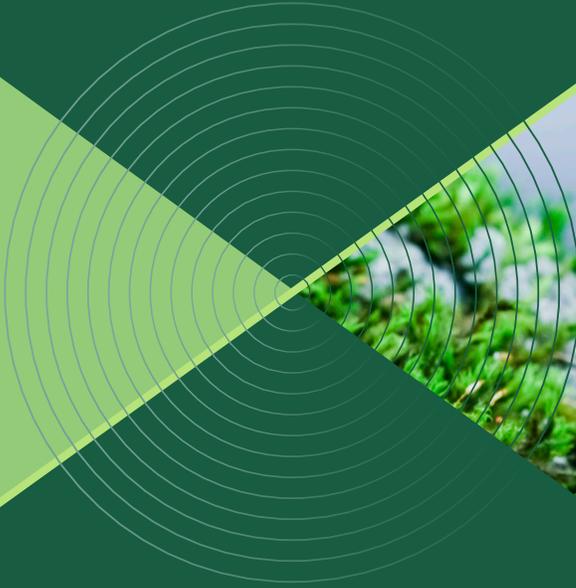


ENERGY FUTURE FORUM
Carbon Management Working Group paper

February 2022



**ACCELERATING GROWTH IN
CARBON MANAGEMENT:**

**POLICY
RECOMMENDATIONS
FOR THE FEDERAL
GOVERNMENT**





The Public Policy Forum works with all levels of government and the public service, the private sector, labour, post-secondary institutions, NGOs and Indigenous groups to improve policy outcomes for Canadians. As a non-partisan, member-based organization, we work from “inclusion to conclusion,” by convening discussions on fundamental policy issues and by identifying new options and paths forward. For more than 30 years, the PPF has broken down barriers among sectors, contributing to meaningful change that builds a better Canada.

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INTRODUCTION

Make no mistake, Canada faces unique challenges and opportunities if it is to achieve its climate change objectives of a 40 to 45 per cent reduction in GHG emissions by 2030 and net zero by 2050, if not sooner. How we do it must meet the test of our national interest: reaching a net-zero future while ensuring a strong economy, national unity and reconciliation with Indigenous people.

Many critical factors are at play. As a northern nation, the dispersion of our population across the massive expanse of our geography, the critical importance of transportation to our economy and society, coupled with significant regionally based economic interests, all shape the definition of Canada's national interest.

At the centre of the net zero conversation is how we reconcile our undeniable climate needs with a strong and growing economy. Doing so means helping existing industry transition to a low carbon economy, while capitalizing on new opportunities presented by decarbonization.

Five core principles have shaped our policy recommendations. Each reflects the ultimate goal: meeting or exceeding Canada's climate objectives. Working together they ensure we do so in a way that recognizes and respects the needs of a strong national economy and the Canadian values of opportunity, fairness and inclusion.

The guiding principles are:

- Keeping Canada competitive relative to other jurisdictions in the transition to a net zero economy;
- Ensuring responsible use of public dollars in achieving the public good of our climate objectives;
- Making certain private industry is an accountable partner in common cause with government;
- Identifying and justifying the need for public and private investment in early projects; and,
- Respecting the necessity for Indigenous reconciliation, safety and environmental protection.

We believe that a “carbon management” industry could play an indispensable role in helping Canada meet both climate and economic objectives.

Carbon management is any activity that captures carbon, utilizes or stores carbon or helps connect the capture and use of carbon. It includes point-source carbon capture at industrial or manufacturing facilities, as well as carbon dioxide removal technologies such as direct air capture.¹

While carbon capture has promise for the energy industry, we want to be clear that carbon management is a truly national opportunity that extends across sectors and regions of our country. It can be put to use at a wide range of industrial sites and activities in all parts of Canada with the ability to remove significant levels of CO₂ emissions. The carbon dioxide removal component of carbon management can also help offset emissions that are very hard to abate directly (e.g., long-haul aviation) and could play the critical role of helping draw down carbon from the atmosphere. The International Energy Agency’s Executive Director Fatih Birol has said that without carbon capture “our energy and climate goals will become virtually impossible to reach.”

Carbon management cannot be a reason to delay clean energy and other mitigation efforts. Rather, carbon management projects must fit within a comprehensive strategy to reach net zero, with low- and zero-carbon energy leading the transition to a future where non-emitting energy becomes the foundation for the Canadian economy. Carbon management

should be pursued in tandem with an ambitious effort to mitigate emissions through other tools such as renewable energy, energy efficiency, a measured reduction in fossil fuels and more. We will need all the tools at our disposal.

Carbon management is a huge economic opportunity – if we choose to seize it. There is a clear pathway to a [\\$1 trillion global market](#) in the coming decades. Canada is well positioned to capture a significant share of that market, but only if we move quickly.

Other countries have seen the opportunity and are moving fast. Whether it's the United States, the United Kingdom, Norway or others, they are speeding ahead with public and private investments that are building an emerging carbon management sector as part of a green energy economy.

Right now, members of the Canadian financial sector say Canada has fallen behind as a destination for investment in the carbon management space and become uncompetitive. Most of the capital is instead going to the United States and the policy supports offered by our southern neighbour are an instructive example for Canada to consider when crafting its own policies.

The United States is offering up to US\$50 per tonne for carbon capture projects, depending on the timing and type of project. Currently, legislation in Congress proposes to increase that amount to between US\$60 and \$180 per tonne depending on project type. These benefits are on top of a carbon credit market under California's low-carbon fuel standard where carbon management proponents are currently able to sell credits for approximately US\$200 per tonne. The United States is also investing more than US\$10 billion in direct air capture "hubs," carbon transport infrastructure, plant demonstration, storage commercialization, utilization program and blue hydrogen². In short, the U.S. government is providing very generous support to attract investment into carbon management projects. Several [other jurisdictions](#), such as the United Kingdom and Australia, are also aggressively pursuing carbon management.³

The time has come for Canada to act. Many stakeholders will have a role to play but industry and government, as well as Indigenous partnerships, will be particularly important. Industry must do its part to address the GHGs stemming from operations and production, including devoting significant capital to decarbonizing their processes. Clearly, the majority of investment required to develop a viable carbon management industry must come from the private sector. But for that to happen, government has to play a critical role in developing policy that creates the conditions for success, including policies that can help attract the

copious amounts of private capital needed for our transition in reaching the public good of a low-carbon economy. [Many new technologies](#) have benefited from significant public policy support to allow them to become more economic and eventually proliferate. Carbon management will be no different.

Canada has the expertise, experience and knowledge to be a leader in carbon management through our head start with capture and store technologies and our long familiarity with large energy projects. As a country, our goal must be to pursue decarbonization in a way that reduces emissions while preserving competitiveness and generating prosperity for Canadians.



Elements of Carbon Management

Carbon management is a broad and growing sector. It encompasses various forms of carbon capture, utilization and sequestration (CCUS), as well as carbon dioxide removal technologies that go beyond direct air capture to also include techniques like enhanced mineralization and ocean-based removal. While this paper contains some recommendations for specific components of carbon management, Canada should be pursuing all components of carbon management aggressively. For example, this document focuses extensively on carbon sequestration, but that does not mean we don't believe carbon utilization also holds great potential. For a fuller description of the carbon management sector in Canada, please refer to our earlier paper "[Capturing a Carbon Opportunity](#)."

POLICY RECOMMENDATIONS

For the carbon management sector to meet its potential as part of Canada reaching its climate goals, significant economic and other support through policy will be required. Over the past year, the Energy Future Forum's Carbon Management Working Group convened its members and external stakeholders through working group sessions and consultations to examine the opportunities for Canada to be a leader in carbon management and to identify policies to enable the carbon management sector to help Canada drive emission reductions and economic growth.⁴

In this report, we focus primarily on the role the federal government can play in accelerating growth in the sector. This should not take away from the fact that provincial and territorial governments also play important roles and, in fact, have clear jurisdiction on certain important issues like geological storage site permitting and liability.

In this section, we lay out some of the key policy areas that need to be addressed to accelerate the growth of carbon management projects in the near term. We divide our recommendations into several themes in order to describe the key areas of focus that governments should prioritize. In some categories, we present multiple policy recommendations, which should be seen as different potential options (though, in most cases, not mutually exclusive). Most of our recommendations apply equally to the two different areas of carbon management – carbon capture, utilization and storage (CCUS) and carbon dioxide removal (CDR), given the direct technology links between the two. Where relevant, we note when a policy is particularly important for one or the other.

We also want to acknowledge that the federal government has taken a significant step forward in the past few months through its development of an investment tax credit (ITC) that will offer a significant incentive to potential carbon management projects. This is an encouraging first step, which is discussed further below. It should be complemented by a range of other policies to incentivize carbon reductions and align to Canada's climate and economic goals across energy and other industrial sectors.

INCREASE REVENUE CERTAINTY

A major barrier to scaling up the carbon management sector is the lack of revenue opportunities available to support these projects.

Without predictable revenues, carbon management projects will struggle to attract capital, preventing carbon capture technology and infrastructure from scaling up at the pace needed for decarbonization.

Credits generated through carbon pricing will eventually help address the revenue gap, especially if carbon prices rise to \$170 per tonne by 2030 as planned. But for CCUS project proponents that future carbon price is not guaranteed as the federal government could choose to scale back the price, eliminate carbon pricing entirely or not fully credit CCUS activities.⁵ For that reason, the private sector cannot include the full value of their future carbon reductions in investment decisions, and financiers are largely unwilling to provide financing based on future revenues because they come with significant policy uncertainty.

Government should address this concern by developing policy to provide near-term carbon abatement revenue and/or greater certainty around future revenue from carbon pricing. Below we present some of the options the government could employ, listed in order of priority. These options are not mutually exclusive, and we believe whatever mechanisms are chosen should be "stackable" (i.e., combinable with other policies and incentives) unless otherwise noted.

- **Guarantee future carbon pricing:** The most straightforward and most cost-efficient way to help address the policy uncertainty around carbon pricing would be for the government to make a financial commitment that increases confidence about future carbon pricing. As [Dale Beugin and Blake Shaffer have suggested](#), this could be

done through an entity like the Canadian Infrastructure Bank (CIB). CIB could offer either a forward contract to guarantee payments that cover any gap between the expected and actual future carbon price, or it could offer upfront financing where repayment amounts were adjusted based on future carbon pricing. Either way, the intervention by the government would act like a form of insurance against changes to the future price trajectory. This approach resembles a “Contract for Difference” (CfD) structure which has been used effectively in a variety of jurisdictions to incentivize clean energy investment including carbon management projects. For example, a CfD style contract was recently signed by the Dutch government to help support a [2 Mt+ carbon capture project](#) at the Port of Rotterdam.

- **Production tax credit (PTC):** A production tax credit would pay carbon capture proponents a fee per tonne of carbon sequestered or utilized. A PTC could be modelled on the successful policy implemented in the United States known as the [45Q tax credit](#) (though it has also been used previously in Canada including for [wind power](#)). The 45Q currently pays up to US\$50 per tonne of carbon sequestered and \$35 per tonne if the carbon is utilized (including for enhanced oil recovery). The U.S. Congress is currently considering a Reconciliation Bill that includes some [significant enhancements to the 45Q](#) including paying up to US\$180 per tonne for saline aquifer sequestration (\$130 for utilization including enhanced oil recovery (EOR) and up to US\$85 for point-source capture (\$60 for utilization including EOR). The enhanced 45Q would also include direct pay, enabling project proponents that cannot monetize a tax credit to generate revenue more easily.

The Canadian federal government is already developing an investment tax credit (ITC), but we believe that a PTC should be considered as a potential complement to an ITC. While an ITC could be a significant help in reducing initial costs, projects still require meaningful revenue if they are to proceed.

Moreover, Canada will need to compete for investment dollars with other jurisdictions like the United States that have a very generous PTC. That PTC is also being applied to all tonnes generated by a carbon management project, whereas the carbon price savings from Canada’s industrial pricing systems only apply to a share of industrial emissions (typically 20 per cent or less), making the Canadian investment environment relatively less attractive.⁶ Clearly, carbon coverage and price increases would work hand in hand with a PTC, with both the “carrot” and the “stick” being required to drive meaningful emissions reductions.



For all the reasons above, we believe a PTC should be seriously considered.

- Clean Fuel Standard (CFS):** Credits generated via the proposed federal Clean Fuel Standard (and similar provincial systems like that in British Columbia) can provide significant revenue opportunities for carbon management projects. In other jurisdictions, such credits have traded for more than [\\$200 per tonne](#) under B.C. provincial and California clean fuel standards. Credits from the [California low-carbon fuel standard is a key part of the business case](#) that underpins the construction of the world's largest direct air capture plant under development in Texas built with Canadian technology.

 - Unfortunately, the latest eligibility rules for the draft federal Canadian clean fuel standard suggest they will only recognize carbon capture and storage (CCS) at liquid fuel and associated hydrogen production facilities. That means carbon captured at other industrial facilities, and/or through processes like direct air capture (DAC) would not be eligible if that carbon ends up being sequestered. We strongly recommend that the federal government reconsider this decision, expanding eligibility to include any project that reduces GHG emissions, similar to the California system. However, we recognize this needs to be done in a manner that ensures the integrity of the carbon credit market, where risk of oversupply exists.⁷
- Direct Procurement:** The federal (or provincial) government could help provide revenue and demand certainty in the CDR market by directly purchasing CDR tonnes or purchasing credits for future CDR tonnes, which would assist with project financing. There are a variety of ways this might work. Here is an example to illustrate the concept: the federal government could make a commitment to sign long-term contracts to purchase a combined 1 megatonne (Mt) or more per year of CDR tonnes in a reverse auction process in 2022 that would repeat annually for multiple years thereafter. Each year, the government would sign contracts with one or more successful applicants that would collectively represent 1 Mt or more of annual emissions reductions, with contracts lasting for the duration of the CDR project (approximately 15-30 years depending on the technology used).⁸

Purchasing CDR would not just be a helpful boost to creating demand for the sector, like current large credit purchasers such as Shopify, it could also play an important role in allowing the government to meet its own organizational climate targets by offsetting emissions, particularly those that may be particularly hard to abate (e.g., emissions from military aircraft).

A public procurement process could also help provide price discovery and ensure credit quality. And it would likely provide a boost to Canadian start-ups, which are innovating in the CDR space but require a first large contract to help get past the technology [“valley of death.”](#) Job creation is another important outcome for any government procurement project, with CDR jobs as an additional, and likely considerable, benefit, especially given focus on transitioning of workers and support for a “just transition.”

While direct procurement would require significant capital, we note that costs for CDR are beginning to decline. One Canadian firm has already announced it can [capture carbon via DAC for US\\$200](#) per tonne or less, and the United States has just declared a goal to bring costs of at-scale CDR to below US\$100 by 2030.

LOWER FINANCING COSTS

Carbon management projects require large capital investments, often on the order of \$1 billion for an at-scale project.

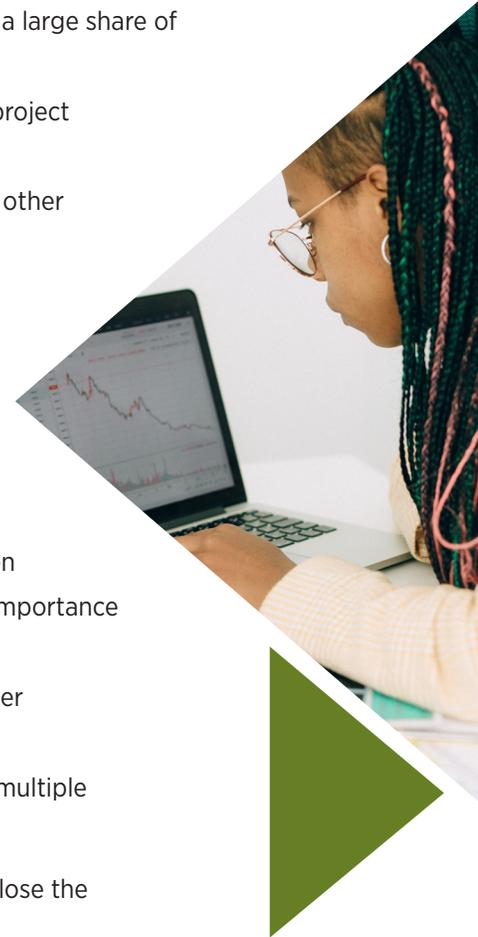
Attracting this type of financing purely from private sources has been challenging to date, especially given the policy risk and small number of established global projects. While the carbon management industry should aspire to “stand on its own” over the long term, public policy to lower costs will be important to help grow the carbon management sector.⁹ In fact, when examining all the large-scale CCUS projects that have been developed globally, it is hard to find one that has proceeded without upfront government support.

Financing is a particularly acute challenge in Canada as the availability of low-cost loans for carbon management projects is scarce, and financing exclusively with equity increases cost of capital, making financial returns difficult.

We recommend the following actions to address the cost of and access to capital:

- **Investment Tax Credit (ITC):** The federal government has already announced an investment tax credit that will be available in 2022. We support the implementation of an ITC and recommend the federal government consider the following design principles as it finalizes the policy:
 - The ITC should, when combined with other policies, apply to a large share of project capital costs
 - The ITC should consider using differentiated rates based on project characteristics. These might include:
 1. Providing more generous support to first-of-a-kind and other early-stage project deployments for a specific sector or technology. For example, the first, second and third at-scale DAC projects are likely to require more support than the tenth.
 2. Offering more generous treatment for projects that have a larger GHG reduction impact on a dollar per tonne basis based on full life cycle analysis
 3. Providing higher levels of support for CDR projects given their significantly higher costs per tonne and strategic importance for decarbonization¹⁰
 4. Considering support that a project is receiving from other government programs
 - Funding should be refundable, transferrable and shareable among multiple project proponents
 - Funding should be provided as close to investment as possible to close the financing gap that exists for proponents of major capital projects
 - All forms of capture infrastructure should qualify including transportation and sequestration (though recognizing that capture is by far the most expensive part of the process)

Regardless of specific design choices, we recommend the federal government consider how the ITC can maximize GHG impact, on a full life-cycle basis, over the long term to help meet Canada's net-zero target. The government might also consider structuring the ITC in a



way that asks firms to commit to certain emissions reductions targets to be eligible for the maximum potential funding value.

- **Financing support:** The ITC could provide a significant boost to many prospective projects. But multiple stakeholders interviewed for this report mentioned that there would still be a challenge to secure the remaining funds needed to finance large-scale projects, especially since hundreds of millions in capital are likely to still be required. This challenge will continue to be particularly acute if the need for greater revenue certainty is not addressed. There is also a risk that Canada loses out on potential investment if financing is more attractive in other jurisdictions, like the United States.

We believe there is a potential role for the government to increase access to finance (though we emphasize that bankable, certain policies and revenue streams must be a primary focus). There are a range of options for the federal and provincial governments to consider including loan guarantees, low-cost debt or equity through entities like the Canada Infrastructure Bank, and grant funding through the net-zero accelerator fund (which could be conditional on performance criteria such as GHG emissions impact). For certain projects (e.g., direct air capture projects), there is also a case for the government to provide equity investments that enable the public to benefit from the potential upside, not just covering the risks from the downside.

A particularly relevant model for Canada to consider as it evaluates options for further policy is the U.S. Department of Energy's Loan Program Office which has up to [US \\$8.5 billion available for "innovative advanced fossil energy projects"](#) such as CCUS. Canada should consider a similar dedicated program, which could be administered through the Canada Infrastructure Bank.

Whatever mechanism or combination of mechanisms is chosen, the federal government should also attempt to define clear criteria that, if met, will allow the applicant to access funding. In other words, the government should try to reduce "funding uncertainty" that has sometimes existed under past programs when project applicants are unclear on the criteria for success and/or must spend many months negotiating with multiple levels of governments before finalizing agreements. Such an approach, especially in contrast to a system like a production tax credit in the United States where the criteria are clear and money flows if you meet them, could reduce the amount of investment dollars that might otherwise go to carbon management.

GEOLOGICAL KNOWLEDGE AND PORE SPACE

In much of Canada, carbon sequestration is not a viable option today because there is little understanding of suitable geology and/or little to no available pore space to sequester carbon. Even in Alberta, where geological knowledge is high and most of the developed pore space is located, much of the currently publicly accessible space is in depleted oil fields where, if the field is still producing, EOR would result.¹¹

The availability of pore space provides significant public benefit (as opposed to just private benefit to a single corporation) and developing such space is thus a worthwhile investment of public dollars.

While pore space is regulated under provincial jurisdiction, we believe there is a role for the federal government to play in financing the identification and development of additional pore space across the country.

- **Funding for site identification & assessment:** The federal government should provide a dedicated pool of grant funds to enable study of high-potential locations (ideally near significant sources of CO₂) to identify suitable storage sites. This work should be done in collaboration with the provincial and territorial governments, given their role in regulating pore space. It might even require provinces and perhaps industry to co-fund prospective projects. New federal funds in this area would build on previous research that has been funded by Natural Resources Canada, which may be an appropriate home for this activity given existing expertise, knowledge and records.
- **Transparent & fair access to sequestration:** In talking to stakeholders across the country, we heard consistently how important it is for governments to ensure pore space for sequestration projects are open access, such that anyone who meets reasonable criteria is able to sequester carbon at those sites (while still incentivizing the private sector to invest in developing the needed infrastructure).¹² Like in other areas of carbon management, Alberta has made the most progress in developing policy in this area and has recently issued a [request for proposals to](#)

[develop sequestration sites](#). Encouragingly, the Alberta RFP asks proponents to ensure “open access to affordable use” of the sequestration site. We hope other provinces will follow suit. The federal government has two roles to play in this area. First, it should encourage all provinces to develop processes for public access to carbon infrastructure such as pipelines and sequestration sites. Second, the federal government has jurisdiction over frontier lands (including offshore areas that may hold significant potential for carbon sequestration) and should develop policies that ensures open-access rights for carbon infrastructure on these lands and waters.

- **Share data & best practices:** Data sharing through OpenAlberta for Shell Quest has shown great benefit to academia and policy groups and serves as a strong example of cross-sector data integration. We recommend governments require CCUS developers share non-competitive data on carbon capture, transportation and sequestration to assist other developers and governments, and to build trust in project safety, performance and climate change mitigation results, including strong attention to ongoing project Measurement, Monitoring and Verification (see below).

OTHER NON-COST BARRIERS

While making projects profitable and ensuring there is pore space for sequestration are fundamental, there are still other non-cost barriers that must be addressed. Our research revealed several challenges that we recommend the federal government address to unlock growth in carbon management, including:

- **Develop a national framework for Measurement, Monitoring & Verification (MMV):** It is critical that carbon sequestration is done safely. No shortcuts should be taken that place undue risk on the environment or communities surrounding carbon management projects. At the same time, MMV requirements should be risk-based and designed with an eye to avoid overly onerous and/or expensive requirements that prevent investments in new carbon management projects.¹⁵ Getting the balance right is difficult and there is no question that safety must be the first priority. Adding to the challenge is that MMV is provincial jurisdiction, with provinces like Alberta and Saskatchewan taking different approaches to date to MMV requirements for carbon sequestration.

While the federal government's role will be limited in this area, we believe it should be engaged in developing MMV standards and trying to ensure that provinces share knowledge and best practices across their MMV regimes.¹⁴ Doing so would increase the likelihood that businesses face consistent rules across the country and have confidence that the regulatory regimes that are in place will remain stable over the lifetime of projects. The federal government also has the convening power to help bring together stakeholders to discuss how to get the balance right between safety and streamlined processes, so that Canada remains competitive with other jurisdictions in attracting carbon management investments.

- **Liability provisions:** Only Alberta currently has a clear system for how to handle long-term liability associated with carbon sequestration, with the government taking on liability post-closure of a project under certain conditions. Liability policies are needed across the country to provide businesses the needed clarity and certainty to make investments. The federal government could play a role in establishing best practice guidelines for how liability can be handled, increasing the likelihood of consistent rules across the country.¹⁵
- **Facilitate cross-border and cross-boundary projects (national or provincial/territorial):** There could be many projects where the carbon dioxide is captured in a different jurisdiction from where it could be best stored. This includes projects across provincial/territorial boundaries (e.g., carbon captured in Saskatchewan where the closest sequestration site is in Alberta) and projects that would cross the Canada-U.S. border.

The latter category may prove particularly important. As a [recent Boston Consulting Group analysis showed, there are large potential opportunities](#) to ship carbon captured at Canadian facilities in Eastern Canada across the border to states like Pennsylvania with well-characterized sequestration sites.

The federal government will have an important role to enable these opportunities. Within Canada, the government can serve as a helpful facilitator, developing best practices for how individual provinces can design relevant regulations that can work in harmony with neighbouring provinces/territories. For potential Canada-U.S. carbon management projects, the government will need to work with American counterparts at the federal and state level to offer coordinated funding and/or ensure the project infrastructure gains social and political acceptance and the necessary regulatory approvals south of the border.

Another particularly important aspect of enabling cross-border and cross-boundary projects will be to develop clear rules for carbon accounting.

When carbon management projects involve multiple jurisdictions, project proponents do not have clarity today about where and how they can monetize carbon credits. Is carbon captured in Saskatchewan and sequestered in Alberta recognized as incremental emissions in Saskatchewan and removal of emissions in Alberta for example? The issues become even more complex when considering carbon flowing across the Canada-U.S. border. To date, tens of millions of tonnes of CO₂ have been shipped from North Dakota to the Weyburn-Midale formation in Saskatchewan and yet none of that CO₂ has generated credits in Canada because it would require an increase in North Dakota emissions.

We recommend the federal government develop clear rules for how to account for carbon that crosses provincial or national borders, working in consultation with the provinces and their U.S. counterparts.

- **Go beyond hubs:** While there is an understandable interest in carbon capture hubs, there will certainly be carbon management projects that will make more economic sense to pursue as a stand-alone effort rather than as part of a hub (e.g., if a source of CO₂ is located very close to an existing sink then it would be more cost-effective to pipe that CO₂ close by than try to link it to a hub that is much further away). Policy at both the federal and provincial level should be designed to accommodate a wide range of carbon management projects, including both hubs and stand-alone projects.
- **R&D for utilization:** While still a relatively small market today, there is potential to scale-up the use of carbon in products from carbonated beverages to steel to petrochemicals. The federal government can play an important catalytic role in funding R&D that can expand the use of carbon utilization projects, especially for early-stage research that typically requires public funds.¹⁶

- **Consider fast-track permitting:** One of the challenges with major new infrastructure projects in Canada is the time and uncertainty involved in the regulatory approval process. To be clear, it is important that infrastructure be carefully considered and that factors like public and Indigenous consultation, environmental and social impacts, safety and much more are carefully and thoroughly completed as part of the approval process. The rigour of the regulatory process cannot be compromised or weakened. Furthermore, if CCUS is administered under the same agencies as oil and gas, the federal government will only be involved in the approval of a limited number of carbon management projects, such as those that have a pipeline or facilities across a provincial border. Nonetheless, there may be opportunities for Canada to consider a risk-based priority approval process for projects that require federal review and are of significant national importance such as large-scale carbon management projects (e.g., a carbon pipeline that would have a large potential to reduce GHGs). For these projects, several parts of the regulatory process could be completed simultaneously rather than sequentially. Such coordination could build on the cross-departmental management that already exists through the [Major Projects Management Office](#).¹⁷ There are other jurisdictions where this type of priority lane has been used.¹⁸

Regulatory approvals, permitting and compliance are complex topics that require careful study, but we note it here as a potential opportunity to accelerate growth in the carbon management sector. Clarifying the government funding and regulatory road map, and importantly, providing a clear Crown focal point for Indigenous consultation for CCUS projects and infrastructure will help facilitate timely investment decisions.



ACKNOWLEDGEMENTS

This policy paper is from the Energy Future Forum, a pan-Canadian group of organizations and individuals in business and government – along with academic, environmental and Indigenous organizations – working to address climate action and our energy future around one table. The Energy Future Forum is determined to see this collaborative effort map out an ambitious set of actions that are environmentally sound, economically beneficial and publicly acceptable.

The mission of the Energy Future Forum is “to develop practical measures that help Canada meet or exceed our 2030 emissions targets on the way to a net-zero future, and that strengthen an innovative economy, deepen shared prosperity and enhance national unity.”

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In alphabetical order, the Energy Future Forum’s members and external stakeholders* include:

ASI Canada	International CCS Knowledge Centre*
Boston Consulting Group	MEG Energy
Canadian Natural Resources Limited	North West Refining*
Carbon Alpha*	Pembina Institute
Carbon Engineering*	RBC
Cement Association of Canada*	Shell Canada
Cenovus	Suncor Energy
CIBC	Svante*
Clean Prosperity Canada	TC Energy
Evok Innovations	Teck Resources
GE	Viewpoint Group
Imperial Oil	

ENDNOTES

- 1 See our earlier paper on [Capturing a Carbon Opportunity](#) for more details.
- 2 <https://www.upstreamonline.com/politics/more-than-10-billion-allocated-to-carbon-removal-technology-with-passage-of-us-infrastructure-bill/2-1-1095574>
- 3 For example, the open-source Northern Lights Project in Norway captures carbon from industrial sites and sequesters it under the North Sea. Fully 67 per cent of the project's \$2.9 billion costs are covered by the government of Norway, which is paying 80 per cent of the \$791 million required for the first stage. The U.K. government has selected two carbon capture clusters to receive funding from the first stage of its US\$1.4 billion CCUS infrastructure fund and intends to build out four CCUS hubs by 2030.
- 4 In addition, EFF conducted interviews with carbon management experts in Canada and abroad, and conducted desk research to help develop the policies contained in this report.
- 5 This presents significant issues for large emitters, especially those in trade exposed sectors that compete globally and cannot pass the costs of carbon abatement onto consumers. The private sector also faces significant carbon credit market risk, especially if demand for credits is reduced and supply is increased as CCUS is adopted.
- 6 While there is still an incentive today to reduce emissions even further because extra reductions can be monetized by selling surplus credits, this incentive will not exist over the long term if all industrial players begin to reduce their emissions. As emissions decline, there may be fewer and fewer buyers, at least in the compliance market.
- 7 While the CFS can be helpful, it should not be relied on as the main driver of carbon management projects. The CFS is not designed to enable carbon management; rather, it is intended to reduce the emissions intensity of fuels. As such, there will be a limit to the number of CCUS projects that could qualify because reducing emissions intensity of fuels by less than 20 per cent will only require so many credits to be generated. In fact, there is a risk that an excess supply of potential CCUS projects could drive down prices, reducing the CFS's usefulness in incentivizing carbon management projects. On a separate but related note, the price of credits will fluctuate based on market forces making it difficult to justify major capital investments on uncertain future prices (a risk similar to that presented by the future carbon price trajectory discussed above).
- 8 Eligible applicants would need to meet strict ESG standards to qualify.
- 9 Ultimately what matters most is the overall economics of the project which means getting the right mix of revenue and costs to give projects an attractive rate of return relative to competing uses of capital. In this sense, policies to increase revenue could theoretically replace the need for policies that reduce costs.

- 10 We assume that the ITC, including the more generous support for CDR, would be provided on a time-limited basis as a primary goal of the ITC should be to help reduce costs to the point where they are economic without further public funds.
- 11 The Shell-operated Quest project is a notable exception where carbon is being stored in a saline aquifer. Note too that the availability of saline sequestration may improve in the coming years as Alberta's new carbon sequestration tenure management process progresses. The potential for saline sequestration is huge. The 2012 Carbon Storage Atlas estimates Canada's saline aquifers at around 100 gigatonnes.
- 12 While not mentioned as frequently, the same issue would apply to carbon pipelines.
- 13 For example, the amount of 3D seismic monitoring required during a project can have significant impacts on the costs of projects.
- 14 The federal government could leverage its experience in risk-based regulation for MMV (among other areas) through its work as at the IEA GHG Weyburn-Midale CO₂ monitoring and storage project.
- 15 The European Union has established rules that also transfer liability of the project to the government assuming the project proponent has met certain criteria including paying into a fund that will cover any potential future liability issues.
- 16 Note that sequestration and utilization are also not mutually exclusive options as some carbon streams could be split into a portion that is utilized and a portion that is sequestered.
- 17 The need to improve the regulatory approval process was noted by the Resources for the Future Economic Strategy table's final report. In the report, they recommend a "nexus pass" for high-performing companies. This principle might also be applied to "high-value" decarbonization infrastructure.
- 18 One example is the FAST-41 permitting process in the United States. A summary of that process can be found [here](#).



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