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Closing the Carbon-Pricing Certainty Gap

Jason Clark
Michael Bernstein
Dale Beugin
Blake Shaffer
Jake Wadland

CLEAN PROSPERITY
CANADIAN CLIMATE INSTITUTE
L'INSTITUT CLIMATIQUE DU CANADA

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Abbreviations

BDC	Business Development Bank of Canada
CCfD	Carbon contract for difference
CCUS	Carbon capture, utilization, and storage
CCS	Carbon capture and storage
CfD	Contract for difference
CGF	Canada Growth Fund
CIB	Canada Infrastructure Bank
COP27	27th Conference of the Parties of the United Nations Framework Convention on Climate Change (2022 United Nations Climate Change Conference)
EDC	Export Development Canada
ERP	Emissions Reduction Plan (2030)
ETS	EU Emissions Trading System
FES	Fall Economic Statement
GGPPA	Greenhouse Gas Pollution Pricing Act
GHG	Greenhouse gas
ITC	Investment tax credit
MSR	EU ETS Market Stability Reserve
Mt	Megatonne
OBPS	Output-Based Pricing System
PBO	Parliamentary Budget Officer
REC	Alberta Indexed Renewable Energy Credit
REP	Alberta Renewable Energy Program
SDE++	Netherlands Stimulation of Sustainable Energy Production and Climate Transition subsidy
TIER	Alberta Technology Innovation and Emissions Reduction Regulation

Executive summary

The problem is uncertainty

Canada has committed to reducing its greenhouse gas emissions by 40-45% below 2005 levels, by 2030. That's less than eight years from now. It's an enormous challenge that demands bold, urgent, and unprecedented action.

A major obstacle stands in the way of achieving our targets, and we need to surmount it quickly in order to succeed. That obstacle is uncertainty: about the future of Canada's federal carbon price, and about the future value of carbon credits traded within Canada's industrial carbon-pricing systems. We call this problem **the carbon-pricing certainty gap**. This is a report about that problem, and how we can effectively address it — fast.

In order to meet the 2030 target, emissions need to come down rapidly, right across the Canadian economy. A significant share of the emissions reductions must come from three sectors in particular: oil and gas, heavy industry, and electricity generation. Together, these three sectors — call them "industry" for short — accounted for nearly half of Canada's 2020 emissions.

Canada has a plan to achieve its target — the 2030 Emissions Reduction Plan (ERP) — and a powerful policy tool: one of the most robust carbon-pricing systems in the world. Carbon pricing is explicitly the "cornerstone" of the 2030 ERP. Pricing incentivizes decarbonization by imposing a steadily increasing charge on emissions across the economy, set to increase to $170 per tonne by 2030.

But carbon pricing isn't yet working as well as it should. Decarbonizing Canadian industry requires billions of dollars in private-sector investments today to achieve our 2030 targets. In order for those investments to make sense for firms and investors, they must be confident that Canada's carbon price will actually increase as scheduled.

In addition, the value of carbon credits, which many firms are depending on to make their investments economical, must closely track increases in the carbon price.

Right now, many firms don't have the confidence to make urgently-needed investments in decarbonization, because they don't believe that Canada's carbon-pricing system is durable. A future federal government could freeze the carbon price, roll it back, or cancel it altogether. That would undermine the economic case for big investments in emissions reduction.

This is a real problem — it isn't theoretical. Over the course of dozens of conversations with industry, business associations, commercial investors, and other stakeholders, the authors heard again and again that the carbon-pricing certainty gap is inhibiting investment, and needs to be addressed urgently in order to accelerate industrial decarbonization.

The federal government recognized this problem in the 2030 ERP, and committed to addressing it. Building on this commitment, here's how we propose that the government should bridge the carbon-pricing certainty gap.

The solution is to reduce the uncertainty — now

The federal government should take urgent action to guarantee the scheduled increases in the carbon price through 2030, and to guarantee the future value of carbon credits. Reducing the policy risks faced by firms will accelerate investment in Canada's industrial decarbonization.

The federal government should announce its plan to address the carbon-pricing certainty gap as soon as possible, and detail it no later than the 2023 Federal Budget. This will show Canadian industry that the government is serious about guaranteeing the carbon price, and start driving urgently-needed investment right away. An ideal opportunity to announce the plan would be at the United Nations Climate Change Conference (COP27) in November 2022. This will help position Canada as a climate leader and back up the Prime Minister's global carbon-pricing challenge with tangible action.

To address the carbon-pricing certainty gap, governments should take three important steps. These recommendations are designed to send the widest possible signal across the economy, maximize emissions reductions, minimize costs to Canadian taxpayers, and be implemented rapidly in service of our 2030 emissions-reduction goals.

Recommendation 1: Introduce carbon contracts for difference (CCfDs)

Carbon contracts for difference (CCfDs) would guarantee Canada's federal carbon price. CCfDs are contracts between the federal government and firms that invest in new low-carbon projects. The contracts only pay out to firms in the event that the federal carbon price doesn't increase as scheduled.

CCfDs are an exciting innovation: they would accelerate industrial decarbonization, and require no new spending, regulations, or taxation. As long as the federal carbon price increases as scheduled, the government won't have to pay anything to CCfD counterparties. CCfDs could even offer a financial upside for the government.

Based on a report by the Parliamentary Budget Officer, we believe that a successful CCfD program could directly accelerate up to 40 million tonnes worth of emissions reductions by 2030.

Not only would CCfDs help insulate private-sector investments from changes to carbon-pricing policy by future governments, they also would make governments less likely to change the policy — because of the potential harms to Canada's reputation as a stable place to invest and to the government's relationship with the private sector, as well as the resultant financial costs. Strengthening the durability of Canada's carbon-pricing policy would have emissions-reduction benefits across the economy, by signalling to all large emitters in Canada that carbon pricing is here to stay.

To accelerate decarbonization, contracts for difference could be used not just to guarantee the federal carbon price, but might also be designed to guarantee the price of carbon credits, or to incentivize low-carbon production — as others have suggested. However, we consider that contracts for difference tied to carbon-credit prices could expose the government to too much liability, and that policy-contingent loans are better for this purpose. The problem of incentivizing low-carbon production, while important, is outside the scope of this report. Accordingly, we focus on using CCfDs to guarantee the federal carbon price.

How CCfDs work

A CCfD could pay the proponent of a low-carbon project the difference between the scheduled carbon price and the actual price in any year of the contract, multiplied by the project's emissions reductions.

For example, a firm that planned to invest in a carbon-capture facility to sequester a million tonnes of CO_2 per year could de-risk their investment by signing a CCfD with the government today, as a guarantee that the carbon price would increase as scheduled.

If a future government froze the carbon price at $95 per tonne in 2025, for example, the firm would become eligible to receive payments. The following year, the firm would receive a payment corresponding to the difference between the *scheduled* carbon price — $110 per tonne in 2026 — and the *actual* price — $95 per tonne — for each tonne of carbon emissions that their project sequestered.

CCfDs could also be structured to deliver revenue to the government, by setting the contract price below the scheduled carbon price — for example, $90.25 in 2025, a discount of 5% below the scheduled carbon price of $95 per tonne. A firm could choose the quantity of emissions reductions to insure within the contract. If the carbon price reached $95 per tonne in 2025, as scheduled, the firm would pay the government $4.75 per tonne. This design could help limit CCfDs to firms that really need them, and could incentivize private-sector investors to also offer CCfDs.

Essential elements of successful CCfDs

To maximize the effectiveness of CCfDs in bridging the carbon-pricing certainty gap, the CCfD program should:

- Guarantee Canada's carbon-price schedule to 2030 and beyond, with flexibility to account for potential future carbon-price increases beyond the current schedule.
- Only be available to new projects, since the purpose of CCfDs should be to incentivize additional decarbonization that is being inhibited by pricing uncertainty.
- Require that payouts to industrial decarbonization projects be tied to verifiable emissions reductions.
- Roll out rapidly, because we need to start accelerating industrial decarbonization immediately in order to achieve our 2030 targets.

- Limit participation to proponents of decarbonization projects only — no speculators.
- Offer the same standard, transparent contracts across sectors and projects. This will make CCfDs more efficient, avoid preferencing particular technologies, and make it more appealing for private financial institutions to participate as CCfD counterparties.

Offer CCfDs through Export Development Canada and the Business Development Bank of Canada

In order for CCfDs to quickly and effectively bridge the carbon-pricing certainty gap, it's important to offer them through the right federal government entities.

We believe that Export Development Canada (EDC) and the Business Development Bank of Canada (BDC), working collaboratively, would be the most suitable government entities to offer CCfDs. These arms-length Crown corporations can immediately begin to set the program in motion, and can capitalize on their investment experience and established business networks to support the rapid uptake of CCfDs.

CCfDs could also be offered by the Canada Infrastructure Bank (CIB), the new Canada Growth Fund (CGF), or by a federal government department. But we believe that the CIB is better suited to offering policy-contingent loans. The CGF will take too long to set up, making it a suboptimal choice to offer CCfDs in the near term — though it could be well-suited to offer CCfDs in the future. Offering CCfDs through a federal government department risks the CCfD program becoming politicized, putting the contracts in jeopardy of being cancelled by a future government.

Recommendation 2:
Prevent carbon-credit oversupply

Most industrial firms in Canada operate within output-based carbon-pricing systems, which charge carbon fees based on emissions intensity (i.e., emissions per unit of output). As firms invest in decarbonization, some of their emissions reductions allow them to avoid paying a carbon price, and the rest can be used to generate tradable carbon credits that they can sell to other firms to help meet their obligations under these pricing systems. Because only around 20% of emissions face a carbon price, it is the credits generated by decarbonization projects that provide a large share of the projects' potential value. Many firms are counting on the future value of carbon credits to make their decarbonization investments profitable.

Guaranteeing the federal carbon price with CCfDs will help to support the future value of carbon credits. But there's another problem that also needs to be addressed. As more decarbonization projects come online, there's a risk that markets could become oversupplied with credits, depressing credit prices and making both existing and future decarbonization projects uneconomic. This risk is discouraging investment by firms concerned that they won't be able to generate sufficient revenue from carbon credits.

To address the second part of the carbon-pricing certainty gap — uncertainty about the future value of carbon credits — the federal government should act to reduce the risk of credit oversupply. This means focusing on the provincial and territorial industrial carbon-pricing systems that regulate the vast majority of Canada's industrial emissions.

The government should begin taking steps to prevent carbon-credit oversupply now, in the fall of 2022. That's when Cabinet will approve industrial pricing systems for the 2023-2030 period, based on a common national standard, called the federal carbon-pricing benchmark. Specifically:

- The federal government should ensure that their evaluation of proposed provincial and territorial carbon-pricing systems incorporates modelling of carbon-credit markets under scenarios where Canada achieves a 40% reduction in emissions by 2030. The government should specifically assess the possibility that carbon-credit oversupply could undermine emissions-reduction goals, and should only approve systems that avoid creating an oversupply of credits.

- The federal government should only approve provincial and territorial systems if all the federal benchmark criteria are clearly met. Historically, this hasn't always been the case.
- The federal government should require all output-based pricing systems to create a public registry of all credit and offset transactions, including credit prices.
- The federal government should make clear that it will require provinces and territories to increase the stringency of their systems — increasing the share of emissions facing a carbon price, and consequently the demand for carbon credits — in the event that oversupply of credits becomes a problem.
- Here the government needs to carefully consider the impact of an increase in stringency on the international competitiveness of Canadian firms, and may require complementary measures to avoid carbon leakage.
- The federal government should also apply the measures proposed above to the federal output-based pricing system.

Recommendation 3: Offer policy-contingent loans to complement CCfDs

CCfDs should be the primary tool to bridge the carbon-pricing certainty gap. But the federal government should also offer policy-contingent loans to firms that invest in decarbonization projects.

Policy-contingent loans could complement CCfDs in helping to guarantee the federal carbon-pricing schedule, and could also help protect investors against volatility in carbon-credit prices. Since the government already offers other kinds of policy-contingent loans through the CIB, this initiative can be implemented quickly.

The repayment terms of these policy-contingent loans would improve — through a reduction in the interest rate on the loan, for example — if the federal carbon price fails to increase as scheduled, or if carbon-credit prices fall below a set threshold. Like CCfDs and measures to prevent carbon-credit oversupply, policy-contingent loans would give firms the confidence to invest in decarbonization today.

Act quickly to achieve our 2030 targets

The province of Alberta, the Netherlands, and the European Union as a whole have all used approaches we describe in this report to successfully accelerate industrial decarbonization. Other jurisdictions are considering them as well.

We believe that the federal government must act quickly and decisively to close Canada's carbon-pricing certainty gap, and that our recommendations can help achieve that objective. Bridging the certainty gap can unlock the full power of Canada's carbon-pricing system to drive the decarbonization of our economy, and help achieve our 2030 emissions-reduction target. We must act now to give ourselves the best chance of success.

Introduction: Uncertainty is holding up Canada's drive to decarbonize

We have an urgent need to decarbonize the Canadian economy in order to achieve our 2030 climate target and transition to a net-zero economy by 2050. To achieve these goals the Government of Canada has established an ambitious 2030 Emissions Reduction Plan (ERP) that, for the first time ever, charts our emissions-reduction pathway to the end of the decade. The plan proposes to reduce Canada's emissions by 40% below 2005 levels by 2030. Canada's carbon pricing regime is described in the ERP as the "cornerstone of Canada's approach to climate action." The federal government has set the carbon-price trajectory to 2030 to help achieve its emissions-reduction goals.

Despite these positive policy signals, Canadian industry is not yet investing in decarbonization projects at the speed required to reach our 2030 goals. An important reason for this is that firms are uncertain about the economic value of decarbonization investments. This is driven by two related problems that are together inhibiting the potential of carbon pricing to drive decarbonization: uncertainty about the carbon-price schedule, and uncertainty about the future value of carbon credits.

Uncertainty about the carbon-price schedule

The first problem is a lack of private-sector confidence that the carbon price will increase as scheduled to 2030. A rising carbon price is intended to motivate companies to decarbonize in order to avoid paying for their emissions in future years. But this incentive is being inhibited by uncertainty about whether the proposed pricing schedule will actually be implemented. Businesses and investors are concerned that a future federal government might not follow through on the steady and stable carbon-price increases currently proposed.

At best this uncertainty is delaying final investment decisions, and at worst it's endangering them — diluting what the carbon-price signal aims to achieve. In the short term, providing investors in major low-carbon projects with a mechanism for managing risks related to the carbon-price trajectory is an important step forward in building investor confidence. Over the medium term, particularly as we move past 2025, the federal government will need to set out the carbon-price trajectory for the period following 2030 in order to address investors' long-term uncertainties.

Post-2030 carbon-price uncertainty

Not only are investors uncertain about the carbon price reaching $170 per tonne in 2030, they're also concerned about the pricing trajectory after 2030. When industry and investors make major project decisions, they use time horizons that extend beyond 2030. Increasingly, they are seeking greater certainty about the long-term trajectory of the carbon price. In this report, we make the assumption that the carbon price will at least remain flat at $170 per tonne following 2030 and note that this should be sufficient to make many low-carbon projects and technologies economically viable.

Uncertainty about carbon-credit value

The second problem inhibiting carbon pricing from driving rapid decarbonization is uncertainty about the future value of carbon credits.

The majority of Canadian emissions are regulated by provincial and territorial industrial carbon-pricing systems. Industrial emitters earn carbon credits when they reduce their emissions below a specific threshold established for their industry or facility type. These carbon credits are tradeable and can be purchased by other firms, allowing the emissions-reducing project to generate a revenue stream and helping the purchaser to meet their carbon-pricing obligations.

Not all carbon-pricing systems and policies are the same across the country, to allow for regionally-appropriate approaches. Provinces and territories can design their respective industrial pricing systems to consider the structure of their economies and the sources of emissions. But these provincial and territorial systems must meet or exceed a minimum standard set by the federal government, known as the federal carbon pricing benchmark, that ensures the carbon-price signal is maintained and the schedule of price increases is met. If any of the sub-national industrial pricing systems are deemed not to meet the federal benchmark, then a national backstop — the federal Output-Based Pricing System (OBPS) — is imposed instead.

Credit oversupply risks creating a too-large gap between the carbon price and the carbon-credit price. There's a risk that markets could become oversupplied with carbon credits, causing credit prices to crash and making both existing and future decarbonization projects uneconomic. This would reduce the incentives for investment in decarbonization, since carbon-credit revenues are a key driver of the economic case for many decarbonization projects. If carbon-credit values are low, firms will not be able to generate the revenue that is required to make some projects economic. Uncertainty about the future price of carbon credits is cited regularly by industry as an inhibitor of investment in decarbonization projects.[1]

The expectation of low credit values is driven by several factors. One is that industrial pricing systems in some jurisdictions allow companies to use a very large share of their emissions reductions to generate credits. This contributes to credit-market oversupply and weakens the carbon-price signal.

A second factor is other policies — in addition to carbon pricing — that promote decarbonization. In Alberta, for example, many analysts expect to see significant investment in carbon capture, utilization, and storage (CCUS) projects thanks in part to the recently-introduced CCUS investment tax credit (ITC). There is a risk that these projects could generate an excess of carbon credits relative to the level of demand from industrial emitters in the province, leading to a decline in credit prices that would undermine the carbon-price signal. What could be a positive in the short term — significant decarbonization by some industrial emitters — could turn out to be a negative in the long term, as other emitters hold back on decarbonization because they believe their investments will generate insufficient carbon-credit revenues.[2]

Uncertainty about the future value of carbon credits could also be exacerbated by anticipated changes to provincial and territorial carbon-credit systems, following negotiations and approvals that are required to meet the updated federal benchmark for 2023-2030. The private sector is awaiting details on how provincial systems will change later this year, following negotiations and subsequent federal Cabinet approvals.

1 See also: Public Policy Forum, *Capturing a Carbon Opportunity* (Ottawa: Public Policy Forum, 2021). https://ppforum.ca/wp-content/uploads/2021/08/CapturingACarbonOpportunity-PPF-Aug2021-EN.pdf

2 Further complicating the picture is the fact that provincial carbon-credit markets are not linked to one another, or are not fully linked to the federal OBPS. These isolated markets may not have enough participants to ensure liquidity; decarbonization project proponents can't be certain that they will find buyers for the credits they generate. Credit demand in one province could be satisfied by supply from another — but only if the systems were to be integrated.

To maintain the effectiveness of the carbon-price signal and incentivize rapid industrial decarbonization, the federal government should act to ensure that carbon-credit prices remain closely coupled with the prevailing carbon price.

The carbon-pricing certainty gap

The interaction between these two risks — uncertainty about the carbon-price schedule and uncertainty about carbon-credit value — gives rise to what we call the carbon-pricing certainty gap. If the federal government only addresses the problem of confidence in the rising carbon price, for example through carbon contracts for difference (CCfDs), but does not address deficiencies in the carbon-credit market, then progress will be made, but the certainty gap will remain, continuing to dampen private investment in rapid decarbonization. The government needs to tackle both problems together to fully address the uncertainty and close the gap.

The good news is that the federal government has already recognized the certainty gap in the 2030 ERP. To support and enhance long-term carbon-pricing certainty, the 2030 ERP commits to exploring measures that will help guarantee Canada's long-term carbon price. Plus, the heavy lifting has already been done: the government has set up a steadily-increasing carbon-pricing regime that is designed to apply across the country, while taking into account provincial economic differences. And the government has been looking to regularly improve the program through measures like direct quarterly rebates to households, and by strengthening the benchmark requirements in advance of negotiations with provinces and territories on the next phase of carbon pricing.

There is a short window of opportunity to address the carbon-pricing certainty gap if decarbonization projects are going to be built in time to achieve Canada's 2030 targets. We therefore recommend that the federal government move quickly to announce its intention to deliver a CCfD mechanism as soon as possible, and detail it no later than Budget 2023.

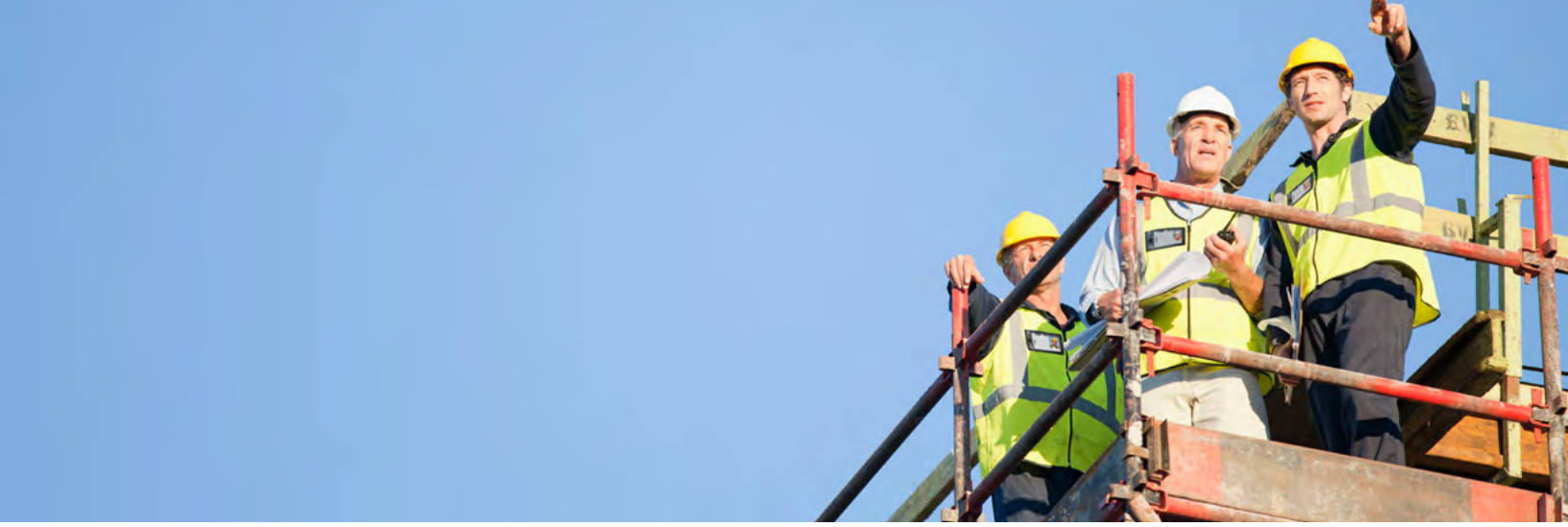
The rest of this report will explore several policy options to address the two problems outlined above and close the certainty gap. The report will analyze the suitability of these options relative to policy objectives, look at relevant international and domestic case studies, and consider potential homes for any future mechanism within the federal government. Finally, this report will provide recommendations for federal government action in the 2023 Budget.

Our recommendations focus on how to maximize carbon pricing's potential to incentivize decarbonization projects that are economic at or below $170 per tonne. Other stakeholders have highlighted the need to incentivize projects that cost more than $170 per tonne, especially for first-of-a-kind low-carbon technology. While we recognize that there is a need to address this "production incentive gap," especially as we transition to a net-zero economy in 2050, it is outside the scope of this report. We highlight this point here in part because all three challenges — the two highlighted in this report and the production incentive gap — could theoretically be solved through contracts for difference, which has resulted in differing policy proposals to address the three different challenges. Table 1 below distinguishes between these three policy challenges, and looks at how CCfDs could be used to address them. In the discussion that follows, we explain why we believe that the priority for CCfD policy should be addressing pricing-schedule uncertainty.

Table 1: Application of CCfDs to three policy challenges

Policy challenge	Potential CCfD solution	Practical example	In scope for this report?
Pricing-schedule uncertainty: Firms don't feel confident enough in the carbon-price schedule to make major investments in decarbonization.	A CCfD could stipulate a payment per tonne that would be issued to firms if the carbon price doe s not increase as scheduled.	A future government freezes the federal carbon price at $95 per tonne in 2025. Beginning in 2026, firms that have signed CCfDs receive compensation to offset the fact that the carbon price did not increase as scheduled.	
Carbon-credit value uncertainty: Firms are uncertain about the future price of carbon credits and thus are unable to justify investments in decarbonization that would require healthy credit prices to make the potential projects economic.	A CCfD could be structured around actual carbon-credit prices received by a decarbonization project, with payments triggered if the project does not hit specified revenue thresholds.	A firm expects to sell carbon credits at an average price of $85 per tonne, but instead earns $60 per tonne. A CCfD might pay the firm $25 per tonne based on the lower than expected revenue.	
Production incentive gap: Some decarbonization projects are not economic even if the carbon price rises to $170 per tonne and carbon-credit values remain at healthy levels. This policy challenge is not about uncertainty in relation to the current carbon-pricing regime.	A CCfD could be signed on a per tonne basis to cover the gap between the carbon price per tonne and the revenue per tonne needed to make the project economic.	A firm has a first-of-its-kind carbon-capture project that costs $250 per tonne. A CCfD might pay the firm $80 per tonne in 2030 and beyond to account for the difference between the $250 per tonne cost and the $170 per tonne carbon price.	

Policy options



To address the two integrated problems of uncertainty about the carbon-price schedule and uncertainty about the future value of carbon credits, which together are creating the carbon-pricing certainty gap, the federal government has a number of possible policy options. Addressing both problems is important. We recognize that the federal government may want to focus first on increasing certainty about the carbon price itself but, for reasons described above, we recommend it also act in the near term to address uncertainty about the value of carbon credits. Both problems must be addressed to close the certainty gap.

Increasing carbon-pricing certainty

The best policy options available to the federal government to increase private-sector confidence that the carbon price will reach $170 per tonne by 2030 are carbon contracts for difference (CCfDs) and policy-contingent loans. We believe that both mechanisms are complementary and effective tools for increasing certainty about the carbon-price schedule and accelerating decarbonization. For reasons described below, we recommend that the federal government prioritize CCfDs. We recommend that CCfDs be offered jointly by Export Development Canada (EDC) and the Business Development Bank of Canada (BDC).

We also believe that policy-contingent loans are an effective tool for supporting low-carbon projects and that the Canada Infrastructure Bank (CIB) should be encouraged to expand its offering of these loans, possibly increasing the size of its overall loan portfolio to enable more projects to move forward.

Together, these policy tools can close the first half of the certainty gap.

We briefly consider legislative amendments as a solution to the carbon-pricing gap, as proposed in the 2030 ERP, but do not find that legislative changes alone will provide the certainty required to unlock investments.

Option 1: Carbon contracts for difference (CCfDs)

A CCfD is a contract between the government and the proponent of a new low-carbon project, which guarantees that if the federal carbon-price backstop is below a specified level at a specific point in time, then the federal government will pay the project owner the difference between that specified level and the prevailing carbon price.

The federal government could offer to sign CCfDs to help mitigate the carbon-pricing risks faced by proponents of new low-carbon projects that are relying on pricing to make their projects economic. The goals of establishing a CCfD mechanism should be (1) providing a guarantee to the carbon price and its scheduled annual increases, to help de-risk new low-carbon projects that reduce or remove emissions; and (2) increasing carbon-pricing policy durability.

CCfDs would help insulate investments from changes in policy direction by future governments, and make governments less likely to change carbon-pricing policy because of the costs they would incur from doing so. Policy changes that strand major private-sector investments would also harm the country's standing as a reliable place to invest, presenting a further disincentive.

CCfDs could be used to address at least three policy challenges related to decarbonization, as outlined in Table 1 above — carbon pricing-schedule uncertainty, carbon-credit value uncertainty, and the production incentive gap. All three policy challenges matter and will require support from the federal government to address, but we argue that government should prioritize CCfDs that are designed to address the carbon-pricing certainty gap identified in the 2030 ERP.

We also recommend that the government take urgent steps to address carbon-credit value uncertainty, but we argue below that other tools are more appropriate to address this problem than CCfDs.

The production incentive gap — which affects decarbonization projects that are only economic at carbon prices above the scheduled maximum of $170 per tonne — is a very different policy challenge that this report does not address. While we recognize

the importance of addressing that gap, especially for long-term decarbonization, we are focused on ensuring that the existing carbon-pricing system is able to live up to its potential. This is what is needed to achieve our 2030 emissions-reduction goals, in particular the reductions that carbon pricing is expected to deliver. Strengthening the existing system is the best way to create favourable conditions for long-term decarbonization.

How CCfDs work

Under the terms of a CCfD, the federal government could agree to pay — for example — the proponent of a carbon capture, utilization, and storage (CCUS) project the difference between $170 per tonne and the prevailing carbon price annually. If the carbon price is $170 per tonne in 2030, as scheduled, the government would pay nothing to the company. If the federal carbon price was only $95 per tonne, the government would pay the company $75 per tonne (multiplied by a contract quantity unit, Q, described below). Note that these values are solely for purposes of illustration.

We believe that the federal government could consider structuring CCfDs in a way that offers it some potential upside, by tying the contract to a lower amount than the expected carbon price in a given year — for example, $161.50 per tonne in 2030, a discount of 5% relative to the scheduled carbon price in that year. If the carbon price reached its intended level of $170 per tonne in 2030, the company would owe the government $8.50 per unit Q. At carbon prices below $161.50 per tonne, the company would receive a payout. Companies might be willing to pay a premium in return for the government de-risking their projects.

In our view, offering a CCfD with a contract price below the carbon price is not necessary to create an effective de-risking mechanism, but it could have the benefit of delivering a financial upside for the federal government in return for offering a form of insurance on the carbon price. It would also help ensure that the program focused on firms who truly need a CCfD to move forward with decarbonization investments. The potential downside is that it could increase costs for the decarbonization projects that the policy is trying to incentivize, which already have high costs.

A CCfD that provided some compensation for the transfer of risk could incentivize private financiers, such as commercial banks, to partner with the government on CCfDs. These financiers would help underwrite the contract in order to benefit from the potential upside if the carbon pricing schedule was maintained. This would have

the additional benefit of strengthening carbon-pricing policy durability by crowding in additional private actors with stakes in maintaining the carbon-pricing schedule.

The formula for calculating CCfD payouts in any given year of a contract would be as follows:

Payout = (Contract Price — Actual Price) x Quantity (Q)

A negative payout amount implies payment owing from the project proponent to the government[3], while a positive amount implies payment owing from the government to the proponent. In the illustrative base-case scenario we describe above, in which CCfDs are priced 5% below the anticipated carbon price, the CCfD payout formula could look like the following in 2030 for each quantity unit, Q:

Contract Price: $161.50 — Actual price: $170 = -$8.50 x Quantity (Q)

As discussed, this implies a payment owing of $8.50 per quantity unit, from the project proponent to the government. If a future government were to delay the scheduled rate of increase in the carbon price, stalling at $95 per tonne in 2025 for example, the scenario in 2030 would look like this:

Contract Price: $161.50 — Actual price: $95 = $66.50 x Quantity (Q)

This scenario implies a payment owing from the government to the project proponent, at a rate of $66.50 per quantity unit, Q.

The government only faces a payment obligation if it doesn't follow through on the intended carbon-pricing schedule. Signing CCfDs would therefore reduce the risk that future governments might weaken the schedule, because doing so would trigger significant financial obligations.

3 This payment would be offset by the fact that the firm would presumably be paying less in carbon taxes because the stable price signal incentivized them to decarbonize. It would also be offset by credits generated from their decarbonization.

While CCfDs could be denominated in many ways, we propose that the government sign contracts for a "CCfD unit quantity Q", where Q is multiplied by the payout rate described above to calculate the potential payout in any given year. CCfD counterparties would be allowed to choose a quantity that best suits the risk and other characteristics of their decarbonization project, up to a maximum quantity corresponding to the project's total decarbonization potential (i.e., if an emissions-reduction project would reduce 500,000 tonnes of CO_2e in a given year, the contract quantity could not be higher than 500,000 in that year). CCfDs should also be limited to counterparties with new decarbonization projects, and should exclude speculators looking to simply trade on the future value of carbon emissions.

Any CCfD should be tied to tangible emissions-reduction or removal commitments from project proponents to ensure that the federal government is de-risking only those investments that support Canada's emissions-reduction goals. If a future government triggers a payment obligation under a CCfD, the payment should be contingent on the counterparty verifying that it achieved the emissions reductions implied by the payout. For example, if a CCUS project proponent signs a CCfD for 500,000 units then it must prove that it captured 500,000 tonnes of carbon in order to receive a payout in the year the contract is exercised. Ideally, these emissions reductions should be calculated on a lifecycle basis[4]. However, given the complexity of verifying emissions reductions, we recommend that the verification requirements apply only to large emitters, meaning any emitter already regulated by an industrial pricing program, whether the federal OBPS or a provincial or territorial system. Smaller emitters should be permitted to validate reductions in a more streamlined fashion; for example, payouts could be conditional on submitting clear proof that the project proponent implemented the proposed project (e.g., receipts for purchasing carbon-capture equipment).

Federally-backed CCfDs would be just as viable in jurisdictions with their own industrial pricing systems as they would be in jurisdictions using the federal OBPS. Even if a province or territory chose to cancel their industrial pricing system, the federal backstop would immediately take effect and support the intended carbon-price escalation. Payments under the CCfD would only be triggered if the federal government chose to weaken the carbon-pricing schedule. Given this design, CCfDs could be implemented without triggering concerns of federal intrusion into provincial and territorial jurisdiction.

4 The proponent should also validate that emissions intensity has declined as part of its verification. The contract must avoid a situation where a CCfD counterparty can demonstrate emissions reductions that occurred only because of a decline in production.

To ensure maximum potential participation in the program, the federal government should consider establishing a standardized, transparent CCfD. A standardized contract would make the process more efficient, helping to get projects launched faster. An alternative or complementary approach could be to run a recurring competitive bidding process for participation in the CCfD program, if the government was interested in differentiating payouts among firms and projects. An example of a competitive process is explored in the Dutch SDE++ program case study in Appendix B.

A standard, transparent contract would also offer another significant advantage: it would increase the likelihood that private-sector actors — such as banks, insurance companies or other financial institutions — might participate in the CCfD market. Financial institutions might choose to participate as co-underwriters of a government-sponsored CCfD, or they might choose to offer their own CCfDs, as they gain confidence in the future carbon-pricing schedule, based on seeing the government sign CCfDs. There are also other creative ways the government could consider inducing third-party participation; for example, by packaging CCfDs as an investment vehicle for the general public, similar to Canada Savings Bonds. Allowing the public to participate in the CCfD program would provide greater policy durability, by further broadening the base of stakeholders committed to the program's continuation.

To provide sufficient certainty to project proponents, we believe that it will be necessary for CCfDs to have durations of at least 10 years, and ideally 15 years, commencing from the date of project operation, to account for the long lifespans of large decarbonization projects. One approach to accommodating long-duration projects would be to offer an "extended-length first-mover" CCfD with an even longer duration — 20 years, for example — for a first tranche of projects, to incentivize quick uptake of the agreements.

CCfDs should be structured to settle any payments owing on an annual basis, for the duration of the contract. The future-year payout levels specified in contracts with durations that extend beyond 2030 — the end-point of the current carbon-pricing schedule — should update automatically if and when the government schedules new increases in the carbon price, in order to extend the CCfD de-risking incentive. An explicit price floor of $170 per tonne (potentially subject to a discount rate as described above) on CCfDs dated beyond 2030 would protect against the possibility of future governments reducing the carbon price after that date, further supporting long-term certainty for investors.

We recommend that the government commit to uniform annual strike prices across all contracts. In some other jurisdictions (explored below), CCfDs are structured with

differentiated payout levels based on sector, technology or activity, with the primary objective of keeping costs low while driving decarbonization. However, differentiating rates within contracts in the Canadian context is not necessary, in our view, because the goal of the contracts is to never have to pay out anything. Plus, even if the contracts risk being seen as generous to project proponents, this could serve as a net positive, as it would further discourage future governments from revising the carbon-price schedule in a way that could trigger payouts. A simpler, standardized CCfD structure could also help reduce the time needed to design and launch the program, and it would make it easier for smaller firms to participate.

A successful Canadian CCfD could accelerate up to 40 Mt of new low-carbon projects by 2030

While it is difficult to estimate precisely, we believe that a realistically successful CCfD mechanism could enable up to 40 Mt worth of emissions reductions from new low-carbon projects. These are emissions reductions that are part of the 2030 ERP targets, and are expected to be achieved through carbon pricing — but that need the additional incentive of CCfDs to get moving.

CCfDs should be structured to support new industrial low-carbon projects — across the oil and gas, electricity, and heavy industry sectors — that are regulated by federal, provincial or territorial industrial carbon-pricing systems. These industries are relying on carbon pricing to justify potential investments in decarbonization and thus would be particularly interested in signing CCfDs to guarantee the price escalation to $170 per tonne. Additionally, to achieve the 2030 ERP's goals of de-risking projects and guaranteeing the long-term carbon price, the CCfD program could extend beyond heavy industry to include new projects in the light manufacturing, transport (i.e., fleet decarbonization) and commercial buildings sectors.

A report by the Parliamentary Budget Officer (PBO) forecast that carbon pricing would drive 47 Mt of industrial emissions reductions. Our 40 Mt estimate assumes that projects responsible for 30 Mt — roughly two-thirds of that 47 Mt — would sign CCfDs. In addition to that amount we expect that the de-risking power of CCfDs will help accelerate 5 Mt of forecast industrial emissions reductions that the PBO attributes to climate policies other than carbon pricing, plus 5 Mt of emissions reductions from projects that are subject to the fuel levy system.

CCfDs imply limited contingent liabilities

CCfDs could help incentivize new low-carbon projects at no additional cost to the government, as long as the carbon price rises as scheduled, to $170 per tonne in 2030. A CCfD program would almost surely be considered a contingent liability in the government accounts, impacting the net government debt but having no impact on the deficit unless the carbon-pricing schedule was not maintained.

The government would only incur liabilities if carbon pricing was not implemented according to schedule. If, for example, the carbon price was frozen at $95 per tonne in 2025, annual government liabilities would peak at approximately $3 billion in 2030, in order to pay out against the 40 Mt of emissions reductions that we anticipate the CCfD program would incentivize by the end of the decade. If carbon pricing was cancelled entirely in 2026, the maximum annual liability would reach $6.8 billion in 2030.

Further details on the potential size of the CCfD program, and the associated liability, is included in Appendix A.

Option 2: Policy-contingent loans

A second option the federal government could consider to address the carbon-pricing certainty gap is to offer policy-contingent loans, as an alternative or complement to CCfDs. Similar to CCfDs, the goals of establishing a policy-contingent loan program should be twofold: (1) to guarantee the carbon price and its scheduled annual increase, in order to de-risk low-carbon projects; and (2) to increase carbon-pricing policy durability, in order to insulate investments from a change in policy direction by future governments.

Policy-contingent loans, or a carbon-pricing loan program, would provide long-term loans to low-carbon project proponents wherein the terms improve for the borrower if the prevailing carbon price falls below the scheduled carbon price. The terms of the loan could be improved by lowering the interest rate or forgiving a portion of the principal repayment. Unlike a CCfD, which provides a direct payment to project proponents if the carbon price does not reach the scheduled level, a policy-contingent loan could provide indirect financial compensation.

Policy-contingent loans have advantages and disadvantages relative to contracts for difference. One advantage is speed of implementation — policy-contingent loans tied to the carbon-pricing system could be offered today through the CIB. The CIB has the expertise and ability to initiate these types of agreements, and already provides other types of policy-contingent financing.

Another benefit is that policy-contingent loans can more easily be customized to specific project circumstances and specific regional carbon-market dynamics, in contrast to a standardized CCfD. For example, the repayment terms could be differentiated according to the economics and risk profiles of specific projects. Terms could also more easily match the emissions-reduction trajectory of a decarbonization project (e.g., if a project plans to begin reducing emissions only after five years of operations, or if emissions reductions are closely linked to unpredictable production changes).[5]

On the other hand, a more nuanced mechanism risks blunting the signal that the federal government wants to send across the economy, that it is serious about maintaining the carbon-pricing schedule. The added complexity could also reduce

5 While CCfDs could also be customized in these ways, it would add significant cost and complexity to the structure. The entities within the government that are likely to offer policy-contingent loans, such as the CIB, already undertake significant due diligence as part of their contracts with counterparties, and the incremental effort to incorporate policy contingency into their contracts is likely to be a lighter lift.

the perceived risks of dismantling this system for a future government, by making the potential consequences harder to discern.

Another important downside is that a policy-contingent loan requires that the government initially assume greater risk than a CCfD. Both the policy-contingent loan and the CCfD assume policy risk — the government incurs liabilities if the carbon-pricing schedule changes. But a policy-contingent loan also carries credit risks that may be independent of carbon-pricing policy risk. The government has no particular comparative advantage in holding these additional risks, and thus it may be better for policy-contingent loans to be issued by a financial institution with expertise in interest-rate hedging and credit markets.

Box 1: Legislative changes to the Greenhouse Gas Pollution Pricing Act

While not explored here in detail, another mechanism that could increase the durability of carbon-pricing policy is an amendment to the Greenhouse Gas Pollution Pricing Act (GGPPA) that excludes the possibility of deviating from the established schedule of carbon-price increases. The GGPPA could be amended to only allow increases to the price trajectory or expansion of the scope of greenhouse gases within the legislation, with majority approval in the House of Commons. Legislative changes, however, would not be sufficient on their own to resolve the carbon-pricing certainty gap, unless paired with an additional policy response such as one or both of the options above, because a future majority in the House of Commons could pass new legislation to amend or cancel the carbon-pricing schedule. The perceived benefits of revisiting the GGPPA would also need to be balanced against potential costs, such as the possibility that, in the midst of rising concerns about inflation and the cost of living among households and business, it would open the door to political re-interrogation of carbon pricing.

Potential homes for a carbon pricing certainty mechanism

There are various federal government entities that could lead the development and delivery of a future carbon-pricing certainty mechanism, whether CCfDs or policy-contingent loans. As political uncertainty is at the root of the carbon-pricing certainty gap and the federal government is seeking to de-risk future investments, we begin by considering arms-length Crown corporations — as the government entities most immune to political intervention — followed by federal government departments. Note that the options below are not mutually exclusive — the government could consider offering CCfDs and policy-contingent loans through multiple government entities.

Export Development Canada (EDC)

EDC should be strongly considered as a potential home for a carbon-pricing certainty mechanism, for several reasons.

As Canada's export credit agency, EDC has an established network of major domestic business partners, significant financial expertise, a mandate to operate domestically that was expanded during the pandemic, and experience in successfully deploying a range of financial instruments to support government policy direction. The clearest example of the latter is the Canada Account, a tool utilized to support export transactions by authorization of the Minister of International Trade, for transactions that, while outside the scope of EDC's mandate, are judged to be in the national interest. The transactions are handled by EDC but risks are assumed by the federal government. The Canada Account has been utilized 31 times since its inception for financing and guarantees. Transactions over $50 million or of a sensitive nature are, in practice, approved by Cabinet.

EDC has a commitment to transitioning to net-zero emissions from its operations and portfolio by 2050. The institution has recognized that a major step for it to achieve this goal is to support its customers to reduce emissions while also increasing support for businesses aligned with the low-carbon transition. A directive from the federal government to EDC to act as the home for a carbon-pricing certainty mechanism, or as an interim home to allow a pricing-certainty mechanism to be stood up rapidly, would align with the corporation's commitment to reduce emissions and emissions intensity. Further, if the carbon-pricing certainty mechanism were to include carbon-removal technologies such as direct air capture, this could help EDC to more quickly achieve its net-zero goal.

EDC recently launched a three-year, $1 billion Sustainable Financing Guarantee program with BMO to guarantee up to half of the bank's loans to carbon-intensive medium- and large-sized businesses to help them lower their emissions, at up to US$60 million per borrower for a term of seven years. The program will allow the bank to offer a greater number of loans than it otherwise would.

EDC has a strong track record of multi-party support and investment delivery across both Liberal and Conservative governments. Since it operates at arms-length from the government, with the exception of some investment tools such as the Canada Account, it has a generally lower profile and is less likely to become a focus of political debate, making it a good potential home for a mechanism to de-risk carbon pricing policy.

Under the Export Development Act, EDC is responsible for supporting and developing domestic business at the request of the Minister of International Trade and the Minister of Finance, and must operate in a manner that complements the products and services available from commercial financial institutions. Housing a carbon-pricing certainty mechanism at EDC could have the dual benefit of reducing political uncertainty and further integrating responsibility for emissions reductions and carbon-pricing durability across additional Cabinet portfolios.

EDC has increasingly focused on the intersection between corporate investments and climate action. In collaboration with BDC, EDC has established a precedent for utilizing financial tools to support domestic firms in navigating unprecedented disruption. In response to the COVID-19 pandemic, EDC's mandate was expanded to provide additional support to domestic businesses, administering both the Canada Emergency Business Account and Business Credit Availability Program, the latter in coordination with BDC. With these programs, BDC and EDC also demonstrated their ability to quickly implement and manage new time-sensitive programs.

Further, EDC has a successful track record of launching and guiding programs with innovative mandates, like its subsidiary FinDev Canada, which drew on EDC's financial and commercial expertise.

Business Development Bank of Canada (BDC)

The federal government should consider BDC as a potential collaborator with EDC on a carbon-pricing certainty mechanism. This could provide even greater political certainty, and enable the federal government to send a wider economic signal by including more medium-sized projects and enterprises, allowing for even further emissions reductions.

Just as BDC and EDC collaborated to support businesses during the COVID-19 pandemic, enabling them to work together to support the net-zero transition could deliver a wider economic signal, and maximize emissions reductions for large and medium-sized businesses. BDC's infrastructure and established business networks would be a big asset in rapidly standing up a carbon-pricing certainty mechanism.

BDC has financial expertise and a growing portfolio of low-carbon and innovation-focused clients. BDC Capital already has its Industrial Innovation Venture Fund, and the Industrial, Clean and Energy Technology Venture Fund. These funds invest in both legacy industries and cutting-edge technologies to support industrial and digital transformation, and enhance Canadian economic advantage. This suggests that BDC already has the focus and expertise to quickly build a pipeline of medium-sized companies with projects that could be supported by deploying CCfDs.

Canada Infrastructure Bank (CIB)

As highlighted in a 2021 C.D. Howe Institute memo on the carbon-pricing certainty gap, in many respects the CIB is a natural home for any carbon-pricing certainty mechanism, based on the Bank's mandate to de-risk major infrastructure projects, with a focus on environmental sustainability and prosperity goals. The CIB already offers policy-contingent loans, and could scale up these offerings, making it an ideal candidate to offer these instruments as a complement to CCfDs.

According to the Bank's April 2022 Spring Update, the CIB has leveraged approximately $7.6 billion across five priority sectors: Transport ($2.9 billion), Green Infrastructure ($0.6 billion), Clean Power ($1.5 billion), Broadband ($1.6 billion) and Trade and Transportation ($0.5 billion). The CIB has drastically accelerated the growth of its investment portfolio — of the 28 investment commitments made since its inception, 20 were added in fiscal 2021-22. The CIB Growth Plan, launched in October 2020, effectively aligns the Bank's priorities with the decarbonization objective that underpins any carbon-pricing certainty mechanism. The growth plan established a $10 billion, three-year plan to accelerate Canada's low-carbon transition by investing in clean power, green infrastructure, and

public transit projects. Building on this, Budget 2022 broadened CIB's role to include industrial decarbonization projects. With this new Budget announcement, the Bank clearly has the financial capacity and authority to sign agreements that address carbon-pricing certainty.

The CIB can be directed to carry out any additional function specified by the Governor in Council that is conducive to its purpose of attracting revenue-generating infrastructure investments by private-sector and institutional investors — in particular investments that foster economic growth or contribute to infrastructure sustainability.[6] According to the Canada Infrastructure Bank Act, the Minister of Finance can transfer up to $35 billion in aggregate, or any greater aggregate amount authorized under an appropriation act. Additional funds could be allocated to the Bank to support an expanded policy-contingent loan facility. Providing this direction in the 2022 Fall Economic Statement (FES) or Budget 2023 would effectively complement a CCfD mechanism and demonstrate multiple approaches to enhancing carbon-pricing certainty. To do so, however, the Minister of Infrastructure would also have to revise the instruction previously given to CIB to limit the government's net fiscal expense through the Bank to $15 billion.

Canada Growth Fund (CGF)

The Canada Growth Fund (CGF), the proposed arm's-length public investment vehicle announced in Budget 2022, has high potential as a prospective home for a carbon-pricing certainty mechanism. The CGF has an explicit mandate to focus on reducing emissions and contribute to Canada's climate goals, economic diversification, and the restructuring of supply chains to help achieve the low-carbon economic transition. The Fund will be allocated $15 billion in initial capital and will have the aim of leveraging public funding to mobilize private capital at a ratio of three to one.

The government will announce details about the CGF in FES 2022, which could align well with the need for a rapid response to the carbon-pricing certainty gap. However, establishing a new institution takes time, and there is a pressing need for carbon-pricing certainty to start accelerating industrial decarbonization. There is a significant risk that the CGF will not begin operating soon enough to deliver carbon-pricing certainty in time to help meet Canada's 2030 climate goals. This means that the CGF is not an ideal near-term home for a carbon-pricing certainty mechanism — but it should be considered as a future home once the institution is operational.

6 https://www.laws-lois.justice.gc.ca/eng/acts/C-6.18/FullText.html

Standing up a new program within a federal department

The federal government could also choose to permanently establish any carbon-pricing certainty mechanism within a relevant government department, such as Innovation, Science and Economic Development Canada. This would provide direct control and potentially ensure a faster timeline for developing the mechanism, thanks to the ability to focus departmental resources at the discretion of the minister.

There is international precedence for establishing a carbon-pricing certainty mechanism within a national government. For example, the Dutch SDE++ program (see Appendix B) is run by the Netherlands Enterprise Agency as part of the Ministry of Economic Affairs. However, placing any mechanism within a federal department could further politicize policy action, and could increase the risk that a future government might cancel contracts or loans it did not like. It could also create coordination challenges between relevant departments (e.g., Finance and Environment).

If the federal government decided to establish the mechanism within a federal department, it may be least contentious to place the program within Innovation, Science and Economic Development, or at the Department of Finance. This would help to ensure that economic considerations are also central to the program design.

Increasing carbon-credit value certainty

Addressing uncertainty about the future value of carbon credits is critical to closing the carbon-pricing certainty gap. It's essential that carbon-credit prices increase along with the federal carbon price, in order to incentivize investment in decarbonization projects that are counting on selling credits to industrial emitters in order to generate revenue.

The overall goal should be to minimize the spread between the carbon price and the price of carbon credits. Or, put another way, we should avoid a scenario where credit supply exceeds demand, as oversupply leads to lower prices. Currently, there is a risk that carbon-credit oversupply will undermine Canada's emissions-reduction goals. Here's why.

Emitters buy carbon credits to meet their compliance obligations under provincial and territorial output-based carbon pricing systems. This means that the maximum demand for carbon credits, in aggregate, must correspond to the total amount of emissions that face a carbon price.

But only about 20% of industrial emissions across the country currently face a carbon price. There's a big risk that there won't be enough demand for all the credits generated by the industrial decarbonization projects that will launch in the coming years. Low credit demand would depress credit prices — which would not only discourage investment in new decarbonization initiatives, but would also defeat the purpose of the carbon price, since emitters could simply purchase cheap credits to meet their obligations, instead of reducing their emissions.

The risk of oversupply may be exacerbated by other climate policies. New low-carbon projects will be coming online in response to policies like the Clean Electricity Standard, the investment tax credit for CCUS, and the forthcoming oil and gas emissions cap. These policies increase the likelihood that there will be a large supply of credits in the output-based pricing markets, but would not stimulate a proportionate increase in demand.[7]

The federal government has tried to address the risk of credit oversupply through the criteria it established for approving provincial and territorial systems for the next phase of carbon pricing, from 2023-2030. In particular, the federal government's criteria include a provision requiring provinces and territories to demonstrate that demand for credits will exceed supply in any given compliance year. In theory, this could be sufficient to address the credit-value uncertainty challenge. But there are reasons why this provision may not sufficiently protect against credit oversupply.

First, some of the sub-national industrial pricing systems that were approved in the previous period were accepted by the federal government even though they were inconsistent with the federal benchmark, and incorporated design principles that compromised the pricing signal. Once again, there will be political pressure on the federal Cabinet to accept systems that don't align with the federal benchmark. It's essential that Cabinet only approve industrial pricing systems that can clearly demonstrate how they are designed to ensure that carbon-credit demand will exceed supply.

Second, the models that federal, provincial, and territorial systems will use to assess compliance with the federal criteria are imperfect predictors of the future. There are many factors that will impact the future demand and supply of credits, which are

7 This may be most problematic for heavy industry, as opposed to oil and gas firms or electricity generators. The oil and gas and electricity sectors will both face regulations — the oil and gas emissions cap, and the Clean Electricity Standard — that will force emissions down even if credit values are low. But heavy industry does not have an equivalent regulation and thus may see even lower demand for their credits.

challenging to model. One particularly salient factor is future climate policy at both national and sub-national levels. New policies — such as proposed tax credits for clean technology that have not yet been fully developed — will impact both demand and supply in ways that are difficult for the models to predict. Further, new clean technology could be deployed faster than modelled — a factor made more plausible by the recent passing of a major US climate bill subsidizing clean technology, the Inflation Reduction Act.

Third, the increase in the share of emissions that would need to face a carbon price (i.e., the rate at which stringency would need to increase) is far beyond what the federal government or any province seems to be contemplating. Both the federal OBPS and Alberta's provincial system, the Technology Innovation and Emissions Reduction Regulation (TIER), have proposed to increase the share of emissions facing a carbon price by 2% annually. But analysis of the TIER system (see Box 2 below) shows that Alberta would need to increase the share of emissions that are charged a carbon price by 5% per year in order to avoid an oversupply of credits, in a scenario where Alberta industry reduces emissions in line with the 2030 ERP. A 5% tightening would be quite aggressive — and would mean over 20% more emissions facing a carbon price by 2030, relative to Alberta's 2% proposal. Tightening at this increased rate would require careful consideration of competitiveness concerns and might require complementary measures such as a border carbon adjustment.

It will also be difficult for the federal government to enforce the criterion that provincial and territorial systems avoid an oversupply of credits because there is a lack of public information about the value of credits and offsets. If prices for credits were trading well below the prevailing carbon price, there would be no way for the government or the public to know this, since all transaction data is currently private.

The federal government could address the challenges highlighted above through actions that would strengthen the federal benchmark which governs provincial and territorial systems. We present those steps as option 1 below. We also describe three other options the federal government could pursue to address uncertainty about the future value of carbon credits — establishing a floor price for credits, allowing fuel distributors to purchase credits, and using policy-contingent loans.

Below we also explore the idea of allowing credits generated in one system to count against obligations in another. We don't find this approach to be viable, due to the potential for credits generated in a system with more lax emissions standards being used to offset emissions in another, ultimately weakening the price signal.

Box 2: Alberta's industrial pricing system and the risk of oversupply

Alberta's industrial pricing system, the Technology Innovation and Emissions Reduction (TIER) Regulation, regulates over 50% of all industrial emissions in Canada. Analysis by Clean Prosperity, in partnership with Grant Bishop of Knightfork, demonstrates that there is a significant risk of credit oversupply in the TIER market under a scenario where the targets in Canada's 2030 ERP are achieved.

In particular, we estimate that an ERP-consistent scenario would require TIER-regulated facilities to reduce their emissions by approximately 70 Mt by 2030, which means that to avoid an oversupply of credits and offsets, TIER would need to apply to at least 70 Mt of emissions across regulated facilities.

Our analysis suggests that TIER would only be able to regulate 70 Mt of emissions if the system stringency — i.e., the share of emissions facing the carbon price — increased by 5% per year from 2023 through 2030 (in addition to lowering the high-performance benchmark for electricity to zero by 2035).

This 5% tightening rate is far beyond the 2% rate proposed by the Alberta government in its initial discussion paper on TIER design for 2023-2030, as well as the 2% tightening rate proposed for the federal OBPS. This finding suggests a significant risk of credit oversupply, though we also acknowledge that a 5% tightening rate would present significant competitiveness concerns.

Option 1: Prevent carbon-credit oversupply

The federal government can take multiple steps to ensure a strong federal benchmark, including:

Evaluate credit oversupply risks in 2030 ERP scenarios: As part of evaluating whether provincial or territorial industrial pricing systems have met the federal benchmark, federal modelling should specifically test for carbon-credit oversupply risks against the emissions-reduction objectives of the 2030 ERP. Provincial and territorial systems should not produce an oversupply of credits under a scenario where industrial facilities in their jurisdictions reduce emissions in line with Canada's emissions reduction plan. The federal government should ensure this is the case by modelling just such a scenario. An example of this type of analysis for the Alberta industrial carbon-pricing system is discussed above in Box 2.

Only approve provincial and territorial systems if all criteria are clearly met: Negotiations between the federal government and the provinces and territories have been ongoing in earnest throughout the year and the federal Cabinet decision to approve provincial and territorial pricing systems for the 2023-2030 period is required before the end of 2022. As Cabinet reviews proposals by provinces and territories, it is critical that only systems that strictly align with the updated benchmark be approved.

Require public reporting of credit transactions: The federal government should require provinces and territories with output-based pricing systems to create an online public registry of all credit (and, where relevant, offset) transactions including quantities and prices. Transaction data should be posted to the registry with the least possible delay. While the hope would be that provinces and territories would voluntarily take this step, at present there is no clear way to determine the market price of carbon credits traded within industrial pricing systems. The lack of such data makes it difficult to know if and when adjustments to system design may be required due to low credit values.[8]

The current federal benchmark criteria call for provinces and territories to "publish regular, transparent reports and/or information on the key features, outcomes, and impacts of their carbon pricing systems, as well as on compliance information and carbon market data where publication could enhance accountability, and carbon market

8 Another problem is that the opacity of the system favours incumbents, who have experience trading credits, relative to new entrants who lack this experience. Transparent data would also allow the creation of financial instruments to help market participants and project developers hedge risks (e.g., futures contracts).

function and oversight." Unfortunately, the criteria do not specifically require publishing of information on credit-market transaction prices. We believe the federal government should make the publication of such data a requirement at the earliest possible date (ideally as part of the approval of systems for the 2023-2030 period).

Require system changes if credit oversupply occurs: The federal government should require provinces and territories to increase stringency in the event that oversupply of credits becomes a drag on any of the sub-national output-based pricing systems. The federal government has already planned a review of the output-based pricing systems in 2026, but we believe the government should communicate to the provinces and territories that they will require increases in stringency as early as 2024, if credit market oversupply depresses credit markets. For example, greater stringency could be required in any system where the average credit price over any 12-month period is more than 30% below the prevailing carbon price. This criterion would be inserted into the updated federal carbon pricing benchmark.

Increase stringency in 2027 at the latest: If carbon pricing is going to continue to be a core driver of decarbonization, the stringency of output-based systems will have to increase. Even though it is likely too late in the process to require greater stringency ahead of the 2023 start of the second phase of industrial pricing, we encourage the federal government to consider increasing stringency at the earliest possible date. Under the current guidelines, the next opportunity for making adjustments to the federal benchmark is in 2027, which is why we've encouraged the federal government to make changes if credit oversupply becomes a concern. We further recommend that the federal government provide a clear signal that it intends to increase stringency as part of its review of industrial pricing systems scheduled to occur in 2026, with any changes coming into force in 2027. The earlier that industry understands that stringency will increase, the less likelihood there will be of a sharp decline in the price for carbon credits.

The federal government should lead by example, by making the same changes recommended above to the federal OBPS.

Any increases in stringency within federal or sub-national output-based pricing systems will need to also consider competitiveness concerns and may require complementary measures to avoid carbon leakage.

Option 2: Establish a floor price for the carbon-credit market

The second option that the federal government could consider to increase certainty about the future value of carbon credits is to set a floor price for the carbon-credit market and utilize its purchasing power to buy credits at this price. This floor price would need to be established for credits generated across the OBPS (performance credits, offset credits, and banked credits) and credits from provincial industrial pricing systems, such as Alberta's TIER system.

The floor price could be adjusted each year and would always be below the prevailing carbon price. In a robust market, carbon-credit prices should be very close to the carbon price, so the floor price should be set at a modest discount to the carbon price. While the federal government could also consider adjusting the floor price for credits generated by different types of decarbonization projects, this would add greater complexity and could inadvertently be seen as preferencing certain technologies over others. The advantage, of course, is that there would be less risk of overpaying for certain decarbonization projects — for example, solar projects may require a much smaller return on their credits than CCUS projects.

A federal floor price, however, creates an important moral hazard that must be addressed if this option is pursued. Provincial and territorial governments might view the federal floor price as a potential subsidy to firms in their jurisdictions. These governments might deliberately enact policies that make it easier to generate credits that companies can use to take advantage of the federal floor price. For this reason, the federal floor-price option is not an ideal policy response and should only be pursued in tandem with a policy like strengthening the benchmark, which would reduce the pool of credits over time, thus reducing the moral hazard.

Option 3: Allow fuel distributors to purchase credits

The third option that the federal government could consider is to expand the carbon-credit market by allowing fuel distributors to avoid paying the federal carbon tax if they purchase credits from an approved industrial pricing system (either the federal OBPS or an equivalent provincial system, such as TIER). Making this change to the fuel-levy rules would boost total demand for carbon credits within industrial pricing systems.

Fuel distributors currently face the full carbon price under the federal fuel levy. Under this option, distributors would be able to participate in the OBPS or an equivalent provincial system to avoid paying the full carbon price by purchasing credits. The Western Climate Initiative, in which Quebec is a participant, allows trading of emission allowances along these lines. In Quebec, fuel distributors buy 100% of their allowances at auction, or on the market.

Our recommendation focuses on the federal fuel levy rather than provincially-run carbon-tax systems because only British Columbia, Prince Edward Island, and the Northwest Territories have their own systems (British Columbia also has no industrial pricing system currently) and we assume it wouldn't be worth the complication of mandating this change based only on those three jurisdictions. One significant effect of this proposal is that it would reduce revenues earned from the fuel levy because some — perhaps many — fuel distributors would buy cheaper carbon credits to avoid paying the carbon price.[9] This would reduce the rebates paid to Canadians to offset their fuel-levy costs.

Allowing fuel distributors to participate in carbon-credit markets is one way to increase demand for credits and reduce the risk of low prices. We considered other options to increase demand — such as increasing linkages between carbon credit markets (see Box 3) — but believe that incorporating fuel distributors is the most viable path to achieving this objective.

9 The impact would depend on how many distributors purchased credits. Today the fuel-levy payments made by fuel distributors far exceed the value of the credits generated via industrial pricing systems, but this could change in the future, especially as decarbonization accelerates.

Option 4: Offer policy-contingent loans with terms that vary based on credit prices

The federal government could address the risk of low carbon-credit values by offering policy-contingent loans with terms that vary based on the market price of carbon credits. For example, the interest rate on a policy-contingent loan could be reduced, even made negative, if average credit prices in a given year fall below a threshold. By adding provisions to deal with pricing-schedule uncertainty, as detailed earlier in this report, policy-contingent loans could address both parts of the carbon-pricing certainty gap. As discussed above, the CIB is an ideal home for these policy-contingent loans, based on their expertise and existing ability to deliver such a product.

Contracts for difference could also be a potential solution if tied to the price of carbon credits, but such contracts would likely expose the federal government to significantly higher levels of financial liability than a CCfD designed to address carbon-price uncertainty. As such, we don't recommend this approach.

Box 3: Increasing the linkages between carbon credit markets

Another idea that we considered, but do not include in the main body of the report because of the potential risks, is for the federal government to work with the provinces to ensure that carbon credits generated in one market can be sold, and count against obligations, in another jurisdiction's market. This could better enable future demand in one jurisdiction to be met with future supply from another.

For example, if there are several new CCUS projects coming online in Alberta before 2030, a likely prospect given the recently announced CCUS ITC and efforts to increase carbon-pricing certainty, then there would be a significant increase in the number of credits generated under the Alberta TIER system. Without expanding the market, these carbon credits would have a limited number of potential buyers. Prices could drop, eroding the carbon-price signal.

Further, as previously noted, a low value for carbon credits hurts the business case for future decarbonization projects that rely on income from credits to attract investment. This challenge could be mitigated by having a larger pool of potential buyers to purchase these excess credits. In the Alberta example, industrial emitters from other provinces, such as Ontario, might decide to purchase excess credits in the Alberta market.

There is clear precedent for linking carbon markets. For example, the Western Climate Initiative, the largest carbon market in North America, includes participants from California, Quebec, Nova Scotia, and soon Washington state as well.

There are two reasons why this option is not viable, in our view. First, the linking of markets could undermine the efficacy of more stringent systems by providing access to credits from less stringent ones. To extend the earlier example, the low credit value in Alberta might actually result in low credit values in Ontario, Manitoba, and other linked systems. Second, there could be perverse effects if pricing systems based on emissions intensity, such as the OBPS, are linked to systems based on absolute emissions reductions, such as cap-and-trade systems.

Policy design considerations

How should the federal government choose among the options presented above and design the specific policy mechanisms that address the problems of carbon-price and carbon-credit value uncertainty?

In this section, we suggest that the government address the certainty gap in a way that sends the widest possible signal across the economy, maximizes emissions reductions, minimizes costs to Canadian taxpayers, and enables new policy to be implemented as rapidly as possible to get new projects into operation before 2030.

We summarize our evaluation of the options against these criteria in Table 2 below.

Table 2: Policy options evaluated against design criteria

Pricing schedule options	Widest signal	GHG reductions	Minimize cost	Speed
CCfDs	✓	✓	✓	✓
Policy-contingent loans	✗	✓	-	✓✓
Credit value options				
Strengthen benchmark	✓	✓✓	✓✓	-
Floor price	✓✓	✓	✗✗	✓✓
Incorporate fuel distributors	-	-	✓	✓
Policy-contingent loans	✗	✓	-	✓✓

Note: Check marks indicate positive ratings, "X" denotes a poor rating, and "-" indicates a neutral rating.

How can the government send the widest possible signal across the economy?

To best address the political risk of carbon-pricing uncertainty, the policy design should prioritize options that send the widest possible signal across the economy. For pricing-schedule uncertainty, that means maximizing access to mechanisms like CCfDs or policy-contingent loans. For credit-value uncertainty, that means providing the greatest possible confidence that the credit market is unlikely to be oversupplied.

Both CCfDs and policy-contingent loans have the potential to send an important signal across the economy, by striking multiple individual agreements that mitigate the carbon-pricing risks associated with decarbonization projects. However, CCfDs are likely to send a broader signal, for several reasons. First, CCfDs add a straightforward guarantee to the carbon price that is intuitive for actors across the economy to understand. If the government says they will pay out $161.50 per quantity unit in 2030, for example, investors can have confidence in this price. In contrast, policy-contingent loans require more complicated calculations to understand the value they provide to counterparties worried about a change in the pricing schedule.

Second, CCfDs can theoretically be signed by any decarbonization project proponent, whereas policy-contingent loans would require a counterparty that is willing to accept project financing from the government. In designing a CCfD the federal government could choose to establish a standard commercial contract that guarantees a standard rate to any project proponent that can meet the specified emissions-reduction criteria, as previously discussed. This could attract both innovative large-scale projects with major emissions-reduction or removal potential, as well as smaller low-carbon projects that also could benefit from de-risking — for example, in the light manufacturing, transport (i.e., fleet decarbonization) and commercial buildings sectors. The CCfD contract template could also be publicly available to increase transparency and enable a wider and faster project intake.

Overall, the CCfD should lend itself to the broadest possible participation and send the widest policy signal across the economy if it is structured in a way that is standardized, transparent, and scalable.

The strongest and widest signal the federal government could send to reduce uncertainty about the future value of carbon credits would be to guarantee a price floor. That would be a clear solution to the risk of a crash in the price of carbon credits

(barring a change in policy by a future government). However, as we will see below, this is also the most expensive policy. In contrast, strengthening the federal benchmark would also send a broad signal across the carbon-credit market — reducing supply and increasing demand — but without significant cost. The third option — allowing fuel distributors to purchase carbon credits — increases market size and thus demand, but sends a narrower signal, by leaving credit supply and prices untouched. The fourth option, policy-contingent loans, also sends a narrower signal, given that loans are only likely to be signed with a relatively small number of large emitters.

How can the government maximize emissions reductions?

Any policy option selected should seek to maximize verifiable emissions reductions, all else equal. Both CCfDs and policy-contingent loans can be structured in a way that ensures emissions reductions. In either case, contracts should include an emissions-reduction or removal threshold commitment from the project proponent that would have to be met in order to receive any compensatory benefits. Any policy should also tie financial outcomes to life-cycle emissions reductions. For example, in the case of a CCUS project, the emissions generated by the carbon capture process itself should be included in the net abatement calculation. An exception could be made for smaller actors (e.g., those not subject to an industrial pricing system), who should be able to access financing with a lower burden of proof, as described above.

Verifying that carbon credits represent real emissions reductions is a larger issue than closing the carbon-credit value certainty gap. However, any of the options presented above should be designed to ensure that credits traded in the carbon markets are truly additional, and consider the net impact of the activity that is being credited.

If maximizing emissions reductions were the sole criterion, the floor price for carbon credits would be the best of the four options presented in this report to address uncertainty about future carbon-credit values — because, as discussed in the previous section, it provides the greatest confidence that credit prices will not crash.

How can the government minimize the cost to the Canadian taxpayer?

Any federal policy action to address the carbon-pricing certainty gap should seek to minimize the fiscal burden on taxpayers. This is simply good public policy. In particular the federal government should try to avoid paying companies to take actions they may have taken anyway, in the absence of policy.

CCfDs present a lower potential cost burden to the taxpayer than policy-contingent loans. If future federal governments remain committed to the carbon-price schedule then there is no additional cost to the taxpayer, as the government would never be required to pay out to a project proponent. Further, CCfDs can be a source of revenue for the federal government, because project proponents might be willing to pay the government for the de-risking instrument, as explored above.

In terms of upfront cost to taxpayers the opposite is true of a policy-contingent loan, wherein the federal government would be required to allocate funding in its fiscal framework, to be provided at the time of project approval. If a future federal government deviated from the carbon-price schedule, the government could incur costs from loans whose interest rates turn negative or that forgive principal repayment in the event of policy changes. Policy-contingent loans also carry the risk of the borrower defaulting.

Both CCfDs and policy-contingent loans could be structured in a way that increases the likelihood of private-sector participation, thereby reducing public liability and increasing the stakeholder base, which should also contribute to policy durability. We believe that standardized CCfDs — by virtue of their simplicity and transparency — have a better chance of crowding in private capital, including from retail investors, as discussed above. Policy responses that have a greater likelihood of attracting more private capital should be preferred, all else equal.

Overall, CCfDs are the preferred option for minimizing the impact on the taxpayer — as long as the federal government remains on its current carbon-price schedule and policy trajectory.

Strengthening the federal benchmark would be the lowest-cost option for addressing credit-value uncertainty as it avoids the government having to buy credits, an approach which could cost many billions of dollars. The strengthened benchmark also has another

potential advantage — it could generate additional revenue for decarbonization, by asking firms to pay more for their emissions. Other options are likely to cost more. Allowing fuel distributors to purchase credits would not have a fiscal impact but would reduce carbon-pricing revenue that could be redistributed to Canadians.

How can the government most rapidly implement the preferred policy options?

The federal government should announce its plan to address the carbon-pricing certainty gap as soon as possible, and detail it no later than the 2023 Federal Budget. This will show Canadian industry that the government is serious about guaranteeing the carbon price, and start driving urgently-needed investment right away.

There is likely a short-term advantage to policy-contingent loans in terms of speed of implementation, as the CIB already signs deals of this nature right now. However, based on the design proposed above, we hope that CCfDs could also be implemented rapidly, making them a viable option as early as 2023.

The fastest route to providing greater certainty in the carbon-credit market would be to announce a floor price. Other mechanisms would require technical adjustments to credit markets across multiple jurisdictions. In contrast, the federal government could presumably announce tomorrow that it is willing to buy carbon credits at a specified price in each of the individual markets.

Strengthening the federal benchmark could also be announced in the medium term, but this approach scores less highly on speed because it could take years before a credit-market oversupply problem is identified and for corrective action, such as increased stringency, to come into force.

Recommendations

The federal government should announce its plan to address the carbon-pricing certainty gap as soon as possible, and detail it no later than the 2023 Federal Budget. This will show Canadian industry that the government is serious about guaranteeing the carbon price, and start driving urgently-needed investment right away. An ideal opportunity to announce the plan would be at the United Nations Climate Change Conference (COP27) in November 2022. This will help position Canada as a climate leader and back up the Prime Minister's global carbon-pricing challenge with tangible action.

Based on the assessment above, we recommend three key actions:

Recommendation 1: Introduce CCfDs to address uncertainty about the future price of carbon

We believe that the federal government should act quickly to address uncertainty about the carbon-price schedule using CCfDs as its primary tool. CCfDs offer a much wider signal to the economy and come with a lower cost to the government than policy-contingent loans. This does not mean abandoning policy-contingent loans; in fact, the government should look to leverage policy-contingent loans in the short term, since the CIB has the ability to implement them right away and it will take time before a CCfD program is established. But we believe CCfDs should be the priority focus over the long term.

The CCfD design should:

- Guarantee the carbon-price schedule to at least 2030 and ideally beyond, with flexibility to account for potential future carbon-price increases.

- Only be available to new projects, since the purpose of CCfDs should be to incentivize additional decarbonization that is being inhibited by pricing uncertainty.
- Require that any payouts to low-carbon projects be tied to verifiable emissions reductions (with more flexible requirements for smaller emitters).
- Roll out rapidly, because there is a need to start accelerating industrial decarbonization immediately in order to achieve our 2030 targets.
- Limit participation in the program to proponents of decarbonization projects only (i.e., no speculators).
- Consider providing potential upside to the government by setting the contract strike price slightly below the expected future carbon price.
- Be a standard, transparent contract with the same terms applied across sectors and projects. A standard contract makes the process more efficient and avoids the policy indirectly acting as a subsidy to certain technologies. Standard contracts also maximize the likelihood of third-party actors, such as banks, participating in the underwriting of some of the contracts, or designing their own similar contracts that they might offer in the private market.

Establish a home within government for CCfDs, such as EDC and BDC

CCfDs should be offered by an arms-length Crown corporation that can immediately begin to set the program in motion, and that can capitalize on investment experience and an established business network to support the rapid uptake of CCfDs by project proponents. We believe that Export Development Canada (EDC) and the Business Development Bank of Canada (BDC), working collaboratively, would be an appropriate choice to house CCfDs. Together these institutions already have a domestic mandate, experience offering insurance products, and an established network of large and medium-sized companies.

Recommendation 2: Prevent carbon-credit oversupply

To address the second component of the carbon-pricing certainty gap — uncertainty about the future value of carbon credits — the federal government should take steps that reduce the risk of credits being oversupplied in the provincial and territorial industrial pricing systems that regulate the vast majority of Canada's emissions. These steps include:

- **Evaluate oversupply risk in 2030 ERP-consistent scenarios:** As part of evaluating whether provincial or territorial industrial-pricing systems have met the federal benchmark, federal modelling should specifically test for carbon-credit oversupply risks against the emissions reductions objectives of the 2030 ERP. Provincial and territorial systems should not result in an oversupply of credits under a scenario where industrial facilities in their jurisdictions reduce emissions in line with the 2030 ERP. Federal modelling should ensure this is the case before any provincial or territorial systems are approved for the 2023-2030 period.
- **Only approve provincial and territorial systems if all benchmark criteria are clearly met:** The federal Cabinet will determine in the fall of 2022 whether the industrial pricing systems submitted by provinces and territories meet the federal benchmark criteria. The cabinet should only approve systems if all criteria are clearly met.
- **Require public reporting of credit transactions:** The federal government should require provinces and territories with output-based pricing systems to create an online public registry of all credit (and, where relevant, offset) transactions, including quantity and price of trades. Transaction data should be posted to the registry with the least possible delay. The lack of such data makes it difficult to know if and when adjustments to system design may be required due to low credit values.
- **Require system changes if credit oversupply occurs:** The federal government should require provinces and territories to increase stringency in the event that oversupply of credits becomes a drag on any of the sub-national output-based pricing systems. The federal government has already planned a review of the output-based pricing systems in 2026, but we believe the government should require changes in stringency as early as 2024, if credit-market oversupply depresses credit prices. For example, greater stringency could be required in any system where the average credit price

over any 12 month period is more than 30% below the prevailing carbon price. This criterion would be inserted into the updated federal carbon pricing benchmark.

The federal government should lead by example by making the same changes recommended above to the federal OBPS, including ensuring that the system will not face oversupply if the 2030 ERP decarbonization targets are met, publicly reporting on credit transactions, and tightening system design if credits do become oversupplied.

Any increases in stringency within federal or sub-national output-based pricing systems will need to also consider competitiveness concerns and may require complementary measures to avoid carbon leakage.

Recommendation 3: Offer policy-contingent loans to complement CCfDs

While we recommend CCfDs as the primary tool for addressing pricing-schedule uncertainty, and steps to reduce the risk of carbon-credit oversupply to address uncertainty about the future value of carbon credits, policy-contingent loans can also be an important complementary tool to address both components of the carbon-pricing certainty gap.

The terms of policy-contingent loans to low-carbon project proponents would improve for the borrower if a) the prevailing carbon price falls below the scheduled carbon price, and/or b) the average price of credits falls below a threshold. Policy-contingent loans can help deliver additional certainty to firms, helping to protect them both against risks associated with changes in the carbon-pricing schedule and volatility in carbon-credit prices. Policy-contingent loans also offer the advantage of being easily customized to the needs of individual decarbonization projects.

Loans designed to address the carbon-pricing certainty gap should be offered through the CIB. The CIB already has the funds, authority, and expertise needed to implement policy-contingent loans, which means that they can be implemented more quickly than CCfDs, or the steps we propose above to address carbon-credit oversupply.

Conclusion: we must act quickly to close the gap

We believe that the federal government must act quickly and decisively to close Canada's carbon-pricing certainty gap, and that our recommendations can help achieve that objective. Bridging the certainty gap can unlock the full power of Canada's carbon-pricing system to drive the decarbonization of our economy, and help achieve our 2030 emissions-reduction target. We must act now to give ourselves the best chance of success.

Appendix A: CCfD emissions reductions and contingent liabilities

Clean Prosperity analysis suggests that a successful Canadian CCfD mechanism, if announced as soon as possible and detailed no later than Budget 2023, could help accelerate up to 40 Mt of emissions reductions by 2030.

These reductions could be achieved at no additional cost as long as the carbon price rises as scheduled, to $170 per tonne in 2030. The government would only incur liabilities if carbon pricing was not implemented according to schedule. If, for example, the carbon price was frozen at $95 per tonne in 2025, the annual government liabilities would peak at approximately $3 billion in 2030, in order to pay out against the 40 Mt of emissions reductions the CCfD program incentivized by the end of the decade (see Table 3). If carbon pricing was cancelled entirely in 2026, the maximum annual liability would reach $6.8 billion in 2030.

CCfDs should be structured to support new industrial low-carbon projects — across the oil and gas, electricity, and heavy industry sectors — subject to federal, provincial or territorial industrial pricing systems that could be expected to reduce emissions economically if the carbon-price schedule is maintained. These industries are relying on carbon pricing to justify potential investments in decarbonization and thus would be particularly interested in signing CCfDs to guarantee the price escalation to $170 per tonne.

How much industrial decarbonization could carbon pricing incentivize? What share of those decarbonization projects would be likely to sign CCfDs?
The Parliamentary Budget Officer (PBO) has estimated that an increase in the carbon price from $50 to $170 per tonne could reduce emissions by 47 Mt by 2030 across the heavy industry, oil and gas, and electricity generation sectors. But the potential pool of low-carbon projects interested in CCfDs could be larger, because these same industrial sectors will also need to cut an additional 61 Mt of emissions by 2030 in order to meet

the targets established by Canada's 2030 ERP (this excludes anticipated emissions reductions from legislated policies announced before the ERP). While these emissions reductions would not come from carbon pricing alone, carbon pricing may provide an important part of the business case for the investments needed to achieve them, and thus the project proponents may still want to sign CCfDs.

Additionally, to achieve the ERP's goals of de-risking projects and guaranteeing the carbon price, the CCfD program could extend beyond heavy industry to include new projects in the light manufacturing, transport (i.e., fleet decarbonization) and commercial buildings sectors.

We estimate that a realistically successful CCfD program could enable 40 Mt worth of emissions reductions from new low-carbon projects, in support of the 2030 ERP goals. Our 40 Mt estimate assumes that projects responsible for 30 Mt of emissions reductions would sign CCfDs, corresponding to roughly two-thirds of the 47 Mt of forecast reductions attributed to carbon pricing by the PBO. In addition to that amount we expect that CCfDs will incentivize 5 Mt of emissions reductions from other industrial decarbonization projects (from the pool of 62 Mt of reductions driven by non-pricing policies), plus 5 Mt of emissions reductions from projects that are subject to the fuel levy system.

Table 3: Emissions reductions from carbon pricing and other measures in 2030

	From carbon pricing		Other policies		TOTAL	
	Emissions reductions (Mt)	CCfD demand (Mt)	Emissions reductions (Mt)	CCfD demand (Mt)	Emissions reductions (Mt)	CCfD demand (Mt)
Industry (oil and gas, electricity, heavy industry)	47	30	62	5	109	35
Non-industry (transport, buildings, waste, other)	49	5	43	0	92	5
TOTAL	96	35	105	5	201	40

Note: The reductions listed are relative to the reference case for 2030 from the PBO's 2021 report. Emissions reductions achieved by legislated policies are not included in the total reductions.

There are a variety of reasons why emitters may choose not to sign a CCfD. For example, some decarbonization projects may be economic at the current carbon price, and may not see the need for a CCfD. If the government charges a premium to firms for signing CCfDs, some may not be interested in having to pay out to the government if the carbon price schedule is realized.

What is the potential financial liability and realistic future cost of a CCfD program to the federal government?

If the carbon price increases as scheduled to 2030 there will be no cost to the federal government, and any financial liability that the federal government carries during that period would be avoided entirely. We believe that CCfD payment obligations could be booked as a contingent liability, impacting the net government debt but having no impact on the deficit.

Nonetheless, it is worth understanding the potential future financial liabilities that the federal government may face if carbon pricing was frozen or cancelled. In such a scenario, the government's liabilities would depend on a number of factors, including the contract structure, year of cancellation, and scope of the program, among others. To help in understanding the government's contingent liability exposure, our 40 Mt scenario is based on the following assumptions:

1. Strike price: The contingent liability exposure of any CCfD program will be based on the contracts' strike prices. For this analysis, we assume a strike price that matches the carbon pricing schedule (i.e., $170 per tonne in 2030).
2. Eligibility criteria: To enhance long-term certainty for new low-carbon projects and send a wide economic signal that guarantees the carbon price, we propose that the CCfD program should be open to projects that face both an industrial carbon price, such as the federal OBPS or Alberta TIER, as well as projects that are subject to the fuel levy. That would allow projects not only from the heavy industry, oil and gas, and electricity generation sectors, but also projects from sectors like transportation (i.e., fleet decarbonization), commercial buildings, and light manufacturing.
3. Contract duration: We consider the minimum duration of a CCfD to be 15 years. This duration strikes a balance between providing sufficient certainty to enable new low-carbon projects, and minimizing the government's contingent liability.
4. Future changes to the carbon-pricing schedule: We assume that there are no changes to the price schedule before October 2025, which is the latest date for the next federal election. We consider cases where carbon pricing is frozen at the 2025 level of $95 per tonne, or cancelled altogether.

5. Demand from decarbonization proponents: The number of low-carbon project proponents that sign CCfDs will influence the government's contingent liability exposure. We have utilized analysis from the PBO and the 2030 ERP to suggest that a realistic and successful CCfD program could contract up to 40 Mt of new low-carbon projects by 2030.
6. Timing of contract signing: We assume that 33% of total CCfDs (13.3 Mt of new low-carbon projects) are signed in 2023, the first year of the program, and a further 33% are signed in each of 2024 and 2025.
7. Terms of exercise: We assume that CCfDs are structured to pay out to low-carbon project proponents the difference between the prevailing and scheduled carbon price, once per year, every year that the contract remains valid.

Based on the assumptions above, we present the maximum annual potential costs of this CCfD scenario in Table 4. If the carbon price was frozen at $95 per tonne in 2025, the peak cost in 2030 would be $3 billion. If carbon pricing was cancelled entirely, the total cost would rise to $6.8 billion annually in 2030. Liabilities would continue in this scenario until 2040.

Table 4: Federal liability scenarios: carbon pricing capped or cancelled (2023-2030)

	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Scheduled carbon price ($/tonne)	65	80	95	110	125	140	155	170
CCfD uptake by industry (oil and gas, electricity, heavy industry) (Mt)	11.655	23.31	35	35	35	35	35	35
CCfD non-industry update (transport, buildings, waste, other) (Mt)	1.665	3.33	5	5	5	5	5	5
Liability if price capped at $95/tonne in 2025 ($ millions)				600	1,200	1,800	2,400	3,000
Liability if carbon pricing cancelled in 2026 ($ millions)				4,400	5,000	5,600	6,200	6,800

Appendix B: International and domestic case studies

There are a number of relevant international and domestic examples that can be considered as the federal government seeks to close the carbon-pricing certainty gap. While Canada would not be the first jurisdiction to address carbon-pricing uncertainty, most other efforts, internationally and domestically, have focused on narrower parts of the policy challenge. Below, we present case studies from the Netherlands, the European Union, and Alberta, and briefly look at Germany.

It's important to think about Canada's climate policy within the international context, because climate change is ultimately a global problem that requires global solutions. Canada can position itself as a leader in the global race to decarbonize by rapidly delivering a carbon-pricing certainty mechanism that works to accelerate emissions reductions.

Establishing a certainty mechanism not only has the potential to strengthen the carbon-pricing regime nationally but also reinforces the fundamental role that pricing can play in the global economy to enable the net-zero transition. As such, announcing a carbon-pricing certainty mechanism in 2022 will not only have positive impacts on the Canadian economy, but also aligns with the Prime Minister's global carbon-pricing challenge launched at COP26, and shows that Canada is walking the talk.

Netherlands Stimulation of Sustainable Energy Production and Climate Transition subsidy (SDE++)

The Netherlands has one of the most innovative pricing-certainty programs in the world for decarbonization investment deployment. Canada can build on the Dutch experience with the potential to provide an even broader — and more cost-effective — signal to the market.

The Dutch program, named Stimulation of Sustainable Energy Production and Climate Transition Subsidy (SDE++), aims to accelerate deployment of renewable energy and other CO_2-reducing projects.

The SDE++ is structured to pay successful project applicants a subsidy for the unprofitable component of a decarbonization project. To calculate the unprofitable portion, the Dutch government first calculates the costs associated with a given project technology and then subtracts the expected revenue from the project, including potential revenue from selling credits into the EU Emissions Trading System (ETS). Funding is provided through a mechanism that acts as a kind of phased reverse auction where applicants with lower-cost technologies (e.g., solar) are considered separately from higher-cost technologies (e.g., CCS). Each category has a maximum subsidy amount but, within a given category, applicants who ask for a lower subsidy amount are preferenced over those asking for a higher subsidy, thereby incentivizing companies to accurately reflect how much they need to cover the unprofitable components of a project.

In practice, the SDE++ program acts like a contract for difference tied to the carbon price, because the subsidy level can fluctuate in a given year based on the prevailing price of credits in the EU ETS. For example, the Dutch government signed a large contract through SDE++ for a 2.5 Mt-per-year CCS project at the Port of Rotterdam, which commits to paying the project developers the difference between €80 and the ETS price. If the ETS price averages €50 in a given year, for example, the project receives €30 per tonne of carbon captured.

Subsidies are granted for periods of 12 or 15 years, with annual adjustments made to account for changes in expected revenue that project types can generate (e.g., if the price of solar rises, or the value of ETS credits drops).

In 2022 the ceiling subsidy intensity, or amount the Dutch government agrees to contribute to a given project, is €300 per tonne. Projects with higher subsidy intensities could still apply, but the unprofitable component may not be entirely reimbursed.

The SDE++ has a budget of €13 billion for 2022. It has provided contracts worth more than €55 billion since 2011.

While the Dutch case study is a contract for difference mechanism, the policy objective and political context are different from Canada's current circumstance. The Dutch program was designed to both address uncertainty in the EU cap-and-trade market and cover the financing gap for low-carbon projects that may not be economic even

under high cap-and-trade prices.[10] In contrast, Canada has a direct carbon price, and the policy challenge described in Canada's 2030 ERP was to provide confidence in the existing price schedule, which is why the ERP commits the government to "exploring measures that guarantee the price on pollution," further noting that "this includes… investment approaches, like carbon contracts for difference."[11]

The CCfD design proposed in this report seeks to close the carbon-pricing certainty gap in order to incentivize the new decarbonization projects needed to reach our 2030 goals. We believe that the type of CCfD we present in this report more directly addresses the policy objectives established by the 2030 ERP. We do not oppose Canada also using CCfDs to bolster early-stage and thus higher-cost decarbonization projects that need support beyond $170 per tonne to address the production incentive gap, but we note that this is a different policy objective to that discussed in this report and in the 2030 ERP.

European Union Emissions Trading System (EU ETS)

The EU ETS is one of the world's largest carbon markets and is considered a "cornerstone" of the EU's policy for cost-effective emissions reductions. Established in 2005, the EU ETS faced a major challenge in its early years because carbon credits ("emission allowances" under ETS terminology) had extremely low values, often below €10 per tonne.

The EU ETS addressed this challenge by reducing the supply of credits in order to increase credit values. The EU directly intervened in the ETS market with both short-term and long-term measures over multiple years, which collectively succeeded in supporting the value of carbon credits.

The first intervention was backloading, whereby the ETS held back a large number of credits that were scheduled to be released into the market starting in 2013, and instead issued them several years later. The impetus for this move was a surplus of more than 2.1 billion credits in the ETS at a price between three and five euros.

10 The Dutch introduced a direct carbon price on industry in 2021, after the launch of SDE++. This makes future carbon prices more certain, but still leaves uncertainty about the value of emissions credits generated in the ETS.

11 Environment and Climate Change Canada, 9.

By 2015, the number of credits on the market had fallen to around 1.78 billion as a consequence of backloading, helping increase the credit price to €6–€10. Backloading reduced the carbon-credit surplus by 40% in 2015, relative to what it would have been otherwise. The ETS achieved this by cutting the volume of allowances at auction by 400 million in 2014, and by 300 million in 2015. A further 200 million allowance units were cut in 2016.

The EU took a second important step to restrict supply and raise allowance prices in 2019, through the Market Stability Reserve (MSR). The MSR automatically reduces the supply of allowances auctioned by transferring allowances into a reserve when the total number in circulation is above 833 million (If there are fewer than 400 million allowances in circulation, 100 million additional allowances are released).[12]

In addition to introducing the MSR, the EU ETS also increased the annual rate of reduction in the number of emissions allowances, from 1.74% in 2013-2020 to 2.2% beginning in 2021.

These interventions have worked. The carbon-credit price stabilized in the range of €20–€30 per tonne in the 2019-2020 period, and has increased significantly since March 2020, reaching over €90 at the time of publishing this report.

Alberta Renewable Electricity Program (REP)

Contracts for difference (CfDs) have been successfully utilized in Canada. Alberta used CfDs to increase renewable electricity generation in a way that was cost-effective for consumers and taxpayers. The federal government can build off this example to deliver a carbon contract for difference (CCfD) that broadens the scope from renewable energy to a much wider segment of the economy, with the assurance that this tool has been already used with demonstrable success.

In January 2016 the Government of Alberta directed the Alberta Electric System Operator to develop and implement a program to bring on new renewable generation capacity through the Renewable Electricity Program (REP). The goal of the REP was to reach 30% of electricity generation in Alberta from renewable sources by 2030 while keeping costs as low as possible. The REP ran multiple annual competitions to secure

12 Henrique Morgado Simões: Revision of the market stability reserve for the EU emissions trading system (Strasbourg: European Parliament, 2022). https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/698896/EPRS_BRI(2022)698896_EN.pdf

additional renewable capacity and utilized a CfD-style mechanism called an Indexed Renewable Energy Credit (REC). Under this system, winning bidders were guaranteed a set price for their renewable energy generation. When the market price of power fell below their set price, the government compensated them for the difference. When the market price rose higher than the set price, the generator paid the difference to the government. The REP competition incentivized lower electricity costs, with winning bidders securing contracts at the prices needed for their projects to be economic.[13]

Between 2017-2019, three competitions were held in the province, before the program was cancelled in mid-2019. The first round, which included three successful project bids, set a record for the lowest renewable electricity pricing in Canada at that time, with a weighted average price of 3.7 cents per kWh. The second and third rounds added six more projects with a weighted average price of four cents per kWh, while adding a total of 760 MW of renewable generating capacity and bringing in approximately $100 million in government revenues.

Germany

Canada is not the only country recognizing the challenges that lie ahead in supporting industrial decarbonization. Earlier this year the German government announced an expression of interest in CCfDs. While limited details are currently available in English, the proposed program aims to support best-in-class deep emissions reductions, of greater than 50%, that are compatible with the German goal of achieving net-zero by 2045. The German CCfD program will focus on supporting major projects in emissions-intensive trade-exposed industrial sectors including steel, cement, and ammonia, amongst others. Under the CCfD the German government will provide guarantees to cover incremental costs of innovative technologies, but if the effective carbon price exceeds the contract strike price then the project pays the difference back to the government. This program can be combined with other funding programs to further enable these projects to move forward.

13 Alberta Electric System Operator: About the program (Calgary: Alberta Electric System Operator, 2019). https://www.aeso.ca/market/renewable-electricity-program/about-the-program/

18 King St E, Suite 1400
Toronto, ON
M5C 1C4

289 919 2041
info@CleanProsperity.ca
@CleanProsperity

192 Spadina Ave, Suite 316
Toronto, ON
M5T 2C2

226 212 9883
info@climateinstitute.ca
@ClimateInstit

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