Missing Megatonnes

Without a broad contracts for difference program, Canada could miss up to 33 megatonnes of emissions reductions in 2030

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With energy-economy modelling by Navius Research

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Executive summary

For Canada to meet its 2030 greenhouse gas emissions targets, we need to get the most out of our existing climate policies. Policymakers can get much more out of industrial carbon pricing, Canada's "cornerstone" climate policy, by solving a critical problem: Firms and investors lack confidence that provincial carbon markets will deliver the revenue they need to justify big, long-term investments in low-carbon projects. As a result, they are holding back on new low-carbon investments.

To address this lack of market confidence, the federal government has committed to offering carbon contracts for difference (CCfDs). CCfDs act as an insurance policy for low-carbon projects, guaranteeing the future value of the carbon credits they generate. The 2023 Fall Economic Statement announced that the Canada Growth Fund (CGF) will issue $7 billion worth of CCfDs.

But CGF's new CCfD program will not do enough to alleviate investor uncertainty. Its $7 billion allocation for CCfDs can unlock specific low-carbon projects, but it cannot systematically build confidence in the long-term value of carbon credits for all market participants. A broad-based program that makes contracts available to emitters across the economy will be needed for CCfDs to achieve their potential to secure market confidence and drive significant investment in reducing emissions.

With modelling from Navius Research, we calculate that Canada could miss up to 33 megatonnes of industrial emissions reductions in 2030 without a broad-based program of CCfDs. Over the long term, this amounts to hundreds of megatonnes of cumulative emissions. Clean Prosperity's estimates suggest that with its current allocation to CCfDs, CGF will only be able to unlock between five and 10 megatonnes.

Our modelling also shows how the federal government may be significantly underestimating the power of industrial carbon pricing to reduce emissions in its 2030 Emissions Reduction Plan — but only when pricing is backed up with CCfDs. The potential power of CCfDs to enable emissions reductions could go even further than our own modelling suggests because we are unable to model technologies that don't yet exist, but that could be transformative for emissions reduction.

We make five recommendations targeted at the federal government, the provinces, and CGF. First, the federal government should follow through on its commitment to greater stringency in industrial carbon markets. This will support carbon credit prices and ensure that CCfDs function as intended — so that the contracts are not exercised and the government incurs minimal fiscal cost.

The federal government should build on CGF's work to date by designing a broad-based CCfD program accessible to emitters across the economy — this is essential for fulfilling the potential of CCfDs. We equally encourage the provinces to consider these recommendations.

Lastly, we recommend that the CGF describe how it intends to administer its CCfD program via a written memo to stakeholders and standardizing the language in its contracts. This will build market confidence, and prepare the way for a broad-based CCfD program. CGF should also seek to maximize the impact of its current $7 billion allocation to CCfDs — by working to crowd in banks and institutional investors, for example.

Introduction

Uncertainty about the future of Canada's provincial carbon markets is holding up investment in major low-carbon projects that can reduce industrial emissions and generate jobs and growth. A broad-based program of carbon contracts for difference (CCfDs), available to emitters across the economy, would unlock the full power of Canada's industrial carbon pricing systems — all while boosting Canada's competitiveness as a destination for low-carbon investment.[1]

The 2023 Fall Economic Statement marked a significant step forward for CCfDs. The Canada Growth Fund (CGF) is now the "principal federal entity" responsible for deploying up to $7 billion worth of CCfDs, and signed its first deal with Entropy in December 2023. The deal guarantees that carbon credits generated by Entropy's Glacier Phase 2 Project will be worth at least $86.50 per tonne for its first 15 years of operation.

Moving into 2024, CGF is well positioned to unlock several large-scale decarbonization projects with CCfDs. However, as currently structured, the CGF program's $7 billion allocation is not enough to systematically address uncertainty about the future of provincial carbon markets. Using new modeling from Navius Research, **we calculate that up to 33 megatonnes of reductions are at risk in 2030 without a broad-based CCfD program in place**. Over the lifespan of a 15-year CCfD program, this amounts to hundreds of megatonnes of cumulative emissions.

In the short term, CGF will only be able to unlock a fraction of these 33 megatonnes — Clean Prosperity's estimates suggest five to 10 megatonnes. There are two principal reasons why. First, CGF will be signing bespoke deals with individual emitters that will help those projects but are unlikely to meaningfully affect market confidence in future credit values. Second, our modelling suggests that most of the missing megatonnes (81% to 93%) can only be accessed with CCfDs that guarantee a carbon price between $110 and $170 per tonne in 2030. Guaranteeing prices at these levels will quickly exhaust CGF's current funds, barring a change in program structure.

More action is needed to push CCfDs to their full potential as a key enabler of industrial decarbonization. CGF must therefore explore options that will allow it to stretch its $7 billion allocation to the maximum extent possible, and the federal Department of Finance should also develop a second program phase to allow more deals to be signed.

[1] CCfDs are financial instruments that can insure and de-risk the future value of carbon credits. This briefing note uses "CCfDs" as an umbrella term for comparable financial instruments that can guarantee carbon-credit prices, including offtake agreements. See Appendix A for further explanation.

Industrial carbon pricing will not function as intended without certainty

Investor uncertainty about the future value of carbon credits that trade on provincial carbon markets is holding up billions of dollars worth of shovel-ready, low-carbon projects.[2] These projects are counting on generating credits and selling them as a key source of revenue. Strong anticipated demand for credits fuels the business case; expectations of weak demand for credits can single-handedly undo the business case.

These low-carbon project proponents are reacting to multiple sources of uncertainty in industrial carbon markets, with two standing above the rest. First, there is the risk that governments could alter the headline price path from its current trajectory to $170 per tonne by 2030, which would reduce the profitability of many low-carbon projects. Second is the risk that credits will become oversupplied, resulting in weak credit demand.[3] For carbon markets to deliver the emissions reductions anticipated in the federal government's 2030 Emissions Reduction Plan (ERP), demand for credits must remain strong, and the market price of credits must closely track the headline carbon price.

Models mistakenly assume market confidence in carbon pricing

We believe that government climate modelling is overestimating the emissions reductions that are possible without the guarantees offered by CCfDs. In most Canadian energy-economy models, large emitters covered by industrial carbon pricing make decisions based on the premise that carbon credit prices will closely follow the headline carbon price. In other words, they behave as if they already have CCfDs in hand. This includes the E3MC model that Environment and Climate Change Canada (ECCC) uses to estimate emissions reductions against the targets in Canada's ERP.[4]

Industries in these models do not act with foresight; they only reduce emissions when the marginal price of carbon exceeds the marginal cost of abatement, and they behave with 100% confidence that the carbon price is durable. Perfect market certainty in carbon pricing is the default setting, and reflects a best-case scenario for government policy objectives.

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[2] https://www.theglobeandmail.com/business/article-canada-carbon-contracts-ccfd-ottawa/
[3] See: Clean Prosperity, Alberta's carbon pricing system needs an important fix.
[4] ERP modelling of the OBPS assumes a 2% tightening in stringency every year post-2022, and that any excess credits in the OBPS market post-2027 are cleared at the benchmark carbon price. https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030/plan/annex-5.html

CCfDs are a tipping-point policy

To investigate real-world uncertainty about carbon markets, we developed three scenarios using Navius Research's gTech model (see Table 1 below). Each scenario simulates emissions reductions that can be expected from different levels of carbon-market confidence across eight heavy industries: oil and gas, mining, smelting and refining, pulp and paper, iron and steel, cement, lime and gypsum, and chemicals and fertilizers. We model only legislated federal and provincial climate policies that are fully implemented, plus the soon-to-be-finalized federal investment tax credits (ITCs).[5]

Scenario 1 simulates zero market confidence in the durability of carbon pricing through 2030, while **Scenario 2** simulates 100% confidence, which would result from a broad-based CCfD program. When CCfDs are stacked on top of federal ITCs and other bespoke funds, the scale of emissions reductions we observe in gTech suggests that a broad-based CCfD program could be a tipping point for dozens of final investment decisions before 2030. For purposes of comparison with the federal government's projections, **Scenario 3** approximates the modelling used to project industrial emissions reductions in the ERP — which assumes 100% market confidence in carbon pricing (an understable but inaccurate assumption), but effectively only until 2026, which we explain further below.

To explore a range of plausible outcomes that broad-based CCfDs could deliver, we modelled all three scenarios separately in gTech using two different sets of assumptions about technological progress between now and 2030: gTech's reference technological conditions, and our more optimistic catalytic technological conditions. Our view is that catalytic conditions more accurately reflect the current circumstances that emitters are facing.[6]

We estimate that broad-based CCfDs could deliver **25 to 33 megatonnes** of emissions reductions per year in key heavy industries by 2030, under reference and catalytic conditions,

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[5] A full description of the baseline legislated policy scenario is available here: https://cleanprosperity.ca/legislated-policy-list.

[6] We altered two key parameters in gTech to simulate catalytic conditions. First, approximately 50% of all industrial capital stock turns over by 2030. gTech accomplishes this by reducing lifespans of technologies by 50%. With a strong enough price signal, 100% of capital stock is theoretically available for turnover.

Second, and more significantly, we assume slightly faster cost declines for key abatement technologies relative to reference conditions (though still within Navius' standard ranges). This second assumption is a proxy for bespoke sources of federal funding aimed at large scale decarbonization that are not included in gTech, including: Canada Growth Fund, the Strategic Innovation Fund (with the exception of the Net Zero Accelerator Initiative), the Clean Fuels Fund, and the Canada Innovation Corporation. The Canada Infrastructure Bank, Net Zero Accelerator Initiative, and the Low-Carbon Economy Fund are included.

respectively. We produce this estimate by measuring the incremental reductions that occur in **Scenario 2** — simulating perfect market confidence in the durability carbon pricing — relative to **Scenario 1**, which simulates zero confidence (See Figure 1). The ERP modelling treats these incremental reductions as a certainty at specific marginal carbon prices. We argue that these emissions reductions are much less likely to materialize without CCfDs.

Figure 1: Missing megatonnes — industrial emissions reductions that can be achieved by 2030 only with 100% confidence in the carbon price.

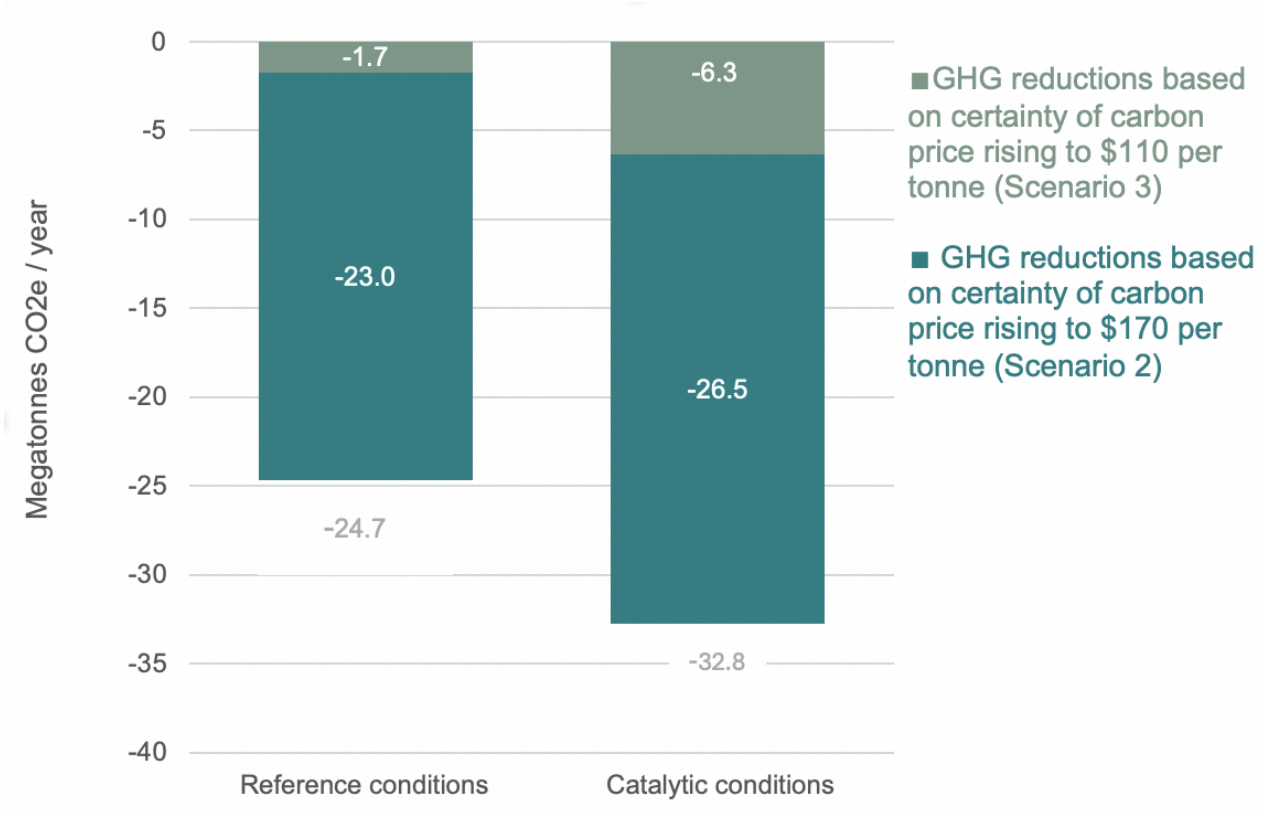

Figure 1 (above) shows the missing megatonnes — how many more industrial emissions reductions Canada can achieve by 2030 if carbon-market confidence is supported using CCfDs. On the left, we show results under Navius' reference technological conditions. On the right, we show the additional reductions under their catalytic conditions.

Figure 1 also breaks down the share of emissions reductions that can be achieved by 2030 when the market has confidence that the carbon price will freeze at $110 per tonne in 2026 (**Scenario 3**), compared to the much larger emissions reductions that come from market confidence that the carbon price will reach $170 per tonne by 2030 (**Scenario 2**, which simulates broad-based CCfDs). We discuss this discrepancy in greater detail below.

Table 1: Modelled scenarios.

Scenario	Price path	Confidence level
Scenario 1: Simulates no CCfDs and no market confidence in the durability of carbon pricing	$170/tonne by 2030	0%
Scenario 2: Simulates 100% market confidence in long-term durability of carbon pricing, as a representation of broad-based CCfDs	$170/tonne by 2030	100%
Scenario 3: Simulates 100% market confidence that federal carbon price will reach $110 but not beyond (approximation of actual E3MC/ERP modelling)	Frozen at $110 per tonne in 2026	100%

Scenario 1 simulates zero market confidence in the durability of industrial carbon prices — it is the baseline for Figure 1. This scenario examines what would happen if no economic actors had sufficient confidence in the trajectory of provincial carbon markets. Functionally, this scenario simulates a market-wide expectation that the carbon price will drop to $0. There are several potential explanations for how those expectations might form across investors and project proponents.

Scenario 2 simulates perfect market confidence in industrial credit markets — the default setting in energy-economy models. It is the polar opposite of **Scenario 1**; it simulates incremental emissions reductions if every economic actor had full confidence that industrial carbon prices would continue to rise to the scheduled level of $170 per tonne by 2030.

Scenario 3 is an approximation of ECCC's E3MC model, a model used as the basis for emissions-reduction projections in the ERP. Here, we simulate perfect market confidence in a headline price that freezes at $110 per tonne in 2026 to account for ECCC's assumptions around foresight and project construction times. This scenario shows how, even under an inaccurate assumption of perfect market confidence in the durability of carbon pricing, E3MC may also be implicitly underestimating carbon pricing's potential to drive industrial emissions reductions, when backed by CCfDs. In E3MC, firms do not take early action to abate emissions in anticipation of the marginal cost of carbon exceeding the marginal cost of abatement. Instead, firms react and make final investment decisions (FIDs) in the same year that the marginal cost of carbon exceeds the marginal cost of abatement. This is followed by a fixed four-year lag to account for construction.[7]

[7] Scenario 3 includes both a retail and an industrial carbon price, which would overstate its effect on emissions relative to Scenarios 1 and 2, which do not include a retail carbon price.

CCfDs can enable firms to act earlier

CCfDs enable firms to decarbonize earlier than they otherwise would have, and therefore earlier than the ERP may be able to anticipate based on the assumptions in E3MC. If firms with abatement costs between $110 and $170 per tonne have CCfDs in hand in 2024, they could make early FIDs in time to contribute to Canada's 2030 targets.[8] These are emissions reductions that E3MC could not capture based on its current assumptions. We use the difference between **Scenario 2** and **Scenario 3** to estimate emissions reductions attributable to broad-based CCfDs. To the best of our understanding, the impacts of uncertainty are not accounted for in E3MC (23 megatonnes fewer reductions by 2030 under reference conditions, 26.5 megatonnes under catalytic conditions; see Figure 1).

Models cannot capture the full potential of the low-carbon economy

Taking all of this into account, 33 megatonnes of emissions reductions is likely not the upper limit for CCfDs by 2030, and certainly not over the longer term. Energy-economy modelling cannot predict with precision when, where, why or how many new economic sectors or technologies will emerge. Our modelling is a snapshot of what CCfDs could do over the next six years. It cannot account for all disruptive sectors or technologies that could be crowded in by CCfDs but are currently at low levels of technological readiness — as noted in our catalytic technological conditions.

While we cannot quantify the effect of these new sectors, we know that they are coming. CCfDs could substantially narrow or even close the gap with the incentives on offer in the US Inflation Reduction Act (IRA) for a range of emerging low-carbon sectors — including new blue hydrogen facilities (See Figure 2), sustainable aviation fuels, and direct air capture.

[8] There are many factors outside of our modelling that could slow project development and construction, most notably access to skilled labour, access to capital amidst higher interest rates, and regulatory delays.

Figure 2: Average gross revenue from policy sources for hypothetical 525 million kgH2/year autothermal reforming project, 2023-2032 ($ per kg of hydrogen).

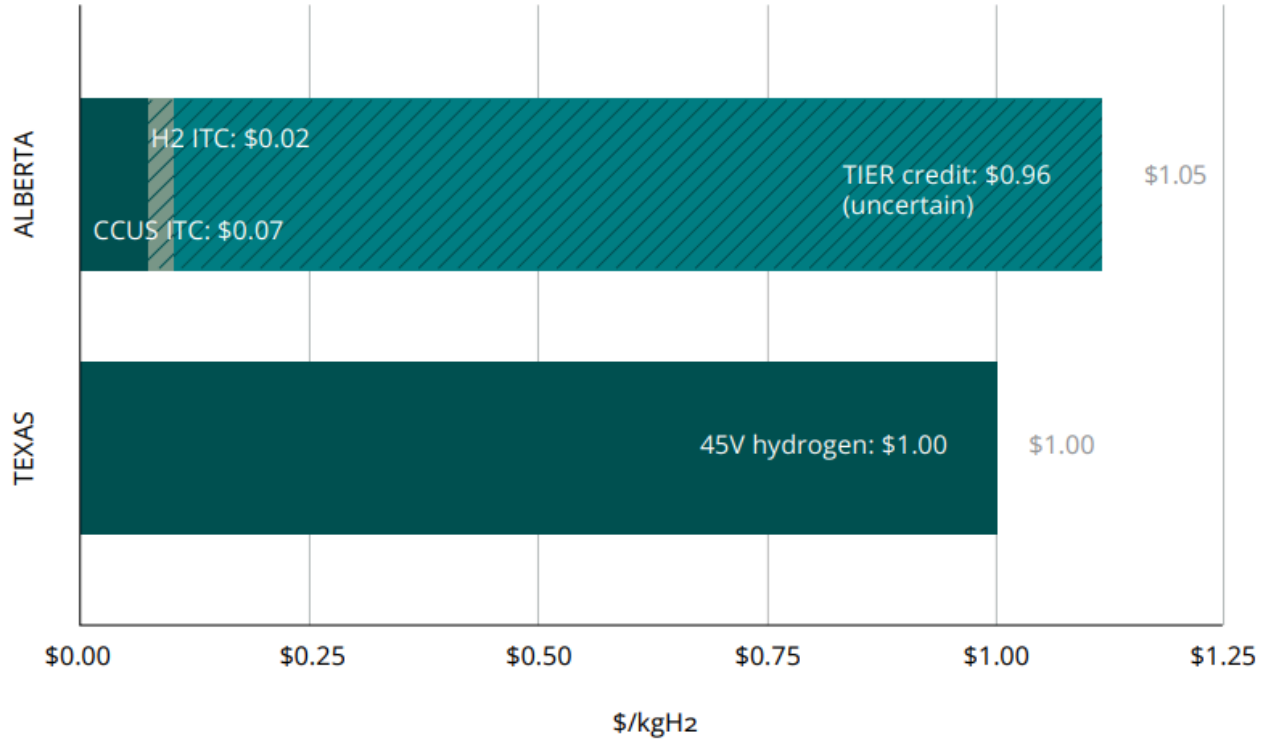

Figure 2 shows policy-based sources of revenue that are available to a hypothetical large-scale blue hydrogen project in Alberta and Texas. The largest potential source of revenue for an Alberta-based project, by far, is from credits earned under the province's industrial carbon pricing system, TIER. These credits are worth $0.96 per kg of blue hydrogen — on par with IRA incentives. This assumes that, on average, TIER credits trade at only a 5% discount to the headline carbon price, supported by broad-based CCfDs at strike prices close to the headline price. CCfDs that offer strike prices at steeper discounts to the headline price would cause this bar to shrink, reducing Canada's potential competitive advantage over the US. Lower strike prices would have the same effect across any project that is eligible to participate in provincial carbon markets.[9]

[9] This analysis is available in recent working papers from Clean Prosperity and the Transition Accelerator: *Creating A Canadian Advantage* and *The Low-Carbon Playbook*.

Market expectations and stringency could affect the potential size of CGF's CCfD program

The volume of emissions reductions that CGF can underwrite with $7 billion worth of CCfDs is an open and urgent question. We calculate that CGF's current design will allow it to capture five to 10 megatonnes, using estimates of strike prices between $85 and $140 per tonne. This is because CGF likely needs to hold capital reserves sufficient to cover the full downside risk of any deal (i.e., the full value of all future credits at the contract strike prices, rather than a fraction of their full value).

There are several ways CGF could recycle dollars it has already committed in previous deals. Most options involve crowding in third parties to purchase CCfDs that CGF has already signed, or partnering with institutional investors to syndicate CCfDs. The sale of CCfDs would also free up capital to sign additional contracts. Given that CGF and its CCfD program are still in their very early stages, the risks to third parties are likely too high for this to be a viable option in the short term.

In the meantime, it is crucial that carbon markets become more stringent. Performance benchmarks for heavy industries must tighten faster over time, and credit prices must continue to track close to the headline carbon price. Greater stringency will build investor confidence in the long-term value of carbon credits, and help ensure that CGF generates strong returns on third party deals and can recycle those returns into additional CCfDs.

Paired together, broad-based CCfDs and greater stringency would help keep credit prices and strike prices aligned, minimizing or even eliminating the net costs of the program. Furthermore, many emitters may not even require CCfDs to incentivize low-carbon investment once a critical mass of CCfDs have cemented market expectations that increasing stringency will support higher credit prices in future.

Canada can't count on policies that haven't been implemented

Some climate policies that Canada has announced — but not yet legislated or regulated — could, in theory, deliver some of the emissions reductions we have attributed to carbon pricing backed up by a broad-based program of CCfDs. But we don't believe these policies — particularly the oil and gas emissions cap or the Clean Electricity Regulations (CER) — materially change the importance of CCfDs.

In particular, we do not believe that the oil and gas emissions cap is likely to lead to significant emissions cuts by 2030. The regulation is not finalized, has already experienced multiple delays,

and will almost certainly face court challenges, among other political risks. Given the uncertainty around this proposed regulation, it would be entirely rational for firms to wait for additional clarity before proceeding with the emissions reductions required for compliance. The time required to achieve policy clarity, added to construction times and workforce development, suggests that an oil and gas emissions cap could have a very limited impact on Canada's 2030 targets.

Furthermore, the government has not included reductions from an oil and gas emissions cap in the ERP models. It is a difficult policy to model because so few details have been announced, never mind implemented.

Whether the CER is implemented or not would have limited impact on our analysis. We did not include the electricity sector in our calculations for emissions reductions from heavy industry. With the exception of cogeneration with carbon capture, there would be minimal overlap between CCfDs as modelled and the CER.

Conclusion: Realizing the full potential of CCfDs requires smart program design, paired with greater stringency

The next 12 to 18 months represent a critical window to unlock decarbonization investments needed to keep Canada's 2030 climate targets in reach. CGF's commitment to allocate $7 billion to bespoke CCfDs is a promising development, but Clean Prosperity's modelling suggests that a CCfD program of this type and size cannot create certainty in provincial carbon markets on its own. How much of our modelled 33 megatonnes of emissions reductions CGF can ultimately capture will depend on how far it can stretch the $7 billion, how the program is funded moving forward, and the stringency of provincial carbon markets.

Recommendations: Build towards a durable, broad-based CCfD program

We recommend that the federal government:

1. Increase stringency in carbon markets

In the context of output-based carbon pricing systems, stringency refers to their ability to drive emissions reductions. Greater stringency should lead to increased demand for carbon credits and is paramount to the success of a broad-based CCfD program.[10] While CGF has a role to play

[10] Previous modelling commissioned by Clean Prosperity is shows the impacts of insufficient stringency in Alberta's TIER market: https://cleanprosperity.ca/alberta-carbon-pricing-system-needs-an-important-fix/

in shaping market expectations, which could affect the number of CCfDs it can issue, it has no levers to address stringency.

One key aspect of stringency is the share of emissions that face a carbon price. For carbon markets to function effectively over the long term, stringency must continue to rise so that the share of emissions facing a carbon price is always greater than the number of carbon credits and offsets being generated. Put another way, demand must rise to meet supply if credit prices are to remain high. Stringency is the key lever by which governments can increase demand for credits.

Using stringency to keep credit values high is an essential part of rolling out a broad-based CCfD program. Without increasing stringency, a broad-based CCfD program would cost the government billions of dollars in payments to decarbonizing firms.

Therefore, for CCfDs to reach their fullest potential, the federal government will need to follow through on its commitment in the 2023 Fall Economic Statement "to enforc[e] the existing requirement…that the design of provincial and territorial output-based pricing systems preserve a marginal price signal at or above the minimum national carbon pollution price, on an ongoing basis, to maintain a strong carbon credit market."

Greater stringency is necessary for the success of broad-based CCfDs. Stringency will grow in importance as more low-carbon projects come online towards the end of the decade, and should be top of mind as the 2026 review of carbon-pricing systems draws closer. As part of this review, the federal and provincial governments should explore options for adjusting stringency in a more responsive manner, with shorter review cycles. The current practice of reviewing carbon pricing systems at five-year intervals is inadequate.

In addition to increasing stringency, the federal government can take further steps to improve market transparency and efficiency. For example, the government could work with provinces to encourage the publication of carbon-credit prices, or examine options to link provincial carbon markets.

2. Develop a second program phase that offers broad-based CCfDs

The CCfD program being implemented by CGF is unequivocally a positive step. But under the current program design and funding levels, CGF will only be able to access a fraction of the 33 missing megatonnes identified in the Navius modelling. To secure the rest of these emissions reductions, the federal government should build upon the initial momentum it has created by implementing a second phase of the program that will offer CCfDs to emitters across the economy.

There are at least two ways the federal government could pursue this new phase. The first is to provide substantial additional funding to CGF to offer broad-based, standardized CCfDs. The second option is to establish a broad-based CCfD program (that could still be managed by CGF) housed within the Department of Finance. Such a structure may be able to leverage the more flexible accounting rules available to the federal government, and allow it to do more deals with less capital held in reserve.

A note to the provinces

Our first two recommendations are targeted at the federal government, but we equally encourage provincial governments to consider these actions. The provinces largely administer their own carbon markets and therefore have many levers available to accelerate industrial decarbonization. For instance, provinces can adjust the stringency of their own carbon markets if the risk of credit oversupply emerges, rather than waiting for the end of the federal government's five-year review period. Any province that commits to increasing stringency over time or sets up a provincially-run CCfD program would send a very strong, positive signal to market participants.

We recommend that the Canada Growth Fund:

3. Provide a written description of the program

Market participants do not currently have a clear picture of how the CCfD program will evolve or who will have access to it. We recommend that CGF rectify this by publishing a memo as soon as is feasible that describes the design details of their CCfD program.

At a minimum, this memo should include details on the types of deals that will be available (e.g., offtakes, two-way swaps) and the process to access them (e.g., standard contracts, reverse auctions). Ideally, this memo should also include a roadmap with additional details about how CGF plans to move quickly towards standardized contracts in the future.

Over the medium term, deployment of CCfDs can help solidify market confidence in future credit prices, and in turn reduce downside risk for CGF. CGF is already considering how its actions can help build market confidence and we think a memo clarifying its plans would help.

4. Work towards standardized contracts

Maximizing the potential of CCfDs to drive emissions reductions will require a broad-based program. As CGF issues bespoke CCfDs, it should develop and refine standardized contract language that can be used in an eventual broad-based program.

Standardization means that low-carbon project proponents will become more confident in their ability to access a CCfD, with less overall complexity and as few administrative and regulatory challenges as possible. In the meantime, creating the expectation that standardization is on the table (i.e., via a memo from CGF) would send a positive signal to the market.

5. Maximize the impact of current funding

CGF's $7 billion is insufficient for a broad-based CCfD program capable of underpinning certainty in industrial carbon markets. If creating market certainty is still indeed a policy objective, then CGF will require additional capitalization.

In the meantime, CGF should do what it can to stretch its existing capital as far as possible. For example, CGF should explore partnerships with commercial banks, institutional investors, and other actors interested in gaining exposure to carbon markets. Numerous deal structures are possible. These third parties could buy specific CCfDs that CGF has already signed (e.g., the Entropy deal), or help underwrite the contract in exchange for premiums. Not only could this be beneficial for CGF's balance sheet, it would strengthen industrial carbon markets by crowding in private actors that would have a strong interest in maintaining the carbon-pricing schedule. Over the longer term, banks and institutional investors may become interested in issuing private CCfDs if they have more confidence in the long-term future of industrial carbon markets.

A note on the policy objective of CCfDs

Our recommendations assume that the primary objective for CCfDs is instilling confidence in carbon markets, thus unlocking large-scale decarbonization. However, we do acknowledge that CGF's mandate also includes an objective to scale up less mature technologies. If it becomes clear that the current CCfD program is not a stepping stone to a broader program, it would be appropriate for CGF to emphasize this more catalytic approach to its CCfD investments and deemphasize delivering emissions reductions by 2030. In practice, this may mean prioritizing CCfDs for technologies that are first-of-a-kind or early-stage, but potentially more transformative. These new technologies are likely to require higher contract strike prices, but could also enable deeper emissions reductions by 2040 or 2050.

Appendix A: What is a carbon contract for difference?

A carbon contract for difference (CCfD) is an agreement between government (federal or provincial) and the private-sector proponent of a new low-carbon or decarbonization project. A CCfD guarantees the future value of carbon credits generated by the project. A guaranteed carbon price can be the "tipping point" for projects that would otherwise have challenges finding project financing. The government guarantees a specific credit price for a specific period of time (ideally 10 to 15 years). Any payment obligations arising from CCfDs are settled on a regular basis.

There are a number of ways to structure CCfDs and other similar instruments that guarantee a specific price for carbon. In December 2023 the Canada Growth Fund (CGF) signed its first CCfD-style contract with Calgary-based carbon capture company Entropy, structured as an offtake agreement. With the offtake structure, CGF commits to directly purchasing carbon credits at an agreed-upon price. Entropy will sell credits directly to CGF rather than seeking a buyer for those credits in the market, starting at $86.50 per tonne of CO_2.

Alternatively, in a top-up CCfD structure, the firm keeps the carbon credits. The government pays out the difference if the average market price of carbon credits is lower than the strike price agreed to in the contract. If the average credit price is higher than the contract price, then the proponent pays the government. Top-up CCfDs compel the firm that has generated the credits to find a buyer in the market and get the best possible price.

In this way, CCfDs help mitigate the carbon-pricing risks faced by proponents of new low-carbon or decarbonization projects that are relying on carbon-credit revenue to make their projects economic.

The government has the ability to avoid making payouts against CCfDs. As long as the government maintains the carbon-price trajectory and ensures that carbon-credit markets operate efficiently, its CCfDs need never be exercised.