Carbon Catalyst

Event Summary Report

May 2025

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PEMBINA Institute

CDR CENTRE

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Acknowledgements

The Pembina Institute acknowledges that the work we steward and those we serve span across many Nations. We respectfully acknowledge the space our organization is headquartered in as the traditional territories of Treaty 7, comprising the Blackfoot Confederacy (Siksika, Piikani and Kainai Nations); the Stoney Nakoda Nations (Goodstoney, Chiniki and Bearspaw First Nations); and Tsuut'ina Nation. These lands are also home to the Otipemisiwak Métis Government (Districts 5 and 6). Learn more about the ancestral territory you are on here.

These acknowledgements are some of the beginning steps on a journey of several generations. We share them in the spirit of truth, justice, reconciliation, and to contribute to a more equitable and inclusive future for all of society.

CDR CENTRE

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Bridging the knowledge gap to unlock Canada's carbon removal potential

The Pembina Institute is a national non-partisan think tank that advocates for strong, effective policies to support Canada's clean energy transition. We use our expertise in clean energy analysis, our credibility as a leading authority on clean energy, and our extensive networks to advance realistic climate solutions in Canada.

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Introduction

Carbon Catalyst was a one-day conference, hosted by the Pembina Institute's CDR Centre, where market participants could engage with the current state of the carbon dioxide removal (CDR) industry, learn from one another's experiences and collectively identify opportunities to accelerate investment.

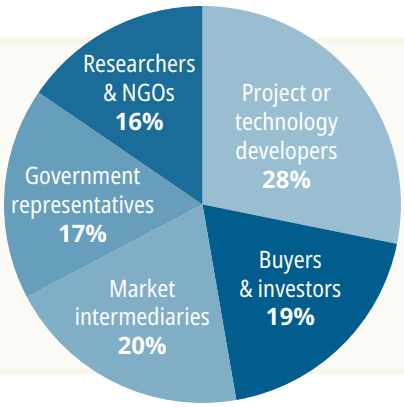
Participants explored the challenges and potential pathways to scaling CDR solutions through interactive sessions and open discussions. Throughout the day, participants emphasized the need for collaboration among all stakeholders to achieve the scale and impact required, while positioning Canada as a global leader in the space.

This inaugural event on April 30, 2025, marks the beginning of what the CDR Centre envisions as a series of collaborative forums aimed at fostering education, dialogue and action in the emerging CDR sector. By providing a community for sharing knowledge and experiences, the CDR Centre seeks to empower organizations to better understand, support and adopt carbon removal strategies.

This report summarizes the key insights and outcomes from the event, providing an overview for those who attended and an informative resource for those who could not participate.

Who was in the room?

With over 120 attendees, Carbon Catalyst brought together a wide range of key players across the CDR ecosystem. The event convened potential and experienced buyers, developers, market intermediaries, non-governmental organizations (NGOs), government representatives and academic researchers, offering a broad perspective on the opportunities and challenges facing this growing space.



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Pembina Institute's CDR Centre

A complement to directly reducing the amount of carbon being emitted, CDR removes carbon dioxide that has already built up in the atmosphere. CDR is a necessary tool to achieve net-zero and stay within a 1.5 °C warming scenario as outlined in the Paris Agreement.

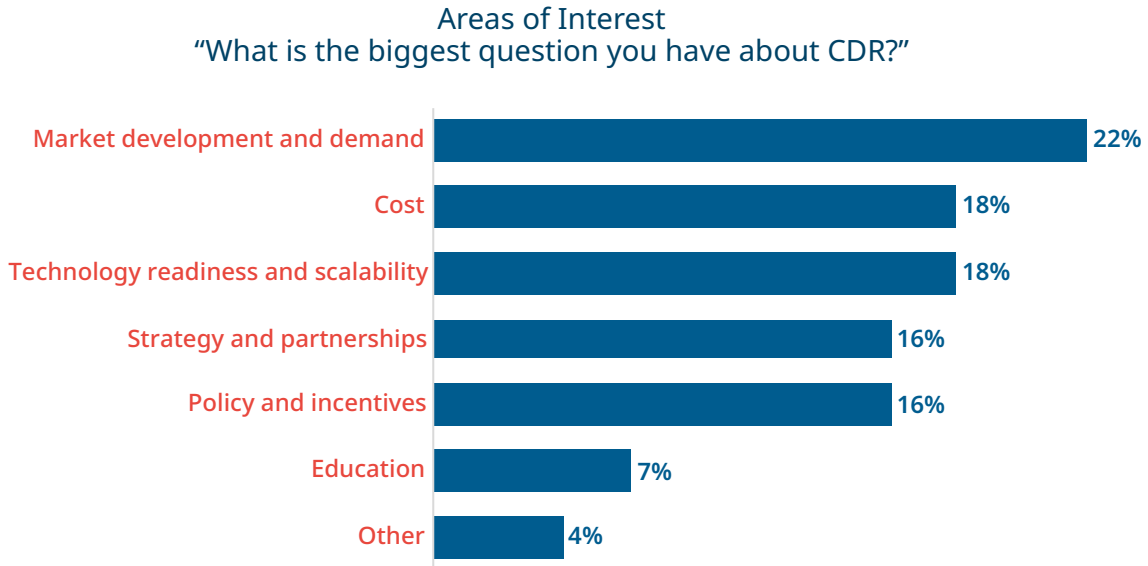
However, many technology-based CDR pathways are currently expensive and not yet deployed at full scale. This is particularly the case for durable CDR: pathways that include methods of storing CO_2 for hundreds of years or longer.

Organizations can help realize these early projects by purchasing CDR credits in advance. By either providing payment upfront or committing to paying for credits in a long-term contract, these buyer organizations can support the financial viability of these projects. This will ensure that sufficient CDR supply is available in the coming decades, when many organizations will likely need CDR to meet their sustainability targets.

The Pembina Institute sees these advanced purchases as a key need to help accelerate the CDR market. The Pembina Institute's CDR Centre aims to increase the number of organizations purchasing CDR in Canada by providing educational tools and resources to support them on their journey.

Biggest questions about CDR

At the start of the event, attendees were invited to share their biggest question about CDR. The responses provided insights into the event participants' priorities, curiosities and concerns around CDR.



Market development and demand

While the distribution of questions across categories was relatively balanced, the largest share (22%) focused on market development and demand. The questions posed highlighted the audience's interest in understanding the mechanisms needed to signal demand, build buyer confidence and ultimately scale CDR. Questions included:

- How can developers meet interested buyers?
- How can first movers be incentivized to act?
- What is the business case for CDR?

Cost

A large proportion of the questions were related to the cost of deployment, signalling the existing assumption that CDR is expensive. Questions included:

- How do we make CDR cheaper to procure?
- How can the capture cost be reduced to balance with the actual purchase price of a credit?

Strategy and partnerships

Some participants posed questions about opportunities in international partnerships to enable a cross-border trading system of credits, as well as integration with the Canadian carbon capture and storage hub.

Technology readiness and scalability

The audience was curious to learn about the full range of CDR methods and which ones showed the most promise to be deployed on a large scale. Questions included:

- Which CDR methods are most feasible on the necessary timescale?
- How developed are CDR technologies?
- What is the state of non-direct air capture technologies?
- How do we generate enough clean power to satisfy CDR development?

Policy and incentives

Questions in this category revealed a desire for timely and clearer policy support to de-risk investments and accelerate deployment. Questions included:

- How can we seize the opportunity presented by the recent federal election results?
- How dependent is CDR tech on tax credits?
- Do we need more supportive policies or incentives to kickstart bioenergy with carbon capture and storage in Alberta?

Education

Questions submitted highlighted a widespread interest in understanding how to buy, what to buy and when to do it. Many participants are still new to or unclear on the technical and commercial aspects of CDR.

Insights from buyers

Market leaders

Amid shifting discourse about climate pledges and sustainability commitments, certain organizations continue to pursue decarbonization through targeted action. In this panel, moderated by Jeremy Barretto (Cassels), Brian Hong (RBC Capital Markets), Finn Tessier-Lavigne (Shopify), and Caroline Glavind (BMO Capital Markets) explored the role of CDR in their current sustainability strategies. The conversation covered how early engagement in the market creates strategic value and what considerations are needed to shape procurement decisions. For organizations just beginning their carbon removal journey, the panel offered candid advice on becoming internal champions for CDR. The main points from the conversation are outlined here.

Buyer education and internal advocacy are crucial

While corporate awareness of carbon removal is growing, limited understanding still affects procurement decisions. Buying CDR is often a custom process, as many companies are still in the early stages of learning how to engage effectively and have not yet established routine processes. Educational tools like Shopify's carbon removal buying guide can help demystify CDR for new entrants.

Besides education, strong relationships with internal teams — especially finance and treasury teams — are key to aligning budgets and long-term strategy.

Now is the time to engage

Early engagement offers strategic advantage. Organizations that move first can de-risk future procurement, develop internal capabilities and shape standards rather than just follow them. Waiting for ideal conditions or incentives may delay progress and limit the opportunity to be influential or catalytic in market development. Potential buyers are advised to start small to overcome inertia and build internal momentum.

Market confidence and integrity are central

Skepticism around the voluntary carbon market has made integrity and transparency top priorities. Recent regulation, such as Canada's Bill C-59 on anti-greenwashing, requires corporations to back their claims with credible, science-based methodologies. In the carbon credit landscape, internationally recognized frameworks like the Science Based Targets initiative (SBTi) are increasingly shaping buyer expectations and are viewed as a key source of guidance for corporate climate action. Buyers can use such frameworks to show that carbon credits are credible, durable and well-aligned with global standards.

Capital, not technology, is the biggest bottleneck

Carbon removal technologies are progressing, but financing hurdles and complex contracting are still slowing deployment. Most projects are still at pilot scale, which keeps costs high. As projects scale into commercial development, prices are expected to fall. The path from innovation to affordability depends heavily on early adopters who can create demand and provide the real-world learning needed to drive progress.

Diversify technologies

Buyers can adopt a portfolio approach to diversify their investments across multiple types of CDR. This can help balance risks for the buyer, while also supporting a wide range of technology developers.

Ensure free, prior and informed consent

Free, prior and informed consent (FPIC) from Indigenous nations is referenced in the United Nations Declaration of the Rights of Indigenous Peoples (UNDRIP). Certain Canadian federal, provincial and territorial governments have enacted legislation to implement UNDRIP. However, mechanisms to meet requirements under UNDRIP may not be clear to all stakeholders for particular projects. Legal processes are ongoing to better understand the requirements of UNDRIP under Canadian law.

Learnings from newer buyers

Many corporate buyers are still navigating the challenges of being early movers in an emerging market. In this session, corporate observers involved in the latest round of the MaRS Carbon Credit Purchasing Program shared first-hand reflections on the process of pre-purchasing high-durability CDR credits. Panelists spoke openly about what surprised them in the procurement process, how their experience has shaped their views on CDR's role within corporate sustainability strategies, and what barriers remain for future transactions.

The session was moderated by Tim Bushman (Carbon Removal Canada) and featured Sebastian Chavez (MaRS Discovery District), Reina Ozaki (Mitsubishi Corporation (Americas)), Kei Morita (ENEOS Americas Inc.) and Takeshi Yamaguchi (Tokio Marine Holdings).

Purchasing carbon credits

The MaRS Carbon Credit Purchasing Program is part of Mission from MaRS: Carbon Management. It helps organizations learn how to identify and buy high-quality carbon removal credits. Launched in 2024, the program combines theoretical learning with hands-on experience, guiding participants through setting purchasing criteria, building a credit portfolio, engaging directly with technology developers, and ultimately purchasing from promising Canadian CDR ventures.

Why did companies participate in the MaRS program?

The participating corporates joined the program with diverse motivations. Some wanted to kick-start internal learning beyond the sustainability team, while others saw the program as a rare opportunity to test CDR procurement without taking on excessive risk.

Many companies are interested in CDR but are held back by internal knowledge gaps, lack of clear guidance, or uncertainty about how to begin. The participants felt that this program helps organizations overcome those hurdles by offering a structured way to learn and align internal teams by engaging more than just the carbon market or sustainability department.

Key takeaways from MaRS program participants

Participants discovered that the carbon credit procurement process is complex. Working closely with program facilitators provided support around contracting, selection criteria and portfolio construction.

- Early action is encouraged. Starting now, before the market is fully formed, helps companies build internal capability and avoid the risks of inaction.
- Before engaging, participants saw carbon removal as a future transaction. By the program's end, they viewed it as an immediate opportunity. This mindset shift underscores how structured, hands-on experience can catalyze early adoption.
- While frustration might be common in early-stage markets, patience and persistence are critical for progress.
- Education in carbon markets allowed companies to create their own standards for carbon procurement, providing more confidence about future purchases.
- Primary concerns include market uncertainty, shifting delivery timelines, lack of standardized regulations, and navigating potential future price reductions.

Sitting down with CDR experts

In this session, participants visited different tables that were each dedicated to a CDR method. Tables were hosted by either an academic researcher or a project developer. This format gave participants the freedom to choose which technologies they wanted to learn more about and to engage in open, informal conversations with experts from both research and implementation backgrounds.

The aim was to encourage curiosity, surface questions from a range of perspectives and deepen the understanding of the diverse CDR approaches being explored. This summary of the table discussions offers a snapshot of the themes and uncertainties participants were more interested in exploring.

Bioenergy with carbon capture and storage (BECCS)

Many attendees learned about BECCS for the first time in this session. The table leads provided an introduction to this technology, which encompasses a wide range of systems that vary around factors like the biomass source and the type of energy generated.

Mineralization

The conversation centered on the scalability of this method, especially in Canada, considering existing infrastructure in the mining industry. Participants also explored potential uses for end products, co-benefits, evaluation of permanence, and the cost per tonne of CO_2 removed.

Biochar

Biochar has a long history and proven effectiveness. Leads explained how biochar is produced and how its end use, whether in soils or building materials, impacts how carbon storage is accounted for. The table reflected on the potential of integrating biochar into conventional agriculture and carbon markets, a practice where Canada lags behind other jurisdictions like Europe. Questions from participants focused on the material's durability, risk of reversal and the lack of measurement, reporting and verification systems robust enough to fully recognize its benefits.

Direct air capture (DAC)

There was a lot of discussion about the materials used for removing carbon dioxide from the atmosphere, including what form these solvents and sorbents take, how long they last and what emissions are associated with the materials. A key topic of conversation was the ability for DAC to scale. In particular, participants debated how energy usage changes as projects grow in scale, what the price floor that DAC could theoretically reach in the future and how different types of systems vary in terms of modularity.

Enhanced rock weathering (ERW)

The challenge of verifying CO_2 removal was the centre of the discussions. Participants raised questions about whether AI technologies could improve the monitoring and effectiveness of ERW, what indicators such as changes in soil or mineral content can be tracked, and what types of rocks are more suitable for the process. The group also explored practical concerns, asking whether crushed rock from mining waste can be repurposed, how much energy is required for the crushing and transport, and what impact Canada's colder temperatures have on the process.

Marine CDR

The discussion on marine CDR raised several important questions around its scope and impact. Participants asked whether methods used for river alkalinity enhancement could also be applied to lakes and other bodies of water. They were curious about the cost of these technologies, and if the primary customers would be local governments or the private sector. The conversation also touched on potential impacts on marine life and the robustness of measurement, reporting and verification processes.

Establishing markets

The current measurement, reporting and verification (MRV) landscape for CDR is rapidly evolving, with protocols and registries working to ensure high-quality outcomes in increasingly complex carbon markets. For newcomers, navigating this space can be challenging. During this panel, Candace Vinke (Verra), Amy Zell (Brightspot Climate) and J.P. Jepp (Nexus Climate and Energy Strategy) joined moderator Carson Fong (Pembina Institute) to explore what makes a high-quality credit and how the industry can effectively engage with evolving standards.

Credit insights for **buyers**

Key Insight	Summary
Educate around protocols	Understand standards and credit types to avoid low-quality or risky purchases.
Avoid unverified credits	Don't buy directly off registries without verifying credit quality and backing.
Support quality through purchases	Choose programs with strong protocols to influence market direction.
Budget for quality	High-quality credits come at a cost. Be prepared to pay for credible outcomes.
Participate in standard-setting	Provide feedback and signal expectations to shape evolving standards.

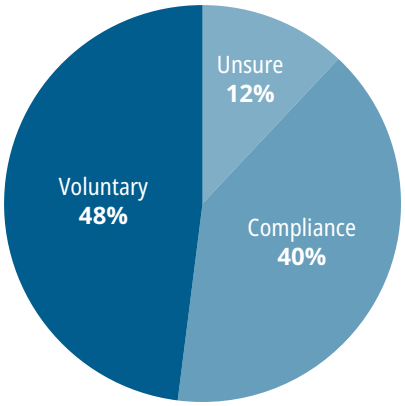
Credit insights for **developers**

Key Insight	Summary
Understand existing methodologies	Select and align with a validated methodology to ensure credit eligibility.
Adapt to evolving standards	Advocate for broader and updated protocols, as methodologies may lag behind tech.
Prioritize data quality	High-quality, verifiable data is crucial for MRV and credit issuance.
Engage regulators	Proactively work with regulators to address gaps in current policy frameworks.
Highlight co-benefits	Demonstrating environmental or social co-benefits can add value to credits.

Attendees were asked whether the voluntary or the compliance market would have a more significant impact on CDR deployment in the next five years. Of the 42 responses received, 48% pointed to the voluntary market, 40% to compliance, and 12% were unsure. Given the pace at which voluntary buyers have engaged in carbon markets and the infancy of CDR's role within compliance markets, a few participants were surprised that the gap wasn't wider in favour of the voluntary market.

This prompted a conversation around how compliance market development could be accelerated through harmonization with voluntary standards. Some audience members urged governments to not "reinvent the wheel," but to adopt and adapt existing protocols where possible. The group emphasized the value of learning from international examples, avoiding duplication and sending clear demand signals to support credit integrity and market growth.

Impact of market type on CDR Deployment



Advance Carbon Removal

During the event, the formation of Advance Carbon Removal was announced by its founder, Ed Whittingham. This new buyers group aims to send a strong demand signal for carbon removal by encouraging participating companies to commit to investing a total of $100 million in Canadian CDR solutions over the next five years.

Community partnerships

The event ended with a fireside chat moderated by CDR Centre director Jorden Dye and featuring Phil De Luna (Deep Sky) and Mayor Jean Barclay (Town of Innisfail). They shared the importance of community partnership in driving clean technology adoption and unlocking local economic benefits.

Deep Sky selected Alberta, and specifically Innisfail, for its ideal combination of geological storage, skilled trades and entrepreneurial spirit.

Mayor Barclay reflected on the town's strategic decision to welcome emerging technologies, describing it as a deliberate effort to grow beyond being "just a place where people live to commute." With limited tools for revenue generation, the municipality has found it essential to support industrial projects like Deep Sky Alpha. The mayor also highlighted how proactive education around energy and innovation and public engagement, including Deep Sky's two-day open house, helped local residents better understand the development. For a mid-sized town like Innisfail that seeks growth opportunities, it's important to move at the speed of business and to set clear policies and regulations so that experts can come in and help with developments like these.

Deep Sky was committed to ensuring a partnership between the company and the town. From the onset the company prioritized early and meaningful community engagement and made sure they answered all the questions from the residents. Deep Sky's presence has already created local economic ripple effects, from job creation and school partnerships to increased foot traffic for local businesses. Phil emphasized that true success comes from curiosity and listening.

The conversation underscored that with the right mindset, collaboration between developers and municipalities can spark economic growth, accelerate climate action and ensure lasting community value.

Opportunities to catalyze investment

As a closing exercise, participants identified what they believe is the biggest opportunity to increase investment in Canadian CDR over the next three years. These opportunities were scored and ranked among the attendees of the event. Five overarching categories of opportunities emerged.

Policy incentives

Government leadership

Visibility and demand signals

Partnerships

Clarity and certainty

Policy incentives

Out of 64 opportunities collected, 27% referred to policy incentives, making this the category where participants saw the greatest potential to accelerate investment in CDR.

The highest-ranked opportunity in this category focused on introducing production tax credits for CDR, modelled after the 45Q tax incentives in the United States. These would help de-risk projects and improve capital flow. Participants emphasized the need for long-term policy certainty, including stable industrial carbon pricing and the explicit integration of durable CDR into compliance markets and Canada's climate targets.

Government leadership

Government leadership beyond policy development was cited in 23% of responses from attendees. Many participants emphasized the critical role of government in positioning Canada as a global hub for CDR, highlighting the potential benefits for domestic actors.

The highest-ranked opportunities included ensuring that governments across Canada recognize and act on the country's natural advantages — its climate, geography and abundant low-carbon electricity. Participants stressed that federal and provincial governments can drive momentum by setting clear market expectations, directly procuring CDR credits and investing in pilot projects.

Visibility and demand signals

Increasing the visibility of Canadian CDR efforts and creating strong demand signals emerged as key opportunities to drive investment. Among the responses, 23% emphasized the importance of showcasing early project success and the economic development benefits that can result from deployment, particularly when backed by broad stakeholder support.

The highest-ranking opportunities included establishing future purchase commitments from credible buyers to create predictable demand and increasing international awareness of Canada's capabilities. Attendees suggested positioning Canada as a prime destination for CDR project development by advertising low-cost storage and abundant low-carbon electricity. Other suggestions included aggregating demand through pooled purchase commitments, increasing education on CDR, and improving communication around the investability and scalability of existing projects.

Partnerships

Partnerships were another frequently identified opportunity area, with 17% highlighting the importance of collaboration across sectors and communities. Participants emphasized the value of joint ventures with Indigenous communities and sectors such as agriculture, ocean farming and mining to maximize co-benefits. Public-private partnerships, international trade ties, and cross-sector consortiums aiming for large-scale deployment milestones were also seen as critical.

The highest-ranked idea was for the Canadian government in partnership with a consortium of actors to commit to purchasing permanent carbon removal from Canadian suppliers ($100 million fund deployed by 2030). Participants agree that this would unlock private investment and could also get other governments involved.

Clarity and certainty

Clarity and certainty in Canada's climate and CDR policy landscape were highlighted in 9% of the responses, with participants emphasizing that investment depends on clear, long-term market signals.

The highest-ranked opportunity in this category, with an average score of 10, called for clear and transparent regulations, referring to interprovincial barriers in Canada. Participants emphasized that clear compliance market frameworks coupled with predictable policy direction can help lower perceived risk and accelerate project development.

Carbon Catalyst will be the first of a series of convening events aimed at collaborating across the community to accelerate investment in CDR.

If you missed this event but want to hear about the next one, contact us to sign up for our mailing list.

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