

Ready, Set, Remove

Planning your company's path
to carbon removal



August
2026

Jorden Dye, Luisa Corredor

PEMBINA
Institute

CDR
CENTRE

Ready, Set, Remove

Planning your company's path to carbon removal

ISBN 1-897390-95-5

Recommended citation: Dye, Jorden and Luisa Corredor. Ready, Set, Remove: Planning your company's path to carbon removal. The Pembina Institute, 2026.

©2026 The Pembina Institute

All rights reserved. Permission is granted to reproduce all or part of this publication for non-commercial purposes, as long as you cite the source.



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 and ancestral territories of the Blackfoot Confederacy, comprised of the bands Siksika, Piikani, and Kainai, the Îyârhe Nakoda Nations, including the bands of Goodstoney, Chiniki, and Bearspaw, and the

Tsuut'ina Dené. These Lands are also home to the Métis Nation of Alberta — Region 3 whose Peoples have deep relationships with the Land.

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.

PEMBINA
Institute

The Pembina Institute
#802, 322 – 11 Avenue SW
Calgary, AB T2R 0C5
Phone: 403-269-3344
www.pembina.org

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.

Donate

Together, we can lead Canada's transition to clean energy. Your gift to the Pembina Institute directly supports environmental education and innovative research that advances understanding and action on critical energy and environmental issues. Canadian charitable number 87578 7913 RR 0001: pembina.org/donate

x.com/pembina bsky.app/profile/pembina.org

facebook.com/pembina.institute linkedin.com/company/pembina-institute



Contents

Executive summary	4
Introduction	5
Ready for carbon removal	6
Set your removal strategy	13
Remove with confidence	21
Next steps	26
References	27



Executive summary

Corporate climate commitments have matured considerably over the past decade, yet the tools most companies have relied on are showing their limits.

Traditional carbon credits are coming under increased scrutiny from regulators, investors and civil society, exposing the gap between what these instruments promise and their actual climate impact. Meanwhile, global emissions are not on track to avoid the most dangerous impacts of climate change, and the approaching net-zero deadline has made one reality impossible to ignore: some emissions cannot be eliminated with existing technology, and no amount of avoidance or reduction crediting resolves that problem.

Carbon dioxide removal (CDR) is the mechanism ready to address this gap. It complements reduction efforts by addressing the emissions that remain after all reduction measures have been taken and by addressing legacy emissions that remain in the atmosphere because the natural carbon cycle removers are overwhelmed and cannot remove them, including those that remain in the atmosphere for hundreds of years.

For corporations in Canada, the timing couldn't be better. A world-leading policy environment, substantial storage capacity, a maturing developer ecosystem, and support from other buyers offer the best conditions to start engaging with CDR while the window of early-mover advantage remains open. The level of support for the CDR industry in Canada is hard to match in any other jurisdiction.



Introduction

The Intergovernmental Panel on Climate Change (IPCC) warns that the window to limit global warming to **1.5°C** and even **2°C** is narrowing rapidly.¹ For companies, this means extreme weather is no longer a distant risk, but an immediate and growing reality. Extreme weather disrupts supply chains, increases insurance costs, and impacts businesses' ability to grow.

As companies confront the limits of emissions reductions alone to address global warming, carbon dioxide removal (CDR) comes into focus. Evolving standards, rising expectations and increasing demand for credible net-zero commitments are moving it to the forefront. These forces are shifting the conversation from *whether* to engage with CDR to *when* and *how* to do it.

There are several ways to invest in CDR, from direct project finance to philanthropic donations. This primer focuses on the most practical avenue for corporate buyers: *carbon removal credits*. These offer a structured, scalable way to support the growth of the CDR market, while building internal expertise and protecting the company from future requirements.

This is not a procurement guide. It will not walk through supplier selection, contracting, or portfolio development. What it will do is provide the foundational structure that must be in place before procurement begins.

This primer is designed to fill a gap for corporations and teams asking whether carbon removal should be part of their sustainability strategy.



Ready for carbon removal

Why removals are becoming a corporate imperative

Over the past decade, corporations have made steady progress in deepening and amplifying the impact of their sustainability strategies, and carbon markets have become a material tool for climate finance and decarbonization. Working with standards bodies and rating agencies, companies have built a massive voluntary carbon credit market, where avoidance and reduction credits have dominated. See page 8 for definitions.

Despite these efforts, the extent of achievable reduction is limited, driving the need to look at how to address *residual emissions*: emissions from hard-to-abate sectors that will remain beyond the 2050 net-zero timeline. As companies turn their attention to the next phase of credible sustainability strategies, carbon dioxide removal has emerged as a climate mechanism purpose-built for this moment.

— KEY INSIGHTS —

- Corporate net-zero commitments are increasingly facing challenges. Strategies built on avoidance offsets are facing increasing legal, regulatory, and reputational scrutiny.
- Carbon dioxide removal is the mechanism designed to address what reductions cannot.
- Residual emissions, or emissions that are hard to abate, are now a material issue, not a footnote.

The emissions gap and why reductions alone fall short

Global emissions efforts have so far failed to reduce annual CO₂ emissions. Each year, the amount of excess CO₂ in the atmosphere increases, narrowing the remaining carbon budget. At current rates, the budget for a **50%** chance of limiting warming to **1.5°C** above pre-industrial levels could be exceeded within the next four years.²

However, **reducing ongoing emissions is only one part of the story.** Even if global emissions were brought down to zero, the carbon dioxide already in the atmosphere from *historical emissions* (total industry-driven emissions released since the Industrial Revolution) would continue to persist for centuries.

This means that reducing emissions alone is not sufficient. Beyond historical emissions, some emissions are currently too integral to certain industrial operations or too costly to eliminate within required timelines. These are often referred to as hard-to-abate or residual emissions. It is these emissions that are increasingly focused on as the stringency of sustainability standards increases.

From climate need to corporate strategy

For companies with net-zero commitments, residual emissions create a practical challenge: most organizations will not be able to eliminate all emissions through reductions alone by **2050**.

As expectations around credible climate claims rise, addressing a company's residual emissions becomes a material issue. **Net-zero strategies that fail to address these emissions risk being viewed as incomplete or misleading.** This trend is beginning to work its way through the system as standards bodies start developing frameworks for incorporating CDR.

As a result, several companies are already investing and building knowledge and capacity on carbon dioxide removal procurement as a critical component of forward-looking corporate sustainability strategies. These early adopters are preparing for future standards, market constraints, and increasing accountability, while securing critical relationships, collecting early learnings and reducing future risk in expanded purchases.

Residual emissions represent the emissions that cannot be eliminated as they “remain unabated at the net-zero target year, after implementing all available mitigation measures contemplated in pathways consistent with reaching net-zero CO₂ emissions by **2050** or earlier.” In other words, residual emissions are those that remain after a company has taken all feasible steps to avoid, reduce, or eliminate its emissions.³

How removal credits differ from traditional carbon credits

Carbon credits have traditionally served as a financial mechanism to incentivize and fund climate solutions that help scale mitigation efforts. Canada has an extensive history with these types of solutions. The Great Bear Rainforest was a first-of-its-kind project that used Indigenous-led conservation and innovative sustainable finance models to secure a critical and endangered ecosystem while generating revenue through carbon credits.⁴

Historically, companies have typically invested in three types of carbon credits: carbon avoidance, carbon reduction, and nature-based carbon removals:

Carbon credits: tradable units that represent one tonne of carbon dioxide equivalent (CO_{2e}) either *reduced* at the source, *removed* from the atmosphere, or *avoided* from being emitted.

Table 1. Traditional carbon credits

Traditional carbon credits		
Carbon avoidance credits	Carbon reduction credits	Nature-based carbon removal credits
		low-durability removals
Fund activities that prevent CO ₂ emissions that would otherwise occur. e.g., conservation activities that avoid deforestation.	Fund activities that reduce CO ₂ emissions relative to existing practices. e.g., improving fuel efficiency, projects that switch to a low-emissions cookstove.	Fund activities that use natural ecosystems to capture and store carbon in living systems for the lifespan of those systems. e.g., afforestation & reforestation projects, improved forest management, soil-carbon projects

The problem is that these traditional types of carbon credits have raised concerns because the carbon they avoid, reduce or remove may not remain out of the atmosphere over the long term and can be reversed due to changing land use practices and ecological disturbances.

In **2025**, avoidance and reduction credits dominated the global voluntary market, accounting for **95%** of retirements (removing the carbon credit from the market), while removal credits (mostly nature-based removals) made up only **5%**.⁵

What is durability and why it matters

Durability refers to how long carbon dioxide stays out of the atmosphere and the risk that it can be re-released before the intended storage period ends.

The methods to remove carbon dioxide from the atmosphere are often grouped by this durability property into *low-durability* removals (traditional nature-based methods) and *high-durability* removals (Table 2).

Table 2. Carbon removal types

Low-durability removals	High-durability removals*
Also known as: - Nature-based carbon removal - Short-lived carbon removal	Also known as: - Technology-based carbon removal - Engineered carbon removal - Durable carbon removal
They leverage natural processes to enhance carbon sequestration.	They enhance natural CO ₂ removal through intentional human interventions. They are additional to natural carbon absorption.
Examples: afforestation, reforestation, peatland and coastal wetland restoration.	Examples: storage in geological formations or in long-lasting products
Carbon may return to the atmosphere in less than 100 years.	Carbon can remain in place for centuries to millennia.

* See the *High-durability carbon removal credits* section for an expanded explanation

Figure 1 illustrates how carbon storage durability varies over time across some CDR methods, highlighting the **reversal** risk (likelihood that stored carbon is re-released into the atmosphere) inherent with less durable approaches.

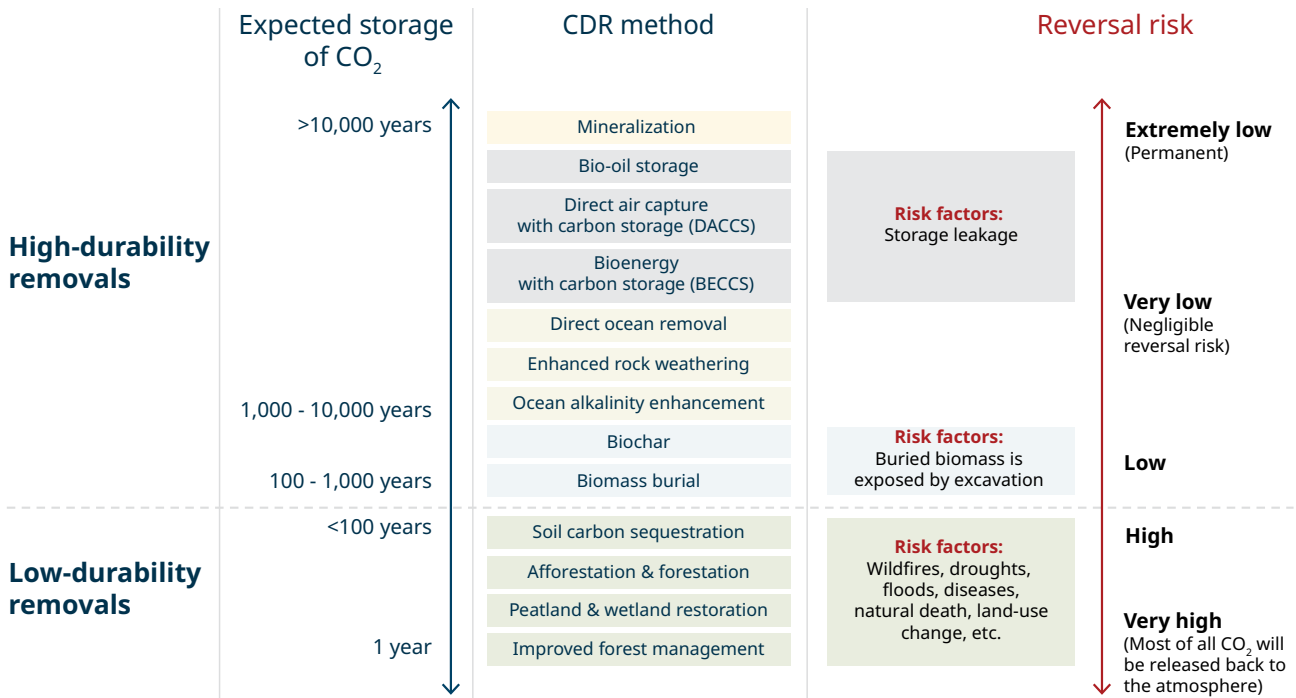


Figure 1. Variation in storage durability across high and low durability removals

Table 3 provides a snapshot of some of the most prominent differences between traditional carbon credits and credits that fund high-durability carbon removal projects:

Table 3. Comparison of all types of carbon credits

	Traditional carbon credits		
	Avoidance/ reduction	Low-durability removal	High-durability removal
What it does	Avoids or reduces emissions that would otherwise be released into the atmosphere	Removes CO ₂ from the atmosphere through biological processes.	Removes CO ₂ from the atmosphere through technological interventions.
Permanence/durability (see Figure 1)	Low durability; reversible and time-limited by the duration of the credit.	Low durability (CO ₂ is stored for less than 100 years)/high reversal risk	High durability (CO ₂ is stored for centuries to millennia)/low reversal risk
Cost range	Often below \$50 per tonne* of CO ₂ avoided ⁶	Average cost between \$24 and \$42 per tonne of CO ₂ removed (illustrative) ⁷	Between \$190 and \$1,300 per tonne of CO ₂ removed (illustrative) ⁸
Transparency	Increasingly scrutinized. High risk of greenwashing claims because of hypothetical scenarios and baselines.	Lower measurement and verification. Removal and storage depend on hard-to-verify assumptions.	Use of rigorous verification models and robust monitoring. Standards organizations set more stringent requirements.
Scalability	Currently scalable. Constrained by quality assurance.	Constrained by land availability.	Significant long-term scaling potential. Constrained by cost.

* All costs in \$Canadian.

Problems with traditional credits: not all carbon credits are equal

A large-scale analysis of carbon-credit retirements by 20 major companies showed that these companies have overwhelmingly sourced cheap, lower-quality avoidance-type credits (e.g., credits that reduce emissions from deforestation and forest degradation in developing countries, also known as REDD+).⁹ While in some cases REDD+ credits have supported forest conservation, projects of this type may claim more avoided deforestation than independent estimates justify, indicating an over-crediting issue and systemic weakness that has led to increasing scrutiny over claim validity and credit integrity, and claims of greenwashing.^{9, 10}

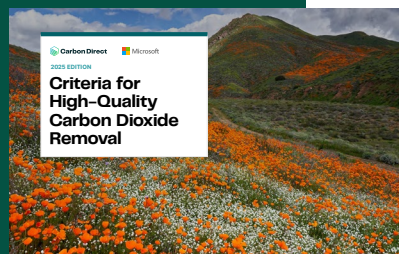
These issues reduce confidence in claimed climate benefits, but they do not imply that all traditional credits are fraudulent. Instead, they underscore the need for rigorous standards, independent oversight and more rigorous methods that ensure the credibility of climate benefit claims.

Weaknesses of traditional carbon credits

- **Over-inflated baseline estimates:**
Credits are issued based on the difference between actual emissions and a projected business-as-usual baseline, but baselines have been set too high leading to exaggerated number of credits relative to the actual climate benefit.
- **Weak measurement and verification:**
Quantifying avoided or reduced CO₂ is technically difficult and resource-intensive. Insufficient monitoring and weak measurements have created space for over-reporting.
- **Lack of transparent governance:**
Fragmented oversight across standard bodies and project developers has allowed low-quality credits to reach the market with limited accountability.

Lessons from traditional credits

Drawing from the carbon market's experience with traditional credits, organizations with experience in procuring high-durability carbon credits, such as Microsoft and Carbon Direct, have already developed guidance on what constitutes high-quality removals: *Criteria for High-Quality Carbon Dioxide Removal 2025 Edition*.



Criteria for evaluating the quality and integrity of a carbon credit

Strong additionality: Making sure the removal of CO₂ would not have happened without the existence of the carbon credit.

Robust quantification: Verifying the accounting of CO₂ emissions removed is not overestimated and is constantly monitored.

Permanence: Ensuring the emissions are removed for the long term, matching the lifespan of atmospheric CO₂, with minimal risk of the carbon re-entering the atmosphere.

Not associated with environmental or social harms: Preventing or minimizing potential harm.

High-quality CDR methods

There are several pathways for removing and storing carbon dioxide, each with different levels of durability, potential and readiness for large-scale deployment. Given the IPCC's emphasis on the need for high-durability removals,¹¹ the Pembina Institute's CDR Centre focuses on those methods that store carbon durably (for at least 100 years) and their role in a corporate carbon management strategy.

These are some of the methods that capture and store carbon for the long term:

- **Direct air capture with carbon storage (DACCS):** Specialized materials catch CO₂ directly from the air and then release it for permanent storage in underground geological formations.
- **Biomass carbon removal and storage (BiCRS):** Growing biomass takes up CO₂, and is then processed for long-term storage.
- **Marine CDR:** Technology enhances natural carbon absorption processes in the ocean to sequester CO₂.
- **Enhanced rock weathering (ERW):** Certain types of rocks are crushed and spread over land to chemically react with CO₂ and remove it from the atmosphere.
- **Biochar:** Biomass is thermochemically decomposed (pyrolyzed) into a stable solid that is added to soil.

Each method offers distinct co-benefits and risks that should be carefully evaluated to ensure alignment with an organization's operations and sustainability goals.

Refresher: High-durability carbon removal credits

High-durability carbon removal refers to human-driven processes that actively capture and store carbon dioxide from the atmosphere **for decades to millennia**. They are additional to natural carbon absorption, and are **a complement to direct emissions-reduction efforts**. High-quality removals provide a means to neutralize those residual emissions that are difficult to eliminate in the near term and to address the backlog of historical emissions.





Set your removal strategy

Building the foundation before you buy

Once an organization has decided to move down the path towards carbon removal, the next steps can feel daunting. But understanding the importance of CDR is only the first step in bridging the gap between knowledge and action. A key consideration for corporations interested in CDR is ensuring the proper sequencing of actions. Foundational activities such as accurate measurement of carbon dioxide inventories, validated reduction targets, and a history of real actions on operational emissions are key aspects of credible plans.

For both Canadian corporations and global multinationals, Canada offers structural advantages in the CDR market that are hard to beat: a supportive and stable policy environment, an emerging ecosystem of CDR developers across methods, and carbon dioxide storage opportunities across the country. These advantages enable corporations to build a diverse portfolio of CDR credits located near their operations. Companies that act now and capitalize on early learnings will secure significant advantages over competitors who try to enter the market when forced by regulators and standards bodies.

— KEY INSIGHTS —

- The best CDR strategies are built on a foundation of measured emissions, credible targets, and demonstrated reductions.
- Corporations that engage in the CDR market now will secure advantages in supply access, pricing, and influence over standards.
- Canada offers distinct procurement advantages with large storage capacity, policy certainty, and a strong ecosystem of developers.

Where CDR fits in a corporate sustainability strategy

As global awareness of climate change has increased and the understanding of the link between corporate risk and climate risk has matured, corporate sustainability has entered a more demanding era. Regulators, investors, and civil society focus on identifying weak climate claims, leading to growing surveillance of carbon credits, which can expose companies to commercial, legal, and reputational risks.

This pressure is reshaping what a credible net-zero strategy requires. For instance, standard-setting bodies such as the Science Based Targets Initiative (SBTi) are beginning to limit the role carbon credits can play in validated targets through its [Corporate Net-Zero Standard](#). Under the currently proposed update, companies will be required to procure carbon removal to address residual emissions starting in **2035**.

Regardless of the short-term inclusion, the IPCC has determined that carbon removal is essential in limiting the impacts of climate change¹², and companies will be required to address this area of their organization's impact. Proactive companies should build CDR knowledge now as they begin to understand how CDR will integrate into their sustainability strategy.

Exposure to carbon pricing and climate regulations elevates CDR as a material issue under the environmental pillar of an ESG strategy, but CDR also offers the potential to span social and governance pillars (Figure 2).

- Environmentally, certain CDR methods can unlock co-benefits that align directly with the company's operational footprint. For example, as part of its waste management strategy, a mining company can leverage its own tailings for carbon sequestration. Likewise, a company in the food sector can improve soil health and nutrient availability through enhanced rock weathering.
- Socially, CDR projects can align with the interests and considerations of communities through co-benefits. For example, river alkalinity enhancement can restore ecosystems and enhanced rock weathering can improve nutrient value of soils, both contributing to food security.
- Within governance, procuring high-quality carbon removal credits with rigorous monitoring, reporting and verification (MRV) and third-party verification shields the company from greenwashing claims and helps satisfy the sustainable finance criteria required by investors.

Together, these dimensions show that CDR is not a siloed climate tool but offers the potential to link environmental performance, social outcomes, and governance integrity within a single sustainability strategy.

CDR and compliance markets

Beyond standards bodies, a shift is also happening in the compliance market, where CDR is beginning to be integrated into existing emissions trading schemes, such as the U.K. system. Integration is also emerging in industry-specific mandatory compliance markets, such as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which only accepts eligible emissions units that meet strict criteria for additionality; permanence; monitoring, reporting and verification; and corresponding adjustments. This strict system now accepts durable carbon removal credits, demonstrating the high quality of high-durability removals.

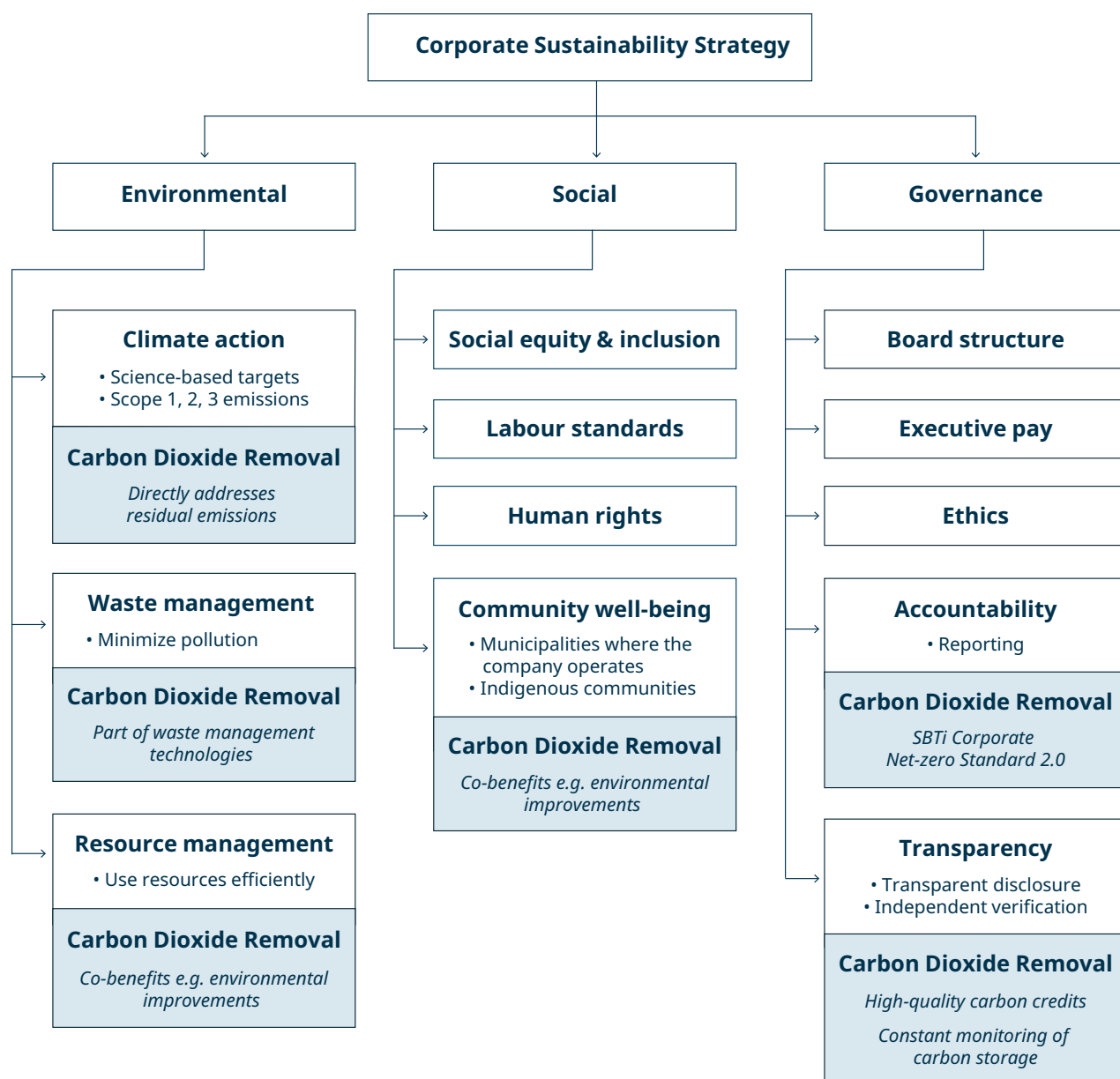


Figure 2. Carbon dioxide removal as part of corporate sustainability strategy
Based on: The Corporate Governance Institute¹³

Sequencing your climate commitments

Purchasing CDR is not the first step in an organization's sustainability program. A foundation of measurement, targets, and emissions reduction progress should be established before corporations engage in the carbon removal market.

The Voluntary Carbon Markets Initiative (VCMI), an organization that aims to enable high-integrity voluntary carbon markets to deliver real climate benefits, and the University of Oxford's Oxford Principles for Net-Zero Aligned Carbon Offsetting have established guidance on corporate best practices for climate action. Their guidance suggests that before organizations engage with carbon markets, they should:

1. Measure and publicly disclose their greenhouse gas emissions
2. Set a near-term emissions reduction target and commit to net-zero emissions by or before **2050**
3. Demonstrate progress towards near-term emissions reduction targets
4. Advocate for public policy that supports the goals of the Paris Agreement¹⁴

Once organizations have begun reducing emissions and are demonstrating meaningful progress, they're ready to engage with CDR to address residual emissions, in parallel with continued abatement (Figure 3).

While formal requirements may arrive in the next few years, procurement decisions, supplier relationships and internal governance structures are already being shaped today. **Any company with a net-zero commitment that doesn't have a CDR plan has an incomplete decarbonization strategy.**

Commit to net-zero
emissions by or before
2050.

1. Establish a foundation of emissions reductions

- Measure and disclose GHG emissions
- Set ambitious short- and long-term goals
- Demonstrate progress towards emissions reduction goals
- Support climate policy

2. Integrate durable carbon removal

- Build knowledge and experience
- Develop partnerships



Figure 3. Stages in a company's net-zero journey

The early mover advantages

Firms that begin building expertise in carbon removal procurement and engaging with the CDR ecosystem now can create advantages that will be difficult for late movers to replicate.

- 1. Secure future supply:** Demand for CDR is expected to outstrip supply by **2030**.¹⁵ Purchasing commitments today can enable buyers to negotiate more favourable terms amidst future supply constraints. These can include options to have first choice on a developer's future supply, or terms to ensure the purchase price reflects future cost savings that the developer achieves within the project.
- 2. Demonstrate sustainability leadership:** CDR investing today has an outsized impact in spurring others to follow. Our **2025** scan of prospective CDR buyers found that the majority of organizations would be more likely to purchase CDR if peer organizations were already doing so.¹⁶ Early investment in durable CDR not only multiplies climate impact but can also solidify an organization's brand as a climate leader.
- 3. Mitigate emerging policy and legal risks:** Corporate standards and compliance obligations continue to evolve, resulting in higher scrutiny on sustainability actions. In Canada, the Net-Zero Advisory body to the Minister of Environment and Climate Change advised the government to set numerical targets for carbon removals in **2025**. The SBTi is currently revising its Corporate Net-Zero Standard, which is considering the role of durable CDR as a neutralization mechanism.¹⁷ Globally, net-zero

and carbon-neutral claims backed by low-quality carbon credits have been in the spotlight amid class-action lawsuits.¹⁸ Moving towards durable, high-quality CDR is a near-term risk-mitigation strategy that helps organizations get ahead of evolving standards.

- 4. Unlock local benefits:** Projects can offer environmental and social benefits to communities through environmental restoration and economic opportunities. A single commercial direct air capture plant designed to remove 500,000 tonnes can support over **1,200 jobs** per year during a five-year construction period and approximately **300 long-term operational jobs** once in operation.¹⁹ Some mineralization projects can safely manage asbestos mine tailings, reducing environmental liabilities for mining companies. River alkalinity enhancement can improve water quality in polluted rivers and restore wildlife ecosystems. As buyers develop a CDR strategy, they should strategically align these benefits with their business to craft a cohesive sustainability story.
- 5. Create business opportunities:** By acquiring expertise in a growing market, companies can capitalize on the knowledge and relationships it builds to unlock new business opportunities. Many buyer organizations have established new revenue channels through their market leadership. An example is Shopify, which established a platform that enables its merchants to offer carbon-neutral shipping through carbon-removal purchases.²⁰



Why Canada stands out for carbon removal

From a buyer's perspective, sourcing carbon removal credits in Canada can offer more than emissions reductions. It can support domestic innovation, strengthen local supply chains and contribute to economic activity in regions where a business operates. These co-benefits are becoming increasingly relevant as stakeholders scrutinize where and how carbon credit investments are made.

Canada combines strong natural advantages with a supportive policy environment, making it an increasingly attractive location for CDR development and fostering an ecosystem that has drawn foreign CDR developers to establish operations here.

Extensive CO₂ storage capacity: Canada has the potential to store **626.2 gigatonnes (Gt)** of CO₂ in deep saline aquifers and depleted oil & gas reservoirs²¹

Unique coastal and offshore potential: Over **240,000 km** of sea-bordered shoreline²², the world's longest coastline is a significant asset for marine CDR.

Geological CO₂ storage potential across Canada (Gt)

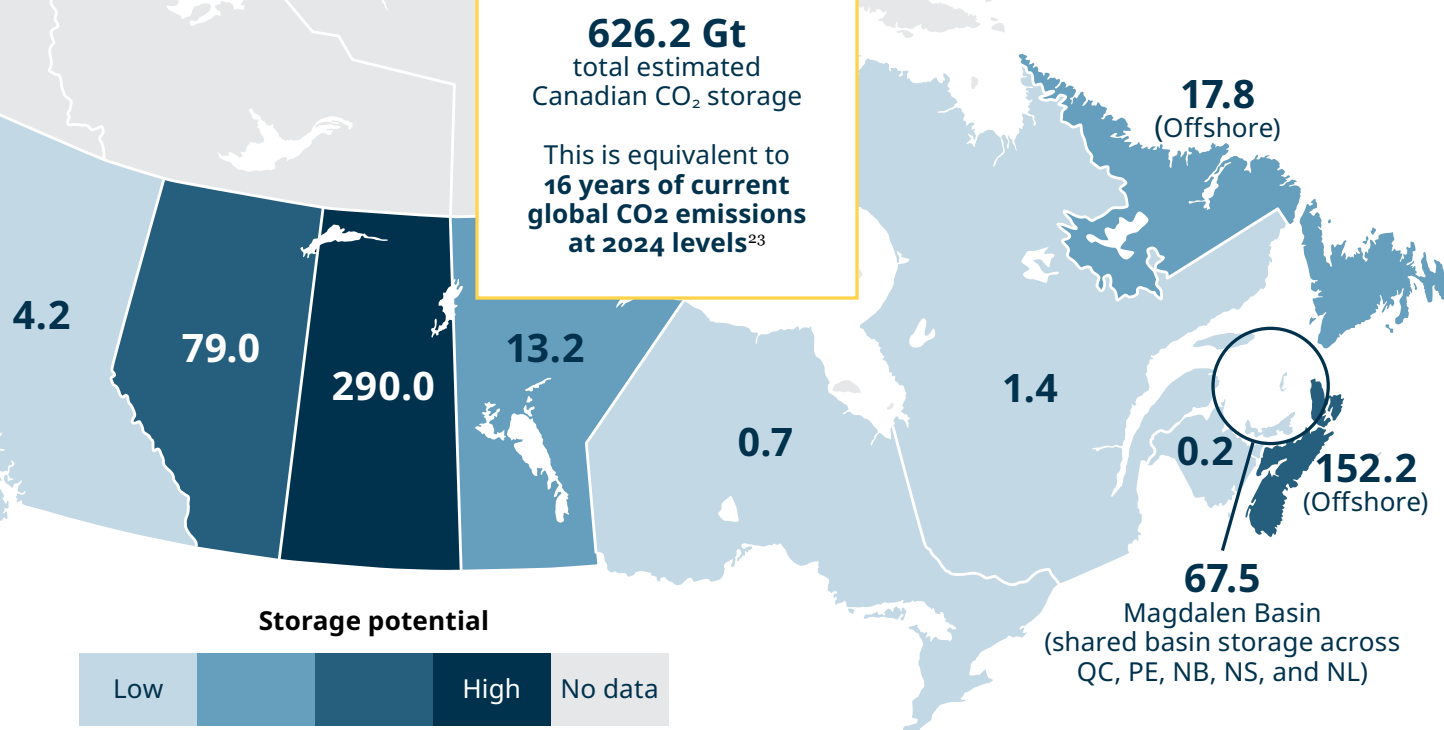


Figure 4. Geological carbon storage potential in saline aquifers in Canada

Favourable policy landscape

Investment in CDR requires long-term certainty, and Canada has taken meaningful steps to provide it. For instance, the Carbon Capture, Utilization, and Storage Investment Tax Credit offers a **60%** rebate on capital expenditures for direct air capture incurred between **2022** and **2030**²⁴, improving the economics for project developers and, by extension, buyers of carbon removal credits.

At the provincial level, Alberta, Saskatchewan, and more recently Ontario and Quebec have introduced dedicated regulations that enable commercial-scale geologic storage. This clear regulatory architecture provides predictable oversight requirements and can reduce regulatory uncertainty compared with jurisdictions where CO₂ storage laws are still emerging or ambiguous. This translates into lower regulatory and delivery risks for buyers.



Take a look at the [*Patchy but Promising*](#) report, where the CDR Centre examined the current inclusion of CDR in the Canadian compliance market in detail.



Promising innovation hubs

Canada has established an innovation network, with CDR research and development happening at multiple levels. Large-scale academic research projects such as CanCO₂re, led by the University of Calgary, and the Ocean Frontier Institute, led by Dalhousie University, are advancing knowledge across a wide range of topics within CDR.

Corporations like Deep Sky, the world's first technology-agnostic project developer of direct air capture projects, are attracting global attention. They are currently testing multiple direct air capture technologies before deploying them at scale, offering diversified exposure to next-generation removal pathways.

Across Canada, CDR developers are pursuing projects in various forms, including direct air capture, enhanced rock weathering, biochar, and more. For corporations interested in CDR in Canada, this offers a diverse range of methods to choose from, an expanding ecosystem of developers that reduces reliance on a single project for credits, and an opportunity to partner with an emerging and critical industry early in its development.

Supportive ecosystem for potential buyers

One of the most practical advantages Canada offers is a structured support ecosystem for corporate buyers at any level of experience. Whether a company is new to the carbon removal market or ready to make a purchase, support is available to guide businesses at every stage of their journey.



For newcomers and explorers: The [Pembina Institute's CDR Centre](#) offers educational resources to help curious, forward-thinking leaders learn more about carbon removal in Canada. You'll be able to find resources, insights and guidance to help navigate this emerging market.

Mission from MaRS

For first-time buyers: MaRS Discovery District offers a [Carbon Credit Purchasing Program](#) to organizations interested in making their first carbon removal credit purchase. The program breaks down the process of procuring carbon removal credits and guides businesses through their first purchase.

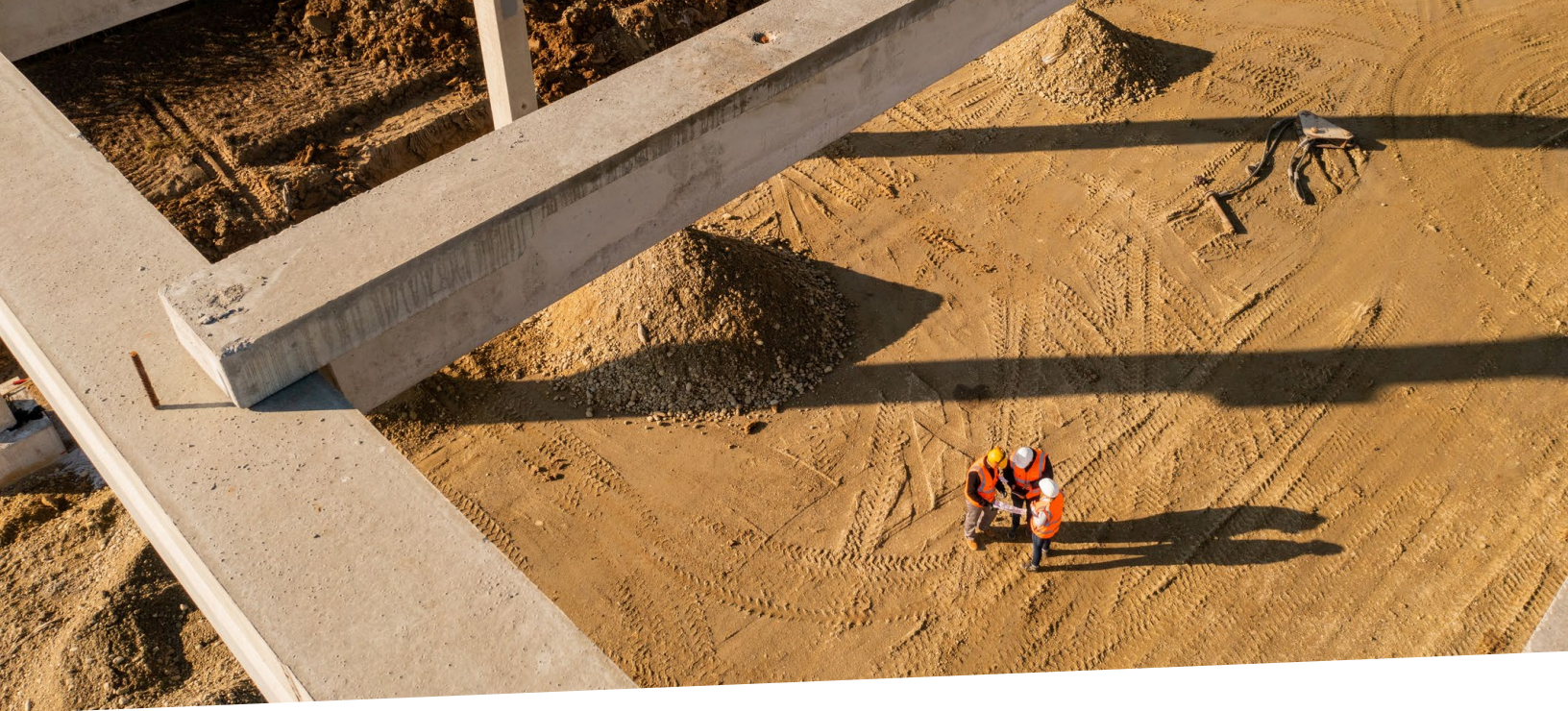


For experienced and large buyers: Experienced buyers or corporations ready to make larger purchases can pool expertise and resources by joining the [Advance Carbon Removal Coalition](#), a buyers coalition focused on mobilizing \$100 million in the Canadian CDR industry.



Buyer spotlight – Shopify

Shopify is a pioneer in corporate procurement of carbon removal, having made its first purchase back in **2020**. They have created resources for new buyers to help share some of the lessons they've learned along the way. They include a [carbon removal playbook](#) and a [buying guide](#). Additionally, in **2022**, they co-founded Frontier, an advance market commitment that pools participant funds to execute CDR purchases, aiming to accelerate CDR deployment by sending a strong demand signal.



Remove with confidence

Assessing readiness and mapping your next steps

Readiness in a new industry is often discussed as a technological or regulatory issue; for corporations pursuing a new sustainability path, readiness is as much an organizational feature. Securing internal alignment at each stage of the CDR journey is key to ensuring an organization is ready to procure. Undertaking a readiness assessment can allow sustainability teams to understand their realistic starting point and provides an honest baseline to build on. The good news for corporations ready to move forward: the roadmap to procurement is phased and achievable, and most organizations are further along than they assume.

— KEY INSIGHTS —

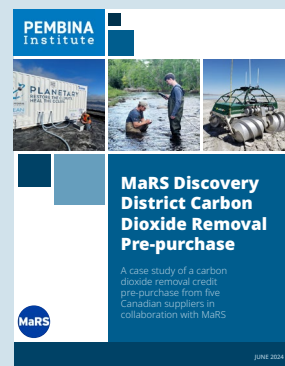
- Internal alignment across sustainability, legal, finance, and communications is not a formality. It separates credible procurement from reputational exposure.
- The risks in CDR are real and manageable. Understanding these risks will be the difference between credible strategies and early mistakes.
- Most organizations are closer to CDR-ready than they think.

Building internal alignment

Engaging with CDR and eventually procuring credits requires a shared understanding across the organization on several fronts beyond the strategic rationale.

Planning and executing a successful CDR procurement sits at the intersection of the legal, finance, procurement, and sustainability departments and quickly exposes gaps in risk definitions. Each department has different priorities around cost, risk, credibility and reputation. Building alignment across these is one of the foundational steps a company can take before entering the market. While often led by sustainability teams, securing buy-in across the organization requires understanding the key concerns of different departments. Building buy-in early in the process can help provide the organizational backing required as departments navigate a new space.

The key to building alignment in a new space is shared language and education. If governance decisions are made before sufficient internal education, there is a risk of overestimating cost and underestimating key risks. Building a shared understanding and internal vocabulary around CDR is an easy first step toward aligning departments and reducing friction later in the procurement process.



Case study: MaRS Discovery District pre-purchase program

In **2024**, the Pembina Institute's CDR Centre, in collaboration with MaRS Discovery District, produced a [case study](#) reviewing the first CDR credit purchase by a small group of first-time buyers through MaRS' pre-purchase program. It was the first deal with all Canadian suppliers. The process showed that internal alignment is a key to success when purchasing CDR credits.

First-time CDR buyers must justify an upfront, multi-year pre-purchase to back-office teams unfamiliar with carbon removal. Success for these teams hinged on a narrative tied to the company's core mandate and a senior champion who could carry the story across the organization.

Addressing common misconceptions about CDR within corporate sustainability

MYTH: CDR replaces emissions reduction

Reality: CDR and emissions reduction are complementary. **Both are necessary** to reach corporate claims of net-zero; that is, that the company's operations are not adding extra greenhouse gases to the atmosphere.

What it may lead to: Dismissal of CDR entirely and an incomplete climate strategy.

The business risk: Gaps in net-zero pathways. Targets may be seen as non-credible, and companies may be accused of greenwashing.

MYTH: It's too early to act on carbon removal

Reality: CDR is early enough that corporate buyers still have leverage to shape outcomes, pricing and standards. Those advantages disappear once the market is mature. Waiting forfeits influence.

What it may lead to: Organizations default to "wait and see," delaying engagement with the CDR market and development of internal capacity required for procurement.

The business risk: Exposure to future supply shortages, higher prices due to late entry into a competitive market and rushed procurement under net-zero deadline policies, plus loss of influence over quality standards.

MYTH: All durable CDR credits are too expensive

Reality: Costs vary widely across high-durability removal methods.

What it may lead to: Delayed engagement with high-durability and high-quality CDR solutions while over-relying on lower-cost but less durable solutions such as those offered by traditional offsets.

The business risk: Failure to meet net-zero targets and increased exposure to greenwashing claims.



Understanding and managing CDR risks

CDR is an emerging market with standard risks, including credit delivery failures or delays, policy evolution, and price volatility (Table 3). Understanding these risks and how they intersect across departments is key to securing buy-in and building a credible CDR strategy.

In **2025**, prospective buyers of CDR in Canada identified perceived risks in delivery, reversal, reputation and local impacts as the largest barrier to purchasing removal credits after high pricing. See more details in the 2025 scan of carbon dioxide removal buyers, *Growing Curiosity*.

Table 4. Potential risks of CDR and risk mitigation

Risk	Potential Impacts	Mitigation / Considerations
Non-delivery of removals	Projects fail to deliver contracted credits.	Structure payments by milestones and consider “pay-on-delivery” models Negotiate flexible contracts with penalties/incentives Build multi-supplier portfolios for reallocation of volumes
Reversal of CO₂	Carbon is re-released to the atmosphere	Favor long-term storage methods with verified permanence Require reversal insurance/buffers Constrained by land availability.
Weak MRV	Uncertainty in accurately measuring tonnes removed or verifying long-term permanence/storage	Demand transparency and maintain constant engagement with developers Consider independent MRV audits using standardized benchmarks
Changing policies	Regulatory changes that deem the carbon credit invalid	Buy credits certified under globally recognized standards Negotiate policy warranties Monitor evolving standards
Technology uncertainty	Technologies at different stages of commercial maturity facing technological challenges.	Diversify across technology readiness level even within the same CDR method
Price uncertainty	Volatility of carbon credit price	Secure long-term offtake agreements Diversify across different technologies within CDR and across methods Monitor cost curves

It is important to note that this is an illustrative snapshot of known risks. Exposure will evolve as organizations move through the procurement journey. Organizations that maintain a close relationship with suppliers and the broader CDR ecosystem will be better equipped to anticipate and respond to risks as they emerge.

Assessing organizational readiness for CDR

With an understanding of how carbon removal can fit into a sustainability strategy, corporations can begin to assess their readiness for developing a path to procurement. This checklist provides an initial assessment of readiness and capabilities required for firms to meaningfully engage with durable carbon removal today.

CDR Readiness Checklist

Internal carbon accounting

- ☐ Establish your emissions baseline through internal carbon accounting
- ☐ Estimate your residual emissions at net-zero, meaning those you cannot abate

Commitments and progress

- ☐ Make a net-zero commitment with clear short- and long-term targets
- ☐ Reduce emissions actively and track measurable progress

Market experience

- ☐ Purchase other types of carbon credits, whether avoidance or reduction
- ☐ Align procurement with standard frameworks such as the SBTi

Comfort with uncertainty

- ☐ Run early pilots or make small advance purchases
- ☐ Accept a degree of uncertainty in an emerging market





Next steps

The window for corporations to act early and secure advantages is rapidly closing. Due to the increasing reputational risk from avoidance and reduction credits, and project supply constraints in the CDR market, the cost of waiting is not zero. Already, corporations across the economy are exploring early CDR procurement and building institutional capacity for future larger purchases. By taking a phased approach and starting with small purchases, early movers are gaining experience across CDR methods and breaking down the integration of this new lever into manageable steps. These firms offer an important early lesson for new buyers: the first tonne is not the last, and small initial purchases are the foundation of strong strategies.

For organizations that determine CDR should be integrated into their sustainability strategies, this primer is just the beginning of the procurement path. Canadian firms have significant advantages over competitors in other jurisdictions. With a supportive and well-developed CDR ecosystem, corporations can access education and support at all stages of the procurement journey.

The Pembina Institute's CDR Centre will continue to provide additional resources for organizations on this journey, including the business case for CDR, guidance on navigating risks, and opportunities that offer strategic advantage to those engaging with this growing market.

If you are interested in learning more about carbon dioxide removal, visit pembina.org/CDR

References

- 1 Intergovernmental Panel on Climate Change, Climate Change 2023: Synthesis Report (2023), 25. https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf
- 2 Global Carbon Project, “Global Carbon Budget 2025: FAQs.” <https://globalcarbonbudget.org/gcb-2025/the-global-carbon-budget-faqs-2025/>
- 3 Science Based Targets initiative, SBTi Glossary. <https://files.sciencebasedtargets.org/production/files/SBTi-Glossary.pdf>
- 4 Environment and Climate Change Canada, “Great Bear Rainforest: a blueprint for success.” <https://www.canada.ca/en/environment-climate-change/services/nature-legacy/campfire-stories/great-bear-rainforest.html>
- 5 Carbon Direct, State of the Voluntary Carbon Market (2026), 14. <https://insights.carbon-direct.com/hubfs/gated-assets/2026%20State%20of%20the%20Voluntary%20Carbon%20Market%20%7C%20Carbon%20Direct%2c%20February%202026.pdf>
- 6 Sylvera, “Carbon Offset Pricing Trends: What Buyers Should Budget for in 2026,” January 30, 2026. <https://www.sylvera.com/blog/carbon-offset-price>
- 7 Morgan R. Edwards, et al., The State of Carbon Dioxide Removal, 3rd Edition (2026), 101. <https://www.stateofcdr.org/report/3rd-edition>
- 8 Supercritical, “Why a Carbon Removal Credit Costs What It Costs,” Critically Speaking, March 10, 2026. <https://thecarbonlowdown.substack.com/p/why-a-carbon-removal-credit-costs>
- 9 G. Trencher et al., “Demand for Low-Quality Offsets by Major Companies Undermines Climate Integrity of the Voluntary Carbon Market,” Nature Communications 15, no. 6863 (2024). <https://doi.org/10.1038/s41467-024-51151-w>
- 10 Tom Swinfield et al., “Learning lessons from over-crediting to ensure additionality in forest carbon credits,” Nature Communications, 17, 3944 (2026). <https://doi.org/10.1038/s41467-026-71552-3>
Nophea Sasaki, “Addressing scandals and greenwashing in carbon offset markets: A framework for reform,” Global Transitions 7 (2025) <https://www.sciencedirect.com/science/article/pii/S258979182500026X>
- 11 Intergovernmental Panel on Climate Change, Technical Summary (2022), 69. https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_TechnicalSummary.pdf#page=69
- 12 Intergovernmental Panel on Climate Change, IPCC Expert Meeting on Carbon Dioxide Removal Technologies and Carbon Capture, Utilization and Storage (2024). https://www.ipcc.ch/site/assets/uploads/2025/01/2407_CDR_CCUS_Report.pdf
- 13 The Corporate Governance Institute, “ESG: A comprehensive guide to the main principles.” <https://www.thecorporategovernanceinstitute.com/insights/guides/esg-a-comprehensive-guide-to-environmental-social-and-governance-principles/>
- 14 Voluntary Carbon Markets Integrity Initiative (VCMI), “Steps to Making a Carbon Integrity Claim.” <https://vcmintegrity.org/guides-tutorials/steps-to-making-a-carbon-integrity-claim-2/>
- 15 Boston Consulting Group, The Time for Carbon Removal Has Come (2023). <https://web-assets.bcg.com/67/f7/of41cd074a66b49cdb8baf5e59co/bcg-the-time-for-carbon-removal-has-come-sep-2023-r.pdf>
- 16 Luisa Corredor and Margret Nellissery, Growing Curiosity: A scan of carbon dioxide removal buyers (Pembina Institute, 2025). <https://www.pembina.org/pub/growing-curiosity>
- 17 Carbon Gap, “Carbon Gap to Facilitate SBTi Workshops on the Role of CDR in Companies’ Net Zero Transitions,” September 16, 2024. <https://carbongap.org/23-september-8-october-sbti-workshops/>
- 18 CBC Radio, “Delta Air Lines Hit with Class Action Lawsuit over Carbon Neutral Claims,” As It Happens, June 1, 2023. <https://www.cbc.ca/radio/asithappens/delta-carbon-neutral-lawsuit-1.6862447>
- 19 Rhodium Group, “Direct Air Capture Workforce Development: Opportunities by Occupation,” October 12, 2023. <https://rhg.com/research/direct-air-capture-workforce-development/>
- 20 David Vranicar, “Make Shipping Carbon Neutral with Shopify Planet,” Shopify, January 31, 2024. <https://www.shopify.com/enterprise/blog/carbon-neutral-shipping-planet-app>
- 21 Canadian Discovery Ltd., Geological carbon storage atlas of Eastern Canada (2026). <https://cdl.canadiandiscovery.com/geological-carbon-storage-atlas-of-eastern-canada-downloads>
Clean Prosperity, Evaluation of Carbon Capture Storage Potential in Canada (2024). https://cleanprosperity.ca/wp-content/uploads/2024/04/Evaluation_of_carbon_capture_and_storage_potential_in_Canada.pdf
Geoscience BC, Northeast BC Geological Carbon Capture and Storage Atlas (2023). <https://www.geosciencebc.com/projects/2022-001/>
- 22 Statistics Canada, “Geography, Section 2.1 Statistical Portrait of Canada (Catalogue no. 11-402-X)” <https://www150.statcan.gc.ca/n1/pub/11-402-x/2012000/chap/geo-geo-eng.htm>
- 23 European Commission, Joint Research Centre. “GHG emissions of all world countries: 2025 report,” https://edgar.jrc.ec.europa.eu/report_2025?vis=co2tot#emissions_table
- 24 Canada Revenue Agency, “Carbon Capture, Utilization, and Storage (CCUS) Investment Tax Credit (ITC): Calculating the credit.” <https://www.canada.ca/en/revenue-agency/services/tax/businesses/topics/corporations/business-tax-credits/clean-economy-itc/carbon-capture-itc/claiming-credit-ccus-itc/calculate.html>



PEMBINA
Institute

pembina.org

x.com/pembina bsky.app/profile/pembina.org

facebook.com/pembina.institute linkedin.com/company/pembina-institute

CDR
CENTRE