

Mobilizing Capital for Industrial Carbon Reductions

Summary Report

On November 13, 2019, CMC Research Institutes, the Bank of Montreal and Energy Futures Lab co-hosted a workshop focused on the challenges of financing carbon capture, utilization and storage (CCUS) technology development. This report presents findings from that event.



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IN BRIEF

On Nov. 13, 2019 CMC Research Institutes (CMCRI), the Bank of Montreal and Energy Futures Lab – with support from Capital Power – hosted a workshop focused on the challenges of financing carbon capture, utilization and storage (CCUS) technology development. This was the third in a series of workshops hosted by CMCRI. The first two meetings focused on identifying general challenges in scaling CCUS and pulled together startups, industry end users, government, NGOs and academics. November's workshop focused on investment and drew together financiers to examine ways to unlock funds for CCUS technology development. Representatives from Canada's major banks, venture capital, and not-for-profit funding organizations were joined by stakeholders from industry, government, academia and the startup sector.

The morning began with two guest speakers who provided an overview of CCUS technologies and the role they play in reducing emissions in a world reliant on fossil energy. The day continued with two panels comprising financiers, industry and startups who examined barriers to CCUS technology scale up and commercialization from multiple perspectives. Experts discussed factors that can lead to the successful development of technologies and explored funding options. Panels were followed by a world café exercise with participants working in groups to brainstorm the most important tools, regulations, and other conditions necessary to encourage scale up and deployment of CCUS technologies.

Several themes emerged from the day's activities. Government support through policies and regulations were cited as critical to the growth of the sector. Participants agreed that risks must be better managed to attract more private and public investors, and it was also recognized that innovators need advice and support in numerous areas, such as business model development.

BACKGROUND

The effects of a changing climate are widespread and difficult to dismiss as 'just the weather'. More frequent flooding, longer heatwaves, intense wildfires, and stronger hurricanes are a few of the impacts destroying ecosystems, endangering lives and disrupting economies. Globally, governments are setting emissions targets and implementing policies which will ultimately impact markets, rendering some goods obsolete while putting a preference on low carbon products. Consumers are also beginning to change buying patterns, shifting their dollars to low carbon goods, and the global market for low carbon products, such as fuels and building materials, is an estimated \$1 trillion.

Against this backdrop of growing global concern over climate change lies a competing fact – the demand for energy is growing, especially in developing nations, and that need is being filled by fossil fuel power generation. Currently, 85% of global energy needs are being supplied by coal, natural gas and oil. And while the market share for renewables such as hydro, wind and solar is increasing, it will take decades to transition off hydrocarbons and onto other forms of energy. In the interim, carbon emissions from industry must be reduced to net zero or zero.

Carbon capture, utilization and storage (CCUS) is a transition technology that can enable near-zero emissions from power plants and carbon intensive industries. At the same time, commercialization of these technologies can help grow the Canadian economy through the development of innovations for export and job creation.

Although multiple models by bodies such as the International Panel on Climate Change consistently include CCUS as necessary for achieving targets that limit global temperature change to below 2°C, deployment of these technologies is slow. To date, 230 Mt CO₂ have been stored through carbon capture and storage (CCS), which represents just 2.5% of global emissions produced from industrial sources in one year. It is estimated that to achieve 2050 climate targets, storage from CCS operations must increase to 5 Gtpa.

The growing urgency of the climate crisis is leading to increased interest in CCUS technologies, and Canada is well placed to meet this demand. The country has a well-educated workforce, world-class CCUS testing and scale up facilities, three of the world's 19 commercial CCS operations, and a growing group of entrepreneurs pushing forward the next generation of carbon conversion innovation. However, there are multiple barriers impeding the progress of the sector.

Consistent messages have emerged from conversations with stakeholders across Canada:

- 1) The country must act quickly to take advantage of new global markets or risk being left behind; and
- 2) A coordinated, collaborative effort would be an effective way to overcome scale up and commercialization roadblocks.

To learn more about challenges facing the sector, CMC Research Institutes and CanmetENERGY Ottawa, with the support of CarbonCure and Delphi Group, held a breakfast roundtable in March 2018. A group of 24 stakeholders from industry, government and the SME community gathered in Vancouver to discuss barriers to technology development and ways to build a robust CCUS sector in the country. Interest was expressed in a follow-up meeting and a full-day workshop was held in Calgary in the fall of 2018. This event, hosted by CMCRI and the Pembina Institute with input from Natural Resources Canada, attracted 40 stakeholders from across Canada and included government, academia, start-ups, industry end users and members of the NGO community.

The group took a deeper dive into challenges and solutions with several themes emerging:

- Policy and regulation are crucial to removing barriers to technology development and adoption;
- Ways must be found to reduce risk and make CCUS technologies more appealing to investors;
- Innovators need to ensure their technologies have a market by connecting with industry end-users early in the development process;
- A national network of CCUS stakeholders could help address challenges in a coordinated way; and
- More communication about CCUS is required to deepen understanding and build support for these technologies within policy experts, governments and the general public.

With funding and investment cited as key challenges facing both innovators and investors, it was natural for CMCRI to look to new audiences for its third workshop. In November 2019, a workshop was held in Toronto aimed at the finance sector. The purpose of this meeting was twofold: 1) provide information about CCUS to a new sector including banks, venture capital, and not-for-profit funding organizations; and 2) learn from investors about the challenges they face financing CCUS technologies.

TORONTO WORKSHOP FINDINGS

Participants

Approximately 40 people attended the 2019 finance workshop and included representatives from three of Canada's major banks, the venture capital sector, not-for-profit funding organizations, and accelerators. The

event also drew CCUS stakeholders from the federal government, start-ups, and the academic research community.

Format

The workshop's purpose was to provide financiers with information about the scale-up challenges facing CCUS innovators and to collect recommendations about ways to successfully fund and work with startups. The morning began with two keynote speakers providing an overview of CCUS, its role in reducing industrial emissions, and an examination of challenges and trends in reducing emissions from the fossil energy industry. Participants then heard from two expert panels. One looked at barriers inherent in technology development from the perspective of innovators and funding organizations. The second featured financiers who discussed different avenues for funding clean-tech development and some of the benefits and challenges of the varied pathways.

The morning wrapped up with a world café exercise in which participants worked in groups to prioritize incentives and business drivers that would support private investment in CCUS technology. These ideas were shared, discussed and voted on as to which solutions they believed could be most impactful.

Key findings

Preferred solutions fell under three themes: 1) strong and stable government support; 2) de-risking investment opportunities; and 3) support for innovators. The summaries below merge information from the keynote speakers, panels and the results of the world café into these themes.

1) STRONG, STABLE GOVERNMENT SUPPORT

Federal and provincial governments can help advance growth of the CCUS sector in a variety of ways – but only if they understand the role CCUS technologies can play in helping the country reach its emissions targets and in stimulating the Canadian economy. Participants felt that more should be done to educate governments about CCUS technology solutions and their revenue-generating potential.

Policy levers for success

A key investment driver for the finance community and industry is a price on carbon. However, a tax or other price mechanism must remain stable over time to stimulate technology investment. Neither investors nor industry are comfortable making large-scale, long-term investments in low carbon technologies if they suspect carbon taxes, incentives, or cap and trade systems will be reduced or eliminated.

While it is difficult to gain public support for a tax of any kind (including carbon taxes), other policy options offer industries incentives to reduce emissions. Participants cited the 45Q tax credit system in the United States as a model that might encourage CCUS investment in Canada. 45Q allows companies to claim \$35/tonne CO₂ used for Enhanced Oil Recovery (EOR) and \$50/tonne CO₂ permanently stored in underground reservoirs. The credit system was enacted in the U.S. in early 2018 and has been applauded for galvanizing growth in the deployment of carbon capture, utilization and storage operations.

Public procurement for market development

Government procurement is another tool that can be used to expand the use of low carbon products and technologies. Governments spend a significant amount on goods and services each year. The federal government, for instance, reports annual spending of about \$22 billion for goods and services. Given this significant purchasing power, public sector procurement initiatives can help shape the direction of new

markets and products, aligning economic and climate goals. Procurement contracts would provide steady demand for low carbon products, creating secure revenue streams that would enable cleantech companies to expand operations and reduce operational costs. Workshop participants agreed that public procurement measures could enable strategic innovation and market penetration in the carbon capture and conversion sector.

2) PAVING THE WAY FOR INVESTMENT

There are multiple barriers that prevent private financiers and industry from investing in new technologies. One global development that might help stimulate industry investment is mounting pressure from investors. Increasingly, companies are being asked by investors to reveal the steps they are taking to reduce greenhouse gas emissions. Although this trend is stronger in the U.S. and Europe than it is in Canada, it is starting to have an impact here.

A risk averse industry

Banks, some large venture capital firms and other investors avoid financing CCUS technologies for a variety of reasons including lack of stability in government funding, long turn-around times for return on investment, and unfamiliarity with technologies that fall under the CCUS umbrella. There is also an assumption by some in finance that CCUS technologies pose an investment risk because they are not yet mature enough for widespread adoption, and this too can affect investment decisions.

One way to reduce investment risk is through the development of a portfolio of technologies. While this is a sound strategic approach to investment and risk reduction, it can be difficult for financiers unacquainted with CCUS technologies to build a suite of innovations for investment. Financiers can benefit from a better understanding of which CCUS technologies are low, moderate, and high risk investments.

Further, some financial institutions are unwilling to invest in CCUS technologies because they don't see them as "breakthrough" innovations compared to other clean technologies. This is partially because of the underlying stigma that CCUS innovations are merely enabling technologies for the fossil energy sector. Better communication could help demonstrate that CCUS technologies have an important role to play decarbonizing industries which lie outside of the hydrocarbon sector.

Participants shared that creating more opportunities for investing in proven technologies, such as pilot projects, would encourage financier engagement. Financial institutions also shared that they'd like companies to have a vision for their technology's role in the transition to a low carbon economy. A forward-looking vision would highlight all benefits of an investment in CCUS technologies rather than focusing solely on revenues, giving investors a comprehensive view of the technology and its climate mitigation and commercial potential.

Moving ahead

Workshop participants identified a willingness within the finance community to support CCUS technologies and noted that novel ways are being explored to create opportunities to invest. Banks are working to develop transition financing for industries investing in technologies that will reduce their GHG emissions. It was suggested that innovators look more closely at equity financing rather than relying on debt financing, which has historically been the preferred route. Banks are also considering perpetual venture capital options that would allow longer wait times, for example 10-20 vs 5-6 years, for returns.

Participants also recognized that costs to first movers are higher than they are for those that follow and several ways were suggested to reduce this disadvantage:

- Risk pooling or restructuring to incentivize private investment;
- Co-funding agreements between private investors and government;
- Extending financial institutions' profit lead time expectations;
- Educating industry about benefits of staying ahead of the competition through early investment in emerging low carbon technologies; and
- Reducing the risk of investment by working with strategic partners to validate new technologies.

3) SUPPORTS FOR INNOVATORS

One of the major barriers facing innovators is transitioning out of small-scale lab projects to the pre-pilot and pilot stages of technology development. Several hurdles need to be addressed beyond finance, including establishing early partnerships between CCUS innovators and industry end-users. Too often industry is presented with a technology as a *fait accompli*, when in reality, the innovation is not financially sustainable, nor will it improve industry operations.

This speaks to a need for more communication between technology innovators, national research bodies and industry end-users. Participants shared that better coordination between Canada's CCUS stakeholders is critical. The development of a national CCUS strategy would help solve several of these challenges. It could provide innovators with the means to identify available resources and could also identify the fit between specific CCUS technologies and industry end-users.

CONCLUSION

The workshop's discussion topics were wide-ranging and covered government, finance, and challenges facing industry, financiers and innovators. However, when participants were asked to vote on factors critical to accelerating the CCUS sector, four key strategies emerged:

- Stable government carbon policies and regulations, including procurement, a carbon tax, and an incentive system that would encourage the investment community and industry to support CCUS innovation;
- A national CCUS strategy to promote investment in CCUS development and commercialization;
- Increased investment opportunities with structuring to reduce risks to private financiers; and
- Coordinated communication between all stakeholders at different stages in the CCUS development and deployment pipeline. Politicians and government administrators need to learn more about the important role CCUS technologies could play in the economy. Industry and innovators need to communicate early to develop technologies that will help solve industry challenges. Government labs and accelerators need to collaborate to provide better, and more, supports to innovators. This is a huge undertaking and needs a champion or a national network to collect and coordinate information into a coherent plan of action.

Based on the outcomes of this and other workshops, it is clear there is a belief that a strong CCUS sector can bring both climate and economic benefits to Canada. There is also recognition this cannot happen without ongoing collaboration between stakeholders. We will continue to play an integral role in the development of this sector by partnering with key stakeholders to produce a technology development roadmap, market studies and policy papers, and a national CCUS network and strategic plan.

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TORONTO ROUNDTABLE - AGENDA

DATE, TIME, LOCATION

November 13

Half day. 7:30 am to 12:30 with lunch to follow.

68th floor, BMO, First Canadian Place.

FORMAT

7:30 to 8:00 am Registration and networking

8:00 to 8:05 am Welcome and housekeeping items, Erin Romachuk, Energy Futures Lab

8:05 to 8:20 am Introduction: Understanding CCUS and why it matters
Dan Zilnik, Board Chair, CMC Research Institutes, and President of AFARA

8:20 to 8:45 am Keynote address and interview: Brian Vaasjo, President and CEO, Capital Power
Dan Zilnik, Board Chair, CMC Research Institutes, and President of AFARA

8:45 to 9:45 am **PANEL #1 - BUSINESS DRIVERS FOR CCUS INVESTMENT**

Panelists discuss challenges of developing technologies, market opportunities for carbon, factors that allow for the profitable integration of CCUS technologies into operations, and drivers pushing companies to invest in carbon reduction.

MODERATOR

- Sandra Odendahl, Vice President, Global Sustainability and Social Impact, Scotiabank

SPEAKERS

- Eric Dunford, Director of Sustainability, CarbonCure
- Dr. Alex Ip, Director of Research and Partnerships, CERT
- Martin Vroegh, formerly Senior Director with Ontario Centres of Excellence
- Tyler Hamilton, Senior Manager, Partnerships, Cleantech, MaRS Discovery District

9:45 to 10 am Refreshment break

10 to 11 am **PANEL #2 - CCUS INVESTMENT AT EVERY STAGE**

Risks and capital needs are different at each stage of technology development. This panel will address the funding/investment gaps at different development stages and discuss policies that would incentivize investment at different stages- allowing technologies to transition through scale up.

MODERATOR

- Bruce Lourie, CEO, Ivey Foundation

SPEAKERS

- Jonathan Hackett, Managing Director and Head of Sustainable Finance, BMO Financial Group
- Peter McArthur, Senior Account Manager, RBC, and chair at Ontario Clean Technology Industry Association
- Joe Regan, Managing Partner, Business Development Bank's Industrial Innovation Fund
- Elizabeth Shirt, Executive Director, Policy and Strategy, Emissions Reduction Alberta

11 to 12:30 pm

Working Session

Erin Romanchuk, Senior Manager, Partnerships, Energy Futures Lab, will lead attendees through a working session with a focus on incentives and business drivers to support investment in carbon capture, conversion, utilization and storage technology development.

12:30- 1:30 pm

Lunch