways Alliance is Canada's largest oil sands producers[1] working together to address climate change. Our six companies operate about 95% of Canada's oil sands production. Through the Pathways Alliance, our vision is to produce some of the cleanest barrels of oil in the world and for Canada to become the global supplier of choice for responsibly produced oil (Pathways Alliance, 2022a). The goal of the Alliance is to work collaboratively among the member companies and with the federal and provincial governments to reduce our emissions by 22 million tonnes per year by 2030 and ultimately achieve our goal of net zero emissions from production by 2050.

The Pathways Alliance also includes Canada's Oil Sands Innovation Alliance[2] (COSIA)'s where environmental innovation work is focused on reducing industry's impacts to air, water and land while accelerating tailings reclamation (Canada's Oil Sands Innovation Alliance, 2022) and the Oil Sands Community Alliance (OSCA)'s long-standing commitment of being a collaborative partner in the community to help manage socioeconomic impacts and benefits.

Clean Technology Development in the Oil Sands

Pathway to Net Zero

There is no single path to net zero. That's why we're pursuing multiple technologies and approaches to achieve our goal of net zero emissions by 2050.

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[1] Canadian Natural, Cenovus Energy, ConocoPhillips Canada, Imperial, MEG Energy, Suncor
[2] Canadian Natural, Cenovus, ConocoPhillips Canada, Imperial, Suncor, Syncrude, Teck Resources

A major component of our plan, and one we can implement the fastest, is carbon capture, and storage (CCS) technology. CCS involves capturing CO_2 emissions at the source, then transporting the CO_2 to safe storage deep underground in geological formations. CCS is a safe, proven and reliable technology and Canada is a leader in using it.

In addition to CCS, we will continue to advance other existing and emerging technologies, such as direct air capture and switching to lower carbon fuels such as clean hydrogen and electricity to power oil sands operations.

Because of the amount of long-term capital investment required to build carbon capture and storage infrastructure, and the speed needed to meet 2030 targets, the countries that are doing this successfully are all using a collaborative model where governments are co-investing alongside industry. It also requires a supportive fiscal/regulatory system.

Initially, the Pathways Alliance will focus on building a foundational CCS network in northern Alberta. At the heart of the network is a proposed carbon transportation line to gather captured CO_2 from more than 20 oil sands facilities and move it to a proposed hub in the Cold Lake area of Alberta for safe underground storage. The line would also be available to other industries in the region interested in capturing and storing CO_2.

However, no one solution will get us to net zero oil production. We need multiple parallel pathways. Pathways Alliance member companies have pooled about 200 scientists and engineers and other experts to advance more than 80 technologies to help in its net zero goals. These include improvements to the current process as well as emerging technologies. Other avenues include electrification, fuel substitution and improved energy efficiency. Our 3-phased approach will achieve reduced emissions and include:

- Phase 1 (2020-2030) - CCS: includes employing carbon capture and storage to transport carbon to a storage facility; could be expanded to include carbon capture from 20-plus oil sands facilities and from other industries.
- Phase 2 (2030-2040) – Improve efficiencies: includes using emerging technologies to improve processes and increase carbon capture; exploring alternative power sources, such as small modular reactors (SMRs), for oil sands production.
- Phase 3 (2040-2050) – emerging technologies: depends on developing existing and emerging technologies to lead the world to net zero oil production.

Collaboration and Innovation

By collaborating through COSIA, our members can leverage each other's expertise and resources to progress quicker, lower the costs of research and development and reduce the

risk. Sharing technologies, learnings and best practices among members, and more broadly with others from around the world, is a win-win for everyone involved, but especially for the environment.

Since 2012, our members have spent over $1.8 Billion on environmental research and clean technology development, accounting for over 1143 research projects and new technologies shared amongst our members. We are actively supporting 10 academic research chairs[3] at leading Canadian Universities and Colleges, which are generating new knowledge in environmental improvements.

Several metrics that show the improvement in environmental performance in the oil sands to date, include:

- COSIA mining operators have reduced net water use intensity from the Athabasca River and its tributaries by 25 per cent, down to 1.4 barrels of Athabasca River water per barrel of oil produced (from 2.2 barrels in 2012).
- COSIA in-situ operators have reduced freshwater use by 46 per cent, down to 0.19 barrels of water per barrel of oil produced (from 0.36 barrels in 2012).
- COSIA members have reduced the operating footprint intensity of in-situ operations by 6 per cent since 2012.
- COSIA members have reduced the production weighted average upstream GHG intensity of mining operations by 14 per cent and reduced the GHG intensity of in situ operations by 8 per cent.

We also bring together leading thinkers from around the world, including industry, government, academia and the public to help solve our challenges.

In 2021, COSIA launched a pilot program to help start-up cleantech companies with promising technologies get to commercial testing faster. These technologies usually need significant development before COSIA members can safely test them on site. COSIA's Clean Tech Scale-up Program matches start-ups with the right resources at the right time to speed up their commercialization journey. The pilot cuts development time for all five participating companies by one third and one technology has moved to field testing. Based on this success, the program has been expanded in 2022.

[3] These research chairs are also supported by Natural Sciences and Engineering Research Council of Canada

Another example of COSIA's successful collaborative model is the recent completion of the multi-year $20 million (USD) NRG COSIA Carbon XPRIZE competition (Canada's Oil Sands Innovation Alliance, 2020). This was a flagship initiative by Canada's oil sands to accelerate development of carbon capture and utilization technologies. This exciting competition helped push first-generation innovation out onto the international stage, proving it is possible to transform carbon from a waste into useful products. The announcement of the grand prize winners was a crowning moment and demonstrates the commitment of the oil sands industry to nurturing emerging clean technologies that will continue to reduce GHG emissions.

Investment in Clean Technology

Canadian companies invest about $1.4 billion a year in clean technology, in which approximately 75 per cent of that amount comes from the oil and gas industry (Clean Resource Innovation Network, 2017; Morgan, 2019). Further, approximately 71 per cent of Alberta cleantech companies seek to sell to the oil and gas industry (Delphi Group et al., 2021; Foresight Canada, 2021).

A recent study outlined the economic potential of clean technology in Alberta, with the energy transition and path to net zero GHG emissions. The study estimates Alberta could create nearly 170,000 new clean technology jobs and contribute $61 billion in GDP to the province's economy by 2050 (Delphi Group et al., 2021).

In its first phase, the Pathways project will deploy an estimated $20 billion in capital spending, unlocking over $50 billion in GDP[4] and create an annual average of 15,000 to 20,000 high paying jobs during construction, with approximately 1,000[5] permanent jobs post construction. The initiative will stimulate the provincial and national economy through the creation of over 15,000 indirect and induced jobs and position Canada as a leader in CCS project design and execution. There is potential of creating an additional 2,000- 2,500[6] annual engineering jobs supporting international CCS projects (Pathways Alliance, 2022b).

We also note that five of our Pathways Alliance and COSIA members are on the list of Canada's Top 100 Corporate R&D Spenders in 2021 (ResearchInfoSource, 2022).

[4] Assume capex spend over 5 years; GDP multiplier of 2.125.
[5] Jobs created in 2021-30 and 2031-40 and 500 jobs created in 2041-50.
[6] OECD estimate of $350B-440B CCUS investment over next 30 years with ~10% in engineering; assuming a 25% Canadian market share and fully loaded FTE pay of $150K.

Path Forward

Pathways Alliance recognize that progress towards net zero emissions will require significant collaboration across industry, and with government, universities and others. No single company, government or industry is going to reach that goal on their own.

Building large scale CCS infrastructure requires long-term capital investment and in order to meet 2030 targets we need to move quickly.

As mentioned earlier, projects showing early success are using a collaborative model where governments are co-investing alongside industry.

For Canada to be a world leader in reducing emissions through carbon capture, we need to ensure our industry remains competitive with other energy producing jurisdictions around the world.

Other projects like those underway in the Netherlands and Norway are receiving public support of up to three-quarters of the cost of the carbon capture investment.

The Investment Tax Credit announced in the federal budget is a positive and welcome support for CCUS.

However, the United States' 45Q tax credits offer significantly more generous financial incentives to build major CCS projects since the recent introduction of the U.S. Inflation Reduction Act.
It's important we continue to work with both the federal and provincial government to help close this gap with our closest competitor.

Pathways Alliance continues to advocate that both Ottawa and the Alberta government find other mechanisms in addition to the ITC to ensure Canadian industry is on equal footing with its competitors to incent CCS investment, or dollars for decarbonization will likely flow to other jurisdictions.

Pathways Alliance are actively discussing other programs, such as the Net Zero Accelerator/Strategic Infrastructure Fund, as collaborative approaches to reduce emissions. Industry is also applying for pore space to enable carbon storage in the Cold Lake Region We were pleased to be advised by the Government of Alberta in early October that our proposed storage hub was chosen to move forward to a further evaluation phase. While that is happening, feasibility studies and engineering work is underway on many proposed capture facilities in the oil sands region, as well as a 400-kilometre transportation pipeline that would transport carbon to the hub.

Apart from continuing to work on a collaborative fiscal framework, Pathways Alliance continues to advocate for a realistic and achievable regulatory framework for emissions reduction.

We remain concerned impractical timeframes for emissions reduction targets for our industry announced by Environment and Climate Change Canada (ECCC) could drive investment away from our industry and our country, reducing production in Canada and increasing production and emissions in other countries

The fact the proposed oil and gas emissions cap of 42% from 2019 levels (a reduction of 35 MT) is significantly higher than what is achievable (22MT by 2030) suggests a significant discrepancy between industry's understanding of these projects and ECCC's model.

We plan to reduce our emissions by 42 per cent from 2019 levels – we have, after all, set a goal of net zero by 2050 – but reaching that as early as 2030 is simply not realistic given current technology, construction and regulatory requirements.

We estimate that using either of ECCC's two options to impose a 42% reduction target on the oil sands by 2030 would require shutting in roughly 1 million barrels per day of production.

We recommend that prior to settling on a specific option for a regulatory mechanism that the federal government should engage in a more robust discussion with industry on a mutually acceptable path forward that would create the conditions for the decarbonization investment.

As part of this process, ECCC should work with both industry and provinces to assess a technologically and economically achievable greenhouse gas emissions reduction trajectory for the oil and gas sector.

We've shared our perspective with the federal government throughout the consultation period, and believe they understand our position and that we're all committed to net zero by 2050. We're making efforts along the path.

We need to keep in mind that this is about reducing emissions and not reducing production.

We're optimistic that we can put the right framework in place that accommodates new forms of energy such as LNG and hydrogen, helps build Canada up to be the preferred source of energy globally AND is consistent with the country's climate goals.

It is clear we agree on the need to reduce emissions significantly by 2030 and that collaboration is essential for us to meet our goals.

We will continue working in collaboration with the Canadian federal and provincial governments on an effective fiscal and policy framework as we meet the world's demands for lower GHG emissions and the oil it needs as part of the energy mix.

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