PEMBINA Institute











A case study of a carbon dioxide removal credit pre-purchase from five Canadian suppliers in collaboration with MaRS



Acknowledgments

The Pembina Institute would like to thank its collaborator, MaRS Discovery District, for sharing their experiences, as well as the teams at Arca, CarbonRun and TerraFixing for their insights.

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.

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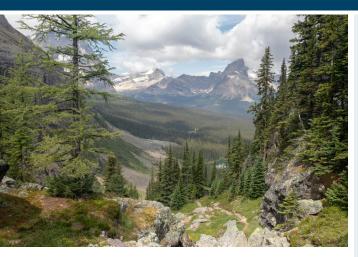
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Executive Summary



With the carbon dioxide removal (CDR) market still in its infancy, initial purchases provide a unique look into the formation of a new industry. Learning from early-stage deals allows both suppliers and buyers the chance to learn about emerging best practices and pitfalls to be avoided.

On April 23, 2024, MaRS announced a pre-purchase of CDR credits from five Canadian CDR developers. It was the first CDR credit deal with all Canadian suppliers, and MaRS is one of the first Canadian charitable organizations to purchase CDR credits.

Because CDR is new to most Canadian businesses and institutions, yet vital to reaching net-zero targets and achieving the Paris Agreement climate target, the Pembina Institute is offering this case study of the pre-purchase as an educational resource. The Pembina Institute is building resources and materials to help more buyers enter the market and support responsible CDR development in Canada.

The key takeaways from the MaRS pre-purchase are:

- 1. **Clarify your story to build internal support:** A strong purpose for buying durable CDR that aligns with the organization's goals will help internal teams connect to the project.
- 2. **Help internal teams navigate uncharted waters:** CDR will be a new area for your organization, and backoffice teams will need support to become comfortable with it.
- 3. **Make use of publicly available resources:**Leveraging popular templates will save both the buyer and supplier time, while ensuring a robust process.
- 4. Shape the purchase to fit your existing organizational systems: An organization's first purchase will require new definitions and processes to be established.
- 5. **Leverage external experts strategically:** Technical experts can help validate the quality and credibility of applications.
- 6. **Allow for discussion and iteration in the process:** Opportunity for back-and-forth feedback will help clarify inevitable miscommunications in the application.
- 7. **Proactively figure out how intermediary services will be handled:** The involvement of third-party verifiers may cause hiccups in some procurement procedures if not handled proactively.
- 8. **Consider different options for managing risks:** Every organization has a different risk framework, but all will want to understand potential options for mitigating common risks.
- 9. **Celebrate your story with your suppliers:** For buyers who choose to, sharing the story of the purchase can help elevate the profile of suppliers as well as the entire CDR market.
- 10. **Maintain regular contact post-agreement:** The agreement is just the start of the partnership between buyers and suppliers. Frequent contact can help ensure a smooth path towards final delivery.



Introduction



Carbon dioxide removal (CDR) is the process of extracting CO2 from the atmosphere and then durably storing it so that it cannot return to the atmosphere. As a complement to direct emissions reductions efforts, CDR is a necessary tool to achieve net-zero and stay within a 1.5 degree warming scenario.

In addition to traditional carbon credits and renewable energy certificates, organizations are now able to purchase CDR credits that can be used to count towards the organization's greenhouse gas (GHG) emissions inventory.

The Pembina Institute aims to provide educational tools and resources for prospective buyers to enable them to participate in the market.

MaRS Discovery District (MaRS) is North

America's largest urban innovation hub and a registered charity based in Toronto that helps Canadian startups succeed so they can solve our toughest problems in such areas as climate, health and the economy.

Mission from MaRS is an ambitious technology adoption program addressing the climate crisis. Through Mission from MaRS: Carbon Management, MaRS is supporting the growth and commercialization of several Canadian CDR suppliers.

Recently, MaRS announced the purchase of CDR credits from five Canadian developers, including several from the Mission from MaRS: Carbon Management program. This case study delves into some of their learnings as a first-time buyer, as well as insights from some of the suppliers.

Table 1: Deal snapshot

Size of deal	84 tonnes (\$60,000)	
Structure	Pre-purchase (payment up-front)	
Delivery Timeline	Within three years	
Suppliers	 Arca (mineralization) CarbonRun (river alkalinity enhancement) Gaia Refinery (bioenergy and direct air capture) Planetary (ocean alkalinity enhancement) TerraFixing (direct air capture) 	
Highlights	MaRS is one of the first Canadian charitable organizations to purchase CDR credits.	

Mission from MaRS: astronomical ambition



The climate team at MaRS views CDR as a critical complement to emissions reductions and mitigation efforts in the fight against climate change. Recent extreme weather events have highlighted the urgency for action and the need to rapidly develop all available solutions such as CDR.

The team sees an opportunity for Canada to be a global CDR leader, which would bring significant economic development and innovation. However, a lack of demand – particularly in Canada – could stunt the growth of the industry, and push developers to look elsewhere to establish operations.

To address the lack of Canadian demand and highlight the offerings of the ventures within the Mission from MaRS program, the team engaged in a first of a kind procurement.

Through this procurement of CDR, MaRS' goal was to kickstart the Canadian CDR market by jumping in as a buyer, augmenting their existing efforts as an ecosystem supporter. It is the first time MaRS has made a procurement of this kind, signalling to other organizations the importance of CDR amongst climate solutions.

MaRS plans to retire the CDR credits upon delivery to counterbalance future operational emissions.



Keys to success at each stage



Understanding the timeline associated with any procurement is essential to planning progress towards sustainability targets. In this case, it took nearly a year to take the deal from initial idea to public announcement. The

following sections highlight the key learnings that MaRS uncovered in their purchase that will be useful for first-time buyers to consider before embarking on their own journey.











Establishing internal commitment

Before anything else can happen, internal teams need to first agree to purchase CDR credits, as well as agree upon the size of the purchase. To achieve consensus, the team at MaRS had to make the case internally that CDR is a critical climate solution, and that MaRS could make a large impact on the industry through a prepurchase. Getting internal teams to align took patience and effort. Not only was this the first time MaRS had purchased CDR credits, but it was also the first time they had purchased carbon credits of any kind.

For MaRS, funds for the pre-purchase came from their

existing Misson from MaRS: Carbon Management program, made available through cost savings measures and operational efficiency improvements. The team had to justify that a pre-purchase was the best use of these proceeds and explain the higher cost that CDR credits typically have compared to other carbon credits. A clear objective for the purchase and an understanding of the organization's larger sustainability strategy will help buyers navigate decisions around the size of the deal and whether it is defined by the amount of tonnes removed versus dollars spent.





Clarify your story to build internal support

There are many reasons to pre-purchase CDR, including: to accelerate the market, to establish expertise in the space, or to secure future supply for use in emissions accounting. While your purchase might aim to achieve all of the above, having a priority goal that aligns with your organization's larger strategy will help internal teams make sense of the purchase.

The primary goal of MaRS was to support their ventures by becoming an early reference customer and signalling demand, thereby addressing a key gap in the CDR market. They would be one of the first Canadian charities to make a CDR credit purchase, and the purchase would further strengthen the organization's brand as an innovative climate-tech leader.

The story and goal align with their organization-wide mandate to support startups and accelerate the adoption of high-impact solutions. This provided a connection point for internal teams and helped them get onboard.

How and who shares the story matters as well. For MaRS, a key to successfully spreading the narrative internally was having a senior leader champion who understood the procurement well and could effectively tell the story throughout the organization.

Help internal teams navigate uncharted waters

Back-office and management teams like senior leadership, procurement, finance and legal are not steeped in climate knowledge and therefore do not have exposure to CDR, let alone the concept of pre-purchasing CDR credits. The Mission from MaRS: Carbon Management team had to start with the basics to build a shared understanding around the importance of the technologies and the potential for impact.

First-time CDR buyers with existing experience buying other carbon credits have the added challenge of justifying the price difference between durable CDR credits and other available credit options that internal stakeholders may have had prior experience buying.

Although the pre-purchase by MaRS featured a variety of technologies, using direct air capture to explain the concept of CDR was found to garner the most understanding. The team found that the technology provided a model for CDR that was most easy to grasp for newcomers to the field.

Once there was an understanding of CDR, the team had to communicate why it was important for MaRS to make a prepurchase rather than use the proceeds for core functions that the organization typically performs, like working with ventures, planning and executing events, and developing knowledge dissemination materials.

Risk was a primary concern, especially given the structure of the transaction: the payment was happening up front, and the goods — in this case, the CDR credits — would not be delivered for years.



ADVICE FROM SUPPLIERS

Identify your key aim and design your purchase around it

From the beginning, the buyer should consider the specific story they want to tell with their purchase, or the impact they want to have on the market. The team at CarbonRun stressed this as a critical first step as it informs how the purchase is structured. For instance, certain project co-benefits — like mine tailings clean up, ocean restoration, or improved agriculture production — might be key for the buyer, in which case they may want to focus on a subset of project types.

With the wide variety of CDR opportunities and unique co-benefits for each technology, buyers can align their CDR purchases with their specific industry. When assessing CDR opportunities, buyers should carefully consider secondary benefits and how they fit into their sustainability journey and goals.

If a buyer seeks to impact the market in a certain way, there are ways to drive towards specific outcomes with the purchase process. Microsoft is **developing stronger additionality criteria** into their process, to ensure that purchases are leading to new CDR capacity that otherwise would not have been built. And Frontier, in their aim to accelerate the advancement towards scalable supply, **requires** projects to have a path to achieving a cost under \$100/tonne.



The team found success in framing the pre-purchase as a small pilot test that could generate learnings for MaRS and precede potential future larger transactions. This also helped justify the structure of the deal as a pre-purchase rather than an offtake agreement, in which the payment would be made upon the delivery of credits.

Because of the newness of the type of deal, navigating legal steps took much longer than other types of procurement. First-time buyers will want to start early with their legal teams, in anticipation of a lengthy process to learn what the transaction is, build the contract and ensure it fits within the organization's risk framework. Delivery risk, or the risk that the agreed-

upon volume of credits will not be delivered within the contracted timeframe, was the primary concern within the MaRS organization, and will likely be the key concern for many buyers.

The climate programs at MaRS are funded largely by philanthropic donors, and so diligence was required to ensure the purchase program supported the intended scope of the funds. The team found it beneficial to connect with their funders early in the process to ensure they were aware and aligned with the purchase concept.

Designing the purchase

With internal support secured for the purchase, the team could now go about designing what the process would look like. While it may seem daunting to establish a new purchase process, MaRS leveraged key resources that greatly expedited the development. They found a way to strike a balance between having a thorough process with an efficient one that is not too onerous for suppliers.

Make use of publicly available resources

buyer organizations have made templates and resources freely available to prospective buyers, in efforts to help grow the market.

MaRS leveraged guides and templates to help shape both the process of the purchase as well as the the instruments. Shopify's Buying Carbon Removal, Explained guide helped with the design of the vetting process, and Carbonfuture's Buyer's Guide to Carbon Dioxide Removal Policy helped develop technical criteria around net negativity, storage durability and cost.

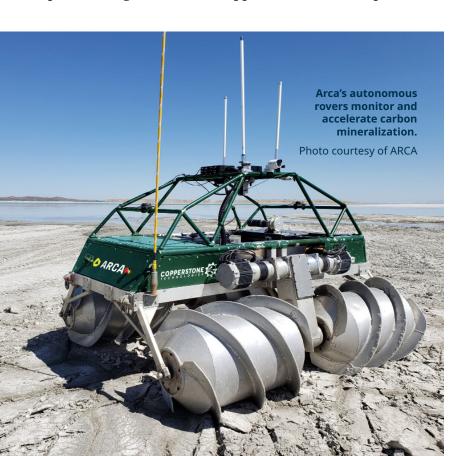
Perhaps the resources most useful for MaRS were the purchase agreement and application form templates

There is no need to re-invent the wheel. Leading from Frontier, a leading group of CDR buyers. Using these templates as a starting point helped reduce the effort required to build the process and significantly shortened the preparation time. Modelling their application form and purchase agreements off these resources also reduced the risk for the MaRS team, by ensuring key considerations were not missed and the process was robust.

> Not only did these resources help MaRS, but by reusing application questions asked by Frontier, they helped reduce the administrative burden of applying for the suppliers. Some suppliers had already applied for purchases from Frontier and could repurpose their

> > applications for the MaRS procurement. For those who had not, the MaRS purchase will help make future applications to Frontier quicker.

> > The template agreements also helped convey the concept of the CDR purchase to the legal team, as it described the transaction in a way that spoke to them. Seeing details like delivery schedules and interim milestones helped them understand how the transaction would be carried out, and seeing the pricing structure as a dollar amount per metric tonne gave clarity on how the funds would be applied. The legal team from MaRS was able to get a head start on drafting the agreement by starting with the Frontier template agreement combined with the standard MaRS procurement agreement.





ADVICE FROM SUPPLIERS

Borrow from market leaders - it helps the suppliers, too

The team at Arca noted that by leveraging supports from market leaders, it is possible to have a process that is both robust and efficient.

Frontier — the leading cohort of buyers — has provided templates and agreements publicly for anyone to use and learn from. MaRS found these tools invaluable as a starting point for their own application form.

And while using these templates saved MaRS a lot of time in creating their own form from scratch, the suppliers also appreciated it. Wherever possible, MaRS kept the questions the same so that the suppliers who also applied for Frontier — or plan to in the future — could re-use their responses. This saved some of the suppliers a lot of time in the application process, which is valuable considering many of them are small organizations with limited resources.

The materials published by Frontier are under a Creative Commons licence. meaning the text can be used and taken directly.



Shape the purchase to fit your existing organizational systems

For any new activity, organizations need to figure out how to build it into their existing systems and processes. CDR credits are no different.

Like many organizations, MaRS' procurement policies are strict and only allow non-competitive procurement in certain circumstances. The team had to justify that this pre-purchase was best conducted as a closed invitation application. This requirement was satisfied because the market is small, with only a few active Canadian venture suppliers, and the pre-purchase was intended as a smallscale pilot. Future purchases in the program will be structured as open calls for bids.

Legal teams may also grapple with how to sufficiently mitigate risk in the transaction. It was rare for MaRS to have a procurement where payment was up front for a delivery years later. This time delay introduced complexity for the team in devising deal characteristics to protect against delivery risk, as it was a departure from typical procurement structures. The team was able to introduce risk mitigation clauses in the purchase agreement, which are detailed in a later section.

The accounting team at MaRS grappled with how to represent the purchase in the books, considering the expense would be incurred in the current year but the full value would not be received for three years. They also had questions around the business purpose of the CDR credits, which would define how the credits are counted and categorized. For example, credits for advertising or promotional functions are accounted for differently than credits purchased with the intention of reselling. For MaRS, the issue was resolved because the purchases could be categorized under their Mission from MaRS Liftoff Program, which has a stated goal of supporting ventures and growing the market. The purchase will be carried over across subsequent years as a liability within the program until full delivery.

Evaluating submissions

Canadian suppliers were invited by MaRS and provided three weeks to apply. In order to assess the strength of the applications received, MaRS conducted a three-step evaluation process:

Internal screening

requirements, performed

Expert reviews

Evaluating applications based on scientific, corporate and governance criteria, performed by external reviewers

Supplier interviews

Discussion with suppliers to clarify aspects of applications, performed by the MaRS team

Leverage external experts strategically

necessary, MaRS organized the evaluation process in a way that allowed them to do as much as possible internally. Criteria like checking if a third party had reviewed a supplier's claims, or if a third party had reviewed the credit development methodology, were all evaluated by the MaRS team.

Criteria that required more nuanced analysis and technical expertise were handled by external reviewers. Particularly, scrutinizing supplier's life cycle assessments and measurements, reporting and verification procedures requires expertise in the specific CDR pathway. This due diligence is important to ensure the quality and credibility of a project.

To leverage external support only where External experts were relatively accessible for MaRS, given their existing network and role in the ecosystem. However, this will likely be a gap for many buyer organizations that are new to CDR and are independently conducting procurement. This is an area that ecosystem supporters can help address by facilitating connections to technology experts.

> with Even external experts, having internal foundational knowledge of CDR pathways is necessary. This can help the buyer ask the right questions and properly interpret information provided by external experts and intermediaries engaged in the transaction.

Allow for discussion and iteration in the process

CDR is new, and norms around purchases are still being set. For any given transaction, it is likely that some of the suppliers submitting a bid are doing so for the first time. Building discussion and opportunity for feedback in the process avoids situations where application questions are misinterpreted, or requirements misunderstood.

MaRS included an interview step in their purchasing process after the application review. This provided not only an opportunity to negotiate the offer price and purchase volume, but also a chance for explanations, clarifications and subsequent modifications to the applications. The face-to-face dialogue allowed for greater connections and stronger partnerships between MaRS and the suppliers.



ADVICE FROM SUPPLIERS

Relationships are key

The team at TerraFixing reflected on the importance of establishing relationships between buyers and suppliers. It's important to remember that these purchases are more than just transactions, but rather, long-term partnerships. In most cases, suppliers will be delivering CDR credits to buyers years after the agreement, and buyers will be

associated with the specific CDR project for a long time. As well, all parties want to collaborate to help mature the CDR market.

Building trust and making a connection will lead to a much more effective partnership. Where possible, buyers should integrate relationship-building into their process.

Potential discussion topics

Including an opportunity for dialogue in the purchase process can help buyers and suppliers clarify areas of the application that need more information, as well as uncover opportunities for increasing value on both ends.

Here are a few potential discussion topics that can be worth exploring in an interview:

What factors influence the pricing? If the delivery schedule changed, or certain assumptions were adjusted to account for uncertainty, would there be pricing impacts?

Why were the measurement, reporting and verification methods listed in the application chosen? Are there any resulting considerations that the buyer should be aware of?

How do you plan to continue to work together with the local community near your project? How do you envision buyers playing a role?

Are there other important considerations to further advance the full value of your project? For example, are there ways to progress the Truth and Reconciliation Commission of Canada's Calls to Action through this project and this potential transaction?

Contracting an agreement

Getting to a signed contract can take a long time. MaRS found success in providing as much info to their legal team as early as possible, to allow for more time steering around unexpected issues.

Proactively figure out how to use intermediary services

First-time buyers may be surprised to find out that they might need to purchase more than just the CDR credits. The MaRS team realized during the process that they had to separately purchase the services of the third-party credit certifier involved in the transaction. This meant going through a separate procurement process again from the beginning — a potentially arduous process in many organizations. The third-party certifier had to be coordinated separately

from the supplier to maintain independence and needed to be arranged at the time of the pre-purchase. If credit insurance was purchased, this too would also have to go through its own procurement process. As early as possible, first-time buyers should determine all the services involved in the purchase and work with their procurement team to ensure costs and administrative requirements of these separate components do not delay the deal.

The team from TerraFixing, from left to right: Tim Wilson (co-founder, PEng), Emma Brakwah (MASc), Dr. Sean Wilson (PhD, founder, CEO), Dr. Vida Gabriel (PhD, founder, COO), Dr. Reza Lotfalian (PhD), and, on the laptop screen, Erik Johannes (PEng).

Photo courtesy of TerraFixing





Consider different options for managing risks

The MaRS team considered three broad categories of risk in the transaction:

Delivery risk

The chance of not receiving the credits purchased as intended in the schedule

Pricing risk

The chance of not paying fair value for the credits purchased

Durability risk

The chance that the removed carbon returns to the atmosphere after the credits are purchased

Pricing and durability risks were considered to be adequately covered by the application evaluation process. The legal team was most concerned with delivery risk, but the parties were able to satisfactorily mitigate the risk for MaRS through the inclusion of certain contract clauses.

Several tools for consideration include:

Adjusting the payment schedule to balance buyer risk and supplier capital requirements.

A refund clause, in which suppliers would have to return funds paid in some events where credits were not delivered.

Time buffers for delivery deadlines, to account for project delays that may arise.

Credit insurance, which can be purchased through a third-party insurance provider and supply similar credits in the event of non-delivery.

Other types of risks, including reputational or compliance risk, may be more heavily weighted by other organizations and would require other tools to mitigate.

First-time buyers should work with their suppliers and legal teams to determine what combination of tools work best for their agreement.

Getting to delivery

Getting the agreement signed is a great step, but it's just the beginning of the relationship. For the supplier, now comes the hard part of building the project and removing carbon. For buyers, there is still a role to play in maximizing the impact of the transaction.



Celebrate your story with your suppliers

When asked about the benefits in participating in this transaction, several of the suppliers highlighted the value that the MaRS brand provides as a reference customer. MaRS is a prominent Canadian innovation driver, and their purchase gives credibility to up and coming suppliers.

Additionally, MaRS has media and communications capacity that many of these small suppliers do not. MaRS arranged a purchase announcement webinar on April 23 that featured a spotlight on each developer, as well as the intermediaries involved.

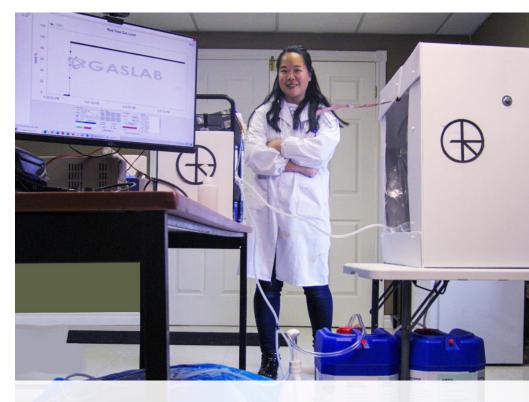
Apart from the value received from the funds used

to purchase the CDR credits, one of the biggest impacts a buyer can have is leveraging their reach to share the story of the transaction. This can elevate the profile of not just the suppliers involved, but also the entire CDR industry. The CDR market is in its early days, and the advanced commitments of cutting-edge buvers can have an outsized impact on accelerating its development. Buyers who choose to do so can demonstrate their sustainability leadership through these impactful purchases.



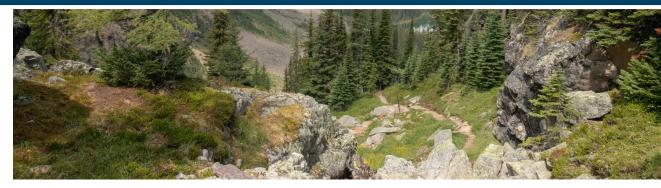
Maintain regular contact post-agreement

A long period of time can pass between signing the agreement to full credit delivery. For MaRS, the delivery schedule sees the last credits being delivered three years after contract signing. To help collaborate on roadblocks and keep project development on track, regular touchpoints between the buyer and supplier can be useful. Regular contact continues to foster a relationship too, which is a key aspect of the partnership as discussed earlier. Schedules for post-agreement meetings and reporting should be written into the contract for full clarity. MaRS plans to have quarterly updates with the suppliers in this transaction.





Closing



While the first CDR purchase can be daunting for buyers, insights from experienced buyers can help others streamline the learning and avoid key mistakes. The unique CDR credit pre-purchase by MaRS highlighted key learnings for prospective buyers when it comes to building internal support, establishing a robust process and navigating procurement complexities. Not only does this pre-purchase case study provide insights that will ensure a smoother first purchase for buyers, but it also spotlights several Canadian suppliers that are actively building and committed to delivering CDR credits soon. The opportunity is ripe for organizations in Canada to demonstrate climate leadership through CDR credit prepurchases and offtake agreements.

At the time of this writing, the deliveries have not yet occurred for the pre-purchase examined in this case study. Updated learnings at the time of delivery will be shared as they occur. Stay connected at pembina.org as the Pembina Institute continues to provide more resources for organizations curious to learn more about CDR.

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