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2020 Expert Assessment of Carbon Pricing Systems

A report prepared by the Canadian Institute for Climate Choices

Canada

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About this Report

In the fall of 2020, Environment and Climate Change Canada (ECCC) engaged the Canadian Institute of Climate Choices (Institute) to conduct an independent assessment of the effectiveness of carbon pricing systems within the country. From the first engagement, it was made clear that the Institute would have the latitude to conduct its own independent assessment of federal, provincial, and territorial carbon pricing systems. ECCC initially consulted provinces, territories, and National Indigenous Organisations (NIOs) to define the scope of the assessment. The Institute adopted this scope and developed a work plan to conduct the research and a process to verify the findings.

Over a six-month period, the Institute conducted multiple rounds of engagement to ensure the information presented in this assessment is factually correct and to test the reasonableness of the Institute's findings. The Institute also engaged several peer reviewers and consulted external experts. Any potential errors in this report are attributable to the Institute.

While this report is published by the Government of Canada, the Institute notes the document is published unaltered and as submitted by the Institute. It represents the findings of the Institute's independent assessment.

This assessment is a document representing the views of the Canadian Institute for Climate Choices.

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Contents

1 The Carbon Pricing Assessment in Context

The Canadian Institute for Climate Choices (CICC) was contracted by Environment and Climate Change Canada (ECCC) in fall 2020 to conduct an independent assessment of federal, provincial, and territorial (FPT) carbon pricing systems within Canada. The assessment's mandate flows directly from a commitment in the Pan-Canadian Framework on Clean Growth and Climate Change (PCF) that states:

> *"Federal, provincial, and territorial governments will engage with external experts to provide informed advice to First Ministers and decision makers; assess the effectiveness of measures, including through the use of modeling; and identify best practices. This will help ensure that actions identified in the Pan-Canadian Framework on Clean Growth and Climate Change (PCF) are open to external, independent review, and are transparent and informed by science and evidence. (PCF p.47)*

The PCF establishes a general approach to reviewing the carbon pricing systems, including this assessment, with the objective of assessing the effectiveness of collective actions and ensuring a continual improvement in emissions performance. The federal government consulted with provinces and territories (PTs) and National Indigenous Representatives to provide guidance to the CICC on the framing of the independent assessment:

- Effectiveness should consider the extent to which a carbon pricing system is designed to provide a signal to incent emission reductions.
- Carbon pricing systems should include appropriate design elements to mitigate competitiveness impacts to sectors at high risk of carbon leakage while mitigating the impacts on vulnerable populations and Indigenous Peoples.
- While data such as impacts of carbon pricing on greenhouse gas (GHG) reductions is limited, with most carbon pricing systems only being implemented in 2019, effectiveness may be assessed in terms of comparing systems against each other using other metrics and in relation to the actions, progress, and lessons learned from domestic and international experience.
- Effectiveness should also consider differences between jurisdictions (e.g., industrial composition, large exempted agricultural sectors, electricity generation mix, types of fuels available, percentage of people living in remote communities) that could influence the degree to which a price on carbon creates incentives for change.

Based on this guidance, CICC identified four considerations for the independent assessment:

- **Emissions reductions**. Does the system provide certainty that emissions will be reduced? The stringency of carbon pricing should not be looked at through a pricing lens exclusively since carbon pricing is only a means to achieve emission reductions. It is the emission reductions that are the primary metric of the effectiveness of carbon pricing.

  Ideally, regionally differentiated economic, energy, and emissions modelling would be conducted to assess the relative effectiveness of various carbon pricing systems and complementary policies. Given that this independent assessment does not include modelling, the assessment focuses on presenting indicators of sound program design. The assessment provides insight on how design choices across jurisdictional programs impact the ability of carbon pricing to reduce emissions and address adverse impacts on people and businesses.

- **A long-term and transparent price signal**. Does the system provide a transparent price signal that effectively and efficiently incents reductions at home or abroad, including through linked carbon markets?
- **Competitiveness outcomes and emissions leakage**. Does the system mitigate impacts on competitiveness both nationally and domestically between jurisdictions, including minimizing the risk of carbon leakage and price distortions across fuels, sectors, and provinces and territories?
- **Indigenous Peoples, vulnerable businesses, and households**. Does the system address the impacts on Indigenous Peoples? Does it address distributional outcomes to businesses of all sizes and households?

It is also important to note issues of scope that guided the assessment:

- **Carbon pricing and indigenous rights merit additional attention.** A range of perspectives exist among Indigenous Peoples in what is now known as Canada regarding carbon pricing. More specifically, views vary regarding the merit of carbon pricing as a mitigation strategy, Canada's process of developing carbon pricing, and the treatment of Indigenous Peoples and communities in the various carbon pricing systems that exist across jurisdictions within the country.

  This assessment does not provide a full consideration of these legitimate views. Given the assessment's focus on carbon pricing design choices, it considers some distributional outcomes of carbon pricing (e.g., exemptions) for Indigenous Peoples and communities within Canada but does not address broader concerns around process participation.

  Moreover, even our analysis of distributional implications for Indigenous Peoples is incomplete. Impacts of carbon pricing on Indigenous Peoples are profound; for example, as Bubna-Litic & Chalifour (2012)[1] note Indigenous Peoples have "lower median income" than non-Indigenous People in Canada[2]. These issues merit additional attention.

- **This is a technical report and assumes a high degree of carbon pricing literacy.** Given the breadth of this assessment and the numerous FPT programs assessed, we have necessarily assumed the reader understands the basic economic concepts of carbon pricing and the nuances of program design. Consequently, readers with less familiarity with carbon pricing programs may find some of the concepts and implications that we explore intricate.
- **We focus on explicit, economy-wide systems with broad-based coverage.** These systems include carbon taxes or charges, cap-and-trade systems, tradable performance standards for large emitters or some hybrid of these three. Other pollution pricing systems will not be reviewed. These include sector caps, such as Nova Scotia's electricity sector cap; renewable

[1] Bubna-Litic, Karen and Chalifour, Nathalie, Are Climate Change Policies Fair to Vulnerable Communities? The Impact of British Columbia's Carbon Tax and Australia's Carbon Pricing Proposal on Indigenous Communities (2012). https://papers.ssrn.com/sol3/papers.cfm?abstract_id=245881. Accessed April 19, 2021.
[2] Indigenous Climate Action. 2021. Decolonizing Climate Policy in Canada. Report from Phase One. https://static1.squarespace.com/static/5e8e4b5ae8628564ab4bc44c/t/6061cb5926611066ba64a953/1617021791071/pcf_critique_FINAL.pdf. Accessed April 19, 2021.

portfolio standards in most provinces; and stand-alone offsetting systems such as B.C.'s carbon neutral program.

- **Price- and quantity-based carbon pricing systems can and do interact.** The PCF recognizes both types of carbon pricing systems, while the reality is that the federation has a diverse patchwork of FPT programs.
- **We assess the carbon pricing systems as implemented in 2020.** The assessment focuses on the systems as they existed in 2020. Emissions data used in our assessment are from the latest National Inventory Report (NIR) as of January 2021, which refers to the 2018 calendar year but was published in 2020.[3]
- **We assess the carbon pricing systems as implemented in each jurisdiction.** This primarily applies to the federal carbon pricing backstop, which is not implemented uniformly across jurisdictions, notably with jurisdictionally differentiated exemptions and point-of-sale rebates. In the federal backstop jurisdictions, we identify specific and often unique design choices that have adopted as well as commonalities.
- **This is not a comparison against the federal carbon pricing benchmark**. This assessment is not assessing stringency within the context of determining whether a provincial or territorial carbon pricing system meets the federal carbon pricing benchmark requirements as per the *Greenhouse Gas Pollution Pricing Act* and related regulations.[4]
- **We do not assess policy interactions.** A major driver of carbon pricing effectiveness is how multiple policies may be interacting to impact the same emission sources and how behavioural change is driven. For instance, if carbon pricing is not the primary incentive to change behaviour, then carbon pricing will be less effective, and regulations, for example, will be more effective. Assessing policy interactions is an important priority to ensure continuous improvement of policy within the federation and is an area that needs much more attention in future reviews.
- **High levels of uncertainty exist.** Because of the nature of this independent assessment, the results necessarily have a high degree of uncertainty. Timelines to undertake this assessment were tight, carbon pricing systems are complex and differentiated in all 13 regions, and data is often missing or unavailable for public use. To minimize this uncertainty as much as possible, multiple rounds of data sharing and revisions with the FPTs were conducted. Still, the reader should view our results as directional, not definitive.

[3] The federal Output Based Pricing System (OBPS) system was used to calculate the indicators in Chapter 4 for Ontario and New Brunswick as of 2020, rather than their proposed systems, which were not operating in 2020. In Section 4.4, we qualitatively assess the main components of Ontario's proposed system (Ontario draft regulations *O. Reg. 241/19)* and New Brunswick's developing large emitter program (New Brunswick draft regulations *Reduction of Greenhouse Gas Emissions Regulation – Climate Change Act*). Future analysis could assess both programs using a similar methodology as followed in Section 4.

[4] Environment and Climate Change Canada, 2018. Technical paper: federal carbon pricing backstop.https://www.canada.ca/en/services/environment/weather/climatechange/technical-paper-federal-carbon-pricing-backstop.html. Accessed January 21, 2021. On March 25, 2021, the Supreme Court of Canada confirmed that the Greenhouse Gas Pollution Pricing Act is constitutional.

- **Is there a good time to conduct a carbon pricing assessment?** Carbon pricing in Canada within the last four years has been in a constant state of flux. Newly elected governments have conducted wholesale changes in systems including scrapping systems entirely or putting their own unique stamp on programs. At the same time, carbon pricing systems are evolving as governments build out their programs and adjust design features as needed. Add in a dynamic global carbon policy environment, including new movement in the United States, and one could think that now is not a good time to assess carbon pricing systems in the country.

  However, given the pace of change, there will likely never be an optimal time to conduct an assessment of carbon pricing systems in the country. Instead, these assessments must be normalized to inform ongoing jurisdictional discussions about the future design of carbon policy within Canada. In the future, ideally, the timing of these assessments would align with jurisdictional reporting and policy review cycles. Embedding independent assessments into ongoing policy stocktaking, including setting five-year reduction targets, can improve policy effectiveness and is an essential element of climate accountability frameworks.[5]

In addition to this introductory section, this report is organized as follows:

- **Section 2** provides an overview of the pan-Canadian carbon policy framework, reminding us that carbon pricing is one among various instruments in jurisdictions' policy packages that are incenting decarbonization.
- **Section 3** provides an overview of carbon pricing systems in Canada with a focus on design choices that impact effectiveness. Emissions are also grouped under the various carbon pricing systems that have emerged and coexist within the federation.
- **Section 4** provides a series of quantitative indicators used to assess the coverage and stringency of carbon pricing systems. Also included is a comparison of the design choices made across the various large emitter programs, which impact competitiveness.
- **Section 5** provides an analysis of the distribution of carbon pricing costs across economic sectors and households under different assumptions of carbon cost pass-through.
- **Section 6** provides a view on the treatment of Indigenous Peoples under jurisdictional carbon pricing programs. Exemptions across jurisdictions are identified.
- **Section 7** provides a summary and conclusions, including an overview of key design choices that support or work against effectiveness. We also review design choices that have been made to account for jurisdictional circumstances, including acceptability.

In addition to the feedback received from the federal government, provinces, territories and from national Indigenous representatives on draft versions of this report, we also sought insight from climate policy experts from academia, from independent research institutes, and from non-governmental organizations across Canada (see list in Appendix A).

[5] Beugin, D., J. Dion, A. Kanduth, C. Lee, D. Sawyer, and J. Arnold. 2020. Marking the Way: How legislating climate milestones clarifies pathways to long-term goals. Canadian Institute for Climate Choices. https://climatechoices.ca/wp-content/uploads/2020/06/CICC-climate-accountability-framework-FINAL.pdf. Accessed April 06, 2021.

With the context and the caveats out of the way, what value does this assessment provide? To our knowledge, it is the first comprehensive assessment of the carbon pricing systems that have been designed and implemented in all jurisdictions within the country. The assessment is also done on a consistent basis, using a common framework and set of indicators that compare the design choices made. In our view, the federation has moved expediently to develop these carbon pricing systems. Because Canada is a federation, a patchwork has unsurprisingly emerged. But as Canada collectively seeks longer-term emission reductions aligned with its 2030 target and net zero beyond, this carbon pricing patchwork could impede overall effectiveness and hinder competitiveness across sectors and jurisdictions. There is still much more work to do to assess the various carbon pricing systems so that effectiveness can be improved, and adverse outcomes avoided. This assessment is an important step in moving that process along.

2 Background: The Pan-Canadian Carbon Policy Architecture

To set the stage for our assessment of carbon pricing systems in Canada, this section provides a sample of the main GHG mitigation policies that are in place at the federal level, as well as in provinces and territories across Canada.

A broad mix of instruments make up the architecture of Canada's climate mitigation policy, of which carbon pricing is one component. Developed in 2016 by the federal, provincial, and territorial governments in collaboration with Indigenous Peoples, the PCF is a key piece of Canada's approach to carbon policy and aims to "meet [the] emissions reduction targets, grow the economy, and build resilience to a changing climate."[6] We use the pan-Canadian approach to refer to federal, provincial, and territorial policies.

The main elements of Canada's policy architecture include a mix of performance regulations, carbon pricing, incentives, and innovation programs. Collectively, these policies apply to most sources of emissions in Canada and are often layered on top of the same emissions (Figure 1).

While the pan-Canadian approach relies on a package of decarbonization policies, providing an assessment of the interplay between carbon pricing and specific policies, or between other climate policies, is beyond the scope of the present assessment.

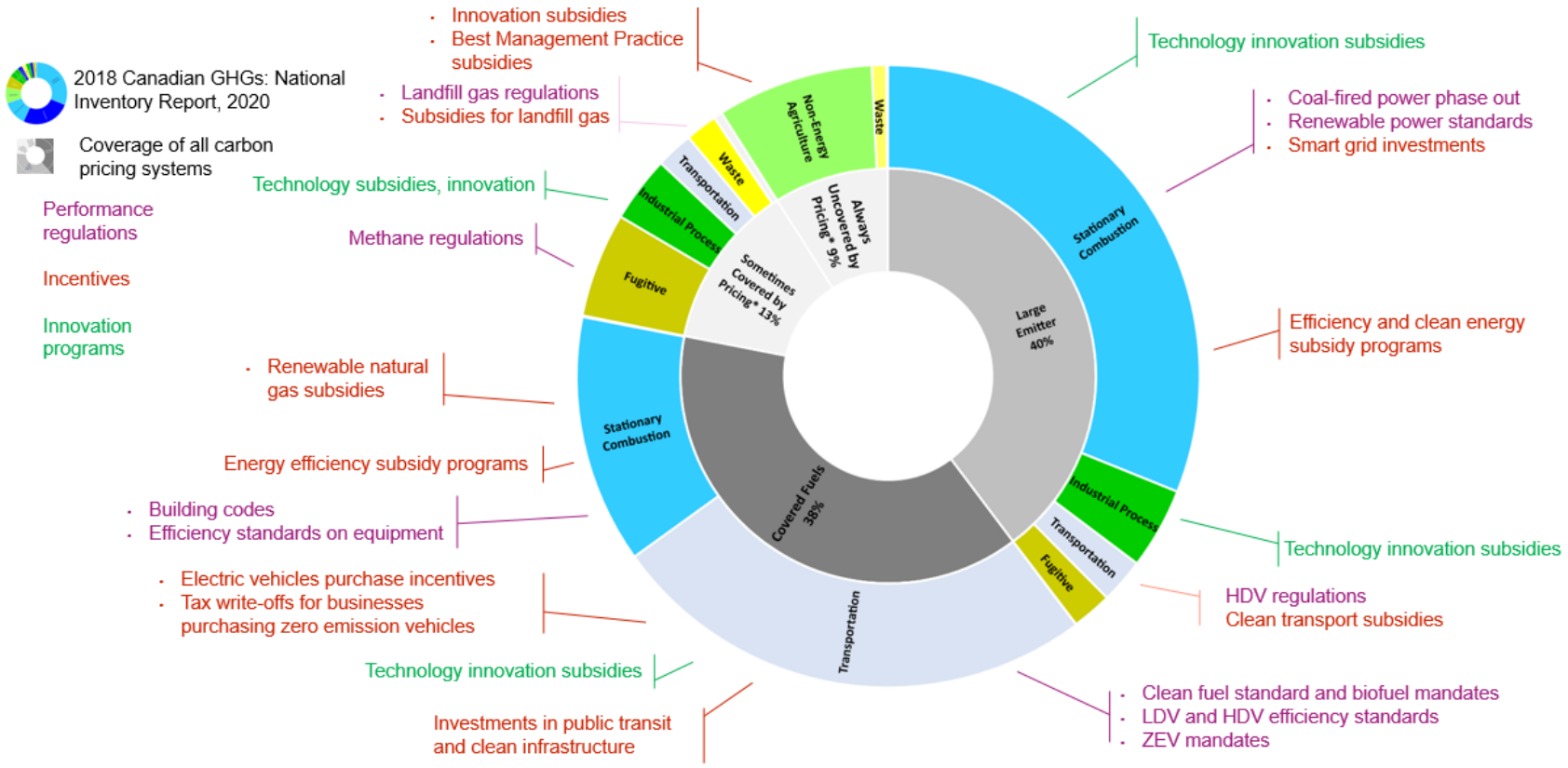
2.1 Performance Regulations

For decades, governments of all political stripes have implemented regulations to reduce emissions. Typically, these "performance" regulations are intended to provide cost certainty for impacted businesses by incorporating flexibility in meeting the imposed emission or energy standard. This compliance flexibility can take a variety of forms, including compliance phase-ins that accommodate long lead times and align with capital stock turnover; trading between entities or products as in vehicle standards; offsets; and compliance payments. In this way, the regulations may to some extent act much like carbon pricing—they may give regulated entities the flexibility to make cost-minimizing choices, among emissions covered by the regulation. However, rarely if ever does a regulation minimize costs across multiple sectors of the economy. Targeted regulations have proven their effectiveness as climate policy instruments in the transportation, buildings, and industry sectors:

- **Energy efficiency standards** for buildings and equipment have been a major focus for years. Canada and various provinces are working to **update building codes** so that expectations for meeting increasing energy performance standards are clear for new construction.

[6] Government of Canada. 2020. "Pan-Canadian Framework on Clean Growth and Climate Change." https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework.html

Figure 1: Canada's Climate Carbon Policy Architecture
Performance regulations, carbon pricing, incentives, and innovation programs targeting different emission sources.



*Sometimes covered by carbon pricing means that at least one carbon pricing program in Canada covers some emissions in this emissions group.
Legend: Heavy duty vehicles (HDV); light duty vehicles (LDV); zero emission vehicles (ZEV)

- In transportation, **biofuel mandates** for liquid fuels exist across the country, while light- and heavy-duty **vehicle emissions and fuel economy standards** have been delivering fuel savings and associated reductions of GHGs and other air pollutants for decades. The federal government's proposed Clean Fuel Standard,[7] a complex and sophisticated performance regulation, will require liquid fuel suppliers to reduce the carbon intensity of the fuels they sell.[8] The standard will establish a broad-based credit market, with the goal of decreasing the carbon intensity of liquid fuels by about 13 per cent by 2030 compared to 2016, using a lifecycle approach.
- In the power sector, Ontario's **coal phaseout** may have been the single largest emission reduction policy the country has seen to date. In 2018, the federal government implemented regulations to phase out traditional coal-fired electricity by 2030.[9] These regulations require all coal-fired electricity generating units, which represent approximately 14 per cent of Canada's GHG emissions, to comply with an emissions performance standard of 420 tonnes of CO_2e per GWh by 2030. Nova Scotia is implementing its plan capping emissions from the electricity sector and promoting renewable energy, recently announcing a renewable electricity target of 80 per cent and a coal phaseout by 2030. Alberta also added a coal phaseout objective by 2030, while Saskatchewan committed to adding more renewable generation by 2030 and built the Boundary Dam carbon capture system and Aquistore storage facility.
- In the oil and gas sector, **methane regulations** were tabled in 2018 at the federal level and took effect in early 2020. The regulations require facilities to address venting methane emissions, to implement a leak detection and repair program for fugitive emissions, and to undertake corrective action when leaks are found.[10] Alberta, B.C. and Saskatchewan were granted equivalency, which means the federal regulations will stand down in those jurisdictions. Alberta incented early-action methane reductions by enabling emission offsets under the *Quantification Protocol for Greenhouse Gas Emission Reductions from Pneumatic Devices* within the construct of Alberta's emission offset system, which is enabled by the *Technology Innovation and Emissions Reduction (TIER) Regulation*. The ability to generate emission offsets will end when these reductions become required by law, so the offset incentive promotes GHG reductions in advance of the regulations and could incent reductions beyond those required by the methane regulations.

[7] Government of Canada, 2020. "Canada Gazette, Part I, Volume 154, Number 51: Clean Fuel Regulations." https://gazette.gc.ca/rp-pr/p1/2020/2020-12-19/html/reg2-eng.html

[8] Environment and Climate Change Canada. 2021. "What is the clean fuel standard?" https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-standard/about.html

[9] Government of Canada, 2020. "Regulations Amending the Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations, SOR/2018-263." http://www.gazette.gc.ca/rp-pr/p2/2018/2018-12-12/html/sor-dors263-eng.html

[10] Environment and Climate Change Canada. 2018. "Canada's methane regulations for the upstream oil and gas sector." https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/proposed-methane-regulations-additional-information.html

Carbon Pricing and Indigenous Rights

As noted in Chapter 1, Indigenous Peoples' views on carbon pricing merit additional attention. Nevertheless, this assessment recognizes the importance of governance and process. Given that Canada is in an era of reconciliation, we acknowledge that many Indigenous people view Canada's carbon pricing policies as a direct violation of Indigenous rights pursuant to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and section 35 of the *Constitution Act, 1982* in several ways. A recently published study by Indigenous Climate Action (2021) highlights that:

- Indigenous people were not included at government working group tables in the PCF. Indigenous participants were treated as interest groups and stakeholders, undermining Indigenous sovereignty and rights to self-determination and self-government under UNDRIP. The Crown has a constitutionally rooted requirement to consult with Indigenous Peoples whenever they contemplate conduct that could adversely impact their rights.
- Consultation between the PCF working groups and three National Indigenous Organizations (NIOs)—the Assembly of First Nations (AFN), Inuit Tapiriit Kanatami (ITK), and the Métis National Council (MNC)—lacked transparency surrounding how the NIOs' feedback would be integrated. Similarly, processes were not in place to ensure that the NIOs were "meaningfully gathering information about the PCF" from Indigenous communities and nations—both of which imply a lack of free and prior informed consent.
- The federal government provides provinces with the option of designing their own carbon pricing policies subject to federal approval. If a province chooses the federal backstop, all the proceeds generated from carbon pricing in that particular jurisdiction are to be returned to that province, which then has autonomy to determine how this revenue is spent. Indigenous communities and nations do not receive the same treatment and are instead "subsumed within whatever carbon pricing policies are adopted by the province or territory they are in" which is not in keeping with nation-to-nation relationships or Indigenous rights to self-determination.

2.2 Carbon Pricing

Carbon pricing is a key instrument in Canada's policy architecture. Prior to the PCF and the Paris Agreement era starting in 2016, Canada's carbon pricing efforts were uneven. Some jurisdictions led, some lagged, and some proposed systems that were ultimately not implemented. There were few similarities in how each jurisdiction chose to implement mitigation policies, exacerbated by political preferences for different carbon pricing approaches and treatments of emitters.

Several provinces and territories chose to exert their jurisdiction over climate change, which is shared with the federal government, by moving forward with their own carbon pricing systems. Those jurisdictions with broad-based carbon pricing designed their systems to meet environmental objectives while addressing their own unique needs.[11] The 2016 Vancouver Declaration on Clean Growth and Climate Change, which paved the way to developing the PCF, recognized the need for "fair and flexible

[11] Working Group on Carbon Pricing Mechanisms. *Final Report*. https://www.canada.ca/content/dam/eccc/migration/cc/content/6/4/7/64778dd5-e2d9-4930-be59-d6db7db5cbc0/wg_report_carbon-20pricing_e_v4.pdf. Accessed September 20, 2020.

approaches" from jurisdictions in reducing GHGs, in light of the diversity of provincial and territorial economies.[12] It is therefore no surprise that a mix of carbon pricing systems coexist within the country reflecting local emissions profiles, economic structures, and political preferences. More detail on the carbon pricing systems existing within the federation is provided in the next section.

The PCF is agnostic on the choice of explicit price-based systems or quantity-based cap-and-trade systems, recognizing:

- An explicit price-based system like British Columbia's carbon tax or a carbon levy and performance-based emissions system as Alberta implemented prior to 2020, or
- A cap-and-trade system (e.g., Quebec).

This recognition reflects the state of play with respect to carbon pricing within the country; in reality, carbon pricing in Canada is a mashup of design choices that blend price signals and emission constraints within programs and across jurisdictions. But with the federal backstop focused primarily on aligning carbon prices across the country, we can expect to have quite different emission outcomes across jurisdictions, making assessments of effectiveness between price- and quantity-based systems difficult.

2.3 Financial Incentives

Putting a price on carbon is just one of many policy tools available to jurisdictions to manage carbon. When the barriers to change are financial, subsidizing affordable alternatives creates incentives for households and businesses to commit to behaviour changes. Governments of all stripes have used subsidies and programmatic spending to incent change, including:

- In the transportation sector, Canada has committed to invest $25.3 billion over 11 years (2017/2018 to 2027/2028) to support **public transit** projects, while all provincial and territorial governments also invest in public transit to varying degrees. The federal government is also offering a purchase incentive of up to $5,000 for **electric vehicles** (EVs), which adds to incentives offered in B.C. (up to $3,000) and Quebec (up to $8,000). Nova Scotia recently announced an EV incentive program of $3,000 for new EVs, $2,000 for used EVs, and $500 for e-bikes.
- **Subsidies for energy efficiency initiatives** also helped achieve GHG reductions in communities across Canada. In recent years, most provinces and territories created a dedicated financing mechanism to incent energy efficiency. Some are using the proceeds of carbon pricing while other are using funds earmarked from general revenue (e.g., Manitoba's Conservation and Climate Fund). The federal government is also supporting energy efficiency projects across the country through the $2 billion Low Carbon Economy Fund.
- If subsidies in green sectors can incent good behaviour, **phasing out subsidies in high-emitting sectors** like oil and gas or **linking them to transitioning to lower-emitting forms of energy** (e.g., carbon capture, utilization, and storage (CCUS); hydrogen) can also bring environmental

[12] Vancouver Declaration on Clean Growth and Climate Change, March 3, 2016. https://scics.ca/en/product-produit/vancouver-declaration-on-clean-growth-and-climate-change/ Accessed September 20, 2020.

benefits.[13] As a member of the G20, Canada in 2009 committed to phase out federal fossil fuel subsidies, a commitment that is yet to be implemented.[14] Provincial and territorial governments, given their jurisdiction over resource development, are not bound by this commitment.

A major feature of these programs is that they tend to be intermittent, often being phased in and out with changes in governments or budgets, which can undermine their effectiveness. Also, to be cost-effective, financial investments should be evaluated on costs per tonne reduced (accounting for any co-benefits) relative to the carbon price and to alternative uses of funds.

2.4 Innovation Programs

Given long-term emission reduction commitments by many FPT governments, such as net zero emissions by 2050, research and development (R&D) investments have a crucial role to play in allowing new GHG reduction technologies to reach maturity and bring down the costs of climate action. Several subsidy programs are in place in Canada, covering various stages of technology readiness:[15]

- At the early stages of technology development, **Sustainable Development Technology Canada** (SDTC) has invested more than $1 billion in 450 companies across Canada since 2001, helping advance pre-commercial technologies that have the potential to bring significant environmental benefits.[16]

Several other initiatives are being undertaken across Canada, such as:

- P.E.I.'s Agriculture Research and Innovation Program;
- Ontario's network of cleantech accelerators; and
- Funding clean technology development and demonstration via **Emissions Reduction Alberta**.

2.5 Emission Projections in 2030

To compare the relative effectiveness of the various carbon pricing systems, ideally countrywide modelling would be conducted that would reflect the detailed design choices of all the programs and how they have been implemented in each jurisdiction. Then the model would forecast out to 2030 and beyond to determine how policy choices impact each jurisdiction's emissions pathway. Furthermore, the model could isolate the impacts of carbon pricing from market drivers and from other policies such as

[13] The environmental benefits brought by phasing out fossil fuel subsidies can vary depending on the subsidy type (e.g., direct transfers for investments in infrastructure or technology, loans, tax deductions, etc.). Sawyer, D. and S. Stiebert. 2010. Fossil Fuels – At What Cost? Government support for upstream oil activities in three Canadian provinces: Alberta, Saskatchewan and Newfoundland and Labrador. IISD. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1701792

[14] Office of the Auditor General of Canada. Accessed January 25, 2021. "Fossil Fuel Subsidies." https://www.oag-bvg.gc.ca/internet/English/esd_fs_e_43320.html.

[15] For a description of the nine levels of technology readiness, from basic principles of concept to actual technology deployment, see Innovation Canada, 2018. "Technology readiness levels." https://www.ic.gc.ca/eic/site/080.nsf/eng/00002.html

[16] Sustainable Development Technology Canada. 2020. "Investing in Canadians developing and advancing clean technologies." https://www.sdtc.ca/en/

financial incentives. Absent such modelling for this assessment, we still think it is important to include some idea of the emission pathway of each jurisdiction out to 2030.

The latest emission projections from Environment and Climate Change Canada (ECCC) provide one view of the emission reduction pathways across jurisdictions.[17] We select the "with additional measures" scenario, given that it includes an assumption that Quebec would achieve its emissions cap using some form of compliance flexibility mechanism such as WCI allowances or offsets. The analysis also includes the impacts of existing complementary policies, including subsidies and regulations.

Included in this scenario is a range of federal, provincial, and territorial measures such as performance regulations, incentive programs, infrastructure spending, and carbon pricing. Still, the marginal cost incentives included in the analysis and modelling in these projections are consistent with the carbon prices discussed below, both for 2020 (Indicator 3) and for 2030 (Indicator 5). As such, these estimates are not a direct reflection of the effectiveness of each program, but they nevertheless provide an indication how policy packages contribute to long-term decarbonization.

The ECCC emission projections include market drivers such as reductions in the cost and availability of technologies that are making their way into the Canadian economy and reducing the emission intensity of economic activities, such as electric vehicles. The projections also include assumptions about commodity prices (e.g., oil and gas, minerals) and structural changes in the economy that influence emission pathways.

In short, many different factors are at play in these projections, several of them having little to do with the effectiveness of carbon pricing. Still, these projections provide good context as to how policy packages and market drivers are reducing emissions in each jurisdiction.

Figure 2 provides the results from the ECCC projections. As can be seen, there is a considerable difference in this scenario between the East and the West:

- **Nova Scotia** and **New Brunswick** are both showing significant declines in emissions relative to 2005. This reflects structural changes in the economy, including the loss of some large industrial emitters, reductions due to businesses and homes switching from carbon-intensive fuels to cleaner energy sources, strong energy efficiency programs, and electricity sector decarbonization policies.
- **Quebec**'s cap on emissions is driving significant emission reductions in the scenarios and perhaps is the purest example of the effectiveness of carbon pricing in these scenarios. The form of the compliance mechanisms is irrelevant here, whether the cap is met through domestic abatement, WCI credit imports or complementary policies, including abatement subsidies financed from carbon auctions. This is an important observation, since Quebec's marginal cost incentive, which is lower than most other jurisdictions (explored in detail in section 4.2), looks as though it sends a relatively weak abatement signal when compared with other jurisdictions. Clearly, it is important to assess both carbon prices and cap declines when assessing the effectiveness of carbon pricing in the country.

[17] Environment and Climate Change Canada. 2019. *Canada's 4th Biennial Report to the United Nations Framework Convention on Climate Change (UNFCCC)*. https://unfccc.int/sites/default/files/resource/br4_final_en.pdf

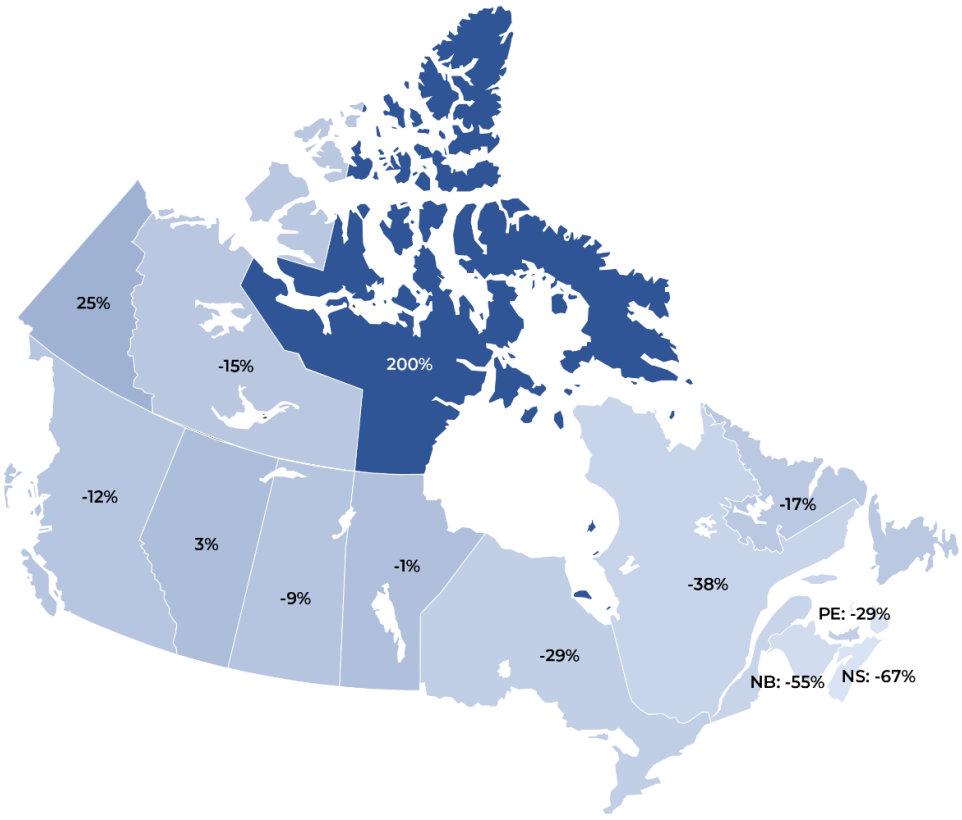
- **Ontario's** ban on coal-fired electricity had a large impact on emissions but so too does the ongoing decarbonization of vehicles under federal regulations and provincial biofuel mandates.
- The **western provinces** and **the territories** show the impacts of expanding economies and the challenge of constraining emissions growth, even with policies like carbon pricing in place.

Looking at this modelling at a superficial level and considering the caveats mentioned above, the ECCC projections suggests that the current level of carbon pricing contained in these projections is insufficient to reduce emissions in line with Canada's Paris Agreement commitment or with deeper decarbonization beyond. Of note, these projections do not reflect the December 2020 announcement on a proposed increase of the carbon price to $170 per tonne in Canada, plus additional measures.

These projections also indicate that the ability for regions to decarbonize is not uniform across the country, even with a common carbon price applied and other complementary policies in place. Differences in emission reductions can be attributed to varying levels and types of economic growth, some of which are much more emissions-intensive, as in the Western provinces. Adding in differences in the ability to abate emissions across economic sectors, we can expect projections to continue to show different emission outcomes by province even with uniform carbon prices.

This observation points to an effectiveness challenge where the current carbon policy architecture, including carbon pricing but excluding the proposed $170 per tonne carbon price, is not delivering reductions aligned with Canada's 2030 GHG target.

Figure 2: Change in 2030 GHGs Relative to 2005 (ECCC, 2019 with Additional Measures)
Policy packages including carbon pricing, performance regulations, and market drivers.



3 Carbon Pricing Systems in Canada

This section provides a high-level overview of the carbon pricing systems in Canada and the historical context that informed the design of these systems. The patchwork of carbon pricing systems across the country speaks both to the advantages of federalism (customizing systems according to regional context and priorities) and its disadvantages (variability and inconsistency across regions). This discussion of carbon pricing instruments—and their historical implementation and evolution—provides additional context for the comparison of current systems in Section 4.

3.1 Carbon Pricing Instruments

Prior to 2016 and the start of the PCF era, carbon pricing was unevenly applied, with early efforts covering about 38 per cent of Canada's national emissions. Alberta and Quebec led the way in 2007, Alberta with a carbon pricing system for large emitters and Quebec with a carbon levy. British Columbia implemented its economy-wide carbon tax in 2008, Manitoba implemented a sector-focused carbon tax to phase out coal in 2012,[18] and Quebec replaced its carbon levy with a cap-and-trade system in 2013.

All these systems were quite different but nevertheless provided blueprints for the carbon pricing instruments now implemented across the country. Today, there are three main classes of instruments.

Price-based systems that apply a carbon charge or tax on covered emissions. These price-based systems place a price based on the carbon content of fossil fuels. Some carbon charges or taxes in Canada apply to all energy emissions from combustion, as in British Columbia and the Northwest Territories. Others apply only to a subset of fuel used in households, buildings, transportation, and small- and medium-sized enterprises, as per the federal backstop and the systems in New Brunswick, Newfoundland and Labrador, and Prince Edward Island. The large emitters, such as cement plants, steel mills, and oil and gas facilities, are often afforded special treatment in a parallel system where the compliance costs paid are a fraction of the fuel charge or carbon taxes to minimize competitiveness risks.[19] Exemptions and rebates are also used to address household and competitiveness concerns in these systems.

Quantity-based systems that set a cap on covered emissions. Cap-and-trade systems are currently in place in Quebec and Nova Scotia. In these systems, the regulator issues a quantity of emissions allowances that is less than the quantity of emissions expected, creating emissions scarcity under a cap. Since each regulated entity has a compliance obligation that is in theory below their business-as-usual emissions, the scarcity then drives demand in an allowance market designed by the regulator. The carbon price in the market that emerges in any given period is a function of abatement costs and future expectations about carbon costs and market conditions. Market function is also affected by other design features, including banking, allowance reserves, and limits on the use and age of allowances.

Quebec's cap-and-trade system was the first economy-wide system implemented to include energy emissions and industrial process emissions. It sets a declining cap on emissions to 2030, sending a long-

[18] Government of Manitoba, 2015. "The Emissions Tax on Coal and Petroleum Coke Act." https://web2.gov.mb.ca/laws/statutes/ccsm/e090e.php

[19] Section 4 provides detail on how the carbon price incents emission reductions despite the preferential treatment to lower the financial impact on the emitter, but that the incentive is muted for some reduction pathways.

term price signal. Compliance flexibility is a defining feature of the program, with a link to California for emitters to both buy and sell emission reduction allowances. Nova Scotia's cap-and-trade system, implemented in 2019, does not allow offset credits and has no linked allowance trade permitted outside of Nova Scotia.

What Are Compliance Emissions?

Compliance emissions are a portion of an entity's GHGs that are subject to a limit set out in carbon pricing regulations. In large emitter systems such as the federal Output Based Pricing System, compliance emissions are set as a fraction of total emissions calculated relative to some facility, product, or sector limit or standard. For covered fuels such as gasoline used by households, the limit is typically set to the carbon content of the fuel that is then subject to a carbon payment.

Large emitter programs to protect competitiveness. These systems are embedded within a cap-and-trade system as in Quebec, a carbon tax system as in B.C., or are stand-alone regulated credit trading systems as in the federal Output-Based Pricing System (OBPS). They are hybrid programs because they mix elements of price- and quantity-based carbon pricing, with the goal of containing costs for large emitters facing a competitiveness risk due to carbon prices higher than those of foreign competitors. The programs make special accommodation for specified facilities or sectors above a certain emissions threshold and/or meet other criteria such as deemed emissions-intensive and trade-exposed (EITE).

The program goal is typically to create incentives for reducing emissions through improvements in emissions performance, while preventing shifts in production or investment to jurisdictions with weaker policy. Competitiveness is protected by providing what is essentially free allocation to industry, with compliance payments or tonnes owed set as a fraction of total facility emissions. This essentially means that the average cost of the policy to the large emitter, or total compliance costs over total tonnes covered, is a fraction of the posted carbon price.

However, the incentive to abate is maintained at the carbon price (or slightly below when, for example, offsets are used),[20] since emission reductions are valued and saleable at the carbon price. Section 4.2 below discusses the importance of the marginal and average costs to reducing emissions and supporting program effectiveness.

Alberta's *Specified Gas Emitters Regulation, 2007* set the standard that most Canadian jurisdictions followed to address competitiveness risks for large emitters. This "crediting" system pairs an emission intensity performance benchmark (or limit) used to calculate the quantity of GHGs owed with a fixed carbon price that effectively limits the cost exposure for the firm. In the case of cap-and-trade systems, the quantity of free allowances is calculated in much the same way, with the major difference being that typically more free allowances are provided to cover a higher volume of compliance emissions.

Large emitter hybrid systems within the country calculate compliance tonnes based on three main types of emission intensity benchmarks or limits: output-based allowances linked to the emission intensity of production, historical emissions, or other metrics such as energy use. The evolution of Alberta's system from facility performance benchmarks to more uniform sector performance benchmarks in 2017 under the *Carbon Competitiveness Incentive Regulation, 2017* influenced the OBPS portion of the federal carbon pricing backstop and provincial systems, including Saskatchewan's and Newfoundland and

[20] Offsets are typically traded at a price discount in the range of 15% to 20% below the carbon price.

Labrador's, as well as the proposed Ontario large emitter system and the system under development in New Brunswick.

In these large emitter programs, compliance flexibility mechanisms used to contain costs include a maximum compliance price that can be paid, tradable emission performance credits that can be bought or sold, and emission reductions that can bought from approved projects outside the regulated entities, or offsets. A host of other design features are also required to help with the smooth functioning of the market and to keep costs low, such as allowing the banking of surplus performance credits. Compliance flexibility mechanisms are discussed in Section 4.4.

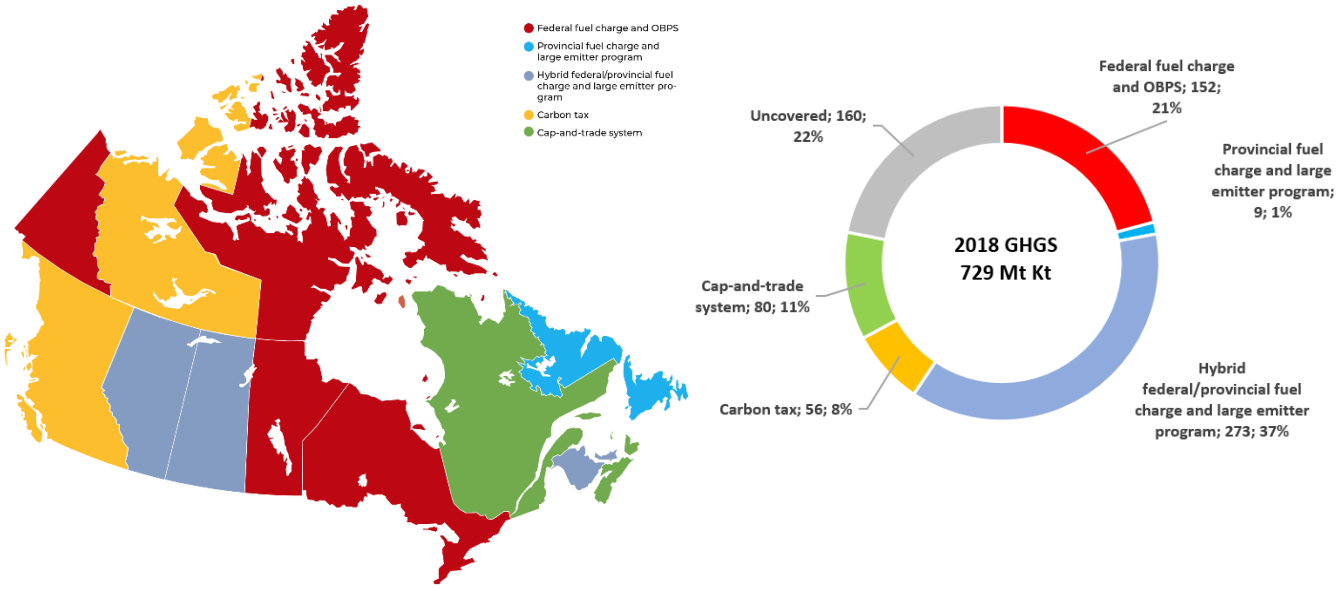
3.2 Coordinating Provincial and Territorial Systems under the PCF

The PCF coincided with a global move to pursue more ambitious GHG reductions, catalyzed by the Paris Agreement. With the PCF in place and the development of the federal carbon pricing benchmark and backstop, all provinces and territories had to determine the form of their carbon pricing program. As a result, in just a few years, Canada doubled the national emissions covered by carbon pricing to 78 per cent.

The PCF provided an answer to the long-standing debate in Canada on whether to implement effective carbon pricing through a quantity-based system, such as cap-and-trade, or a price-based system, such as a carbon tax. The PCF allows both. As a result, both price- and quantity-based systems can and do co-exist within the federation, with a diverse set of carbon pricing systems now operating. Since each jurisdiction can choose the type of carbon pricing program to implement and whether to design its own system or defer to the federal carbon pricing backstop, there are now five distinct carbon pricing groupings co-existing within the federation, each of which is discussed below (Figure 3).

Note that programs for large emitters proposed in Ontario and being developed in New Brunswick are not included in the figure since they were not operating in 2020.

Figure 3: Carbon Pricing Groupings Operating in 2020
Five groupings of carbon pricing programs exist, covering 78 per cent of 2018 national emissions.



3.2.1 Federal Fuel Charge and OBPS

Both the federal fuel charge and OBPS cover Manitoba, Nunavut, Ontario, and Yukon, representing 152 Mt or 21 per cent of the total emissions in Canada covered by carbon pricing. While all four jurisdictions fall under the federal backstop, there are design differences in each system:

- **Manitoba.** On March 5, 2020, the Government of Manitoba announced that it will implement a flat $25-per-tonne Green Levy as proposed in the Climate and Green Plan through Bill 35. Due to the COVID-19 pandemic, implementation of Bill 35 was delayed. The province has also indicated it will consider reducing the provincial sales tax to offset the impacts of the federal fuel charge. The federal fuel charge revenues are returned to all households via Climate Action Incentive payments and to small and medium-sized enterprises (SMEs), institutional buildings, non-profits, and Indigenous communities via Climate Action Incentive Fund programming, as is also the case in Alberta, Saskatchewan, and Ontario. OBPS revenue will support in-province GHG reduction initiatives for industrial emitters.

- **Nunavut.** Adjustments were made to the federal fuel charge to omit aviation fuel, while relief is provided for diesel-fired electricity generation in remote communities. These adjustments were made to mute the carbon price impact of already high transportation costs in the territory. These emissions are also intransient, meaning there are limited options to easily reduce them.

  All federal revenue from the charge on covered fuels is returned directly to the government of Nunavut. Nunavut is providing rebates representing 50 per cent of the fuel charge at the point of sale, up until 2023. In 2024, the rebate will drop to 40 per cent and thereafter drop by ten percentage points annually. Nunavut plans to fully phase out these rebates by 2028.

- **Ontario**. The federal fuel charge and federal OBPS currently apply to Ontario, but the province is in the process of implementing its own large emitter system called the Emissions Performance Standards (EPS) program for large industrial emitters through its *Greenhouse Gas Emissions Performance Standards* regulation. The Government of Canada confirmed on September 20, 2020 that the province's EPS meets the required federal carbon pricing benchmark, and the federal system will stand down on January 1, 2022.

  The Ontario EPS will automatically apply to any facility that emits 50,000 tonnes or more of CO_2e annually if its primary activity falls with those listed in paragraphs 1 to 38 in Schedule 2 of *O. Reg. 241/19* or if the facility is registered in the federal OBPS. Tests will then be applied to assess the level of risk to competitiveness and the rate of relief applied (see Section 4.4 for more detail).

  The EPS will also apply on a voluntary basis to any facility that emits at least 10,000 and less than 50,000 tonnes of CO_2e, provided it is engaged in an Industrial Activity listed in Schedule 2 of *O. Reg. 241/19* and it is registered in the federal OBPS. The carbon price for excess emissions is $40 per tonne in 2021 and will increase by $10 per tonne annually, reaching $50 per tonne in 2022. Under the EPS, funds collected from payments for excess emissions units are required to be used primarily for GHG reduction initiatives, particularly in the sectors regulated by the EPS program. The funds can also be used to administer the related regulations.

- **Yukon**. As is the case for Nunavut, Yukon has opted for the federal backstop. Part of the revenue collected from the fuel charge (45%) is transferred by the federal government to households in the form of rebates. These rebates are unrelated to individual fuel use and do not impact the marginal cost incentive to abate. The remainder of the proceeds are transferred to the Yukon government, which then transfers them to local businesses mostly (51%), but also to municipalities (3%) and First Nations governments (1%). The OBPS revenue is intended to support GHG reduction initiatives in the Yukon, while several mining companies have been granted rebates linked to their fuel use under the federal fuel charge.

3.2.2 Provincial Fuel Charge and Large Emitter Program

A provincial fuel charge and a provincial large emitter program are implemented in Newfoundland and Labrador, covering about 80 per cent of provincial emissions and one per cent of national emissions.

- **Newfoundland and Labrador.** Newfoundland and Labrador has both a provincially implemented carbon charge, which is regulated under its *Revenue Administration Act*, and a program for large industrial emitters, which is administered through its *Management of Greenhouse Gas Act*.

  The carbon price, aligned with the federal carbon price schedule, contains various exemptions, such as for fuels used by the provincial government or by First Nations; fuels for aviation, bulk export, agriculture, forestry and silviculture, fishing, and heating; and fuels used to produce electricity in isolated coastal Labrador communities.

  The large emitter program automatically applies to facilities that emit 25,000 tonnes or more of CO_2e per year, with opt-in provisions for facilities that emit at least 15,000 tonnes per year. Participants may choose to reduce their emissions annually according either to a facility benchmark based on historical emissions, or to a sectoral benchmark based on the top 33 per

cent of performers. All facilities are currently using historical emissions as the benchmark. Once online, the provision of hydroelectricity from the Muskrat Falls Project will support the displacement of electricity from NL Hydro's oil-powered Holyrood Thermal Generating Station and assist in displacing coal-fired facilities in the Atlantic Region. In recognition of investments in Muskrat Falls hydroelectricity, time-limited emission-reduction crediting provisions are provided to oil-powered Holyrood Thermal Generating Station. All facilities are currently using historical emissions as the benchmark. Any emissions exceeding the benchmark must be covered by credits purchased.

There are two types of credits in Newfoundland and Labrador's large emitter program:

1. **Performance credits** earned by facilities that have exceeded their target; these credits can be used by the facility or sold to other regulated facilities. The possibility of using credits to achieve up to 100 per cent of the reduction target is limited to offshore facilities. Regulated onshore facilities can only use performance and Fund credits to achieve a certain portion of their target, as outlined in legislation (85 per cent in 2021; 80 per cent in 2022 and subsequent years).; and

2. **Newfoundland and Labrador Greenhouse Gas Reduction Fund credits** that must be purchased from the provincial government at the federal price of carbon. To achieve the remaining reductions, further Fund credits may be bought but at four times the normal cost. This has the impact of incenting emission reductions at the facility instead of using other compliance options.

Proceeds from the large emitter program are directed to the Newfoundland and Labrador Greenhouse Gas Reduction Fund, which provides direct funding to eligible facilities for technologies or equipment that will result in GHG reductions beyond those required. This means that fund payments will not directly support facility compliance and must instead demonstrate reductions beyond those required by the regulations.

3.2.3 Hybrid Federal-Provincial Fuel Charge and Large Emitter Program

Alberta and Saskatchewan have chosen to implement their own large emitter programs, while the federal fuel charge is applied to covered fuels. P.E.I. has chosen the opposite, implementing its own fuel charge but deferring to the federal OBPS. New Brunswick has a provincial fuel charge and currently has the federal OBPS in place, although it is in the process of implementing its own program for industrial emissions. The federal/provincial hybrid programs currently cover 37 per cent of Canada's total emissions.

- **Alberta.** The federal fuel charge applies to Alberta. The province previously had its own carbon tax, but this was repealed on May 30, 2019, thus leading to the implementation of the federal fuel charge on January 1, 2020.

  The province implemented its own large emitter program through its *Technology Innovation and Emissions Reduction (TIER) Regulation* for large industrial emitters on January 1, 2020, which replaced the *Carbon Competitiveness Incentive Regulations* that came into force on January 1, 2018. TIER automatically applies to facilities that emit more than 100,000 tonnes of CO_2e per year, and other facilities can opt in if they compete with TIER emitters and/or are deemed

emissions-intensive and trade-exposed. The carbon price is $30 per tonne as of March 2021. TIER provides free allocation of emissions by assigning emissions benchmarks to facilities. Most benchmarks are set based on historic facility performance, but there are also high-performance benchmarks which recognize best-in-class performance within a given sector. Facilities who are unable to meet their performance benchmark can achieve compliance by using offsets or credits, or by paying the carbon price for every tonne emitted above their benchmark. Compliance payments from TIER are used to support emissions reductions in Alberta, the Canadian Energy Centre, and deficit reduction.

- **Saskatchewan**. The federal fuel charge applies to Saskatchewan, and the province implemented its own large emitter program through its *Management and Reduction of Greenhouse Gases Amendment Act*, which took effect on January 1, 2019. Notably, the provincial large emitter program does not apply to electricity generation or natural gas transmission pipelines; the federal OBPS applies to emissions in these sectors.

  The provincial large emitter program automatically applies to facilities that emit 25,000 tonnes or more of CO_2e per year. Facilities that emit at least 10,000 tonnes of CO_2e and less than 25,000 CO_2e per year can voluntarily opt in. There is no minimum opt-in threshold for oil and gas producers operating more than one site. The carbon price is $30 per tonne as of March 2021.

  Carbon price proceeds from the provincial large emitter program will be generated starting in 2021 and will be directed to Saskatchewan's Technology Fund.

- **New Brunswick.** New Brunswick has a provincially implemented carbon charge, which is regulated under its *Gasoline and Motive Fuel Tax Act*. The charge, which took effect on April 1, 2020, is $30 per tonne as of March 2021. Home heating oil is exempted from the fuel charge, while any fuel charge paid on natural gas is subject to a full on-bill rebate. Specifics regarding how revenues from the carbon tax are being used are not yet publicly available. That said, the province has offset its provincial fuel tax to mute the incentive provided by the carbon charge.

  The province also developed its own large emitter program for large industries, which the federal government approved on September 20, 2020. Under this system, benchmarks set compliance at a level that is a fraction of total covered emissions. The federal OBPS still applies in New Brunswick, as the provincial system has not yet come into effect. How compliance will occur as the federal system stands down is yet to be determined. Revenue from compliance obligations will be directed towards the province's Climate Change Fund, with the aims of reducing emissions and adapting to climate change.

- **Prince Edward Island.** Prince Edward Island implemented its own fuel charge through the *Climate* Leadership *Act* and the *Climate Leadership Regulations,* which took effect on April 1, 2019. The carbon charge does not apply to fuels used by farmers or fishers, in aquaculture or for home heating. It also does not apply to fuels used for inter-provincial aviation or the marine industry—specifically cruise ships and commercial vessels. First Nations purchasers are also exempt.

  The current carbon price, as of April 1, 2020, is $30 per tonne of CO_2e, and it is scheduled to rise to $40 per tonne in 2021. The proceeds from P.E.I.'s fuel charge are returned to consumers,

businesses, and municipalities in the form of rebates or adjustments via credits, rate reductions, or fee reductions. P.E.I. defers to the federal OBPS for its one large emitter.

3.2.4 Carbon Tax

Carbon taxes implemented by British Columbia and the Northwest Territories cover eight per cent of national emissions.

- **British Columbia.** British Columbia has a provincially implemented carbon tax, which is regulated under its *Carbon Tax Act* and covers both general and industrial emissions. Exemptions from the carbon tax include fuels used for agriculture, fuels sold on reserve lands, and fuels that are used in industrial processes rather than combusted, among others.

  B.C.'s carbon tax rate was $40 per tonne CO_2e in 2019 and is scheduled to rise by $5 per tonne per year for two years. Due to the impacts of COVID-19, the planned increase for 2020 has not yet been enacted; the rate remains at $40 per tonne of CO_2e until April 2021, when it is due to increase to $45 per tonne. In April 2022 it will rise to $50 per tonne.

  The CleanBC Industrial Incentive Program (CIIP) seeks to reduce the average costs associated with the carbon tax for large industrial emitters on tax paid above $30 per tonne. Firms in eligible sectors that emit more than 10,000 tonnes of CO_2e per year and report their emissions can apply for tax relief. In 2020, a transitional measure allowed all eligible firms to receive a minimum incentive payment of 75 per cent of their carbon tax paid over $30 per tonne. Rebates up to 100 per cent of payments over $30 are dependent on a facility meeting or exceeding established "world-leading" or "best in class" emission benchmarks, which provides a strong incentive to invest in abatement across all facility emissions. Incentive payments are linked to the development and approval of an emission reduction plan that demonstrates either reductions with abatement options equal to what the carbon price would deliver, or a 15 per cent reduction by 2030.

- **Northwest Territories.** Because the Northwest Territories' carbon tax also applies to large industrial emitters, there is no separate large emitter program in place. However, large industrial emitters do benefit from a rebate program to offset part of the carbon tax impacts. The fuel charge is regulated under N.W.T.'s *Petroleum Products and Carbon Tax Act*, as well as the *Income Tax Act* and their associated regulations. The system took effect on September 1, 2019.

  The carbon tax does not apply on First Nations reserves, provided the bands have not transitioned to self-governance models. Additionally, fuels purchased by visiting military forces, fuels used for aviation, and small containers of fuel (10 litres or less) are also exempt. Moreover, the carbon tax is fully reimbursed on heating fuels for entities emitting less than 50,000 tonnes of CO_2e annually. In industry, a rebate of 72 per cent is applied to the carbon tax, while 12 per cent of the tax paid is reserved in a facility-specific account and accessible for GHG reduction projects.

  N.W.T.'s carbon price was $30 per tonne of CO_2e in 2020 and is scheduled to rise by $10 per year until reaching $50 per tonne in July 2022.

3.2.5 Cap-and-Trade System

Cap-and-trade systems are implemented in Quebec and Nova Scotia, covering 11 per cent of Canada's emission inventory.

- **Quebec.** Quebec implemented the *Redevance annuelle au Fonds vert*, a carbon levy, in 2007, covering all fuel distribution in the province from 2007 to 2012. In 2013 and 2014, after the implementation of cap-and-trade, the carbon levy applied to transportation fuels only, until they became covered under cap-and-trade in 2015.

  Quebec's *Système de plafonnement et d'échange des droits d'émission* (SPEDE) applies to fuel suppliers, as well as to large emitters with GHGs of at least 25,000 tonnes of CO_2e per year, with opt-in provisions available for facilities emitting at least 10,000 tonnes of CO_2e per year. The province allocates allowances for free to large emitters deemed to be at risk of carbon leakage. The proportion of free allowances can be as high as 90% to 100% of the emission intensity target (benchmark), following a formula based on their level of exposure to carbon leakage. All other emission sources, notably covered fuels, do not receive free allowances. Quebec's system has been officially linked to California since January 1, 2014, meaning that industries in Quebec and California that are covered by the SPEDE can trade allowances.

  The total emissions limit declines by approximately 2.5 per cent per year up to 2030. The allowance price is determined by the market, and Quebec sets a minimum auction price. This minimum was $16.34 for 2020 and rises by five per cent plus inflation annually. However, trades between facilities are not bound by this price. The latest settlement auction price (November 2020) was $22.15. Because it is a common market, the carbon price in Quebec is identical to the one in California. Revenue from auctions is directed into the Quebec Electrification and Climate Change Fund, which is used to facilitate initiatives from Quebec's 2030 Plan for a Green Economy, such as energy efficiency and public transportation.

- **Nova Scotia.** The province implemented a cap-and-trade system in 2019 that applies to both fuel suppliers and large industrial emitters (emitting 50,000 tonnes of CO_2e or more per year). The system sets annual emission limits that decline by approximately four per cent per year between 2019 and 2022. Program participants must cover their annual emissions with allowances created by the province that match the declining emission limits.

  Nova Scotia allocates 80 per cent of fuel suppliers' allowances free of charge and large emitters receive 90 to 100 per cent of their allowances free of charge calculated based on facilities' historical performance benchmarks. Exemptions include GHG emissions from non-combustion sources in agriculture and waste sectors, as well as GHG emissions from offshore oil and gas production. As of 2020, there were no offshore oil and gas platforms operating in Nova Scotia.

  The minimum price is $20 per emission allowance for auctions held in 2020. For each year after 2020, the minimum price will increase by five per cent plus inflation. In the latest auction held in December 2020, the settlement price was $24.70. Proceeds from emission allowances auctions are directed to the Green Fund, which supports mitigation and adaptation programs. Recent announcements included EV and energy efficiency subsides from the Green Fund.

3.3 Summary: Provincial and Federal Carbon Pricing Systems

The patchwork of carbon pricing programs across the country includes a combination of provincial and territorial systems and the federal carbon pricing backstop, bifurcated along two lines:

- **Emissions from covered fuels**, including liquid, gaseous and solid fuels such as gasoline, diesel, and natural gas. These fuels are typically used in households, transportation, buildings, and small- and medium-sized enterprises. Electricity is typically not included but instead falls under large emitter programs. Carbon pricing for covered fuel usually applies at the point of distribution to a limited number of fuel distributors, with the carbon price then passed on to consumers at the point-of-sale, for example at the gasoline pump.
- **Emissions from large emitters**, such as those in the cement, mining, oil and gas, chemicals, steel, and refining sectors. Carbon pricing typically creates a heightened competitiveness risk for these large emitters, which usually emit over 25,000 tonnes per year,[21] due to their high emission intensity and competitive markets at home and abroad. Carbon pricing for large emitters applies a price on the quantity of GHGs emitted relative to a regulated limit. The limit is typically expressed as a function of production and emissions, or emissions per unit of production. If the facility beats the emission limit, it can generate credits, for example in the OBPS system, or allowances in cap-and-trade systems, that can be sold or banked for future compliance. Depending on the system, if the firm does not meet its emission limit, the firm has options such as reducing emissions, buying emission reductions or purchasing offsets, or making a payment. The main objective of these programs is to protect competitiveness that can be threatened if carbon prices with trading partners are misaligned.

Figure 4 and

Figure 5 provide a summary view of how Canada implements carbon pricing across covered fuels and large emitter emissions. We adopt this taxonomy throughout the report to discuss the jurisdictional carbon pricing systems.

[21] Thresholds for large emitter treatment and opt-in vary across jurisdictions. A review of the various thresholds is presented in Section 4.4.

Figure 4: Carbon Pricing for Covered Fuels

Covered fuels are 38 per cent of national emissions.

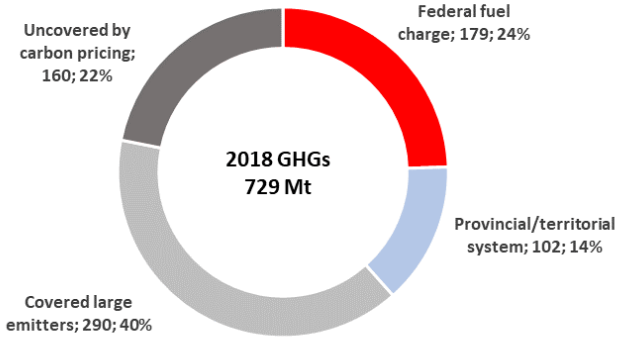
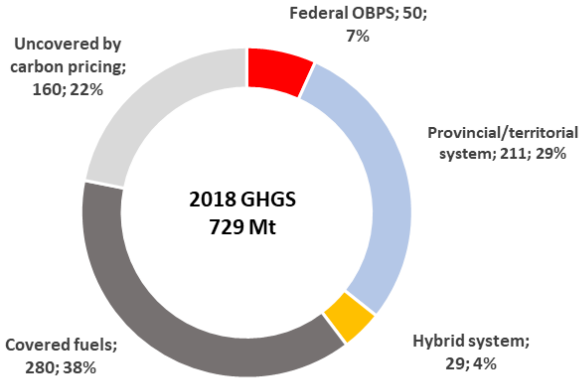


Figure 5: Carbon Pricing for Large Emitters

Large emitters are 40 per cent of national emissions.



4 Effectiveness Indicators: How Many Tonnes of Emissions Are Covered at What Price?

Under the PCF, the objective of carbon pricing is tied directly to ensuring a continual improvement in emissions reductions at a level that is informed by science and aligned with Canada's Paris Agreement commitments, for example:

- Among other objectives, action by governments under the PCF is about "implementing a collaborative, science-based approach to inform Canada's future targets that will increase in stringency as required by the Paris Agreement," (PCF, p.3).
- "The effectiveness of actions will also be assessed with a view to ensuring continual improvement so as to increase ambition over time, in accordance with the Paris Agreement." (PCF, p.46).

With science now indicating a need for more policy ambition before 2030 and for decarbonization by mid-century, we can think of continuous improvement to mean the ability of carbon pricing to contribute to long-term emissions reductions. More specifically, we would expect the stringency of carbon pricing policy to be aligned with reducing GHG emissions over the short- and long-term (i.e., to 2030 targets and net zero beyond[22]).

The question then becomes how to measure effectiveness. The PCF, reflecting input from the Working Group on Carbon Pricing Mechanisms,[23] provides good guidance:

- "[Carbon pricing should apply] to a broad set of emission sources throughout Canada and with increasing stringency over time either through a rising price or declining caps." (PCF, p.7).

This guidance, which is reasonable to adopt for this assessment, implies that effectiveness is a function of both a broad coverage of emission sources and an expectation of an increasingly stringent price signal that incents continuous emissions reductions. To assess effectiveness, the assessment considers the share of emissions in a jurisdiction that are affected by pricing policies and the size of the financial rewards for emissions reductions created by the carbon price.

A critical distinction to keep in mind for this assessment is that when comparing the stringency of price- and quantity-based systems within the federation, both a declining cap on emissions and a rising fixed carbon charge or tax rate can be effective. This differentiation makes comparing systems tricky, with indicators of effectiveness for cap-and-trade systems more related to the decline rate that limits emissions, versus price-based systems which can better be assessed by looking at level of the carbon price:

- **Price-based approaches** are good at containing costs because they apply a fixed price. The regulator can set the carbon price and then determine the financial exposure for emitters. The

[22] See CICC, 2021. *Canada's Net Zero Future: Finding our way in the global transition.* https://climatechoices.ca/wp-content/uploads/2021/02/Canadas-Net-Zero-Future_Summary_FINAL.pdf
[23] Working Group on Carbon Pricing Mechanisms, Accessed March 19, 2021. *Final Report*. https://www.canada.ca/content/dam/eccc/migration/cc/content/6/4/7/64778dd5-e2d9-4930-be59-d6db7db5cbc0/wg_report_carbon-20pricing_e_v4.pdf

trade-off is that there is quantity uncertainty. Because the abatement response is not known, the regulator cannot predict the resulting emission level that corresponds to the carbon price.

- **Quantity-based approaches** provide greater certainty on the emission levels since the cap sets the maximum level of emissions allowed. The trade-off is that there is greater cost uncertainty. The regulator does not have information on the costs that constraining emissions will impose on emitters.

The effectiveness of a carbon price in shifting production and consumption towards less carbon-intensive goods depends on consumer and business responsiveness to price changes. Many of the indicators we develop below to review carbon pricing effectiveness within Canada are more suited to assessing price-based systems, since they are focused on the carbon prices. Where appropriate, we discuss the implications for assessing the effectiveness of quantity-based systems, including the importance of a declining cap on emissions.

A key point is that the indicators focus on both coverage and stringency to be indicative of overall carbon pricing effectiveness. We do not, however, provide a quantitative assessment of the actual or expected emissions reductions from the programs since we do not have recent emissions data (discussed below), nor did we use an integrated economy-wide model to project emissions reductions for the programs. When reviewing the indicators, there are few items to keep in mind:

- **Emissions are for 2018**. We use the latest publicly available emissions data for each jurisdiction as of January 2021, which is data published in 2020 for the calendar year 2018. This lag in the production of annual GHG inventories creates challenges for both policymaking and policy evaluation. The 2019 National Inventory Report was published in April 2021 but could not be integrated into this assessment.
- **Program design is as implemented in 2020**. We select 2020 as the base year to assess carbon pricing programs. This year captures the latest developments in systems; however, we are aware that major program updates are still occurring. This is a perennial challenge with assessing carbon pricing systems—they are continually being updated. Since our analysis takes a 2020 snapshot of programs as implemented, it does not explicitly account for the cumulative impact of systems that have been operating for several years.
- **Analysis is static**. Given uncertainty about future design features and abatement responses, we hold constant many of the changing temporal aspects of carbon pricing systems, including carbon price schedules, declining caps, tightening rates, emissions abatement responses, coverage, and opt-in provisions. We do, however, comment later in this report on the importance of many of these temporal dynamics and their impact on effectiveness. Also note that investments in capital-intensive emissions reduction technologies will be highly dependent on expectations about future stringency and program design.

- **Federal OBPS is assumed in Ontario and New Brunswick.** We do not quantitatively assess the large emitter programs proposed in Ontario[24] and being developed in New Brunswick[25] since we focus on programs as implemented in 2020. However, we do analyze the key features of the proposed programs in Section 4.4.

4.1 How Many Emissions Are Covered by the Carbon Price?

The first element of effective policy is **coverage**, or the emission sources covered by the carbon pricing program. "Coverage" refers to the extent to which the incentives from a carbon pricing policy apply to a greater share of total emissions. The PCF argues that covering a common and broad scope of emissions supports effectiveness, which helps avoid domestic pollution havens and adverse competitiveness outcomes:

> *"[…]Pricing will be based on GHG emissions and applied to a common and broad set of sources to ensure effectiveness and minimize interprovincial competitiveness impacts." (PCF, p.50).*

All else being equal, broader coverage increases the effectiveness of policy. To be effective, therefore, the carbon price should cover as many emission sources as possible, except when some emission sources are uniformly exempted across jurisdictions and are targeted by other non-pricing policies. To compare coverage across provinces and territories, we consider two **indicators of emissions coverage**:

1. The quantity of emissions covered by the carbon price in each jurisdiction is measured by the **quantity of emissions valued by the price incentive**.
2. The share of emissions that *could* be covered is measured by the **coverage standard**.

Each is discussed below.

GHG Gases Covered by Carbon Pricing

The types of GHGs covered by carbon pricing are mostly identical across the country, with the following gases mainly covered:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

Of note, NF_3, which is used in the production of flat-panel displays and thin-film solar cells, is not covered by the carbon price in British Columbia, Newfoundland and Labrador and Saskatchewan. NF_3, however, represents only a small fraction of overall emissions.

[24] Draft regulations. July 4, 2019, O. Reg 241/19: Greenhouse Gas Emissions Performance Standards regulation (EPS regulation) under the *Environmental Protection Act*.
[25] Draft regulations. November 2020. Reduction of Greenhouse Gas Emissions Regulation – Climate Change Act, https://www2.gnb.ca/content/dam/gnb/Departments/eco-bce/pdf/pr/2020/11/20-132E.pdf

Indicator 1: The Quantity of Emissions Valued by the Price Incentive

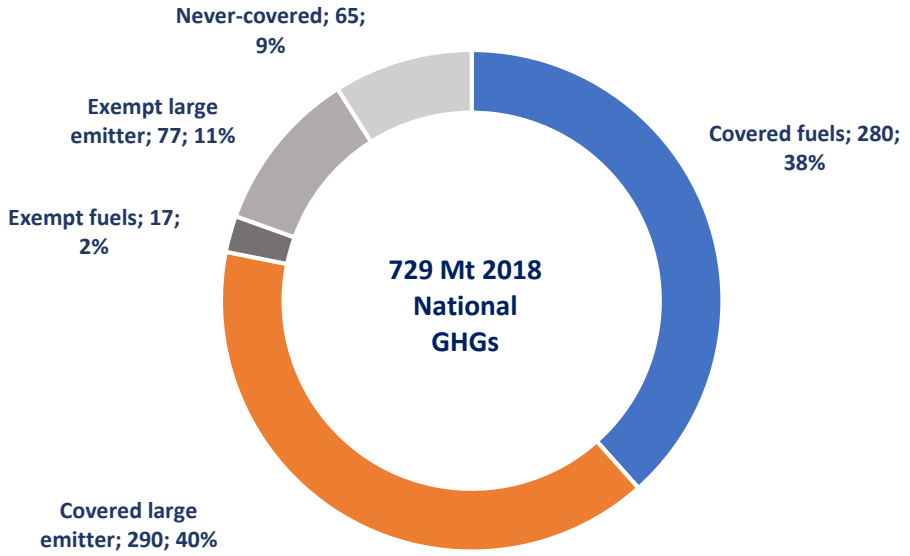
Emissions covered by the price incentive include all emissions in a province or territory that have an opportunity cost. In other words, an emitter can avoid paying the price of carbon by reducing these emissions—or even generate revenue from selling credits, if they are able to reduce these emissions even more. A price incentive transmitted broadly creates incentives for more emitters to reduce more of their emissions. All else being equal, broader coverage increases policy effectiveness and cost-effectiveness.

To estimate the quantity of emissions valued by the price signal across the country, we conducted a detailed review of the FPT carbon pricing systems to identify covered, uncovered, and exempt emissions. Carbon pricing coverage was then mapped onto the 61 different emission categories for each jurisdiction as reported in the National Inventory Report (NIR, 2020; 2018 emission year). Emissions for the purposes of this assessment can be classified according to the following groups (Figure 6):

- **Covered fuels** include emissions related to fuels that are covered under a fuel charge, carbon tax or emissions related to fuels that are paid directly by fuel suppliers in cap-and-trade systems. In total, 280 megatonnes of fuels are covered, representing 38 per cent of national emissions.
- **Exempt fuels**. These emissions are specifically exempted under regulations in a jurisdiction (e.g., exempted emissions from marked diesel and gasoline for agriculture sector use). Specific exemptions identified in regulations are equal to three per cent of the total emissions, or 17 megatonnes. The largest exemption is off-road agricultural diesel fuel. But that said, exemptions were identified in many other NIR emission groups. Some exemptions like domestic aviation and domestic navigation are implemented in many jurisdictions, while some like heavy-duty diesel vehicle exemptions are specific to a few jurisdictions.
- **Covered emissions from large emitters.** These emissions are regulated under large emitter programs and include energy and industrial process emissions. In total, 290 megatonnes of industrial GHGs are covered, representing 40 per cent of national emissions.
- **Exempted emissions from large emitters.** These are sources of industrial emissions not covered by large emitters programs. Most exemptions are related to process and fugitive emissions, where some jurisdictions choose to not cover process emissions, but others do. In total, 77 megatonnes of industrial GHGs are exempted, representing 11 per cent of national emissions.
- **Total covered emissions.** These are the sum of emissions covered by either a charge on fuels or a large emitter program. Carbon pricing programs in 2020 covered about 78 per cent of Canada's 729 megatonnes in 2018, the latest year for which national GHG data is available.
- **Never-covered emissions.** Certain emissions are never covered by any jurisdiction in carbon pricing programs in Canada (e.g., non-energy-related agricultural emissions and land use emissions). These emissions account for nine per cent of Canada's total emissions or 66 megatonnes. Offset protocols typically target emissions in this group since these emissions are difficult to price. In our view, offsets do not automatically expand the coverage of the carbon pricing programs. Typically, this is because compliance emissions, or emissions subject to a regulatory requirement, are a fixed quantity in any given period. Therefore, from an overall effectiveness perspective, there are no incremental gains from the use of offsets for compliance

since the overall quantity of compliance remains unchanged. Offsets are, however, a key tool to reduce the *costs* of compliance and as such are addressed in the average cost indicator below.

Figure 6: Quantity of Canadian Emissions Valued by the Price Incentive
Covered emissions, exempted emissions, and never-covered emissions.



For each jurisdiction, we calculate the quantity of emissions valued by the price incentive as follows:

$$SE_i = \frac{CE_i}{TE_i}$$

Where:

SE_i = Share of emissions covered in each jurisdiction, *i*

CE_i = Covered emissions in each jurisdiction, *i*

TE_i = Total emissions in each jurisdiction, *i* (not including land use)

Figure 7 provides an overview of the quantity of emissions covered by the price incentive in all jurisdictions. Due to varying design choices and the structure of jurisdictional emission inventories, carbon pricing covers between 54% and 87% of jurisdictional emissions and 78% of national emissions. The emissions covered by the price incentive in each jurisdiction are provided in Figure 8 and Figure 9.

We note that comparing emissions covered by the price incentive across jurisdictions is not a reliable comparator given the considerable difference in emission sources in Canada's provinces and territories. Most notably, the agriculture sector includes large emission sources that are never covered by carbon pricing in any jurisdiction in the country or, as in the case of on-farm diesel emissions, are exempt from carbon pricing in all jurisdictions except Quebec. When agricultural emissions are a large contributor to

overall emissions, as in Prince Edward Island, Manitoba, and Saskatchewan, the indicator shows a low level of coverage.

Figure 7: Emissions Covered by the Pricing Incentive as a Share of Total GHGs
Coverage differs due to carbon pricing choices and the share of GHG sources not covered anywhere in Canada.

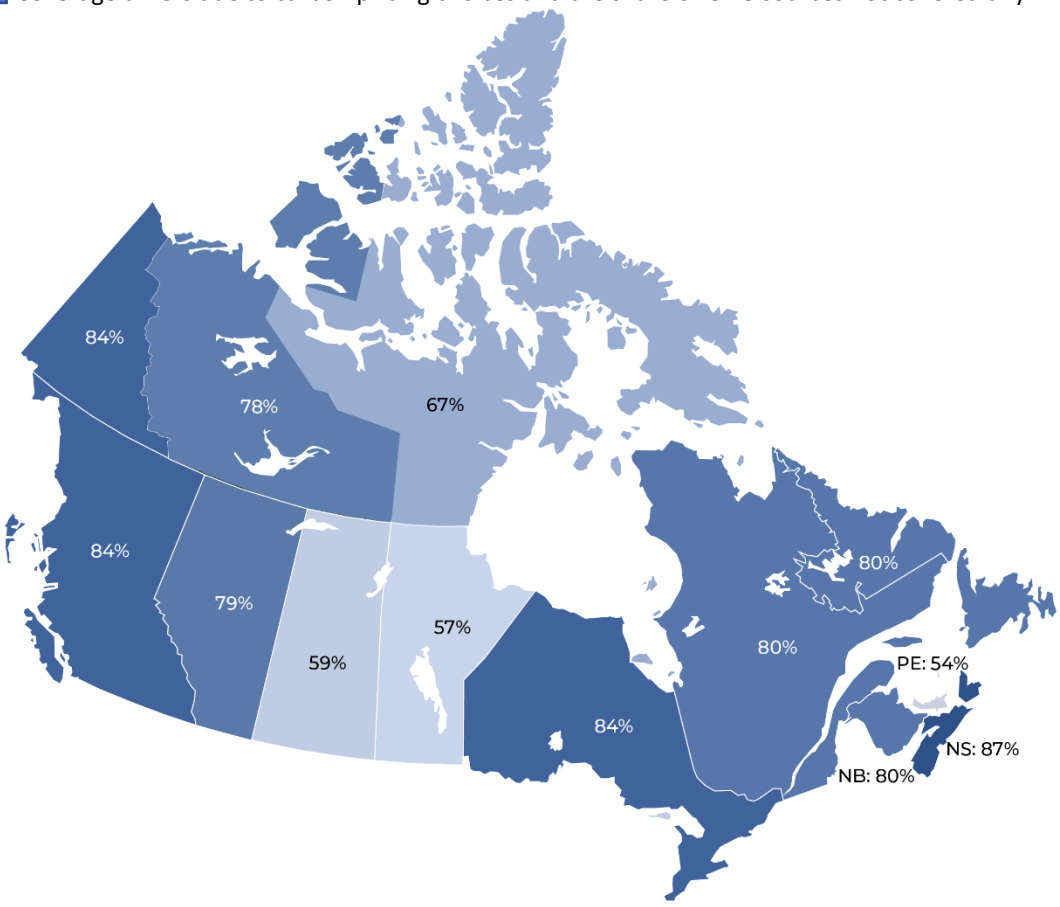


Figure 8: Emissions Covered by the Price Incentive by Jurisdiction, Kilotonnes[26]
The total emissions covered, exempt, and not covered by carbon pricing.

Jurisdiction	Total Emissions	Covered by Price		Not Covered by Price		
		Covered Fuels	Large Emitter Program	Covered Fuel Exemptions	Large Emitter Exemptions	Never Covered
AB	272,555	53,388	162,360	3,096	35,371	18,340
BC	65,525	38,128	16,903	1,674	4,092	4,727
MB	21,806	10,524	2,009	871	1,607	6,795

[26] The estimated total coverage in our analysis was compared to federal estimates provided to CICC and was within the bounds of +/- six per cent for all provinces and territories. These differences are not surprising given the need to make assumptions to apportion NIR emission groups between, for example, emissions that are covered and those that are not covered by carbon pricing.

Jurisdiction	Total Emissions	Covered by Price		Not Covered by Price		
		Covered Fuels	Large Emitter Program	Covered Fuel Exemptions	Large Emitter Exemptions	Never Covered
NB	13,278	3,877	6,691	1,098	1,033	578
NL	11,009	3,842	4,994	945	1,059	169
NT	1,229	962	1	222	41	3
NS	17,009	7,359	7,436	605	1,063	545
NU	700	338	130	207	24	2
ON	164,979	97,747	40,745	1,798	13,339	11,349
PE	1,679	858	50	254	107	412
QC	82,550	46,562	19,110	1,758	5,978	9,143
SK	76,442	16,124	29,197	4,530	13,165	13,426
YT	624	523	0	46	47	7
CD	**729,385**	**280,232**	**289,625**	**17,105**	**76,927**	**65,496**

* Totals may not sum due to rounding errors.

Figure 9: Emissions Covered by the Price Incentive by Jurisdiction, Per Cent

The per cent of emissions covered, exempt, and not covered by carbon pricing.

Jurisdiction	Total Emissions	Covered by Price		Not covered by Price		
		Fuels	Industrial GHGs	Fuel Exemptions	Industrial Exemptions	Never Covered
AB	100%	20%	60%	1%	13%	7%
BC	100%	58%	26%	3%	6%	7%
MB	100%	48%	9%	4%	7%	31%
NB	100%	29%	50%	8%	8%	4%
NL	100%	35%	45%	9%	10%	2%
NT	100%	78%	0%	18%	3%	0%
NS	100%	43%	44%	4%	6%	3%
NU	100%	48%	19%	30%	3%	0%
ON	100%	59%	25%	1%	8%	7%
PE	100%	51%	3%	15%	6%	25%
QC	100%	56%	23%	2%	7%	11%
SK	100%	21%	38%	6%	17%	18%
YT	100%	84%	0%	7%	8%	1%
CD	**100%**	**38%**	**40%**	**2%**	**11%**	**9%**

A few **technical considerations** are worth noting:

- Reported emissions in 2018 for regulated facilities, from provincial databases or the federal Greenhouse Gas Reporting Program,[27] were considered in the designation of the splitting emissions into groups; however, **there is uncertainty in the grouping allocations**, given that emissions covered in the carbon pricing systems are not always reported. Also, there are no estimates of emissions from smaller facilities that fall below reporting thresholds that may have opted into a large emitter program. We note that these emissions are relatively small and therefore do not materially impact the result should assumptions be incorrect. Note that it is possible that 2020 emissions differ significantly from the emissions reported in 2018.
- **Emissions covered by the carbon price under covered fuels and large emitter programs** include emissions from energy used directly, such as fossil fuel and biomass; energy used indirectly, such as heat, hydrogen, and electricity; and releases of process and fugitive emissions from production. Other gases and sector emissions could be covered outside of the program due to the presence of GHG offsets. Quebec also covers emissions embodied in the electricity imported from outside Canada. Figure 10 provides an overview of the coverage of industrial process emissions.
- **Exemptions are considered outside of the share of emissions covered**. However, emissions where carbon price rebates are provided are included in the coverage indicators. Often there is a full or partial rebate. When partial rebates are provided, there is some incentive to reduce emissions but at a level that is less than if rebate was not in place. In cases where there is a full offset of the carbon price through point-of-sale rebating, for example, there is still a weak incentive linked to the knowledge that the carbon price exists. Exemptions are listed in Figure 10.
- "**Covered fuel exemptions" and "large emitter exemptions"** are emissions that are not covered in the jurisdiction but in theory could be covered since at least one other Canadian jurisdiction has chosen to cover these emissions. We return to this concept of "covered somewhere" in the next indicator, where we develop an approach to compare coverage across programs on a consistent or standard coverage basis. Note that federal and provincial methane regulations for oil and gas facilities will expand the overall policy coverage for some jurisdictions. For example, Alberta, in addition to covering methane emissions from oil sands and large natural gas producers, has offset protocols to incent reductions from smaller producers in advance of oil and gas methane regulations coming into force.
- **Never-covered emissions** are typically related to land use and non-energy agricultural emissions. Biogenic carbon emissions are not included in coverage, as these emissions are not categorized in the NIR emissions database we use, while all land use emissions are exempted from carbon pricing.

[27] Government of Canada. Accessed March 19, 2021. "Greenhouse Gas Reporting Program (GHGRP) – Facility Greenhouse Gas (GHG) Data." https://open.canada.ca/data/en/dataset/a8ba14b7-7f23-462a-bdbb-83b0ef629823

Figure 10: Share of Industrial Process Emissions Covered by Jurisdiction
The total industrial process emissions covered by carbon pricing.

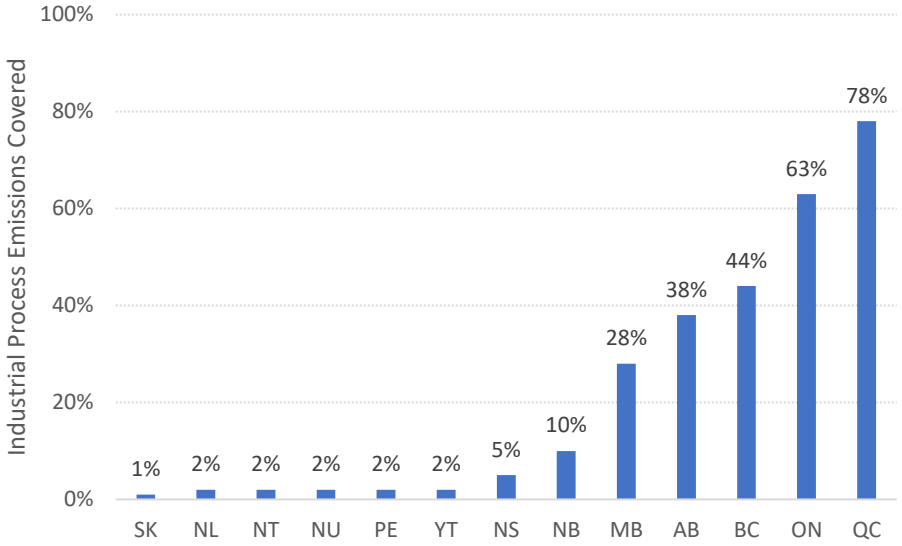


Figure 11: Exemptions to Covered Fuels
Listed exemptions for priced fuels.

Province / Territory	Category of Fuel Exemption	NIR Emission Category	Total Emissions (kt)	Exempted Emissions (kt)	Exemption Fraction (%)
Alberta	Agriculture	Energy & Off-Road Agriculture & Forestry	3,398	3,096	91%
British Columbia	Agriculture	Energy & Off-Road Agriculture & Forestry	1,393	653	47%
	First Nations	Residential Buildings	4,291	116	3%
		Commercial & Institutional Buildings	2,718	73	3%
		Transportation	12,344	333	3%
	General	Railways	1,005	502	50%
Manitoba	Agriculture	Energy & Off-Road Agriculture & Forestry	986	871	88%
New Brunswick	Agriculture	Energy & Off-Road Agriculture & Forestry	112	85	76%
	General	Commercial & Institutional	309	137	44%
		Residential	664	494	74%
		Domestic Aviation	107	107	100%
		Heavy-Duty Diesel Vehicles	772	77	10%
		Domestic Navigation	127	64	50%
Newfoundland and Labrador	First Nations	Residential Buildings	537	31	6%
		Commercial & Institutional Buildings	316	18	6%
		Transportation	1,867	106	6%
	General	Public Electricity & Heat Production	1,128	34	3%
		Other Manufacturing	18	3	15%
		Agriculture & Forestry	7	7	100%
		Domestic Aviation	205	205	100%

Province / Territory	Category of Fuel Exemption	NIR Emission Category	Total Emissions (kt)	Exempted Emissions (kt)	Exemption Fraction (%)
		Domestic Navigation	551	551	100%
		Off-Road Agriculture & Forestry	26	26	100%
Northwest Territories	First Nations	Transportation	132	44	33%
	General	Commercial & Institutional	115	38	33%
		Residential	57	19	33%
Nova Scotia	General	Domestic Aviation	265	265	100%
		Domestic Navigation	341	341	100%
Nunavut	General	Public Electricity & Heat Production	56	56	100%
		Domestic Aviation	151	151	100%
Ontario	Agriculture	Energy & Off-Road Agriculture & Forestry	2,529	1,798	71%
Prince Edward Island	First Nations	Residential Buildings	6	0	1%
		Transportation	451	5	1%
	General	Residential	233	175	75%
		Agriculture & Forestry	12	6	50%
		Domestic Aviation	22	19	85%
		Domestic Navigation	32	32	100%
Quebec	General	Domestic Aviation	839	839	100%
		Domestic Navigation	919	919	100%
Saskatchewan	Agriculture	Energy & Off-Road Agriculture & Forestry	5,240	4,530	86%
Yukon	General	Public Electricity & Heat Production	33	23	70%
		Domestic Aviation	46	46	100%

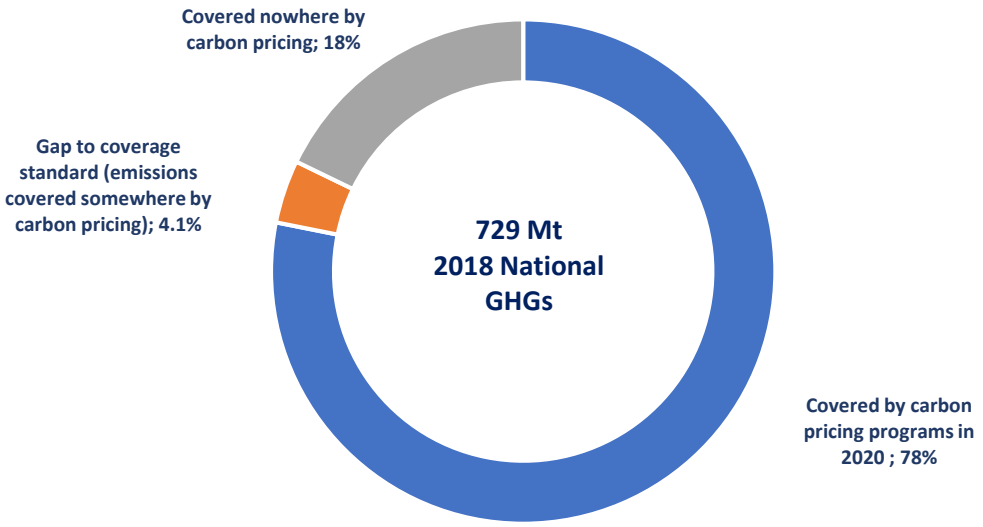
Indicator 2: The Emissions that Could Be Priced: The Coverage Standard

To better account for differences in emissions profiles between jurisdictions, we developed a second metric of coverage: the "coverage standard." Conceptually, this standard is like the B.C. coverage standard applied to the federal carbon pricing benchmark, where emissions covered under each program is compared against the covered emissions in British Columbia. The application of the B.C. carbon tax, however, omits a whole range of GHGs that are covered by carbon pricing elsewhere in Canada, and as such we established a more comprehensive standard to compare each jurisdiction's program coverage on an equal basis.

We identified sector or emission coverage treatment by Canadian carbon policies and then applied this standard across all jurisdictions. The standard of coverage developed identifies categories or partial categories of emissions that *are currently covered in at least one province or territory*. A first step to develop the standard was to review all FPT carbon pricing systems to identify which emissions are covered. If a group of emissions or part of a group of emissions is covered somewhere by carbon pricing, we flagged it and added it to the coverage standard. Then, for each jurisdiction, we identified those emissions identified as covered somewhere. Appendix B provides the categories of emissions included in the coverage standard.

Applying this coverage standard to national GHGs indicates that 82 per cent of 2018 emissions could be covered under carbon pricing. This is four percentage points higher than the actual carbon pricing coverage of 78 per cent of total national emissions (Indicator 1 above). This finding implies that there is scope to increase the coverage of carbon pricing programs within the country (Figure 12).

Figure 12: Emissions that Could Be Priced: The Coverage Standard
Actual program coverage, emissions covered somewhere by coverage standard, and emissions covered nowhere.



We calculate the coverage standard indicator as the ratio of actual program coverage to the coverage standard applied to each jurisdiction as follows:

$$SBPE_i = \frac{CE_i}{TLE_i - EE_i}$$

Where:

$SBPE_i$ = Share of priced emissions covered in each jurisdiction, *i*, as a proportion of the coverage standard

CE_i = Covered emissions by the carbon price in jurisdiction, *i*

TLE_i = Total emissions in each jurisdiction, *i* (not including land use)

EE_i = Emissions in each jurisdiction, *i*, that are in categories that are not covered anywhere by carbon pricing (i.e., exempted or never covered). Where there are cases where an emission category is only partially exempted (for example, for fugitive methane emissions), we proportionally adjust emissions to the highest stringency—i.e., using the highest share of the emissions that are covered in any province.

The columns in Figure 13 are designed to parse out the total emissions into the categories that inform the coverage standard. They can be interpreted as follows:

A. **Emissions excluded from the standard: always excluded GHGs.** These emissions include non-energy agricultural emissions; industrial process emissions; other product manufacture and use emissions; land use emissions and sinks; and waste emissions that are not related to solid waste disposal.

B. **Emissions excluded from the standard: partially covered GHGs.** Partial coverage refers to situations where at least one jurisdiction covers some part but not all emissions from an emission category through the fuel charge or large emitter system. These include emissions from solid waste disposal; emissions from the production and consumption of halocarbons, SF_6 and NF_3; fugitive emissions from the oil and natural gas sectors; and industrial process emissions related to lime production, mineral product use, and chemical production. Total coverage of these emission groups under carbon pricing programs is unlikely for several reasons, including the fact that some emission sources fall below reporting thresholds for larger emitter programs while some emissions, like halocarbons, come from the household sector.

   Examples of partial coverage in emission groups include several waste disposal landfills in Alberta's TIER program for large final emitters, where about six per cent of emissions from solid waste disposal facilities are covered.[28]

C. **Coverage standard as a share of total emissions.** Emissions that determine the coverage standard are total emissions minus emissions that are excluded in all jurisdictions and minus partially covered emissions (100% – A – B).

D. **Actual coverage by carbon pricing programs.** The percentage of total emissions in the province or territory that are covered either by a fuel charge or some other carbon pricing system.

E. **Share of GHGs covered by program over the standard** (D/C)**.** The emissions covered by carbon pricing in a jurisdiction divided by the coverage standard (covered somewhere).

F. **Trade-weighted coverage.** This expands the share of GHGs covered over the standard by offsets or traded units from outside Canada.[29]

[28] No other province has included landfills in their large final emitter systems, but if we added this to the coverage standard applied to all jurisdictions, we would include a proportion of solid waste disposal emissions equivalent to coverage in Alberta. For example, Saskatchewan's solid waste disposal emissions are 586 $ktCO_2e$; if we extended coverage to six per cent of these emissions (Alberta's coverage), then we would add 35 $ktCO_2e$ to the coverage standard.

[29] If a program is a net *importer* of emission reduction units for compliance (like Quebec importing California emission allowances and Alberta using offsets for compliance) the trade-weighted coverage is increased by the quality of imported units to reflect broader coverage. Conversely, if a jurisdiction is a net *exporter* of credits, this means that a portion of the emissions reductions happening locally are accounted for elsewhere, therefore decreasing the trade-weighted coverage. See: https://ecofiscal.ca/wp-content/uploads/2016/07/Ecofiscal-Commission-Comparing-Stringency-Carbon-Pricing-Report-July-2016.pdf

Figure 13: Emissions Coverage Indicators across Jurisdictions
Coverage as a share of total 2018 emissions.

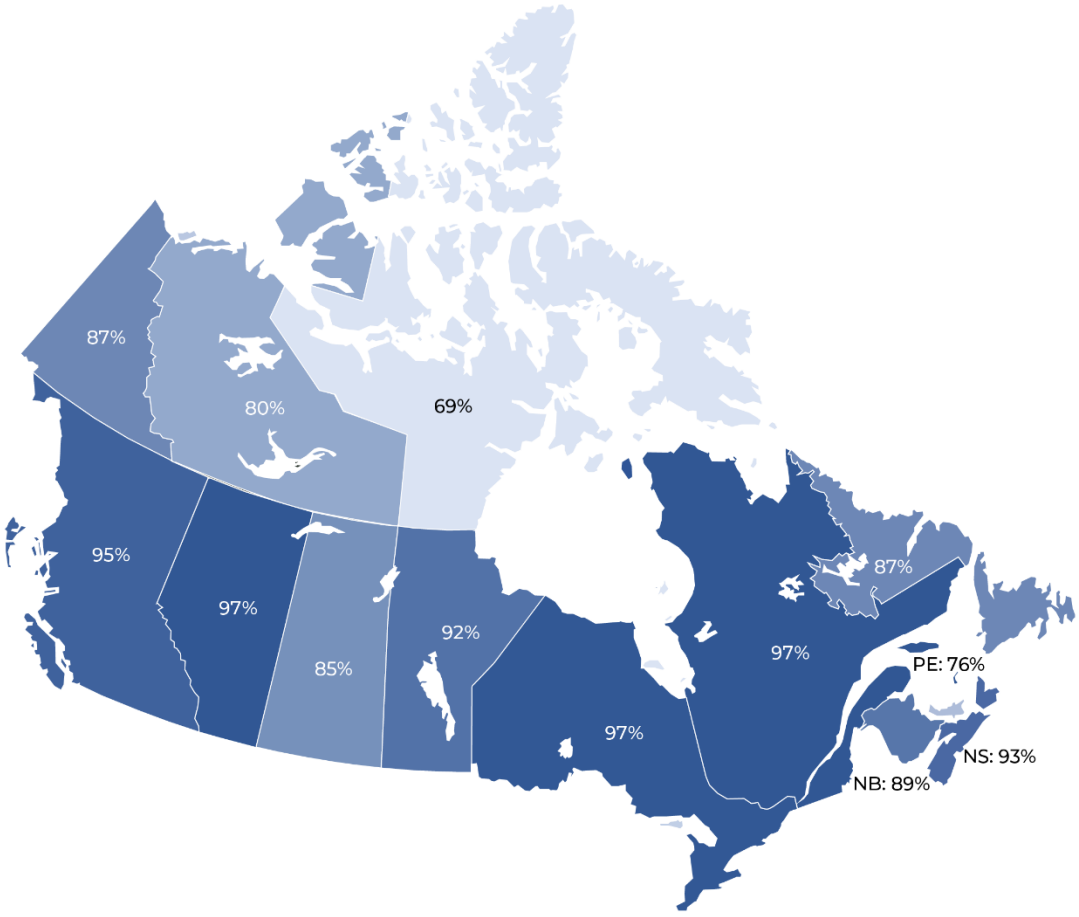
	Calculations				Results	
	A	B	C	D	E	F
	Always excluded	Partially covered, always excluded	Coverage standard	Covered by carbon prices	Share of GHGs covered by program over coverage standard (D/C)	Trade-weighted coverage
	%	%	%	%	%	%
QC	11%	7%	82%	80%	97%	99%
AB	7%	12%	82%	79%	97%	99%
ON	7%	6%	87%	84%	97%	97%
BC	7%	4%	89%	84%	95%	95%
NS	3%	4%	93%	87%	93%	93%
MB	31%	6%	63%	57%	92%	92%
NB	4%	6%	89%	80%	89%	89%
YT	1%	3%	96%	84%	87%	87%
NL	2%	6%	92%	80%	87%	87%
SK	18%	13%	70%	59%	85%	85%
NT	0.3%	2%	97%	78%	80%	80%
PE	25%	5%	71%	54%	76%	76%
NU	0.3%	2%	97%	67%	69%	69%

* Colour codes may differ even with identical figures due to rounding.

Under our definition of the coverage standard, no jurisdiction covers all emission sources to the standard, with coverage varying from 69 per cent to 97 per cent (Figure 14). Differences in the coverage standard are driven by uneven fuel charge exemptions and uneven coverage of large emitters. More specifically:

- Fuel exemptions, including those applying to First Nations, explain the lower coverage in Nunavut and the Northwest Territories.
- The fuel exemption responsible for the largest variations in coverage standard across Canada is the marked fuels exemption in agriculture. Provinces where these fuels are a significant portion of total economic activity and hence overall emissions, such as Saskatchewan, Manitoba, and Prince Edward Island, have lower coverage as a result.
- Generally, process emissions are only partially covered by the large emitter programs. Some systems, including those in Saskatchewan and Nova Scotia, have limited or no coverage of specific industrial process emissions.
- Other provinces may have a significant portion of industrial process emissions not covered by the large emitter programs, and as a result, this lowers their emissions coverage.

Figure 14: Coverage Standard Emissions Valued by the Price Incentive
Emissions covered by carbon pricing somewhere in Canada make up the coverage standard.



4.2 What Is the Value of Emission Reductions?

Stringency refers to the strength of the incentives created by a carbon pricing policy to reduce GHG emissions or how much reducing emissions pays. All else being equal, economic theory instructs that a more stringent policy will be more effective. Economic theory would support the need to send a uniform and consistent price signal across emitters to drive the lowest-cost emissions reductions across all covered emissions. As noted above, this can be done either directly by setting a price on carbon using a tax or a charge or indirectly by setting a cap on the quantity of emissions allowed.

Yet various aspects of stringency drive the effectiveness of policy in different ways. The **stringency indicators** developed for this assessment include:

- **The marginal cost incentive**, which is the carbon cost applied to compliance emissions, provides the incentive for facilities and consumers to reduce emissions. This is the value of an emissions reduction, with a higher value creating a higher incentive to reduce emissions. However, note that the observed carbon price in cap-and-trade regimes cannot be solely equated with effectiveness (see box). The marginal cost incentive can be reduced if point-of-sale rebates are offered in parallel to carbon pricing.

- **The average cost incentive**, which is the cost on all the emissions owed to comply with the program, incorporates the exemptions and point-of-sale rebates that lower the total value of all emission reductions. This indicator provides two insights. First, it indicates how strong the signal is for new facilities or major retrofits to improve their emission performance. Second, it provides insight into inter-jurisdictional competitiveness and how costs are distributed.
- **The expected future marginal cost incentive** indicates the long-term signal that affects ongoing investment and buying decisions to manage carbon.
- **The impacts of revenue recycling choices** can address adverse competitiveness and income impacts but can also impact, positively or negatively, the marginal and average cost incentives.

Note that this section assesses the **federal OBPS in Ontario and New Brunswick.**

All four indicators are important to understand stringency. Each is discussed below.

Observed Carbon Prices and Effectiveness in Cap-and-Trade Systems

Even though we use marginal and average costs as proxies for carbon pricing effectiveness, these indicators must be interpreted with caution when assessing cap-and-trade systems (Quebec and Nova Scotia).

In regimes with a cap on absolute emissions, the marginal cost is the result of several factors, the most important ones being the quantity of available allowances, the cap decline rate, the auction reserve prices, the cost containment reserves, the access to compliance flexibility, and the impact of complementary climate policies on emissions. In fact, these factors can exert offsetting pressures on the observed marginal cost. A higher cap decline rate, for example, puts upward pressure on marginal costs, whereas well-designed complementary policies such as investments in public transit, electric vehicle subsidies, or industrial innovation programs decrease the demand for fossil fuels, putting downward pressure on prices. Access to international units can also lower marginal costs but may not necessarily impact overall effectiveness, given the presence of the binding cap. Finally, advance auctions or an oversupply of allowances can put downward pressure on the marginal cost.

Therefore, when evaluating the effectiveness of cap-and-trade systems—and for that matter the large emitters programs that allow for traded units such as the federal OBPS—special consideration should be given to the tightening rates and to specific system design components (long-term price signals—see Indicator 5, free allowances, transitional assistance factors, etc.) rather than the observed marginal cost

Indicator 3: The Marginal Cost Incentive: The Value of an Emission Reduction

The most straightforward method to compare the relative price stringency of carbon pricing mechanisms is to consider the marginal cost incentive across jurisdictions.

The marginal cost incentive calculated in this indicator considers the carbon tax or charge rate, the price of a tradeable allowance in a cap-and-trade system, or the price of a credit in an output-based system (dollars per tonne). It also accounts for point-of-sale rebates and, in the case of B.C., for a unique incentive structure under its CleanBC Industrial Incentive Program (CIIP). It is therefore a weighted marginal cost incentive calculation.

Given the limited availability of data, the marginal cost incentives presented below do not directly incorporate the effects of credit banking, overallocation of free allowances, performance credits, or weak benchmarks for large emitters, all of which could put downward pressure on the incentive to abate. Specifically, the design choices that impact the marginal cost incentive include:

- **Point-of-sale rebates.** These effectively lower the marginal cost incentive of the policy. We identified them where appropriate and used them to calculate this indicator. Rebates linked to fuel consumption include point-of-sale rebates and the offsetting of some portion of provincial fuel taxes to mute the impact of the charge on the fuels covered.

  These rebates reduce the marginal cost incentive to 6.63 cents per litre for the 2020 carbon price, which then lowers overall effectiveness.

Theory: How Marginal Cost Incentives Affect Stringency

Marginal incentives drive the "technique effect". Abatement choices are driven primarily by the marginal incentive, which is influenced by the carbon price but also by point-of-sale rebates and the presence of compliance flexibility such as banking or trading. The marginal price signal incents low-carbon technology or behaviour change, thereby lowering the emission intensity of production or consumption. Emitters (both firms and individuals) have an incentive to avoid paying the carbon price by making changes in energy consumption, production processes or the types of fuel used.

- **Other rebates.** Some rebates are not linked to fuel consumption or emissions directly, as in the federal Climate Action Incentive, and have no impact on the marginal cost incentive.
- **Compliance tonnes as a fraction of covered emissions.** Large emitter programs that set compliance tonnes, or the tonnes subject to the carbon price, as a fraction of covered emissions are not included as an adjustment to the marginal cost incentive. Since all emission reductions are tradeable in large emitter programs, the incentive to reduce tonnes and generate performance credits is maintained on all emissions and not just compliance tonnes.
- **Banking** of performance credits or tradeable units is not explicitly considered in this indicator due to data limitations. Our expectation is that banking, if used in a significant way, would lower the long-term marginal cost incentives to the extent that the carbon price was rising, and emission reductions were banked for compliance in later periods. That said, the allowance price in cap-and-trade systems would price in the impact of banking and other market dynamics and likely better reflects future expectations about stringency than a fixed price instrument such as

the posted carbon price. The price of tradeable units in large emitter programs where banking is allowed would also price in the expected rise in future carbon costs.

- The impact on the marginal cost incentive of **free allocation or benchmarks in large emitter programs** is not accounted for in this analysis. In theory, an over-allocation of free emissions could result in a surplus of tradeable units in the large emitter programs, putting downward pressure on the marginal cost incentive. In a cap-and-trade system, the carbon price floor, by preventing that allowances be sold on the market below the regulated price, would limit how low prices could fall. In large emitter programs, the reverse is also true, where tight benchmarks could increase the demand for tradeable units and so drive up the marginal cost incentive in future periods. In a system with a fixed maximum carbon price, such as in the federal OBPS, the marginal cost incentive could only climb so far before firms just paid the carbon price on their compliance obligations, effectively containing the cost risk.

The marginal cost incentive is adjusted for rebates at point-of-sale. Other effects on the marginal cost incentive such as banking and trading of compliance units are not included, as discussed above. We calculate the marginal cost incentive as follows:

$$MCI_i = (CP_{i,j} - CP_{i,j} \times \frac{RE_{i,j}}{CE_{i,j}})$$

Where:

MCI_i = Marginal cost incentive calculated in each jurisdiction, *i*

$CP_{i,j}$ = Carbon price in 2020 in each jurisdiction, *i*, for each category of emissions, *j*. Note that under B.C.'s CIPP program, the carbon price is based on the emission intensity of the large emitter facility covered relative to a threshold benchmark and a best-in-class benchmark. The variable carbon price creates a marginal cost incentive that is unique for each facility and can exceed the carbon price.

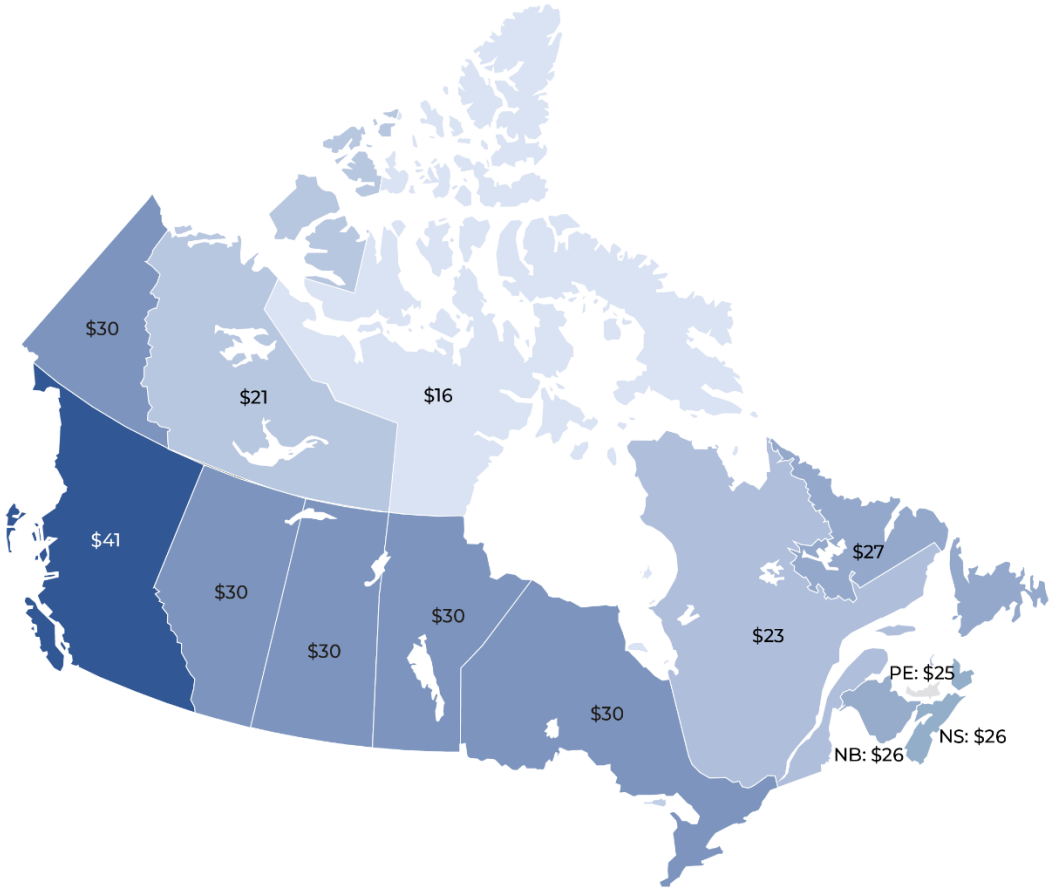
$RE_{i,j}$ = Emissions in each jurisdiction, *i*, that are directly rebated at point-of-sale, for each category of emissions, *j*. These include only rebates that are received immediately, meaning that portion of the carbon price is never paid by the consumer and any marginal cost incentive for emission reductions is thereby removed.

$CE_{i,j}$ = Emissions covered under both a fuel charge and large emitter programs in each jurisdiction, *i*, for each category of emissions, *j*

The results are summarized in Figure 15. The marginal cost incentive ranges between a low of $16 to a high of $41 per tonne of CO_2e.

Figure 15: The 2020 Marginal Cost Incentive

The marginal cost incentive to abate (in $/tonne CO_2e) is not uniform across programs.



The marginal carbon incentive is not uniform across the country:

- **British Columbia** has the highest marginal cost incentive. Originally, B.C. proposed an increase in the carbon price to $45 per tonne for 2020. However, it was suspended due to the economic impact of COVID-19. Also of note is the increased marginal cost incentive provided by the CleanBC Industrial Incentive Program, where facilities can have an incentive above the marginal price to reduce emissions relative to their GHG performance. Under the program, if a facility has an emission intensity greater than a "threshold" benchmark, it pays the full carbon price of $40 per tonne, whereas it pays only $30 if it is beating the "best-in-world" benchmark. If the firm is operating between these two benchmarks, the marginal cost incentive is between $50 and $60 per tonne and is paid on a declining carbon tax rate. Because this declining carbon tax rate applies to all compliance emissions from a facility and not just those between the two benchmarks, the marginal cost incentive can be above B.C.'s carbon tax rate of $40 per tonne. In practical terms, assuming a broad distribution of emission intensities, we estimate an average marginal cost incentive of $47 per tonne for large emitters, which is used in the model for all large emitter compliance emissions.
- **Alberta**, **Ontario**, **New Brunswick**, **Manitoba**, **Newfoundland and Labrador**, **Prince Edward Island**, **Yukon**, **Saskatchewan**, and the **Northwest Territories** all have marginal cost incentives aligned with the federal carbon price schedule ($40 per tonne in 2021 and $50 in 2022). Absent

modelling credit supply and demand, we assume that the price holds in the large emitter programs (i.e., no overallocation).

- **New Brunswick** and **Prince Edward Island** both offer point-of-sale rebates limiting the overall increase of gasoline and diesel fuel price to two cents per litre.[30]
- **Newfoundland and Labrador** limits the carbon charge increase by offering a gasoline tax credit of two cents per litre.[31] It also has a unique regime that encourages emissions reductions for onshore operations, discouraging the overreliance on the purchase of fund credits and boosting program effectiveness. As per Newfoundland and Labrador's regulations, an onshore operator may purchase fund credits to achieve the remaining 10 per cent of its compliance obligation, at a price four times higher than the regular price (this proportion rises to 15 per cent in 2021 and then 20 per cent in 2022). This does not apply to offshore operations, which have access to fund credits at the regular price, reflecting a limited set of abatement options for offshore facilities.
- The **Northwest Territories** provides direct rebates for the mining sector, for diesel fuel used in electricity generation, and for fuels used to heat buildings. Rebates are calculated to be 72 per cent of the 384 kt of emissions covered by the rebates.
- **Nunavut** provides a direct rebate equal to 50 per cent of the federal fuel charge on 338 kilotonnes of emissions.
- To calculate **Nova Scotia**'s marginal carbon incentive, we use the average settlement price from two 2020 auctions for 2019 vintage allowances, which is $24.32 per tonne. A price for 2020 vintage allowances was not available at the time of report writing. We therefore applied the regulated seven per cent adjustment in the floor price to the 2019 vintage price, which yields $26.02. This is the expected floor price increase for 2020 vintage permits.
- For our **Quebec** analysis, we used an average allowance auction price of CAD $22.78 per tonne (26.1 million allowances sold in 2020 in four auctions). This estimate is likely high given that 2020 vintage allowances were sold in 2017 at prices below the 2020 settlement price. That year, 3.1 million 2020 vintage allowances were auctioned in advance auctions at an average price of $18.57.

Indicator 4: The Average Cost Incentive: The Cost on Emissions Owed

The average cost is equal to the marginal cost incentive multiplied by the final compliance units for each jurisdiction. For covered fuels, compliance units are the same as the covered emissions. However, for large emitter programs, compliance units may be based on product emission intensity benchmarks or

[30] KPMG, 2020. "New Brunswick — Tax on Carbon-Emitting Products Starts April 1, 2020." *TaxNewsFlash Canada,* No. 2020-34. https://assets.kpmg/content/dam/kpmg/ca/pdf/tnf/2020/ca-new-brunswick-tax-on-carbon-emitting-products-starts-april-1-2020.pdf ; Government of PEI. Accessed March 04, 2021. "Schedule of Incremental Levy Increases." https://www.princeedwardisland.ca/sites/default/files/publications/schedule_of_incremental_levy_increases.pdf

[31] Department of Finance, 2020. *Information Bulletin Gasoline and Carbon Products.* Bulletin No. RAA-CARBON-002. Government of Newfoundland and Labrador. https://www.gov.nl.ca/fin/files/Gasoline-and-Carbon-Products-Information-Bulletin-RAA-CARBON-002-November-7-2020.pdf

allocation limits. Average cost is also equal to total direct carbon pricing revenues divided by total covered emissions in each jurisdiction.

The average cost of carbon pricing is important to effectiveness as it drives long-term capital decision making related to the cost of ownership and incents major facility retrofits to make facilities more viable, such as installing carbon capture, utilization, and storage (CCUS) technology. For firms, average costs reflect incentives to reduce their emissions by reducing long-term production levels or by not investing in new facilities (i.e., on the "extensive margin"). On one hand, low average costs are deliberate efforts to design policies to limit the risks of "leakage" (i.e., the movement of production, investments, and associated emissions to jurisdictions with weaker policy). On the other, low average costs also can reduce structural changes in economies over time, slowing low-carbon transitions.

The average cost is calculated as total compliance costs divided by tonnes covered, and therefore considers the level of total cost. If, for example, a firm pays a carbon tax or charge on all tonnes emitted or embodied in fuels, the marginal cost incentive equals the average cost. If there are offsets or trading, the average trading price equals the average cost. To the extent that free allocation, tax credits, or exemptions reduce compliance costs, the average cost of compliance with the policy will be less than the marginal cost incentive.

Theory: How Average Costs Affect Stringency

Average costs drive "scale" or investment effects. In carbon pricing programs, it is the average cost that drives the impact on the scale of economic activity and hence emissions, as output is altered when production costs rise and returns on investment fall. Drops in demand due to higher prices (conservation response) will also impact scale.

Average costs drive "composition" or market effects. With carbon costs imposed, firms with low carbon costs per unit of production will outcompete high-emission-intensity producers and gain market share, all else equal. To the extent average costs are close to the marginal incentive, a longer-term shift in the composition of output or economic structure will occur towards operations with relatively low emissions per unit of production.

Since the denominator of the average cost calculation is tonnes of covered emissions, the indicator does not capture when tonnes are exempt from the policy. A jurisdiction could show that its marginal cost incentive equals the average cost, but the calculation would not reflect that overall covered tonnes are a small share of the emissions inventory. We consider this adjustment in Section 4.3, where the emissions coverage standard (Indicator 2) is used to weigh the average cost and provide a consistent comparator across jurisdictions.

We calculate the average cost as follows:

$$AC_i = \frac{CU_{i,j} \times MI_{i,j} - OE_{i,j} \times (MI_{i,j} - OP_{i,j})}{CE_{i,j}}$$

Where:

AC_i = Average cost calculated in each jurisdiction, *i*

$CU_{i,j}$ = Compliance units in each jurisdiction, *i*, for each category of emissions, *j*.

$MI_{i,j}$ = Marginal cost incentive calculated in each jurisdiction, *i*, for each category of emissions, *j* (e.g., categories of emissions include emissions from covered fuels and large emitter sector emissions with different marginal cost incentives).

$OE_{i,j}$ = Estimated eligible offset units used as compliance in 2020 for carbon pricing systems in jurisdictions, *i*, for each category of emissions, *j* (i.e., Alberta and Quebec).

$OP_{i,j}$ = Estimated average unit price for offsets used as compliance in 2020 for carbon pricing systems in jurisdictions, *i*, for each category of emissions, *j* (i.e., Alberta and Quebec).

$CE_{i,j}$ = Covered emissions in each jurisdiction, *i*, for each category of emissions, *j*.

Our estimates are subject to uncertainty due to the limited availability of data on actual compliance emissions. We do not have detailed compliance data on whether facilities covered under a large emitter program in each jurisdiction are below or above their applicable emission intensity benchmark. We addressed this uncertainty by sharing with the FPTs our assumed compliance tonnes, or the tonnes subject to pricing, and covered emissions. In some cases, we revised our assumptions based on FPT input, while in others we verified that our assumptions were sufficiently accurate for the analysis.

We factored the following determinants in our calculations:

- **Free Emissions for Large Emitters.** In principle, many facility benchmarks used to determine free emissions in credit systems and free allocation in cap-and-trade systems are based on comparing a facility's emission level against an average emission limit for the sector, for example 80 per cent or 90 per cent of the sector's average emissions per unit of production. We reviewed the FPT systems and applied sector-based benchmarks to all facilities to develop average costs for large emitters in these programs. These thresholds were used to make an estimate of compliance emissions and therefore overall revenue, from which the average carbon price for the covered emissions is calculated.
- **Offsets**. Where use limits on offsets exist (e.g., eight per cent of compliance obligation in Quebec), lower price offsets would be the first choice for meeting compliance obligations and would not reflect the cost paid, at the margin, on the final tonnes that make up the compliance obligation. This lowers the average cost in Quebec and Alberta as follows:
    - Offsets purchased by Quebec entities since 2013 total approximately 5.8 million units.[32] Based on average offset costs versus auction prices (offsets are 19 per cent cheaper)[33] and based on offsets accounting for approximately 1.9 per cent of total compliance allowances, the average cost is adjusted downward by 0.4 per cent.
    - Under Alberta's TIER program, entities can purchase offsets developed by Alberta offset suppliers. Approximately 11.5 million offsets have been purchased for compliance since

[32] California Air Resources Board "ARB Offset Credit Issuance." https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program/arb-offset-credit-issuance. Accessed April 06, 2021.
[33] California Air Resource Board. *Summary of Transactions for Offset Credits 2019.* https://www.environnement.gouv.qc.ca/changements/carbone/transferts-droits-en.htm. Accessed April 06, 2021.

2011.[34] Based on assumed average offset costs versus carbon prices (offsets are 15 per cent cheaper) and based on offsets accounting for approximately 24 per cent of total compliance allowances over the 2015 to 2019 period, the average cost price for emissions under the large emitter program is adjusted downward by 3.6 per cent.[35]

Key determinants not included in these calculations that would lower our estimated average cost include banking, advance auctions where allowances are obtained at lower prices, and abatement implemented at a cost below the carbon price. Among these factors, abatement costs are likely the most important. As a matter of fact, a firm might have a low average cost of compliance and yet still have an average compliance cost equal to marginal compliance cost if it can reduce its internal emissions cheaply.

The main source of variation in average carbon costs across regional systems is the ratio of compliance tonnes to tonnes covered. Figure 16 provides a comparison of the ratio of compliance tonnes to covered emissions for each jurisdiction. Higher ratios indicate that carbon pricing programs are not significantly discounting the compliance obligations for the regulated entities. For overall emissions (third column), the ratio represents all emissions subject to compliance costs, i.e., covered fuels and large emitters, over tonnes covered by both systems.

Figure 16: Ratio of Compliance Tonnes Owed to Covered Emissions by Jurisdiction
The lower the ratio, the greater the level of free emissions granted.

	Ratio for Covered Fuels	Ratio for Large Emitters	Ratio for Overall Covered Emissions
NT	100%	12.3%	100.0%
YT	99%	12.0%	98.7%
PE	100%	19.8%	95.6%
MB	100%	16.8%	86.7%
BC	100%	54.8%	86.1%
NU	97%	20.0%	77.8%
ON	100%	13.8%	74.6%
QC	100%	11.7%	74.3%
NL	100%	10.0%	49.1%
NB	100%	18.8%	48.6%
SK	100%	18.8%	47.7%
AB	100%	13.0%	34.5%
NS	20%	7.0%	13.5%
CD	**98%**	**16.0%**	**56.3%**

[34] Alberta Carbon Registries. “Alberta Emissions Offset Registry Listing.” https://alberta.csaregistries.ca/GHGR_Listing/AEOR_Listing.aspx. Accessed April 06, 2021.
[35] Government of Alberta. 2020. *Specified Gas Emitters Regulation and Carbon Competitiveness Incentive Regulation Results.* https://open.alberta.ca/dataset/42dc8cb3-8269-4ee9-b54f-03430f1e254d/resource/69c4d820-e638-48fc-a029-7643fcf3836a/download/aep-specified-gas-emitters-regulation-and-carbon-competitiveness-incentive-regulation-results-20.pdf

Given the range of tonnes owed for compliance to tonnes covered by carbon pricing, it is not surprising that the average cost incentive for all covered emissions varies considerably across jurisdictions, from a low of $4 per tonne to a high of $36 per tonne, with a national average of $17 (Figure 17). There are several points worth noting:

- The large outlier is **Nova Scotia** at $4 for all covered emissions, where compliance tonnes represent 13.5 per cent of covered tonnes and the marginal cost incentive in the cap-and-trade system is lower than most other jurisdictions.
- **Alberta** is also low at $10 for all covered emissions. **Alberta** and **Saskatchewan** ($14) have a lower average cost because large emitters make up a larger share of each jurisdiction's total emissions. Also, fewer emissions in the large emitter sectors are priced, given concerns related to competitiveness.
- **Newfoundland and Labrador**'s average cost at about half the marginal cost incentive is a function of only 10 per cent of covered emissions subject to compliance in the large emitter program, whereas 100 per cent of covered fuels are priced. As well, the large emitter sectors make up a large share of total covered emissions (57 per cent).
- **Quebec**'s low average cost is a function of free allocation for the large emitter sectors but also the low marginal cost incentive that reflects the market price for WCI allowances.

This difference means that in some jurisdictions, the impact on business and household income is much higher than others, with the risk that this could drive economic activity to other jurisdictions. Inversely, in jurisdictions where the average carbon is low, long-term signal to invest in low-carbon technology may also be muted. However, how carbon proceeds are returned will also affect overall income. This was not assessed in this analysis but is important to the understanding average costs.

For covered fuels, the average costs are mostly uniform across the country except in Nova Scotia, where free allocation is provided equal to 80 per cent of fuel distributor emissions (Figure 18). This puts a significant wedge between the marginal and average costs for the province.

For the large emitter sectors, the average cost shows much wider variation, ranging between $1.80 per tonne in Nova Scotia and $25.60 in British Columbia (Figure 19). Such variations are a direct function of choices made to reduce the average cost of the policy either through free allocation or setting benchmarks that result in a low level of compliance tonnes relative to covered emissions. In our view, such variation points to major competitiveness concerns between jurisdictions within the country. It should be noted, however, that business attractiveness amongst jurisdictions is also determined by factors such as revenue recycling policies and the level of sales and income taxes.

Figure 17: Average Carbon Incentive: All Covered Emissions
National average is $16.93 per tonne CO_2e.

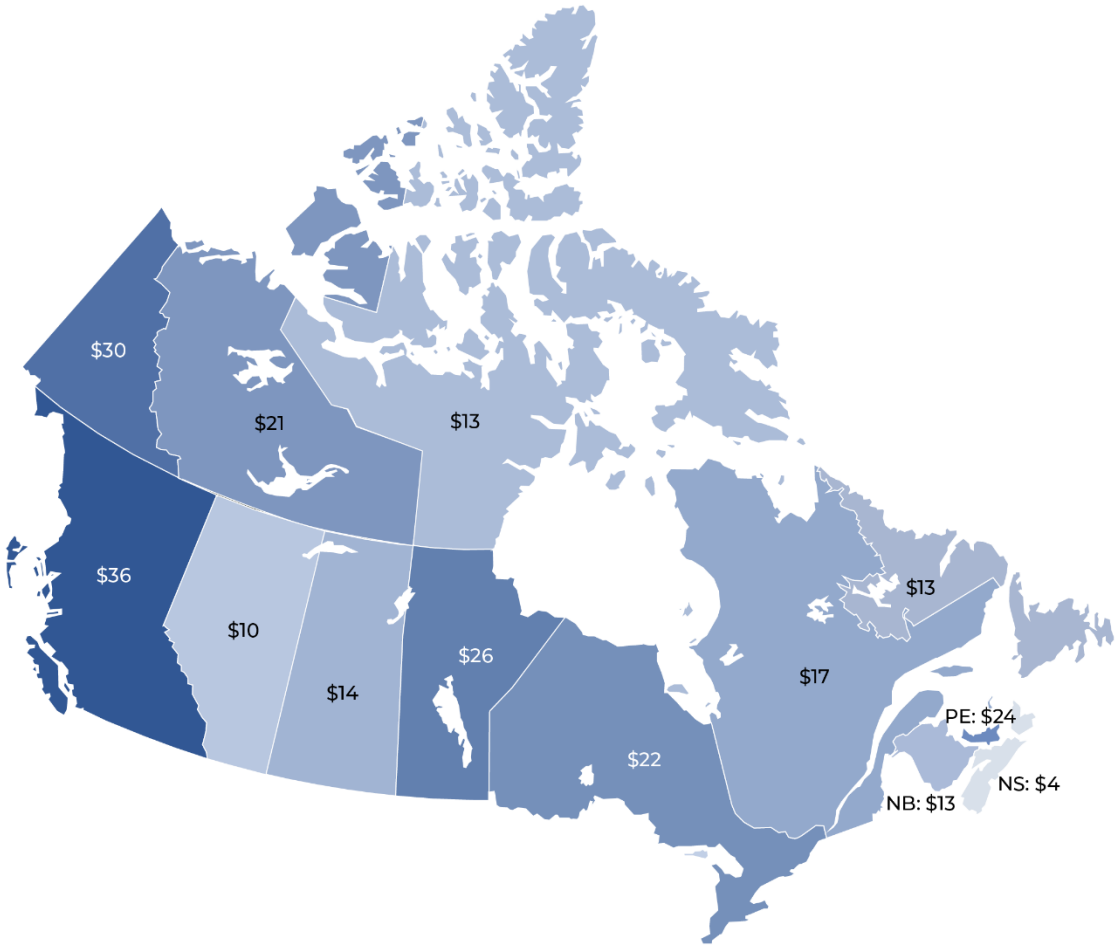


Figure 18: Average Carbon Incentive for Covered Fuels (Fuel Charge, Tax or Cap-and-Trade)
National average cost is $29.31 per tonne CO_2e.

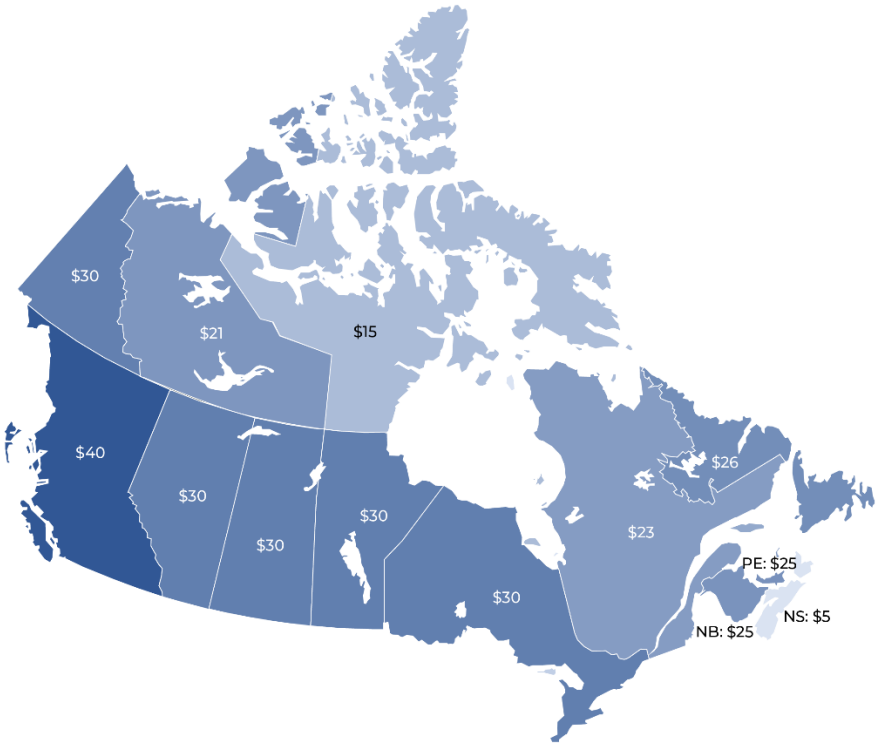
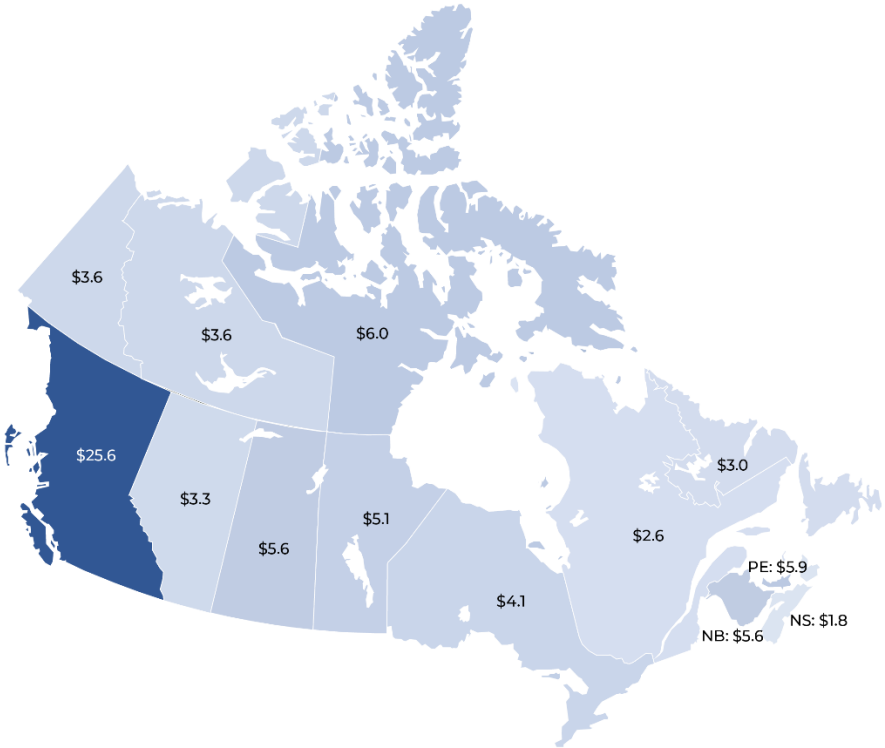


Figure 19: Average Carbon Cost for Covered Emissions from Large Emitters
National average is $4.96 per tonne CO_2e.



Risks of oversupply in credit markets

Design choices in large emitter programs such as the quantity of free allowances granted can keep the *average* cost of carbon low, while not affecting the *marginal* cost of carbon, which is the primary driver of emission reductions.

In large emitter programs with emissions performance credits, such as the federal OBPS, emitters can have low average costs because they only pay for emissions that exceed an emissions-intensity benchmark. Yet firms still have a *marginal* incentive to reduce emissions even beyond their emissions intensity benchmarks because in doing so, they can generate a credit from abatement investments, which can be sold to other firms at the price of carbon or banked with the expectation of prices rising. In a functional credit market, this price will be determined by the price per tonne that firms must pay to government on at least a portion of the emissions that exceed their intensity benchmark, to the extent that banked or emission credits are used to meet compliance on a portion of the compliance obligation.

This principle of reducing average costs (but not marginal incentives) is fundamental to approaches to addressing concerns around competitiveness and leakage (see Section 4.4).

Yet this principle does not necessarily hold in all cases. If large emitter programs are *too* weak and too many emitters have emissions-intensity benchmarks that can easily be met, demand for credits will fall as large quantities of credits are generated, and so too will the market price for those credits. And firms will no longer have the same marginal incentive to improve emissions *beyond* their emissions intensity benchmarks. The actual marginal price of carbon will be driven lower.

A jurisdiction with a strong cap decline or tightening rate but stronger natural emissions decline can still be in an oversupply situation, and vice versa. While market reforms and policy reviews can deal with supply and demand issues, they can also disrupt the price signal for past and future investments if not done carefully. Tracking the price of credits in secondary markets would help identify potential gluts in markets, which is built into Indicator 4 above. But still, credit market modelling would be needed to accurately assess the impact of credit oversupply on the carbon price.

The E.U. Emissions Trading System has demonstrated that market reforms, such as the Market Stability Reserve, can successfully deal with overallocation and market imbalances. Routine review periods, transparent consultations, and publicly available modelling and analysis have helped to improve market functioning and increased confidence in the market, with allowance prices now at an all-time high.

Indicator 5: Setting Long-Term Expectations: The Expected Future Marginal Cost Incentive

Expectations of *future* carbon prices also increase effectiveness. When emitters expect higher future carbon prices (with greater certainty) they are more inclined to invest in projects that reduce emissions over the long term. Expectations of future carbon prices also create incentives for low-carbon innovation. In December 2020, the federal government announced in its plan “A Healthy Environment and a Healthy Economy” that the carbon price would rise by $15 per year after 2022, reaching $170 by 2030 ($143 in constant 2020 dollars). Because this carbon price is a proposal and was not implemented in 2020, it is not included in our analysis.

Figure 20 highlights the range of expected carbon prices in 2030. Key findings are as follows:

- **Quebec** has an explicit long-term signal extending past 2022 through its regulated declining emissions caps to 2030. A WCI allowance price forecast is used for Quebec.[36] A reserve price could also be a good proxy for the future carbon price, but the forecast we use for the WCI price does not indicate that the reserve price is met (and therefore no downward pressure on the allowance price results from a release of reserve allowances into the market).
- **Nova Scotia** has caps in place to 2022, and although it has indicated a pathway to 2030 to which the cap-and-trade program will contribute, there is no signal explicitly mentioned in regulations.
- The published **federal backstop** carbon price schedule does not send a clear price signal beyond 2022 and therefore is not consistent with sending a long-term signal that carbon pricing systems would be increasing in stringency to 2030.
- Despite the presence of the federal backstop carbon price, a few jurisdictions including **Newfoundland and Labrador**, **P.E.I.**, and **New Brunswick** have chosen not to publicly communicate a commitment to a price schedule increase to 2022. P.E.I. has not committed to the $50 price on covered fuels.
- **British Columbia** halted its planned carbon tax increases above $40 to address COVID-19 concerns. The B.C. carbon tax rate is increasing to $45/tonne in April 2021 and $50/tonne in April 2022. B.C. has a climate governance regime in place to assess the long-term price schedule more proactively.
- **Alberta**'s budget reflects the $50 price increase for its large industrial emitter program in 2022.

We conclude that **the carbon price schedules in all jurisdictions except Quebec are inconsistent with incenting continuous improvement over the longer term.** Most jurisdictions across Canada have a regulated price schedule out to 2022, while a few have only announced prices to 2021. In most cases, the price schedule is not indexed to inflation and is therefore increasing in stringency at a lower rate than the nominal price would suggest. In Figure 20 below, the $43 price in most jurisdictions corresponds to an inflation-adjusted price of $50 in 2022.

[36] Clear Blue Markets. 2020. "WCI Cap and Trade New Normal." Slide Presentation.

Figure 20: Expected Long-term Carbon Price in 2030 (in Constant 2020 $/tonne CO_2e)
Only one program sends a price signal beyond 2022: Quebec.

Revenue Recycling Choices: Balancing the Marginal Cost Incentive with Income Impacts

While the carbon price itself is the main driver of emission reductions, decisions about how revenue generated through carbon pricing is returned to the economy can also influence effectiveness and overall stringency (both positively and negatively). Carbon pricing can place a financial burden on some households and businesses, especially those with fewer near-term opportunities to reduce emissions or with lower incomes. The twin objectives of incenting emission reductions and minimizing adverse income impacts define how the rebating of carbon pricing proceeds takes place across Canada. Most jurisdictions use a mix of the climate mitigation programs and rebates (Figure 21).

Approaches to revenue recycling can be organized across three different approaches, each with different effects:

1. **Point-of-sale rebates work against the marginal cost incentive to reduce emissions.** Point-of-sale rebates are commonly used to minimize income impacts through either a partial or full price reduction when fuel is purchased. This can be done through a decrease of the excise tax paid at the pump or by a direct rebate on the total carbon price paid: for example, a debit and then offsetting credit on a natural gas bill. The net effect is that the consumer does not see the full marginal cost incentive and therefore there is no corresponding impact on behaviour. Examples include:

- **Nunavut** is subsidizing rebates that represent 50 per cent of the federal fuel charge at points of sale, up until 2023. In 2024, the rebate will drop to 40 per cent, and then to 30 per cent in 2025, 20 per cent in 2026, and 10 per cent in 2027. The federal fuel charge will be fully implemented in Nunavut starting in 2028.
- **New Brunswick**, **P.E.I.**, **Newfoundland and Labrador**, **Nunavut**, and the **Northwest Territories** all provide some relief to households by reducing the excise tax on fuels proportionally to the fuel charge (or by providing point-of-sale rebates that partly offset the fuel charge (Nunavut, Northwest Territories).

2. Rebates delivered through personal or corporate tax cuts or otherwise untied to fuel consumption can reduce the negative income impacts of pricing while maintaining the marginal cost incentive. Untying the rebate from the fuel sale is one way in which the marginal cost incentive can be maintained. Under this approach, either governments reduce taxes that are unrelated to fossil fuel consumption to offset the income impact or they provide rebates directly:

   a) **Tax cuts.** This approach reduces personal or corporate income taxes at a level that may correspond to the revenue raised by carbon pricing.

   b) **Tax credits or post-sale rebates unlinked to fuel consumption.** This approach returns some or all the revenue directly to households and/or to businesses through tax credits or rebates that are not linked to GHGs emitted or fuel consumed.

   Unlike tax cuts, tax credits and unlinked post-sale rebates have the advantage of increasing the visibility of a jurisdiction's carbon pricing every time the tax credits and rebates are issued, thereby potentially boosting support for the policy.

   Examples of these approaches include:

   - **British Columbia** reduced corporate and personal income taxes to offset the average cost impact of the carbon tax. The program was initially designed to be revenue neutral for government, meaning that government revenue used for program spending would not increase through the carbon tax. However, in recent years, this revenue neutrality changed as some carbon tax proceeds are now directed to program spending.
   - At the **federal level**, the approach is to return most carbon charge revenue directly to households through rebates not linked to GHGs emitted. This applies to **Alberta**, **Manitoba**, **Ontario**, and **Saskatchewan**, where the federal fuel charge is in force, and will likely continue after 2022, as announced in December 2020. In **Nunavut**, which has chosen to implement the federal fuel charge, the federal government transfers the revenue to the territorial government. In **Yukon**, part of the revenue collected is transferred directly to households in the form of rebates, while the remainder is transferred to local businesses municipalities and First Nations governments through the Government of Yukon.

3. **Carbon proceeds are often used to incent additional emission reductions.** Revenue from carbon pricing is often directed to climate change programs that support emission reductions. Examples of this approach include subsidies for building retrofits; electric or hybrid vehicles subsidies; and

financial support to industries to acquire low-emitting technologies. Climate adaptation programs can also bring significant benefits but do not incent GHG reductions directly.

This approach has the strongest link to supporting system effectiveness by boosting the marginal cost incentive. Whereas carbon pricing acts as a touchstone for the economy, signalling to businesses and households where things are heading, well-designed rebate programs can unlock cost-effective mitigation potential that is blocked by non-economic barriers such as the lack of infrastructure or insufficient capital. Comparably, higher-cost innovation incentives can reduce marginal abatement costs in the long run.[37]

Design matters, however, and if programmatic funding is designed poorly, the impact it will have on abatement choice and behavioural change will be small.[38] Consideration should be given to avoiding funding measures that are not in line with the additionality principle: i.e., measures that carbon pricing could have incented anyway. Assessing the cost-effectiveness and additionality of various climate mitigation programs is outside the scope of this independent assessment and should be a subject of future work.

Examples of complementary climate change programs that support emission reductions include:

- All large emitter programs—including the **federal OBPS**, the **proposed Ontario EPS**, and the **developing New Brunswick program**—have provisions to return proceeds to industry to help with mitigation projects.
- **Newfoundland and Labrador**'s Greenhouse Gas Reduction Fund for industry is funded by the sale of credits under the large emitter program. By legislation, such funds are only available for emissions reductions beyond those required for compliance. Additionally, facilities not mandated to participate in the large emitter program can apply for funds to assist with emission reductions. Both these provisions provide incentives for emission reductions above the compliance obligations of the program.
- In **Alberta**, a portion of compliance payments from the large emitters program (TIER) are directed to the TIER Fund to support emission reduction and innovation projects.
- In **Saskatchewan**, compliance payments from the large emitter program go to the Saskatchewan Technology Fund to support emission reduction projects in regulated entities. An advisory committee advises the Minister on priority projects.

[37] Hood, Christina. 2013. *Managing Interactions Between Carbon Pricing and Existing Energy Policies. Guidance for Policymakers.* International Energy Agency. https://ieta.wildapricot.org/resources/EU/Overlapping_Policies_Drafting_Group/managinginteractionscarbonpricing_final.pdf

[38] Funding climate programs and subsidies in a cap-and-trade system are notable exceptions. Subsidies applied to emissions covered by the cap will *not* result in more emissions reductions (which are defined by the cap itself) but instead decrease mitigation costs, decrease the price of tradeable permits, or decrease the extent to which permits are imported from California. Canada's Ecofiscal Commission, 2017. *Supporting Carbon Pricing: How to identify policies that genuinely complement an economy-wide carbon price.* https://ecofiscal.ca/reports/supporting-carbon-pricing-complementary-policies

- A portion of carbon tax proceeds is made available to emitters via the **CleanBC Industrial Incentive Program**. Another portion of the proceeds are returned directly to emitters that exceed performance benchmarks.
- In **Prince Edward Island**, carbon pricing revenues are used to offset provincial fuel taxes, to reduce the costs of car licensing (which works against the carbon price by lowering the cost of driving), and to subsidize transit users (which supports mitigation).
- In the **Northwest Territories**, proceeds from the carbon tax are used for GHG reduction projects.
- In the cap-and-trade jurisdictions of **Nova Scotia** and **Quebec**, all proceeds from emission allowances auctions are directed to their respective climate change funds, with various mitigation and adaptation programs in place. In cap-and-trade systems, as mentioned previously, spending on mitigation on covered emissions can put downward pressure on allowance prices.

Figure 21: How Carbon Proceeds Are Returned
Approaches to revenue recycling vary across jurisdictions.

Federal (AB, MB, NU, ON, SK, YT)	BC	NB	NL
Fuel charge: AB, **MB**, **ON**, **SK**: Revenue from coverage fuels mostly returned to households via direct rebates, with a rural top-up. Some program spending for small businesses and municipalities, universities, schools, and hospitals. **NU**, **YT**: Transferred to governments to be used for varied uses. **Large emitters:** Revenue is returned to large emitters in federal OBPS, except in **AB** and **SK**. that have their own large emitter programs; revenue is directed to varied uses, including technology innovation.	Personal and corporate income tax offsetting. Direct rebates to households (Climate Action Tax Credit). 75% of increment over $30 returned to industry if GHG plans submitted; 100% if they meet world-leading emissions benchmark. Excess to CleanBC Industry Fund.	Revenue from carbon charge of $9/tonne (2 cents/litre) for emissions reductions and adaptation through the Climate Change Fund. Rest of carbon charge revenue returned at point-of-sale through lower fuel excise tax.	Revenue from the carbon charge is part of the province's general revenues. General climate change programs are funded by the province's general revenues. NL GHG Reduction Fund for industry funded by the sale of credits under then large emitter program. Funds returned to large emitters cannot be used for compliance but must be used for other emission reductions.

NT	NS	PE	QC
Partly returned to households via point-of-sale rebates (100% rebate on heating fuel) and general tax rebates (Cost of Living Offset). Partly used for climate change programs.	Supports mitigation and adaptation programs through the Green Fund.	Returned to households and businesses through rebates and offsetting excise taxes.	Supports mitigation and adaptation programs through the Electrification and Climate Change Fund.

4.3 The Price Incentive Adjusted by the Coverage Standard

Below, we present two indicators of *overall* effectiveness, building on the indicators of coverage and stringency presented above. The indicators combine the emissions coverage standard (Indicator 2) with the marginal (Indicator 3) and average cost incentives (Indicator 4). This provides a view of how both coverage and stringency contribute to effectiveness in each jurisdiction.

Indicators 6 and 7: Marginal and Average Cost Incentives Adjusted by the Coverage Standard

Ultimately, effectiveness of carbon pricing programs will be a function of *both* coverage and stringency. The marginal and average carbon incentives are combined with the coverage standard indicator to account for both the strength of the incentives and the breadth of emissions covered. The resulting indicators are the following:

- **Indicator 6: Marginal cost incentive adjusted by the coverage standard**. The coverage-weighted marginal cost incentive is the product of each jurisdiction's coverage standard (Indicator 2) and marginal cost incentive (Indicator 3).
- **Indicator 7: Average cost incentive adjusted by the coverage standard**. The coverage-weighted average cost is the product of each jurisdiction's coverage standard (Indicator 2) and average cost incentive (Indicator 4).

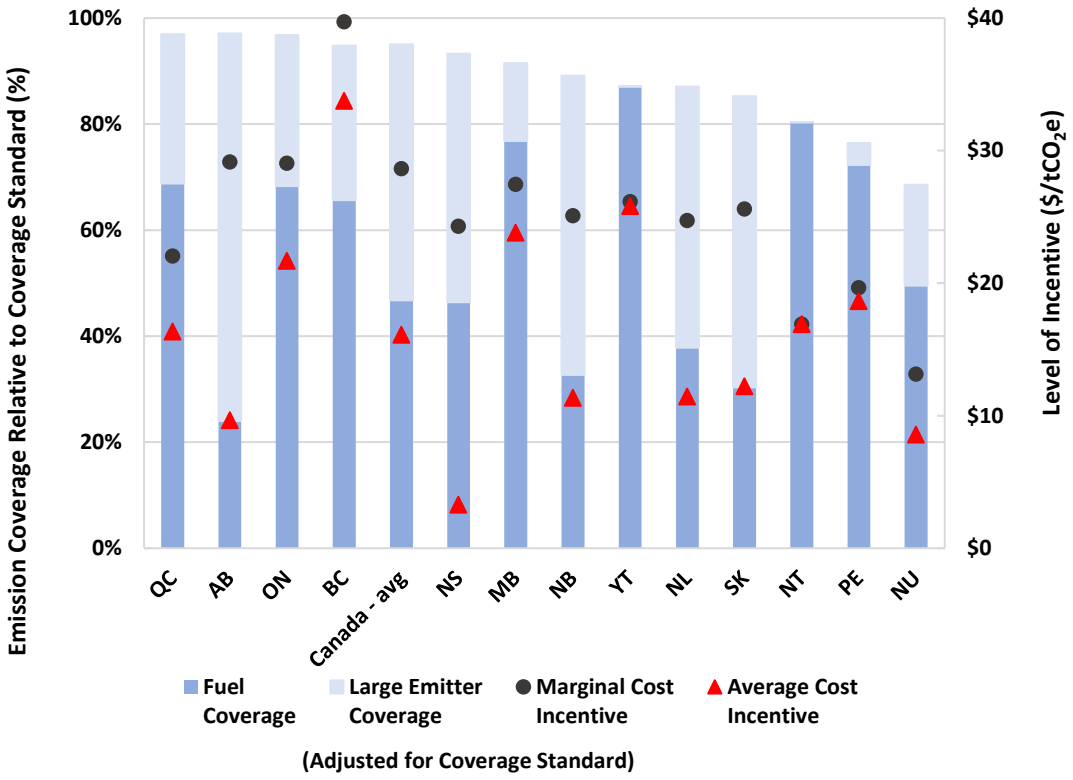
For both indicators, a higher value reflects more stringent policy, meaning that the incentives—short-term for the marginal cost incentive and long-term for the average incentive—are maintained and broadly transmitted throughout the economy. Note, the values are likely upper bounds given that compliance could be achieved more cheaply than we have assumed. For example, affordable abatement options can generate performance credits in large emitter programs that are valued below the compliance price (i.e., the marginal cost incentive of $30 per tonne). This would also lower the average cost incentive.

Our analysis reveals considerable variation across jurisdictions in these key effectiveness indicators. When we adjust for coverage, the marginal cost incentive is more variable across the country than when coverage is not considered. The **adjusted marginal cost incentive for covered fuels and large emitter emissions combined** is by no means uniform across jurisdictions, ranging between $13 and $40 per tonne, with a national average of $29 (Figure 22). The **average cost adjusted by the coverage standard** ranges between $3 and $34, with a national average of $16.

- At one end of the spectrum, **B.C.**'s higher marginal cost incentive coupled with the extra incentive associated with the CleanBC Industrial Incentive Program results in a weighted marginal cost incentive that is 36 per cent higher than the national average.
- At the other end of the spectrum in terms of marginal cost incentive are **Nunavut**, the **Northwest Territories**, and **Prince Edward Island**. In these jurisdictions, significant exemptions and low coverage levels relative to the coverage standard pull down the coverage-adjusted marginal and average cost incentives.
- Free allocation drives down average costs significantly, especially in **Nova Scotia**.

Note that this section assesses the **federal OBPS in Ontario and New Brunswick** as implemented in 2020.

Figure 22: Price Incentives Adjusted for the Coverage Standard
Covered fuels and large emitter programs.



For **covered fuels**, the **marginal cost incentive** is also more variable after accounting for the coverage standard, ranging from a low of $9.30 per tonne to a high of $38.32, with the national average of $28.16 (Figure 23):

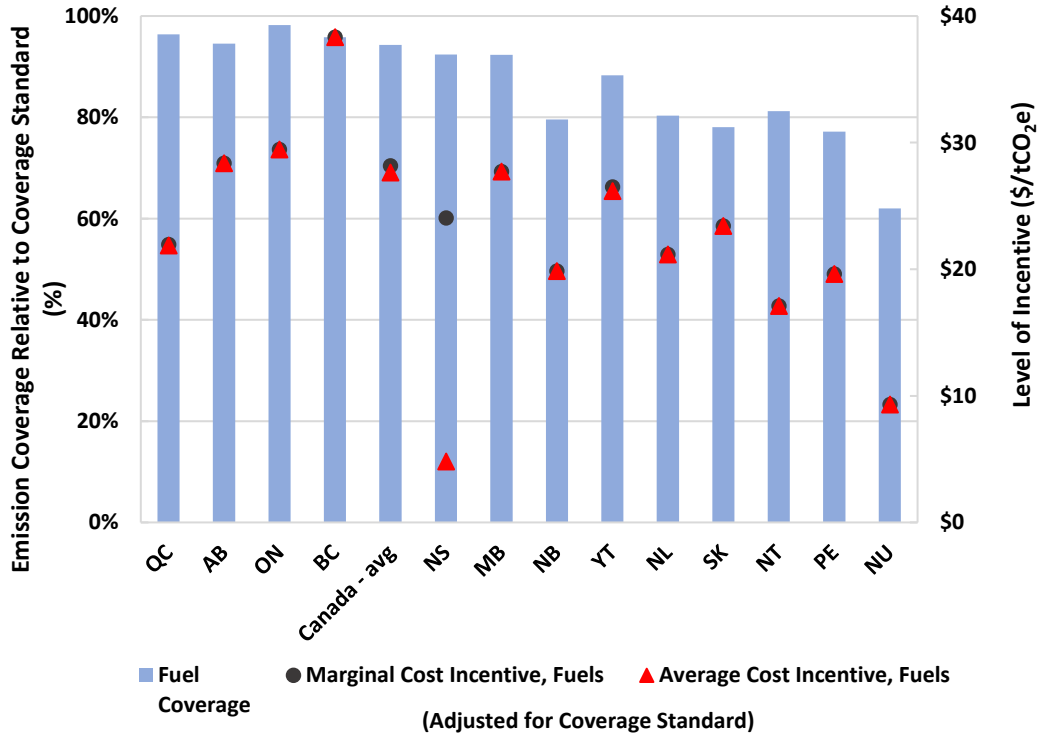
- The low value of the marginal cost incentive adjusted by the coverage standard observed in a few jurisdictions, including **Nunavut**, the **Northwest Territories**, **Newfoundland and Labrador**, **Saskatchewan**, and **P.E.I.**, is a direct result of the exemptions in place but also the lower coverage.

- The low value of the marginal cost incentives adjusted by the coverage standard in **Quebec** and **Nova Scotia** is a function of the relatively low cap-and-trade allowance prices, despite coverage that is about equal to or greater than the national average. This price metric does not fully reflect the stringency level of these systems, given the presence of hard emissions caps.
- **B.C.**'s marginal cost incentive is still the highest in the country when coverage is considered.

The **average cost incentives adjusted by the coverage standard** also vary significantly, from a low of $4.81 a tonne to a high of $38.32, with the national average of $27.63:

- Lower average costs reflect high levels of rebating on fuel purchases and exemptions.
- The outlier is clearly **Nova Scotia**, where the coverage is high but, again, where free allocation in the fuel sector reduces the average cost of the program well below the national average.
- In **British Columbia**, the marginal cost incentive adjusted by the coverage standard is roughly equal to the average cost, reflecting a strong signal to reduce short-term and longer-term emissions.
- As a rule, the marginal cost incentives adjusted by the coverage standard are close to the average cost, given that there is little rebating directly tied to emissions in the programs.

Figure 23: Covered Fuels: Price Incentives Adjusted for the Coverage Standard
Covered fuels (fuel charge, taxes, and non-large emitters in cap-and-trade).



For **covered large emitter emissions**, the marginal cost incentives adjusted by the coverage standard follow a pattern similar to total jurisdictional emissions. However, in a few jurisdictions the marginal cost incentive is brought down by lower coverage, and specifically by a lack of coverage of industrial

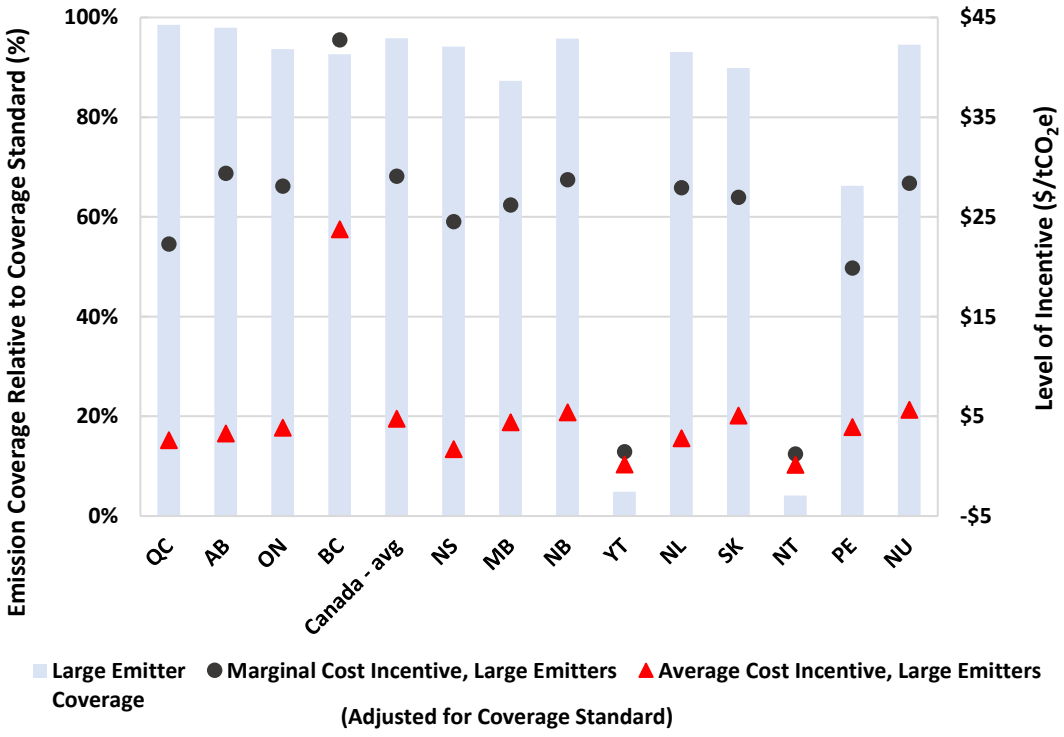
process and fugitive emissions. For the large emitters, marginal cost incentives adjusted by the coverage standard range between a low of $1.22 to a high of $42.74, with the national average at $29.09 (Figure 24). The **Yukon** and **Northwest Territories** results are a function of lower coverage and high levels of rebating that lowers the average cost.

The large differences in average costs are not surprising, given the presence of the large emitter programs. This difference is by design and does not necessarily imply that large emitter programs are not stringent. If the credit or carbon markets are functioning well, the marginal cost incentive drives abatement choices and emissions reductions. The question then becomes whether the market mechanisms are in place and being adequately monitored to ensure a well-functioning credit market. In our view, this is not the case in most jurisdictions.

Perhaps more importantly, it is not always clear that the competitiveness assessments entirely justify the level of financial relief provided and the resulting low average costs. More robust and transparent assessment methods would better reveal the competitive risk the industry is facing.

Still, when looking at stringency in terms of the average cost incentive adjusted by the coverage standard, there is a big difference between systems using performance benchmarks and free allocation (cap-and-trade and large emitter programs) and the system in **B.C.**, which uses full pricing.

Figure 24: Large Emitters: Price Incentives Adjusted for the Coverage Standard
Covered large emitter emissions.



4.4 Competitiveness and Large Emitters: Lowering the Total Cost on Emissions Owed

While the indicators above are our main metrics of effectiveness, a range of other design choices—particularly with respect to the design of large emitter programs—also merit attention as secondary indicators.

As policy stringency increases over time—consistent with aspirations for deeper reductions—carbon pricing policies will need to be monitored to determine the extent to which competitiveness considerations present leakage risks. As indicated previously, these impacts can occur when production or investment (and the emissions associated with them) shift to jurisdictions with weaker climate policy. Industries that are emissions-intensive and trade-exposed (EITE), given their high exposure to rising carbon prices and their reliance on international trade, are more prone to delocalization than other industrial sectors.

The international context is evolving rapidly. For example, 31 per cent of Canada's exports to the U.S. over the last five years were destined for states with some form of carbon pricing. California alone accounts for nine per cent of Canada's exports and has a comprehensive cap-and-trade program linked with Quebec. Meanwhile, 21 per cent of imports from the U.S. come from states with some form of carbon pricing. California accounts for seven per cent of those imports. The share of imports into Canada or exports to countries with carbon pricing regimes in place only increases when China, South Korea, Japan, and the European Union are considered as well. All provincial and territorial carbon pricing systems within the country address competitiveness concerns to some extent, most notably through lowering average costs to large industrial emitters and through the recycling of carbon pricing proceeds. Clearly, however, the details of these design choices matter. Efforts to address competitiveness impacts can also come with trade-offs in the effectiveness and cost-effectiveness of policy.

To compare the treatment of large emitters across carbon pricing systems, we developed five indicators based on a detailed review of the programs:

- **Large emitter program inclusion thresholds**. This indicator compares the emission levels that are a prerequisite for inclusion in large emitter programs as well as for other facilities to op-into large emitter programs.
- **Criteria for EITE Treatment.** The tests for determining EITE status in large emitter programs are compared, along with the adjustments to emission standards or benchmarks.
- **Large emitter average cost incentives by sector and jurisdiction**. The average costs across economic sectors and jurisdictions are compared.
- **Increasing stringency through cap declines and tightening rates.** Long-term signals can be transmitted with annual cap declines or adjustment rates to the emission standards. These are compared across the carbon pricing programs.
- **Compliance flexibility mechanisms.** Compliance flexibility can ensure low-cost compliance. The various approaches to compliance flexibility are compared.

Note that this section assesses the **proposed large emitter programs in Ontario and New Brunswick**. We therefore switch focus here relative to the last sections to concentrate on the emerging design elements.

1. Large Emitter Program Inclusion Thresholds

Mandatory and opt-in thresholds for inclusion in large emitter programs vary across jurisdictions. Opt-in provisions allow industrial facilities to avoid paying a general fuel charge on the fuel consumed and to render them eligible for large emitter provisions and support programs, including rebates.

The uneven emission thresholds for inclusion in large emitter programs likely leads to uneven carbon costs between competing industries located in different jurisdictions. A facility producing 30,000 tonnes of CO_2e annually, for example, would face different carbon costs in different regions. More closely aligned opt-in levels would likely help to potentially reduce this impact.

Most jurisdictions have a 50,000 tonne CO_2e mandatory threshold and a 10,000 tonne CO_2e opt-in threshold (see Figure 25), but there are a few exceptions and points worth noting:

- **Alberta** has a 100,000 tonne CO_2e mandatory threshold.
- **Newfoundland and Labrador**, **Quebec**, and **Saskatchewan** have a lower mandatory threshold of 25,000 tonnes CO_2e.[39]
- The **federal OBPS** has a minimum threshold of 50,000 tonnes CO2e for mandatory inclusion.
- The proposed **Ontario** Emissions Performance Standards (EPS) will automatically apply to facilities that emit 50,000 tonnes or more of CO_2e annually. In addition, for the facility to qualify for inclusion, its primary activity must be an Industrial Activity listed in paragraphs 1 to 38 in Schedule 2 of *O. Reg. 241/19* or the facility must be registered in the federal OBPS.

Inclusion in these programs also requires the facility to undertake additional reporting and auditing. However, opt-in provisions significantly reduce the relevance of these thresholds. For instance:

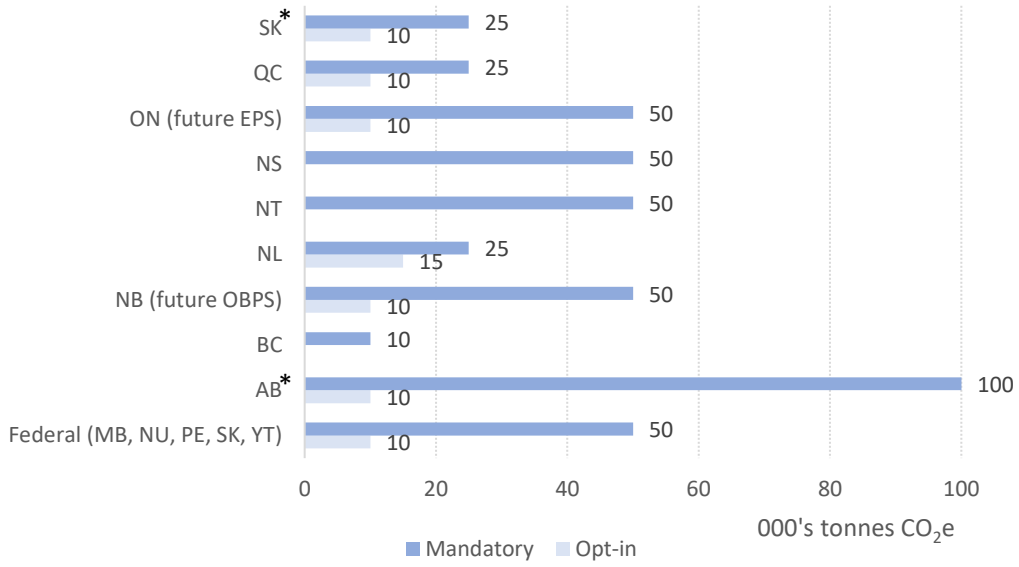
- In **Saskatchewan** and **Alberta**, there is no minimum emission threshold for oil and gas producers that operate more than one site and wish to opt-in to avoid paying the carbon charge on all emissions. Alberta chose for practical administrative reasons to not have a lower threshold for facilities that meet the TIER definition of a conventional oil and gas facility. The opt-in threshold for other sectors is 10,000 tonnes CO_2e, but Alberta has “like-for-like” provisions where if a facility has a competitor facility which is regulated, they can opt-in regardless of size.
- The **federal OBPS** and **other provincial systems** have an opt-in threshold of 10,000 tonnes CO_2e.
- **Newfoundland and Labrador** has a slightly higher opt-in threshold of 15,000 tonnes CO_2e.
- **Nova Scotia** does not have opt-in provisions since all emitters are afforded treatment similar to large emitters.

The opt-in provisions are designed to reduce the competitiveness impact on smaller facilities that are not characterized as large emitters under the mandatory thresholds. Potential competitiveness impacts are avoided through opt-in by moving the small emitter from paying the full carbon price on uncovered fuels to a lower average cost. Smaller emitters can thereby receive the treatment that large emitters enjoy, namely a compliance obligation that is a fraction of their total emissions. From an effectiveness

[39] The federal OBPS applies only to electricity and natural gas transmission pipelines in Saskatchewan.

perspective, however, the opt-in provisions lower the long-term effectiveness of carbon pricing since the large emitter treatment lowers the average cost of the carbon price.

Figure 25: Large Emitter Program Mandatory and Opt-In Inclusion Thresholds (000's tonnes CO_2e)
Thresholds tend to be a function of jurisdictional emissions while opt-in levels look uniform.



* In SK there is no minimum threshold for oil and gas producers operating more than one site. In Alberta, there is no minimum opt-in threshold for conventional oil and gas facilities as defined in the TIER regulations or for facilities that are competing with facilities in TIER (like-for-like opt-in).[40] Note: the SK system applies to all industrial sectors except electricity and gas transmission pipelines (the federal OBPS applies to these two sectors).

2. Criteria for Defining EITE and Their Treatment

The approaches that provinces and territories have used to identify large emitter sectors that are considered EITE and therefore afforded a lower average cost though special treatment are often opaque, with some similarities between jurisdictions. Differing approaches to granting EITE treatment likely afford some facilities a competitive advantage due to lower average carbon costs.

These approaches are:

- For the **federal OBPS**, the benchmarks are, for the most part, set according to the production-weighted average emissions intensity of all facilities producing similar products across Canada.[41] ECCC adjusted each output-based benchmark using two main analyses:

    1. A multistep assessment of the sector's risks of carbon leakage and competitiveness impacts. ECCC uses a combination of emissions intensity and trade exposure criteria to assess

[40] See https://www.alberta.ca/technology-innovation-and-emissions-reduction-regulation.aspx
[41] ECCC. 2021. "Review of the Federal Output-Based Pricing System Regulations." Government of Canada. https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/review.html

whether a sector is in a high EITE risk category. Modelling and analysis were also used to adjust benchmarks; and

2. Each sector's level of industrial process emissions, which are more challenging to reduce than other emissions.

Output-based standards for sectors considered to be at low or medium risk are set at 80 per cent of the sector's average emissions intensity, while those assessed to be at high risk are set at 90 per cent or 95 per cent of the sector's average. A total of 78 output-based standards have been set under the OBPS, covering more than 30 industrial sectors across Canada.

- In **Alberta**'s TIER, the only function of EITE is to determine opt-in eligibility, with the following criteria for a facility:

  (i) That has an emissions intensiveness that equals or exceeds 3% and a trade exposure that equals or exceeds 20%;

  (ii) That has an emissions intensiveness that equals or exceeds 15% and a trade exposure that equals or exceeds 10% but is less than 20%; or

  (iii) That has an emissions intensiveness that equals or exceeds 30% and a trade exposure that equals or exceeds 0% but is less than 10%.

  In Alberta, adjustments to benchmarks are established in a transparent manner. According to published guidance, in most circumstances facilities can only use credits and offsets totalling up to 60 per cent of their compliance obligation.[42] However, facilities that meet economic hardship criteria may apply to use performance credits and offsets to fulfill the entirety their compliance obligation. If increased credit usage is insufficient to relieve economic hardship, facilities are eligible to an in-kind allocation to keep compliance costs under three per cent of sales revenue or 10 per cent of profits as part of the Cost Containment Program.

- **New Brunswick** proposes the same criteria as Alberta to determine EITE status.
- **Ontario** facilities will be considered EITE through a combination of EI and TE:
  - EI ≥1,000 and TE ≥10%; or
  - TE ≥30[43]
- In the **Nova Scotia** and **Quebec** cap-and-trade systems, EITE status is used to determine the proportion of allowances that are handed out for free (transitional assistance factors) as opposed to auctioned to facilities. Transitional assistance factors can range from a rate of zero,

[42] Government of Alberta. 2020. *Standard for Developing Benchmarks, Version 2.* https://open.alberta.ca/dataset/0cba733c-5038-4503-a2ef-33edb14abae3/resource/36aebdca-a9b0-4eef-8f90-bdbf3fdef8ad/download/aep-tier-standard-developing-benchmarks-2020-07.pdf

[43] EI = GHG emissions / Value added; TE = (Value of exports + imports) / (Value of domestic shipments + imports). Government of Ontario. 2019. *Making Polluters Accountable: Industrial Emission Performance Standards*. https://prod-environmental-registry.s3.amazonaws.com/2019-07/EPS%20Regulatory%20Proposal%20%28EN%29_0.pdf

where all emissions are priced, to 1, where an activity or sector is considered highly exposed to carbon leakage risks. In both systems, transitional assistance factors range from 0.9 to 1. Typically, the transitional assistance factor is used to grant industry time to transition to lower-carbon operations and to compensate for misaligned carbon prices in home and away markets. In theory, if all countries had a similar carbon price, this factor should be zero. The assistance factor generally should decline over time, reflecting the transitional nature of the assistance provided.[44]

- **Quebec**'s EITE screening criteria include a combination of EI and TE:
    - EI ≥ 500 and TE ≥30%; or
    - EI ≥ 2,500 and TE ≥10%[45]
- In **Nova Scotia**, three industries are subject to a transitional assistance factor: cement production (1 or 100 per cent); pulp and paper (0.9 or 90 per cent); and natural gas processing (0.9 or 90 per cent).
- In **British Columbia**, as part of the current policy cycle, 75 per cent of payments over $30 per tonne are returned, and 100 per cent can be returned if the firm beats a high-performing benchmark, although this is likely to change over time. Firms in eligible sectors that emit more than 10,000 tonnes of CO_2e per year and report their emissions can apply for tax relief.

The approaches to identifying EITE facilities and the granting of preferential treatment as applied across the jurisdictions are not consistent. Figure 26 highlights the observed differences in how sectors are identified for participation in large emitter programs, for example. The presence of differential approaches to large emitter treatment grants differing levels of preferential treatment to facilities that are often competing in the same markets, leading to domestic competitiveness risk and therefore leakage risk across jurisdictions. Better alignment on common practices and thresholds would decrease competitiveness risks across sectors and between jurisdictions. It would also force a common view about the level of acceptable competitiveness risk across sectors and jurisdictions within the country.

[44] Neither Quebec nor Nova Scotia use the expression "transitional assistance factors" in their regulations but refer to "assistance factors." However, both provinces effectively decrease their free allocation levels over time – see subsection 4 on increasing stringency.

[45] In Quebec, the assistance factors for eligible emitters were initially set at 1 from 2013 to 2020. Starting in 2021, the levels range from 0.9 (90 per cent) for sectors with lower carbon leakage such as tire production, agrifood, aerospace, gold and diamond mining and sawmills, to 1 (100 per cent) in sectors such as aluminum, cement, and lime. A 0.6 assistance factor applies to electricity production agreements contracted prior to 2008. In all other cases (which is the general rule), the electricity sector is not eligible to free allocation. See Tables 5, 6 and 7 of the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*: http://legisquebec.gouv.qc.ca/en/showdoc/cr/Q-2,%20r.%2046.1?langCont=en#sc-nb:1

Figure 26: How Sectors or Facilities are Identified as EITE, Including Opt-In
A lack of uniformity in how large emitters are identified can lead to domestic competitiveness risks.

	Federal (MB, NU, PE, SK,[1] YT)	AB	BC	NB (future program)	NL
How is EITE status determined?	50 Kt or Opt-in: 1) EI ≥1% and TE >10% or 2) EI ≥3% or 3) TE >80%[46]	1) EI ≥1% and TE >10% or 2) EI ≥3% or 3) TE >80%[47]	All firms emitting more than 10,000 tonnes	1) EI ≥1% and TE ≥10% or 2) EI ≥3% or 3) TE ≥80%[48]	X
	NT	**NS**	**ON (future EPS)**	**QC**	**SK[1]**
	X	Industries subject to adjustment factor: Cement Pulp and paper Natural gas processing	1) EI ≥1,000 and TE ≥10% or 2) TE ≥30%[49]	1) EI ≥ 500 and TE ≥30% or 2) EI ≥ 2,500 and TE ≥10%[50]	X

EI = emission intensity; TE = trade exposure
[1]The Saskatchewan system applies to all industrial sectors except electricity and gas transmission pipelines (the federal OBPS applies to these two sectors).

[46] An emitter must engage in industrial activities listed in the OBPS regulations and emit >50 kt or be determined to be at significant competitiveness and carbon leakage risk from carbon pricing based on either meeting these thresholds or meeting several other criteria set out in the Policy on Voluntary Participation in the OBPS.
[47] "Emissions intensiveness and trade exposure is measured using Statistics Canada and Trade Data Online for the value of emissions, gross value added, and exports and imports by sector in the Alberta economy": s. 3.1.2 of the *Standard for Developing Benchmarks, Version 2* (Government of Alberta, 2020). https://open.alberta.ca/dataset/0cba733c-5038-4503-a2ef-33edb14abae3/resource/36aebdca-a9b0-4eef-8f90-bdbf3fdef8ad/download/aep-tier-standard-developing-benchmarks-2020-07.pdf
[48] Emission intensity = GHG emissions * Price of emissions * 10% / Gross value added; Trade exposure = (Value of exports + imports) / (Value of domestic shipments + imports). Government of New Brunswick. 2019. *Holding Large Emitters Accountable: New Brunswick's Output-based Pricing System.* https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Climate-Climatiques/HoldingLargeEmittersAccountable.pdf
[49]EI = GHG emissions / Value added; TE = (Value of exports + imports) / (Value of domestic shipments + imports). Government of Ontario. 2019. *Making Polluters Accountable: Industrial Emission Performance Standards*. https://prod-environmental-registry.s3.amazonaws.com/2019-07/EPS%20Regulatory%20Proposal%20%28EN%29_0.pdf
[50] EI = GHG emissions / Value added; TE = (Value of exports + imports) / (Value of domestic shipments + imports). Ministère de l'Environnement et de la Lutte contre les changements climatiques. "Marché du carbone: Entreprises à forte intensité d'émissions et exposées aux échanges commerciaux (FIEEEC)." http://www.environnement.gouv.qc.ca/changements/carbone/entreprises-fieeec.htm

3. Large Emitter Average Cost Incentives by Sector

The average cost incentive drives long-term investment decisions in industrial sectors but can also induce carbon leakage if not managed correctly (see discussion under Indicator 4: The Average Cost Incentive). To assess the average cost incentive by sector, we conducted a triage exercise that identified nine broad sectors of large emitters that cover 41 per cent of national emissions and 87 per cent of all large emitter emissions. We then separated out large emitter sector compliance emissions and average sector benchmarks by jurisdiction. Average costs were then estimated to the extent that the large emitter sector operated within a jurisdiction. We then estimated the range of compliance emission and average costs by sector nationally, reflecting the jurisdictional variation.

Note that there is uncertainty in these estimates, and they are at best directional. Sources of uncertainty primarily relate to our assumptions about sector benchmarks versus the actual emissions performance of facilities, namely:

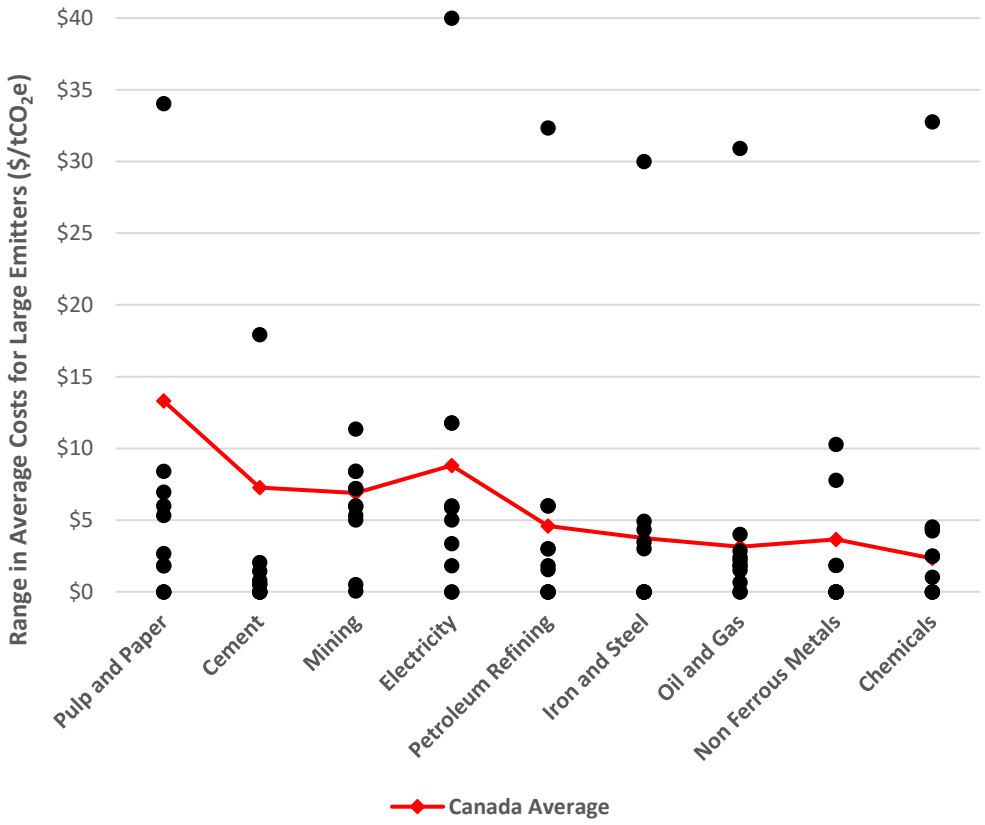
- **The distribution of facility performance relative to the assumed average sector benchmark** will vary significantly, impacting the average cost.
- **Uncertain estimates of compliance emissions by sector**, even though the overall estimate of large emitter coverage for a jurisdiction may be sufficiently accurate.
- **Missing facilities for which there is suppressed emissions data in the NIR**: for example, mining in the territories.
- **Inaccurate sector compliance tonnes** due to drawing on data from different years. For example, the analysis is based on 2018 emissions, 2020 carbon prices, and coverage as we thought it was in 2020—which probably means 2019, as opt-ins may be contributing to increased coverage.
- **Coverage under large emitter programs versus the fuel charge**. Some emission sources we assume to be covered under large emitter programs may in fact be covered under the fuel charge, and vice versa. Opt-in provisions would impact this significantly, but we do not have the data to accurately assess that impact.

There is a small degree of uncertainty in the results given that there are groups of large emitter emissions that are missing from the triage, as they are not disaggregated in the national inventory. These include production and consumption of halocarbons, SF_6 and NF_3. Others do not belong to any of the nine large emitter sector categories we selected (i.e., lime production and mineral product use, pipeline transport, off-road, and manufacturing).

The average costs for large emitter sectors vary significantly within programs and across jurisdictions, indicating domestic competitiveness misalignment and potential inter-jurisdictional leakage (Figure 27). A more thorough analysis of market dynamics around credit market liquidity, allocation, and facility level benchmark setting would add to the precision of this analysis.

As mentioned above in section 4.3, a low average cost does not necessarily mean low effectiveness in the short-term. If the marginal cost is still incenting reductions and carbon markets are functioning efficiently, the low average cost may only be the result of design choices to protect competitiveness. But over the longer term, low average costs do not send a signal to improve the emission intensity of new investments or to shutter old, inefficient, or high-emitting operations (see Indicator 4 for more detail).

Figure 27: Range of Large Emitter Average Costs across Sectors and Jurisdictions
Average costs vary significantly within and across sectors.



4. Increasing Stringency Through Cap Declines and Tightening Rates

Large emitter programs, with their emission performance benchmarks, are designed to lower the average cost of carbon to address competitiveness risks and to allow firms the time to transition their operations to a lower emissions level. Tightening rates are planned changes in the level of the benchmarks, implemented as annual reductions for a sector, facility, or product performance benchmark. As performance benchmarks become more stringent in response to tightening rates, the quantity of compliance tonnes owned by a facility rises, as does the average cost of carbon. This then increases effectiveness as it increases the average cost to facilities.

Generally, two mechanisms are used in large emitter programs to tighten the benchmarks and to gradually reduce free allowances:

- **Cap declines.** In Quebec's and Nova Scotia's cap-and-trade systems, emissions caps are reduced on a yearly basis.
- **Annual tightening rates.** These are set as a percentage, which can be zero or aligned with an emission performance objective, such as a decline rate in the overall cap: for example, 2.5 per cent annually. In large emitter programs such as **Alberta**'s TIER program, they are used to determine compliance emissions, whereas in cap-and-trade systems, an allocation reduction

factor (in **Quebec**) or cap adjustment factor (in **Nova Scotia**) is applied to the benchmark used to determine free allocation.

When tightening rates are present, regulators have a policy lever available that can adapt the large emitter program to changing circumstances, whether it is new technology or a reduction in competitiveness risk as more trading partners price carbon. Tightening rates are particularly important as the competitiveness landscape changes. As more and more jurisdictions implement stringent climate policy (carbon pricing or otherwise), the "playing field" becomes more level in international markets and the need for measures to address competitiveness and leakage concerns decrease.

Adjusting performance standards over time can be done in various ways, whether through a tightening rate or through periodic reviews of performance standards by regulators. Although periodic reviews allow for a more flexible approach to respond to changing technologies and markets, tightening rates provide more predictability to businesses.

Figure 28 summarizes the tightening rates and cap decline rates for each jurisdiction. Note, however, that starting benchmark levels matter and may negate or exacerbate the tightening rate misalignment. A system with high free allocations needs to tighten a lot before it catches a system with more stringent benchmarks, even if tightening is gradual or non-existent. We found that tightening rates vary greatly between and within jurisdictions and through time.

- The **federal OBPS** does not have a tightening rate, except for some electricity generation activities. Schedule 1 of the *Output-Based Pricing System Regulations* sets declining performance standards for electricity generation between 2019 and 2030. For facilities generating electricity from solid fuels, the average annual tightening rate is 6.7 per cent (this also applies to electricity generation facilities that now use liquid fuel and gaseous fuel but used solid fuels in 2018). For new facilities generating electricity from gaseous fuels coming online after 2021 that have a ratio of thermal energy to electricity of less than 0.9, the annual tightening rate progressively increases from 11 per cent in 2022 to 50 per cent in 2029, coming down to zero CO_2e in 2030.
- In **Newfoundland and Labrador**, a tightening rate of zero per cent is applied to facilities opting for a benchmark based on the top 33 per cent performers in a sector. In other sectors, the tightening rate is three per cent.
- In **Alberta**, no industrial sector faces a tightening rate higher than one per cent, while the rate for oil and gas facilities that are below the 100,000-tonne threshold is zero. The tightening rate does not apply to facilities considered to be the most emissions-efficient within a given sector (i.e., the top 10 per cent performers located in Alberta), oil and gas producers, emissions associated with electricity usage, and industrial process emissions. It also does not apply to any CO_2 from an industrial process source that is captured and exported from the facility or used as feedstock to produce urea.[51] No time limits on the application of tightening rates are published

[51] Government of Alberta. 2020. *Standard for Developing Benchmarks, Version 2*. https://open.alberta.ca/dataset/0cba733c-5038-4503-a2ef-33edb14abae3/resource/36aebdca-a9b0-4eef-8f90-bdbf3fdef8ad/download/aep-tier-standard-developing-benchmarks-2020-07.pdf.

for Alberta, although a full review of TIER is scheduled for 2022, with subsequent reviews occurring every five years thereafter.

- Cap-and-trade jurisdictions (**Nova Scotia** and **Quebec**) use a mix of emissions cap decline rates (roughly 4 per cent per year for Nova Scotia[52] and 2.5 per cent for Quebec[53]) and free allocation reduction factors (4 per cent in Nova Scotia[54] and 0.5 to 3 per cent in Quebec[55]).
- **Newfoundland and Labrador** and the proposed **Ontario** EPS set tightening rates up until 2022, whereas **Saskatchewan** and the large emitter program being developed in **New Brunswick** have tightening rates until 2030.
- In **Newfoundland and Labrador**, facilities can opt for either a performance benchmark based on the top tercile (33 per cent) performers in their sector (in which case there is no tightening rate—emissions can stagnate if the top tercile does so) or an average annual tightening rate of 3.1 per cent (6 per cent in 2019, 2.1 per cent in 2020, 2.2 per cent in 2021, and 2.2 per cent in 2022).[56]
- **New Brunswick**'s proposed EITE program has a tightening rate of approximately one per cent of emission intensities (up to 2030). Even though the New Brunswick system is not in effect yet, a 2019 policy draft indicates that "New Brunswick is proposing to set annual declining Stringency Factors, such that all covered facilities in the program will reduce their GHG emission intensity by 10% by 2030."[57]
- The general tightening rate in **Saskatchewan** is 10 per cent by 2030 (roughly one per cent per year over 12 years). The following sectors have a five per cent tightening rate by 2030 (roughly 0.5 per cent per year): mining, iron, and steel mills; fertilizer manufacturing; pulp mills; ethanol manufacturing; grain and oilseed processing; char production and activated carbon production. A 15 per cent tightening rate by 2030 (roughly 1.5 per cent per year) applies to upstream oil and gas stationary fuel combustion.[58]

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[52] In Nova Scotia, the annual cap declines from 13.68 Mt CO_2e in 2019 to 12.15 Mt CO_2e in 2022, an average annual decline of 3.9 per cent.

[53] The annual cap declines from 55.26 Mt CO_2e in 2021 to 44.14 Mt CO_2e in 2030, an average annual reduction of 2.5 per cent.

[54] See Schedule 1, Tables 1–2 of the *Cap-and-Trade Regulations* (*N.S. Reg. 48/2020*). https://www.novascotia.ca/just/regulations/regs/envcapandtrade.htm#TOC3_104 Accessed March 11, 2021.

[55] In Quebec, the performance benchmark from which free allocation is established is reduced by a fixed factor of 80% applied to combustion emissions from most fossil fuels and was reduced annually from 2013-2020 by one to two per cent per year (allocation reduction factor) for all emissions except industrial process emissions. In 2021-2023, the annual allocation reduction factor will be 0.5 per cent for fixed process emissions, 1.5 per cent for combustion emissions and three per cent for other emissions, up until 2023.

[56] *Newfoundland and Labrador Regulation 116/18.* https://www.assembly.nl.ca/Legislation/sr/Regulations/rc180116.htm

[57] Government of New Brunswick. 2019. *Holding Large Emitters Accountable: New Brunswick's Output-based Pricing System.* https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Climate-Climatiques/HoldingLargeEmittersAccountable.pdf

[58] *Management and Reduction of Greenhouse Gases (Standards and Compliance), Regulations M-2.01 Reg 3:* https://publications.saskatchewan.ca/#/products/92803

- **Ontario**'s proposed EPS has stringency factors set to increase by either two per cent or five per cent per year depending on the EITE assessment: stringency for high EITE sectors was set to start at two per cent in 2019, increasing by two per cent per year to eight per cent in 2022 for combustion emissions. For low/medium EITE sectors, stringency was set to start at five per cent in 2019, increasing by five per cent per year to 20 per cent in 2022 for combustion emissions. No stringency factor is applied to fixed process emissions or fossil fuel electricity generation for the 2019–2022 period. There is no tightening rate applied to certain emissions (i.e., fixed process and electricity generation).
- Given that a carbon tax is in effect in **British Columbia** and the **Northwest Territories**, no tightening rate apply. In British Columbia, a five-year benchmark review of the CleanBC Program for Industry is set to occur in 2024.

Clearly, there is little uniformity in the application of tightening rates within large emitter programs. We make the following observations:

- **Tightening rates are absent or uneven, jeopardizing domestic competitiveness and long-term effectiveness.** The uneven application of tightening rates can result in misaligned domestic average carbon costs and hence production leakage risk between domestic jurisdictions. There is also a risk to effectiveness across systems, given the long-term uncertainty created for investment due to the quantity of free allocations obtained and a continuing weak average cost signal. Yet, it is the starting benchmarks that set the level of free allocations that also matter, where systems with higher decline rates may in fact have lower levels of stringency given a low starting benchmark.
- **The lack of tightening rates in some large emitter programs is a risk to overall effectiveness.** The uneven presence of tightening rates as a regulated lever within many large emitter programs reduces the ability to accommodate changing circumstances, notably new low carbon technologies and a lessening of competitiveness risk as trading partners price carbon.

Regulators need to have a way to adjust performance standards to keep markets functional and to avoid over-compensating through free allocation. This could take the form of a set tightening rate, frequent updating of performance standards, or an overall adjustment factor that regulators can apply to all standards at once as needed. Market mechanisms can help to adjust credit supply and demand to the extent imbalances emerge that put downward pressure on marginal cost incentive.

Figure 28: Large Emitter Tightening Rates, Cap Declines, and Allocation Reductions
Tightening rates are absent or uneven, jeopardizing overall effectiveness.

	Federal (MB, NB, NU, ON, PE, SK,[59] YT)	AB	BC	NL
Tightening rate / Declining cap	[Tightening rate] None, except for some electricity generation (up to 2030)	[Tightening rate] 0–1% of emission intensities (no time limit)	None (carbon tax)	[Tightening rate] 0–3% of emission intensities (up to 2022)
	NT	NS	QC	SK
	None (carbon tax)	[Declining cap] 4% of covered emissions + 4 % cap adjustment factor (up to 2022)	[Declining cap] 2.5% of covered emissions (up to 2030) + 0.5%-3% allocation reduction factor (up to 2023)	[Tightening rate] 0.5%–1.5% of emission intensities (up to 2030)

Note: the tightening rate figures are rounded to the nearest 0.5 per cent, and actual compliance rates will differ.

5. Compliance Flexibility Mechanisms

Compliance flexibility is an important element to ensure emission reductions are achieved cost-effectively and to help with the smooth functioning of credit and allowance markets. Flexibility mechanisms are design features that provide alternative ways for emitters to comply with the policy (beyond reducing emissions or paying the carbon price). These mechanisms can decrease both the average and marginal cost incentives for covered facilities while bringing about, in theory, the most efficient ways to reduce GHG emissions within and across jurisdictions.

The flexibility mechanisms common across carbon pricing programs include trading and compliance use limits; offsets (recognized units); and holding limits and banking. Each is discussed below.

i) Trading and Compliance Use Limits

In large emitter programs and cap-and-trade systems, regulated entities trade credits or allowances between regulated entities. The ability to earn and sell permits is fundamentally how large emitters send price signal across most emissions. Trading allows entities to choose the most appropriate way to meet their compliance obligation: either by reducing their own emissions and/or by purchasing surplus permits from other entities.[60]

All jurisdictions except **British Columbia** and the **Northwest Territories** allow participating facilities to trade credits (Figure 29). Facilities covered by the federal OBPS (in **Manitoba**, **New Brunswick**, **Nunavut**, **Ontario**, **Prince Edward Island**, **Saskatchewan**) can trade surplus credits between facilities from other

[59] The federal OBPS applies only partly in Saskatchewan, i.e., for two sectors (electricity and natural gas transmission pipelines).
[60] ICAP. 2021. *Brief #2: 7 arguments for emissions trading*. https://icapcarbonaction.com/en/?option=com_attach&task=download&id=717

participating jurisdictions, whereas facilities governed under the **Quebec** cap-and-trade system can trade allowances in Quebec and California.

There is no uniformity in how covered facilities can use performance credits and offsets to fulfill their compliance obligations. In **Alberta**, the limits range up to 60 per cent of their compliance obligation. In **Manitoba**, **New Brunswick**, **Nunavut**, **Ontario**, **Prince Edward Island**, and **Saskatchewan**—all provinces where the federal OBPS applies—the limit is 100 per cent in 2019–2020 and then 75 per cent. In **Newfoundland and Labrador,** the limit is 90 per cent as of 2020. Under the proposed **Ontario** EPS regulation, emissions performance units are tradable units distributed by government to facilities where emissions were lower than the emissions limit.

We observe there are limited trading linkages between jurisdictions, hindering carbon finance flows and leading to higher cost mitigation outcomes.

Figure 29: Compliance Flexibility Mechanisms: Trading and Compliance Use Limits
Limited trading between domestic programs.

	Federal (MB, NB, NU, ON, PE, SK,[61] YT)	AB	BC	NL
Trading	Trading in and between **MB, NB, NU, ON, PE, SK, YT** **Credits and offsets** can represent up to **75%** of compliance[62]	**In-province** trading only **Credits and offsets** can represent up to **60%** of compliance	╳	**In-province** trading only **Credits** (performance and Fund) can represent up to **90%** of compliance for onshore facilities[63]

[61] The federal OBPS applies only partly in Saskatchewan, i.e., for two sectors (electricity and natural gas transmission pipelines).
[62] The 75 per cent limit applies starting with the 2022 compliance year.
[63] These limits on access to credits do not apply to offshore facilities. Government of Newfoundland and Labrador. Accessed April 06, 2021. "Made-in-Newfoundland and Labrador Carbon Pricing Plan." https://www.gov.nl.ca/eccm/files/publications-nl-carbon-pricing-plan.pdf

	NT	NS	QC	SK
	X	In-province trading only Holding limit of 500k allowances **Purchase limit:** ○ Fuel suppliers: 15% of GHGs per auction; 25% of GHGs per year ○ Facilities: 3% of GHGs per auction; 5% of GHGs per year ○ Nova Scotia Power Inc.: 5% of available allowances per auction	Trading in and between QC and California Holding limit set by formula (around 2% of available yearly allowances) **Purchase limit:** ○ Emitters: 25% of available allowances per auction ○ Voluntary participants: 4% of available allowances per auction	X

ii) Offsets (Recognized Units)

Offsets are emissions reductions or carbon sequestration from activities outside the scope of a carbon pricing system. Provided there is a protocol in place, offsets or recognized units can be generated and then used for compliance in carbon tax, cap-and-trade, or large emitter regimes. They can be either domestic or international. Offsets extend the carbon price to other emissions sources that typically are not covered, which lowers average costs for large emitters.

Offsets protocols are not uniformly well established, with offsets used for compliance in **Quebec** (since 2013), **Alberta** (since 2007), and the federal OBPS, which also recognizes some Alberta offsets. Quebec's cap-and-trade system allows entities to purchase offsets developed under the WCI program (Quebec and California).

Three jurisdictions have offset systems for industrial emissions in place: **Alberta**, **Quebec**, and **British Columbia**. In British Columbia, however, as of today only liquefied natural gas (LNG) facilities are eligible for offsets, and this is moot given that no such facility is currently operating. In 2020, Alberta, offsets account for about 32 per cent of EITE compliance, while in Quebec offsets contributed, by our estimates, about 3.5 per cent of total cap-and-trade compliance (Quebec limits the use of offsets for compliance to eight per cent on all regulated emissions, which is not comparable to the federal OBPS or Alberta, where compliance emissions are calculated relative to the benchmark and is a smaller fraction of regulated emissions).

Provincial and territorial governments, as well as the federal government, worked together through the Canadian Council of Ministers of the Environment to develop a pan-Canadian framework for greenhouse gas offsets.

The federal government published proposed regulations for the Federal Greenhouse Gas Offset System in the *Canada Gazette* in March 2021 and are, at time of writing, still available for a 60-day comment

period.[64] Facilities in jurisdictions where the federal OBPS is in place (**Manitoba**, **New Brunswick**, **Nunavut, Ontario, Prince Edward Island, Saskatchewan**, and **Yukon**) can fulfill their compliance obligation using offset protocols currently recognized by Canada, namely the offset programs from Alberta and British Columbia. **New Brunswick**, **Nova Scotia**, **Newfoundland and Labrador**, **Ontario**, and **Saskatchewan** do not currently have offsets protocols in place but are evaluating possible systems.

A review of offset programs is presented in Figure 30 below. It is worth noting that proportion of compliance fulfillable by credits and offsets (expressed as percentage) is not directly comparable between **Quebec**, the **federal OBPS** and **Alberta**. Quebec's compliance is based on total emissions, whereas compliance in the federal OBPS and Alberta is based on the difference between emissions and the emissions limit.

Figure 30: Large Emitter Use of Offsets for Compliance
Offsets programs are not uniformly well established.

	Federal (MB, NB, NU, ON, PE, SK,[65] YT)	AB	BC	NL
Offsets	AB and BC programs recognized (5 recognized AB protocols as of now)[66] **Credits and offsets 75%** of compliance[67] (on a smaller compliance emissions base than QC)	**In-province** offsets only **Credits and offsets 60%** of compliance (on a smaller compliance emissions base than QC)	**In-province** offsets only, although not a compliance option at the present time[68]	Reviewing the role of offsets

[64] ECCC. 2021. "Federal Greenhouse Gas Offset System." Government of Canada. https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system.html

[65] The federal OBPS applies only partly in Saskatchewan, i.e., for two sectors (electricity and natural gas transmission pipelines).

[66] ECCC. 2020. "List of Recognized Offset Programs and Protocols for the Federal OBPS." Government of Canada. https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/list-recognized-offset-programs-protocols.html. The federal GHG offset system is under development: ECCC. 2021. "Federal Greenhouse Gas Offset System." Government of Canada. https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system.html.

[67] The 75 per cent limit applies starting with the 2022 compliance year.

[68] In British Columbia, as of today only liquefied natural gas (LNG) facilities are eligible to use offsets, and this is moot given that no such facility is currently operating: Government of British Columbia. Accessed April 06, 2021. "Greenhouse gas emission offset projects." https://www2.gov.bc.ca/gov/content/environment/climate-change/industry/offset-projects

NT	NS	QC	SK
		QC and California offsets	
X	Reviewing the role of offsets	Can represent up to **8%** of compliance (on a larger compliance emissions base than AB or federal OBPS)	Reviewing the role of offsets

iii) Holding Limits and Banking

Holding limits are the largest number of emission allowances or credits that a market participant can hold in its holding account at any given time. Holding limits are in place to prevent any single participant from being able to have the power to manipulate market prices through trades.

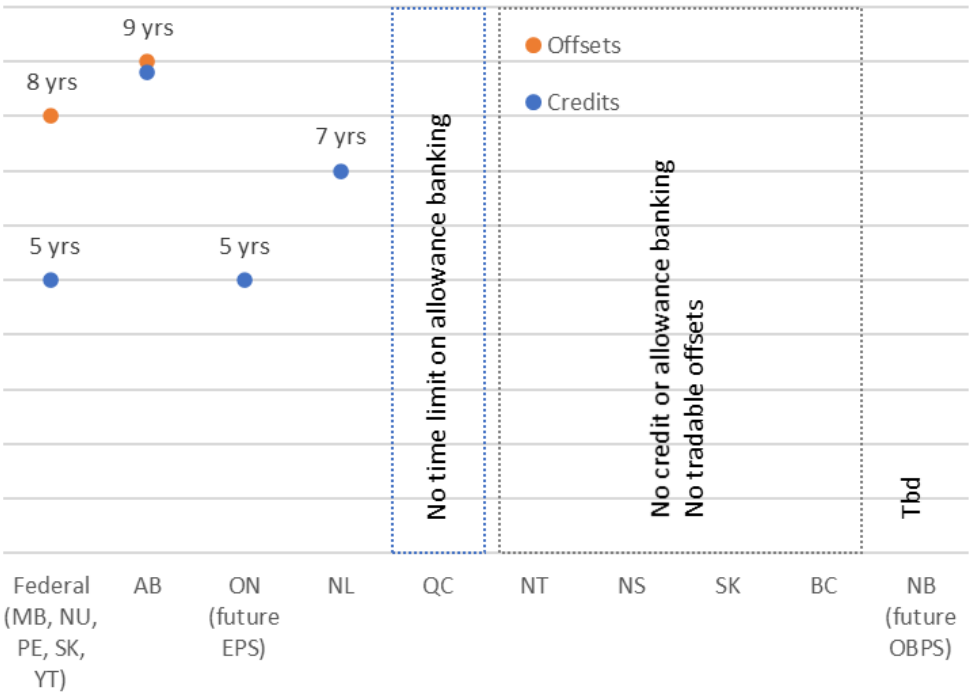
Banking involves saving allowances purchased or received in one period for use in subsequent periods. It allows entities to manage their emissions in the most cost-effective way over time, smoothing their demand.

Most jurisdictions impose a time limit on holding or banking performance credits or offsets. In both the **federal OBPS** and the future **Ontario** EPS, performance credits can be held or banked for up to five years. In **Newfoundland and Labrador**, those credits can be held or banked for up to seven years. The limit for offsets is eight years in the federal OBPS, while the limit for both performance credits and offsets in the **Alberta** TIER is nine years (see Figure 31).

Borrowing, i.e., using future credits to fulfill current-year compliance obligations, is not allowed in any Canadian jurisdiction.

There is a wide range of usage and banking limits in place. Setting time limits for usage and banking too high creates a risk to the extent that surplus compliance units may accumulate in the system, driving down the long-term marginal cost incentive. With these misaligned, some entities are afforded the opportunity to achieve compliance with lower abatement costs, leading to misaligned marginal and average incentives between facilities that are often competing domestically.

Figure 31: Time Limits on Usage: Traded Units and Offsets
There is a wide range of usage limits in place.



5 Who Ultimately Pays the Carbon Costs?

In this section, we evaluate who ultimately pays the carbon costs from the provincial and territorial carbon pricing programs. To determine the share of the carbon costs borne directly by the emitters, before rebates are applied, we allocated the total carbon costs calculated from the estimated program coverage and average costs in Section 4 above and then flowed these through a model of Canada's economic structure of supply and use. We account for how carbon costs are passed on as price increases through supply chains to businesses, households, and international exports. Of note, however, we did not address revenue recycling given a lack in transparency in how some jurisdictions are recycling carbon revenue. Therefore, it is not appropriate to interpret the costs estimates below as the net carbon costs borne by households and businesses. And since provincial and territorial systems rebate almost all of carbon costs, we would expect that on average for all households and businesses, the net carbon costs are close to zero, with some households even overcompensated.

"Who pays" is ultimately a question of fairness and distributional outcomes more than effectiveness in reducing GHG emissions. Nevertheless, different distributional outcomes flow from the design choices discussed above with respect to effectiveness.

Our approach is as follows:

- **Allocate average carbon costs to producing sectors.** We allocate the carbon costs related to each of the NIR emission categories to the appropriate production sector and, by extension, to the commodity consumed.[69] For example, the cost of emissions related to public electricity and heat production would get allocated to electric power generation, transmission and distribution in our model and then passed on as an increase in the price of electricity to businesses and households based on their consumption of electricity.
- **Factor in the ability to pass on costs and conduct pass-through scenarios.** Regulated utilities delivering electricity can pass on all or most of their carbon costs, but this may not be the case for many of the commodity producers. Depending on a GHG emitter's ability to pass on carbon costs down the supply chain and to final consumption, including exports, some share of costs will end up raising the price of goods and services downstream while some share will stay with the emitter.

[69] Combining Statistics Canada supply and use tables with the direct and indirect emission intensities published by Statistics Canada enables us to identify direct and indirect emissions associated with output (supply) and then subsequently allocate them to various uses, including household expenditures, capital formation (e.g., buildings), government, and exports. We balance the emission intensities to match the National Inventory and supply and use tables for Canada. We then track the embodied carbon in goods and services as they pass from production to consumption. This is a similar method followed by the Parliamentary Budget Office to estimate embodied carbon in household consumption. See: Statistics Canada. 2021. "Supply and Use Tables." Government of Canada. https://www150.statcan.gc.ca/n1/en/catalogue/15-602-X;
Statistics Canada. 2021. "Direct plus indirect energy and greenhouse gas emissions intensity, by industry." Government of Canada, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3810009801;
Office of the Parliamentary Budget Officer. 2019. *Fiscal and Distributional Analysis of the Federal Carbon Pricing System.* https://www.pbo-dpb.gc.ca/web/default/files/Documents/Reports/2019/Federal%20Carbon/Federal_carbon_pricing_EN.pdf

Based on past analysis and modelling, we calculate average overall cost pass-through rates for Canadian industry to be in the order of 60 per cent, with sectors like trade-exposed industry passing on a small share of the cost, while utilities pass on nearly 100 per cent of the carbon cost. An assumption of 100 per cent cost pass-through would significantly increase the household costs we estimate below, while lowering industry costs.[70]

To show the distributional range of carbon costs, we explore the implications of alternative cost pass-through assumptions on household and sectors by varying the cost pass-through according to the following assumptions:

- Scenario 1: zero per cent (i.e., no cost pass-through);
- Scenario 2: average cost pass-through rates for each industry determined through research (between 14 per cent and 96 per cent, depending on the sector)[71]; and
- Scenario 3: 100 per cent (i.e., full cost pass-through).

- **Compare carbon costs to income or GDP.** Carbon costs are expressed as a fraction of household income or a fraction of GDP for government, other industry, and large emitters. These indicators are similar to the financial hardship tests used in Alberta[72] and the federal OBPS[73] to gauge the level of free allocation granted to large emitters, and those could that voluntarily opt-in and thereby receive a free emissions allocation if they meet additional criteria. Specifically, the profit test is analogous to the metric we develop, where an emitter is considered likely at a financial risk if the profit ratio, or compliance costs over profit, is greater than 10 per cent.
- **Consider carbon costs before any revenue recycling and rebates to the sectors**. Since carbon pricing is typically revenue neutral from a government balance perspective across Canada's different carbon pricing systems, further analysis would be needed to determine the net impact after carbon revenue recycling, and to fully understand the net cost implications. However, revenue recycling schemes vary greatly by province and territory and are complex, and we have not undertaken this analysis here.

[70] The Parliamentary Budget Office assumes a 100 per cent cost pass-through. However, both our work with industry and the literature examining real-world outcomes of GHG policy find that the 100 per cent cost pass-through is an extreme assumption. See:
Office of the Parliamentary Budget Officer. 2019. *Fiscal and Distributional Analysis of the Federal Carbon Pricing System.* https://www.pbo-dpb.gc.ca/web/default/files/Documents/Reports/2019/Federal%20Carbon/Federal_carbon_pricing_EN.pdf
[71] For example, see CE Delft and Oeko-Institut. 2015. *Ex-post Investigation of cost pass-through in the EU ETS: An analysis for six sectors.* European Commission.
https://ec.europa.eu/clima/sites/clima/files/ets/revision/docs/cost_pass_through_en.pdf
[72] A large emitter or opted-in facility is considered likely to experience economic hardship attributable to the compliance costs incurred if it fails a profit test, where the ratio of facility's compliance costs to an estimate of its earnings before interest, taxes, and amortization (EBITA) in a given year is greater than 10 per cent.
[73] Under the Voluntary (opt-in) Policy of the federal OBPS, sectors may be added to a list for EITE treatment if carbon costs are large relative to revenue—i.e., facilities that make up 10 per cent or more of the sector's revenue face carbon costs that exceed three per cent of revenue. As of time of writing this report, these indicators have not been used to gauge the level of free allocation for opt-in sectors, only as a factor based on which they could be permitted to opt-in if another factor is also met, as explained in the Policy.

Based on our analysis, we estimate about $9.6 billion in annual carbon costs from all carbon pricing systems based on 2018 emissions and 2020 carbon prices (Figure 32 and Figure 33). How these costs are distributed across the economy varies significantly depending on the cost pass-through assumptions:

- **Household** carbon costs increase by 50 per cent between a zero per cent cost pass-through assumption and a 100 per cent cost pass-through assumption, representing 0.39 per cent of 2018 household income in the average estimated cost pass-through scenario. Under our central scenario, overall carbon costs paid by households do not exceed 74 per cent of the total collected from covered fuels.

- **Large emitter** sector carbon costs of course increase dramatically between Scenario 3, where they pass on all their direct carbon costs, and Scenario 1, where no costs can be passed on. These scenarios represent the extreme, and it is likely that Scenario 2, which represents some level of cost pass-through (roughly an average of 60 per cent for all of industry), is the most representative of actual conditions.

  Scenario 2 (some cost pass-through) estimates that the average fraction of carbon costs represent 0.68 per cent of GDP for large emitters. Again, this is before revenue recycling cost reductions that return all carbon revenues to the sectors. In theory, the total carbon revenue returned to all sectors should exceed actual carbon costs of all sectors because some carbon costs are paid by foreign entities through international exports.

  Large emitters clearly have higher carbon costs than anyone else, even when factoring in the average cost adjustments afforded under large emitter programs. A major consideration, however, is the extent to which carbon costs can be passed on through exports and supply chains. Finally, since all large emitter programs return most of the revenue collected back to the sector, the impacts are likely lower than predicted below. That said, the distribution of this revenue matters, and the extent to which facilities cannot access carbon revenue will exacerbate the financial impact on the facility.

- For **other industry and business subject to the full fuel charges and allowance costs under cap and trade**, carbon costs before rebating are 0.11 per cent of GDP in the Scenario 2 that assumes some cost pass-through. Other industry and business not enjoying large emitter treatment typically cannot access carbon revenue to mitigate the average cost impact, whereas households get a large proportion of the rebating from covered fuels. An important observation from our analysis is that other industry and business that are not afforded large emitter treatment are most likely being treated inequitably. We note three biases in the treatment of revenue recycling for these facilities:

  - First, the 100 per cent cost pass-through is likely not a reasonable assumption. Many of these facilities are highly traded just like the large emitters, with a large share of their output destined for foreign markets, and they often compete domestically with imports.

  - Second, while these facilities may be less emissions-intensive than the large emitters, they are nevertheless typically less profitable. This means that small incremental additions in cost can have a large impact on operational feasibility.

  - Third, other industry and businesses may still have emission intensities that are approaching that of large emitters, but they are not included in large emitter programs because they are

small and thus below size inclusion thresholds. Even where lower opt-in thresholds apply, there may be sufficient delay to include these facilities if no existing product benchmarks have been developed.

Future reviews need to take a closer look at revenue recycling within the country. Ideally, a detailed review of all the recycling programs and the proceeds collected would be compared against the carbon cost paid by economic sectors and by households with different income levels.

Figure 32: Gross Carbon Costs as a Share of Income (Before Rebating)
Gross carbon costs / household income or sector GDP, 2018.

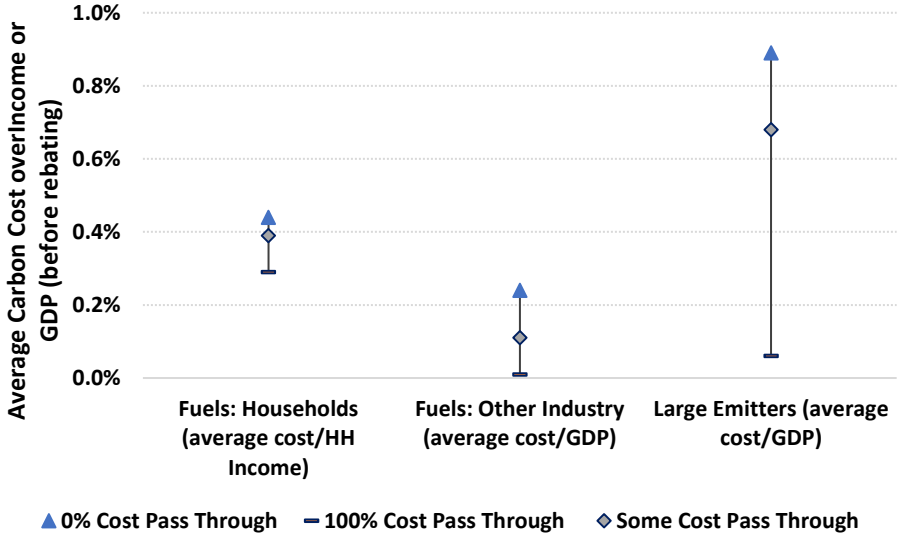


Figure 33: Carbon Costs for All Jurisdictions (Gross carbon costs before FPT revenue recycling)
Three different cost pass-through assumptions, 2018.

Economic Sector		Scenario 1 0% Cost Pass-Through			Scenario 2 Average Estimated Cost Pass-Through			Scenario 3 100% Cost Pass-Through		
		Carbon Costs $million		Cost/ Household Income or GDP[1]	Carbon Costs $million		Cost/ Household Income or GDP[1]	Carbon Costs $million		Cost/ Household Income or GDP[1]
		$million	%	%	$million	%	%	$million	%	%
Covered Fuels	Households	$4,085	43%	0.29%	$5,429	57%	0.39%	$6,160	65%	0.44%
	Government	$315	3.3%	0.09%	$309	3.2%	0.09%	$317	3.3%	0.09%
	Other Industry	$3,449	36%	0.24%	$1,598	17%	0.11%	$165	1.7%	0.01%
Large Emitt. Program		$1,698	18%	0.89%	$1,305	14%	0.68%	$119	1.2%	0.06%
All Exports[2]		$0	0%	NA	$907	9.5%	NA	$2,786	29%	NA
TOTAL		**$9,548**	**100%**	**0.48%**	**$8,641**	**91%**	**0.43%**	**$6,761**	**71%**	**0.34%**

[1] The household sector considers carbon costs relative to overall household income. Other sectors of the economy consider carbon costs relative to the GDP generated for the sector.
[2] In Scenario 1, there are no carbon costs associated with international exports, whereas in Scenario 2 and Scenario 3 some carbon costs are passed through to international exports and therefore borne by importing countries, so they are not included in the Canada sector total.

6 Indigenous Peoples and Carbon Pricing

This section considers the implications of the design choices discussed above for Indigenous Peoples in particular. Indigenous communities transcend provincial and territorial boundaries and face different carbon pricing rules in different jurisdictions. As a result, differences in how carbon pricing is being implemented across jurisdictions can be expected to have unequal impacts, particularly for non-status First Nations individuals, self-governing First Nations, Métis communities, and First Nations, Métis and Inuit residing in non-Indigenous communities due to their exclusion in the eligibility criteria for exemptions.

These differences raise questions of fairness for Indigenous Peoples and communities. Our analysis surfaces these important questions but does not provide guidance as to the best approach moving forward. As we noted in Section 1, we recognize that Indigenous views regarding carbon pricing and the processes used to develop these policies are diverse and complex. Our intent is to provide additional information about one narrow aspect of implications for Indigenous Peoples from existing carbon pricing in order to support ongoing conversations between Indigenous and federal, provincial, and territorial decision-makers.

6.1 Key Design Elements: Exemptions and Revenue Recycling

Our analysis relies on publicly available program design information for all jurisdictions. It focuses on two main policy design choices: exemptions and revenue recycling.

Note that findings below describe design differences in existing carbon pricing systems, but do not evaluate these differences. Exemptions for example, tend to reduce environmental and economic performance of carbon pricing policies, all else being equal. We recognize, however, that all else is *not* equal, and that Reconciliation requires other aspects of design choices to be taken into account. See the box below.

Tax Exemptions for First Nations Peoples and Communities

There is a commonly held belief among many non-Indigenous people in Canada that First Nations receive unfair advantages such as tax exemptions and financial assistance with post-secondary education. Such exemptions may be inaccurately viewed as First Nations being given “free” things. However, it must be noted that tax exemptions and other financial measures are linked to Indigenous rights. Moreover, these measures are certainly not given to First Nations for free; conversely, they came at a high cost resulting from harms that have been committed by the Euro-Canadian state through colonization and various colonial projects that continue to adversely impact Indigenous peoples and communities today.

The assessment found both differences and similarities among provinces and territories with regards to exemptions for Indigenous communities. In particular, the assessment found that carbon pricing programs provide exemptions for some—but not all—Indigenous communities:

- **Direct exemptions** apply to an entire group, such as status First Nations governed under the *Indian Act*. There may be specific exemptions mentioned under a carbon pricing act or regulations, and there may be general exemptions linked to First Nation status. Across jurisdictions there is a consistent exclusion to direct exemptions for non-status and self-governing First Nations.

- **Indirect exemptions** apply to certain emission sources in some jurisdictions, such as the exemption of aviation or diesel-fired electricity generation in remote communities in Yukon. Indirect exemptions provide relief to both Indigenous and non-Indigenous off-grid and remote communities in Canada. While indirect exemptions are not a class-based exemption, 170 of 292 remote communities[74] in Canada are Indigenous. These exemptions generally do not apply to Indigenous communities that are grid-connected.
- **Off-reserve exemptions** are available for status First Nation individuals, should they take possession of fuel on-reserve. Since residency on-reserve is not a requirement for status First Nation individuals to purchase fuel on-reserve tax exempt in most PTs, this relief measure apply to at least some First Nation individuals who reside off-reserve. However, it can be presumed that for many status First Nation individuals who reside off-reserve, purchasing fuel on-reserve will not be feasible consistently. Moreover, this is not an exemption that would be available to any Métis or Inuit residing in non-Indigenous communities.

Some **revenue from carbon proceeds** is allocated to Indigenous communities in jurisdictions where the federal backstop applies, and at least one province with a provincially implemented carbon charge has revenue-sharing agreements with Indigenous communities. However, few details regarding these arrangements are publicly available.[75]

6.2 Federal Backstop and Treatment of Indigenous Communities

The federal carbon price on covered fuels does not fall under the general tax exemption under the *Indian Act* since it is deemed a regulatory charge and not a tax. Practically, this means:

- **Direct exemptions** under the federal carbon charge on covered fuels do not apply to Indigenous Peoples in Alberta, Manitoba, Saskatchewan, Ontario, Nunavut, and Yukon.
- There are **indirect exemptions** that are sector-based rather than class-based in Nunavut and Yukon that benefit Indigenous communities, including for fuel used for aviation and diesel-fired and natural gas electricity generation for remote communities. For example, the exemption for diesel-fired and natural gas electricity generation apply to off-grid communities in Alberta, Manitoba, Ontario, and Saskatchewan. Indigenous communities such as Shamattawa and Lac Brochet in Northern Manitoba produce electricity using diesel generators and would be eligible to the indirect exemption under the federal backstop. Similarly, some exemptions for fishers and farmers would also indirectly affect some Indigenous communities and individuals.

Another indirect exemption is available through the Nunavut Carbon Rebate (NCR) , which is at-the-pump relief worth 50 per cent of the charge imposed, with funds collected by the Canada Revenue Agency returned directly to Nunavut. These funds are not earmarked for climate change initiatives per se but are instead transferred to Nunavut's Consolidated Revenue Fund.

[74] In this report, "remote communities" refers to communities that have fewer options for reducing emissions (and thus avoiding carbon costs) given limited access to electricity grids, natural gas networks, or transportation networks.

[75] Quebec's Green Economy Plan, which is funded in part by the carbon market revenue, will allocate $19.2 million over five years to support climate change actions in Indigenous communities and $11 million over five years to preserve the quality of life in Northern communities.

6.3 Provincial and Territorial Programs

No information regarding exemptions for Indigenous communities located in **Nova Scotia** or **Quebec** was identified. However, British Columbia, New Brunswick, Newfoundland and Labrador, the Northwest Territories and Prince Edward Island each have exemptions for status First Nation individuals and bands governed under the *Indian Act*, although there are some differing contingencies in each jurisdiction:

- In **British Columbia**, status First Nation people and bands governed under the *Indian Act* receive an exemption from the carbon tax when purchasing fuel for personal use on-reserve and some treaty lands that were previously reserve lands, subject to certain conditions. In recognition of this exemption, B.C. established an exempt fuel retailer program. This program allows retailers on First Nations land to purchase tax exempt fuel that is resold tax-exempt to First Nation individuals and bands.

  There is also a low-income tax credit that would assist with the impact of the indirect cost of the carbon tax embedded in household spending on items such as food. There is no exemption available to First Nation individuals who purchase fuel for business use in a corporation, cooperative, tribal council, or any band-empowered entity. British Columbia contains self-governing Indigenous communities that are no longer governed by the *Indian Act*, and therefore this exemption would not apply to them or non-status First Nations.

  Climate-related spending in B.C. targeted at Indigenous communities includes the Indigenous Clean Energy Initiative and the First Nations Clean Energy Business Fund. However, there is not a direct link between the funding for these programs and carbon tax revenues.

- It is worth noting that under the now-defunct **Alberta** Carbon Charge, **direct exemptions were available** for status First Nations and First Nation bands that are governed by the *Indian Act,* with respect to fuel purchases, provided that:

  - The purchaser takes possession on-reserve; and,
  - The fuel purchased is for their own use or consumption.
  - The fuel purchased by a First Nation Band must be for use in band-owned vehicles and equipment; fuel purchased for resale or for export to another jurisdiction will not be tax-exempt, nor will fuel used by a corporation, even if the organization is band-owned. On-reserve fuel retailers are unable to purchase the fuel they sell tax-free, as taxes are rolled into the overall price, but they can apply for refunds.

  It should also be noted that Alberta is the only province in Canada where Métis have self-governing communities, the exemptions under the Alberta Carbon Charge that previously existed (before being replaced by the federal fuel charge) did not apply to these communities.

  This relief measure did not apply to self-governing First Nations.

- In **New Brunswick**, all status First Nation individuals who purchase fuel on a First Nation are exempt from paying the charge on covered fuels. This exemption would include both personal use and use in exempt activities such as a fishing operation owned by a sole proprietor. Any purchases for Band operations, such as for school buses, are also exempt if the fuel is purchased

on the First Nation. Any status First Nation individual, whether they live on the First Nation or are from a different First Nation, can purchase exempt fuel on a First Nation provided they have a valid Status card. All First Nations retailers purchase fuel with the charge on covered fuels. The retailers apply to receive the rebate back from government for refunds on exempt First Nations sales to First Nation individuals monthly.

- The **Northwest Territories** has a similar system in place insofar as First Nations governed under the *Indian Act* are exempt when making purchases or taking delivery of fuels on-reserve. Like British Columbia, the N.W.T. contains self-governing First Nations that are not governed by the *Indian Act* and are therefore excluded from the relief measures, along with non-status First Nation individuals. Additionally, the N.W.T. is home to the Inuvialuit Settlement Region, which is one of the four regions comprising Inuit Nunangat,[76] and 33 remote Indigenous communities, for which there are no direct exemptions, although aviation fuel and home heating fuel (including diesel) are exempt. This is an indirect exemption that provides relief to off-grid and remote communities.

- **Newfoundland and Labrador** also has a similar exemption for status First Nation individuals and bands governed under the *Indian Act*, but the exemption is expanded further than B.C.'s and the N.W.T.'s in that it also exempts band-empowered entities. This would have the effect of excluding non-status First Nation individuals from relief measures.

  While there are no class-based exemptions for Inuit communities in Newfoundland and Labrador, but there is a general exemption for aviation fuel used for trips within Canada that would indirectly apply to at least some of these communities. Other exemptions include home heating fuels, electricity generation, fishing, fish processing and possibly mineral exploration, as we explain below. The five Inuit communities of Nain, Hopedale, Postville, Makkovik and Rigolet are not connected to the Labrador Interconnected System power grid. Instead, each of these communities has diesel-generated electricity, which would be exempt from the carbon tax. Fishing and fish processing activities are conducted in a number of these communities. An exemption for mineral exploration could be added since the Voisey's Bay mine is effectively surrounded by Nunatsiavut, a region in Labrador comprising one of four regions in Inuit Nunangat.

  Newfoundland and Labrador has committed to investing $2.7 million from its Low-Carbon Economy Leadership Fund agreement with the federal government to finance energy efficiency retrofits in Inuit communities.

- In **Prince Edward Island**, status First Nations governed under the *Indian Act* are exempt. This excludes non-status First Nation individuals. There are no limitations with regards to use by certain First Nations entities (e.g., corporations, band-powered entities, etc.); the exemption applies to status First Nations governed under the *Indian Act* more broadly than in some other

[76] "Inuit Nunangat" is used today to describe four regions: the Inuvialuit Settlement Region (northern Northwest Territories), Nunavut, Nunavik (northern Quebec) and Nunatsiavut (northern Labrador). Inuit Nunangat is home to 53 Inuit communities and comprises about 35 per cent of Canada's land mass and 50 per cent of its coastline. Canadian Geographic. Accessed March 19, 2021. *Indigenous Peoples Atlas of Canada*. https://indigenouspeoplesatlasofcanada.ca/article/inuit-nunangat/

jurisdictions, such as British Columbia. Most eligible First Nation individuals can receive this exemption in P.E.I. when taking possession of fuel on-reserve, regardless of whether they reside off-reserve or whether they are purchasing on another band's territory. However, because the exemptions are administered by the bands, it is possible that a given band may opt not to offer an exemption to First Nation individual registered by another band. There is at least one First Nation band in the province that the Government of P.E.I. is aware of that may have chosen not to exempt members of some other bands. Finally, 50 per cent of the revenue collected on taxable sales on-reserve is shared with the band council without stipulation on what the funds are to be used for.

- **Quebec**'s cap-and-trade system (SPEDE) does not provide direct exemptions for Indigenous communities or individuals. However, Quebec provides indirect exemptions by excluding aviation fuels from coverage, which benefits northern communities that rely heavily on air transportation for goods and travel. Regarding revenue recycling, there are currently no specific funding programs using cap-and-trade revenue for First Nations. However, new Indigenous and Northern community funding programs are planned, including $11 million over five years to preserve the quality of life of Northern communities and $19.2 million to support climate change actions in Indigenous communities. These are to be funded in part by cap-and-trade revenue.

The Assembly of First Nations' Submissions Regarding the Constitutional Challenge to the Federal *Greenhouse Gas Pollution Pricing Act*

On March 25, 2021, the Supreme Court of Canada confirmed that the *Greenhouse Gas Pollution Pricing Act* is constitutional. 26 interveners (or coalitions of interveners) made submissions in this case, including four Indigenous groups or communities: the Anishinabek Nation and United Chiefs and Councils of Mnidoo Mnising; the Assembly of First Nations; Athabasca Chipewyan First Nation; and the Assembly of Manitoba Chiefs.

The Assembly of First Nations (AFN) made submissions that "a national response which respects First Nations rights, Title, jurisdiction and responsibilities was critical given the disproportionate impacts that both climate change and carbon pricing pose for First Nations":

- There is no dispute that First Nations will experience the impacts of climate change in ways that most non-Aboriginal Canadians will not, due to First Nations' locations, economic situations, and a heavy reliance on the environment. As noted by the Ontario Court of Appeal in the *Reference re Greenhouse Gas Pollution Pricing Act*, climate change has had a particularly serious impact on First Nations communities in Canada, which tend to be exacerbated by the close relationship between First Nations and the land and waters on which they live.
- The Pan-Canadian Framework on Clean Growth and Climate Change addressed this susceptibility of First Nations, noting that "unlike rebuilding after an extreme event like a flood or a fire, once permafrost has thawed, coastlines have eroded, or socio-cultural sites and assets have disappeared, they are lost forever."

Further, AFN notes in its submission to the Court that carbon pricing will also affect First Nations in unique ways:

- First Nations also tend to be disproportionately impacted by the implementation of regulations on GHG emissions and their accompanying charges. They are particularly susceptible to the impacts of a carbon price due to factors such as their remoteness, poor-quality housing, and subsistence lifestyle. Remote First Nations communities have a lower ability to substitute less-carbon-intensive goods and services due to limited selection. Therefore, as energy costs rise, the impact upon remotely located communities will be greater than those facing shorter distances and lower costs to access basic necessities. The increased costs of these basic necessities such as food will put more pressure on traditional practices like hunting and fishing, which will likely reduce the availability and reliability of the natural resources upon which remote First Nations depend.

7 Summary and Conclusions

Carbon pricing, along with other policies such as performance regulations, can be a key driver of deep emissions reductions in Canada. It can help achieve an ambitious 2030 target, and it can set Canada on the path to net zero by 2050. Yet, it can only do so if it is designed to be effective.

The current patchwork of federal, provincial, and territorial carbon pricing programs reflects shared jurisdiction over climate policy in Canada but also the heterogeneity in regions' economies, emissions profiles, and local priorities. To some extent, variation in policies is appropriate and not a risk to overall effectiveness. But in some cases, design choices—many of which are consistent across various carbon pricing systems in Canada—are likely to undermine efforts to drive deep, cost-effective emission reductions as part of a transition to net zero.

This independent assessment develops a framework for assessing and comparing the effectiveness of federal, provincial, and territorial carbon pricing policies. As we conducted the assessment, we sought to verify our results and conclusions with the FPTs, National Indigenous Organizations, and climate policy experts. This independent assessment of federal, provincial, and territorial carbon pricing systems highlights several key trends and challenges.

Multiple design choices determine the stringency (and thus the ultimate effectiveness) of a carbon pricing policy. No one indicator provides a complete assessment of the stringency of a carbon pricing. Different policy design choices contribute to overall stringency, and multiple indicators are required to assess and compare stringency as a result. Figure 34 below summarizes the framework of indicators developed in this report. We also apply this framework to our assessment of current federal, provincial, and territorial carbon pricing systems. Using available data, we estimate each indicator as implemented in each province and territory. We also conducted a review of the major design elements contained in FPT systems, providing comparisons on key design elements across jurisdictional systems where possible.

Figure 34: Indicator Summary
Results with Interpretation

Indicator	Impact on effectiveness	Relevant design choices
How Many Emissions Are Covered by the Carbon Price?		
Indicator 1: The quantity of emissions valued by the price incentive	Broader coverage drives more effective policy: • Due to varying design choices and the structure of jurisdictional emission inventories, carbon pricing covers between 54% and 87% of jurisdictional emissions and 78% of national emissions. • Jurisdictions differ due to carbon pricing choices and GHG sources not covered anywhere in Canada.	(+) Covering more sources of fuel-related emissions (+) Covering more process emissions from large emitters (–) Exemptions
Indicator 2: The emissions that could be priced: The coverage standard	Can carbon pricing be expanded? We reviewed Canadian carbon policies to identify a coverage standard of emission sources and applied the standard across all jurisdictions: • If applied, 82% of emissions could be covered through carbon pricing.	

Indicator	Impact on effectiveness	Relevant design choices
	• Differences in coverage between jurisdictions are driven by uneven fuel charge exemptions and uneven coverage of large emitters.	
What Is the Value of Emission Reductions?		
Indicator 3: The marginal cost incentive: The value of an emission reduction	The most straightforward method to compare the relative price stringency of carbon pricing mechanisms is to consider the marginal cost incentive on carbon across the jurisdictions: • Marginal cost incentives drive the "technique effect" and create incentives for adopting lower-emissions technologies, processes, or fuels. • A low marginal cost incentive in cap-and-trade systems does not necessarily translate into low overall effectiveness given the presence of the cap. • Point-of-sale rebates result in weak marginal cost incentives. • The marginal cost incentive ranges from a low of $16 to a high of $41 per tonne.	(+) Higher incentives for covered fuels (+) Lower cap levels (in cap-and-trade) (–) Point-of-sale rebates (–) Offsetting reductions in fuel taxes Unknown (–) risk: Credit market gluts from generous allocation of free allocation to large emitters
Indicator 4: The average cost incentive: The cost on emissions owed	Average cost incentives drive "scale" and "composition" effects by encouraging emission reductions through new investments and major capital retrofits: • The long-term signal to invest in low-carbon technology is muted when the average cost is low. • The average cost incentive for all covered emissions across jurisdictions varies considerably, from a low of $4 per tonne to a high of $36 per tonne, with a national average of $17. • For the large emitter sectors, the average cost shows much wider variation, ranging between $1.80 in Nova Scotia and $26 per tonne in British Columbia. • This difference means that in some jurisdictions, the impact on business and household income is higher than others. For business this could drive economic activity to other jurisdictions.	(–) Free allocation in cap-and-trade systems (–) Free allocation / high sector emissions intensity benchmarks in large emitter programs (+) Better alignment of free allocation / benchmarks across large emitters Unknown (+/–) risk: net cost impact of revenue recycling
Indicator 5: Setting long-term expectations: The expected future marginal cost incentive	Expectations of *future* carbon prices also increase effectiveness. When emitters expect higher future carbon prices (with greater certainty), they are more inclined to invest in projects that reduce emissions over the long term: • Despite the presence of the federal backstop carbon price, a few jurisdictions have chosen not to communicate publicly a commitment to a price schedule increase to 2022. • The carbon price schedules in all jurisdictions except Quebec are not consistent with incenting continuous improvement over the longer term. • In December 2020, the federal government announced the backstop carbon price would rise $15 per year after 2022,	(+) Communicate declining caps (+) Commit to a long-term and increasing carbon price schedule (+) Index the carbon price to inflation

Indicator	Impact on effectiveness	Relevant design choices
	reaching $170 by 2030 ($143 in constant 2020 dollars). This carbon price is a proposal. It was not implemented in 2020 and is therefore not included in the analysis. • In most cases, the price schedule is not indexed to inflation and is therefore increasing in stringency at a lower rate than the nominal price would suggest.	
Revenue recycling choices: Balancing the marginal cost incentive with income impacts	The twin objectives of incenting emission reductions and minimizing adverse income impacts define how rebating the proceeds of carbon pricing takes place across Canada. How carbon revenue is returned can influence effectiveness and overall stringency (both positively and negatively): • Point-of-sale rebates work against the marginal cost incentive to reduce emissions. • Rebates delivered through tax cuts or untied to fuel consumption can reduce the negative income impacts of pricing while maintaining the marginal cost incentive. • Well-designed rebate programs can unlock cost-effective mitigation potential that is blocked by non-economic barriers such as the lack of infrastructure or of sufficient capital. Comparably, higher-cost innovation incentives can reduce marginal abatement costs in the long run. We estimate about $8.6 billion in annual carbon revenue from all carbon pricing systems based on 2018 emissions and 2020 carbon prices.	(–) Point-of-sale rebates (–) Rebates linked to individual fuel consumption (+) Funding for climate mitigation programs and subsidies
The Price Incentive Adjusted for the Coverage Standard		
Indicator 6: Marginal cost incentive adjusted by the coverage standard	This indicator combines indicators of coverage and marginal cost incentive to measure overall stringency: • When the marginal cost incentive is adjusted to account for coverage, we see greater variation than when coverage is not considered. • The marginal cost incentive adjusted for the coverage standard is by no means uniform across jurisdictions, ranging between $13 and $40 per tonne, with a national average of $29. • Large emitters range between a low of $1.22 to a high of $43 per tonne, with the national average of $29.	(affected by multiple factors, as per Indicators 1–5)
Indicator 7: Average cost incentive adjusted by the coverage standard	This indicator combines indicators of coverage and marginal cost incentive to measure overall stringency: • The average cost incentive adjusted for the coverage standard ranges between $3 and $34 per tonne, with a national average of $16. • Free allocation drives down the average costs significantly, especially in Nova Scotia. • When looking at stringency in terms of coverage-adjusted average cost incentive, there is a big difference between	

Indicator	Impact on effectiveness	Relevant design choices
	systems with free allocation and B.C.'s system, which incorporates full pricing. • The low average cost incentives are effectively locking Canada into a high-emission trajectory with market access risk.	

Exemptions in covered fuels are eroding marginal cost incentives to reduce GHG emissions. On the road to net zero, and with carbon pricing chosen by governments as a core policy, effective and efficient outcomes require the marginal cost incentive to be broadly applied across emission sources. When carbon prices are applied to fewer emissions, they drive fewer emissions reductions while increasing costs. Two important trends in exemptions and rebates in federal, provincial, and territorial systems are worth noting:

- Coverage of large emitter programs can include process and fugitive emissions. Some jurisdictions cover these emissions, and some do not.
- Multiple programs exempt transportation and home fuels.

Some exemptions are designed to reduce the cost burden on vulnerable businesses or households or exclude hard-to-abate emissions. Excluding aviation fuels in the North, for example, could makes sense given that carbon cost increases could have a disproportionate impact on incomes in communities that are already vulnerable.

Yet, alternative approaches can address vulnerability concerns without eroding the incentive to abate. A shift away from exemptions from coverage and rebates tied directly to fuel use and toward support based on factors independent of fuel use can address concerns while maintaining the effectiveness of carbon pricing.

Point-of-sale rebates and offsetting changes in fuel taxes are eroding marginal cost incentives to reduce GHG emissions. Design choices that deliberately dilute incentives to reduce emissions work against the goals of carbon pricing policy. For example, offsetting provincial fuel taxes, often at the point of sale, directly erodes the marginal cost incentive and, by extension, the average cost. This then erodes the effectiveness of the program to deliver emission reductions in both the short- and longer-terms.

Again, alternative approaches to rebates in which rebates are not tied to fuel use or emissions can address other policy goals without undermining the effectiveness of carbon pricing in reducing emissions.

Both marginal cost and average cost incentives in large emitter programs often lack transparency. The opaqueness of large emitter programs, including those in cap-and-trade systems, means that the true marginal cost incentive cannot always be easily determined. The quantities of compliance emissions or banked compliance units for large emitters are published by just a few jurisdictions, making accurate comparisons of marginal costs challenging. Further, system-wide compliance information is typically not available, making it impossible to assess market conditions, the key determinant of the marginal cost incentive. This opaqueness exists in credit-based large emitter programs and cap-and-trade systems.

Several factors suggest that true marginal cost incentives for large emitters might be lower than we have identified in this assessment. Generous allocation of free emissions, for example, might mean that the supply of credits in large emitter systems exceed demand, diminishing incentives for firms to outperform their required emission reduction obligation.

Better transparency on key effectiveness drivers, including allocation, banked information, and compliance, is needed to assess the costs and incentives facing large emitters.

The exact way in which a preferential status is granted to the large emitters that are considered EITE, as well as the treatment conferred by the status, are often not laid out in detail across jurisdictions. A patchwork of large emitter program designs exists in the country. This becomes a significant risk when effort is required to interact with U.S. and European systems to assess relative stringency in a world moving towards border carbon adjustments. It also raises domestic competitiveness concerns, where some competing facilities not located in the same jurisdiction are conferred differing levels of benefit.

As a positive step forward, FPTs recently published a report on approaches and best practices to address the competitiveness of large emitters.[77]

Low average cost incentives do not send a long-term signal for low-carbon investment decisions. Large emitter carbon pricing programs are *designed* to lower average costs (while maintaining the marginal cost incentive) to address concerns around competitiveness and leakage risks. We identified the average cost across all large emitter programs to be $4.96 per tonne in 2020. This equates to a cost of 0.6 cents per dollar of GDP. With a $170 per tonne carbon price ($141 in 2020 dollars), the equivalent average cost under today's large emitters systems would be in the order of $21 per tonne (in current 2020 dollars) or 2.8 cents per dollar of GDP.

Low average costs may pose a challenge over time for two reasons.

First, as other countries move forward with aggressive carbon policies of their own, they will seek to level the international playing field through trade barriers linked to the relative stringency of carbon policy between competitors. The international context is already changing. For example, 31 per cent of Canada's exports to the U.S. over the last five years were destined for states with some form of carbon pricing. California alone accounts for nine per cent of Canada's exports and has a comprehensive cap-and-trade program linked with Quebec. Meanwhile, 21 per cent of U.S. imports come from states with some form of carbon pricing. California accounts for seven per cent of those imports. The share of imports into Canada or exports to countries with carbon pricing regimes in place only increases when China, South Korea, Japan, and the European Union are considered as well.

Second, a low average cost also slows the long-term shift toward low-carbon production that will be more important for international competitiveness. This average cost incentive is important for long-term decarbonization, as it sends the primary investment signal that all new capital stock should push towards low- or zero-emitting. But the current large emitter programs provide a perverse long-term incentive. They are explicitly rewarding the most emissions-intensive facilities in the country to not make the major investments needed to be prepared to compete in a carbon-constrained market, where

[77] FPT Steering Committee, 2021. A study addressing competitiveness and carbon leakage risks under carbon pollution pricing, Annex to: ECCC, 2021. Pan-Canadian Approach to Pricing Carbon Pollution: Interim Report 2020. http://publications.gc.ca/collections/collection_2021/eccc/En4-423-1-2021-eng.pdf (Accessed April 10, 2021)

trade barriers will likely be adjusted inversely to the stringency of Canadian carbon policy. The low average cost incentives could lock Canada's economy into a high-emission trajectory with market access risks.

In the short term, a low average cost incentive is somewhat acceptable given competitiveness concerns. Yet, large emitter programs will have to be reviewed to better understand how they can be adjusted to incent the transformative change needed to push towards net zero.

Differences across federal, provincial and territorial programs may pose inter-provincial competitiveness and leakage risks. Some variation in provincial and territorial carbon pricing systems reflects local contexts (in particular, variation in revenue recycling approaches). However, other elements of the design patchwork can cause problems.

Wide variation in sector-specific emissions-intensity benchmarks, for example, lead to correspondingly wide variation in average carbon costs faced by facilities producing the same product in different provinces. Over time, this variation could create incentives for firms to shift production to facilities in regions with more generous large emitter systems. A subsequent "race to the bottom" effect could exacerbate concerns around market liquidity in large emitter credit markets, as described above.

Inadequate rebating of carbon revenue to industries that are not large emitters is a major gap. These facilities are subject to average costs under the covered fuel programs that are, on average, six times higher than for large emitters. Yet in some cases, they compete in international and domestic markets just like large emitters, and in some cases are highly mobile and thus prone to leakage risk. An important observation from our analysis is that other industry and business that are not afforded large emitter treatment are most likely being treated inequitably. There is a case for revisiting rebating programs if non-large emitter competitiveness is to be assured, especially as carbon prices rise toward 2030.

Differences in how federal, provincial, and territorial carbon pricing systems affect Indigenous Peoples pose challenges for fairness and towards reconciliation. Carbon pricing systems across the country do not treat Indigenous Peoples in a uniform way. Some communities in some jurisdictions receive exemptions that allow them to avoid carbon costs, whereas other communities face the full carbon cost. Since Indigenous communities in Canada are heterogeneous, standardizing the treatment of Indigenous communities in terms of exemptions across jurisdictions poses its own challenges: equality of treatment is not necessarily equitable. Explicitly considering treatment of non-status and self-governing First Nations, First Nations, Inuit, and Métis Peoples who reside in non-Indigenous communities without a requirement to purchase fuel on-reserve could provide channels that reduce this inequity. Further engagement could inform potential changes to policy (whether changes in coverage and exemptions or in changes in revenue recycling) that could address these concerns.

Appendix A: List of Experts Consulted

In addition to the feedback received from the federal government, provinces, territories, and national Indigenous organizations, we also consulted with climate policy experts from academia, independent research institutes and non-governmental organizations across Canada. Thirty-minute interviews were carried out with the experts listed below as well as a number of peer reviews of the draft document.

1	Andrew Leach	Associate Professor, University of Alberta
2	Catherine Abreu	Executive Director, Climate Action Network Canada
3	Chris Bataille	Associate Researcher, Institute for Sustainable Development and International Relations
4	Erik Haites	President, Margaree Consultants Inc.
5	François Delorme	Lecturer, Université de Sherbrooke
6	Jennifer Winter	Associate Professor, University of Calgary
7	Jim Whitestone	Chief Environmental Officer and Chief Economist, Convergence.tech
8	Ken Boessenkool	JW McConnell Professor of Practice, Max Bell School of Public Policy
9	Katie Sullivan	Managing Director, International Emissions Trading Association
10	Louis Beaumier	Executive Director, Institut de l'énergie Trottier at Polytechnique Montréal
11	Louise Comeau	Director of Climate Change and Energy Solutions, Conservation Council of New Brunswick
12	Mark Jaccard	Professor, Simon Fraser University
13	Michael Bernstein	Executive Director, Canadians for Clean Prosperity
14	Nicholas Rivers	Canada Research Chair in Climate and Energy Policy, University of Ottawa
15	Rebecca Sinclair	Program Coordinator, Lake Winnipeg Indigenous Collective
16	Sarah Hastings-Simon	Research Fellow, University of Calgary

Appendix B: Emissions Groups Included in the Coverage Standard

Major Emission Category	NIR Category	Fraction of Emissions in Coverage Standard (%)
Stationary Combustion	Public Electricity and Heat Production	100%
	Petroleum Refining Industries	100%
	Oil and Gas Extraction	100%
	Mining	100%
	Iron and Steel	100%
	Non-Ferrous Metals	100%
	Chemical	100%
	Pulp and Paper	100%
	Cement	100%
	Other Manufacturing	100%
	Construction	100%
	Commercial and Institutional	100%
	Residential	100%
	Agriculture and Forestry	100%
Transportation	Domestic Aviation	100%
	Light-Duty Gasoline Vehicles	100%
	Light-Duty Gasoline Trucks	100%
	Heavy-Duty Gasoline Vehicles	100%
	Motorcycles	100%
	Light-Duty Diesel Vehicles	100%
	Light-Duty Diesel Trucks	100%
	Heavy-Duty Diesel Vehicles	100%
	Propane and Natural Gas Vehicles	100%
	Railways	100%
	Domestic Navigation	100%
	Off-Road Agriculture & Forestry	100%
	Off-Road Commercial & Institutional	100%
	Off-Road Manufacturing, Mining & Construction	100%
	Off-Road Residential	100%
	Off-Road Other Transportation	100%
	Pipeline Transport	100%
Fugitive	Coal Mining	100%
	Oil	13%
	Natural Gas	10%
	Venting	30%
	Flaring	100%
Industrial Process and Product Use	Cement Production	100%
	Lime Production	90%
	Mineral Product Use	90%

Major Emission Category	NIR Category	Fraction of Emissions in Coverage Standard (%)
	Ammonia Production	90%
	Nitric Acid Production	80%
	Adipic Acid Production	80%
	Petrochemical and Carbon Black Production	80%
	Iron and Steel Production	100%
	Aluminum Production	100%
	SF_6 Used in Magnesium Smelters and Casters	90%
	Production and Consumption of Halocarbons, SF_6 and NF_3	40%
	Non-Energy Products from Fuels and Solvent Use	20%
	Other Product Manufacture and Use	0%
Agriculture (Non-Energy)	Enteric Fermentation	0%
	Manure Management	0%
	Direct Sources	0%
	Indirect Sources	0%
	Field Burning of Agricultural Residues	0%
	Liming, Urea Application and Other Carbon-Containing Fertilizers	0%
Waste	Solid Waste Disposal	6%
	Biological Treatment of Solid Waste	0%
	Wastewater Treatment and Discharge	0%
	Incineration and Open Burning of Waste	0%
	Industrial Wood Waste Landfills	0%

Appendix C: Calculation of the Effective Marginal Cost Incentive on Fuel

Incentives to reduce emissions come from a combination of a direct carbon price and other taxes on fuels. Moreover, in some jurisdictions these factors are implicitly connected, given that carbon prices were increased, and fuel prices were decreased in tandem. New Brunswick, P.E.I., and Newfoundland and Labrador have all offset the carbon tax increases on fuels with reductions in provincial excise taxes:

- An overall increase of two cents per litre for gasoline and diesel fuel in New Brunswick[78] and P.E.I.[79]
- A gasoline tax credit of two cents per litre in Newfoundland.[80]

The total fuel tax burden varies significantly across provinces when we take into account regional fuel markets and the total tax burden, including carbon prices and other fuel taxes. This metric therefore implicitly includes two dimensions of fuel prices: market costs and total tax, including the carbon price and any offsetting of excise fuel taxes linked to the carbon price.

Provinces and territories that offset the carbon price with provincial fuel tax offsets or point-of-sale rebates that result in an overall lower total tax rate than other jurisdictions are essentially reducing the carbon price effect on these fuels. Lowering the average cost on fuel purchases works against the effectiveness of carbon pricing by reducing the signal to change behaviour and invest in lower-emitting technology. As the data indicates (Figures 35 and 36), there is not necessarily a justification to reduce the provincial tax rates when all taxes, including the carbon charge, are compared across jurisdictions.

Notes for figures:

- Tax calculations based on: Natural Resources Canada. 2020. “Fuel Consumption Levies in Canada.” Government of Canada. https://www.nrcan.gc.ca/our-natural-resources/domestic-international-markets/transportation-fuel-prices/fuel-consumption-levies-canada/18885
- Fuel prices from: Statistics Canada. 2021. “Monthly average retail prices for gasoline and fuel oil, by geography.” Government of Canada. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000101

[78] KPMG, 2020. “New Brunswick — Tax on Carbon-Emitting Products Starts April 1, 2020.” *TaxNewsFlash Canada,* No. 2020-34. https://assets.kpmg/content/dam/kpmg/ca/pdf/tnf/2020/ca-new-brunswick-tax-on-carbon-emitting-products-starts-april-1-2020.pdf

[79] Government of PEI. Accessed March 04, 2021. *Schedule of Incremental Levy Increases.* https://www.princeedwardisland.ca/sites/default/files/publications/schedule_of_incremental_levy_increases.pdf

[80] Department of Finance, 2020. *Information Bulletin Gasoline and Carbon Products.* Bulletin No. RAA-CARBON-002. Government of Newfoundland and Labrador. https://www.gov.nl.ca/fin/files/Gasoline-and-Carbon-Products-Information-Bulletin-RAA-CARBON-002-November-7-2020.pdf

Figure 35: Levelized Cost of Gasoline and Total Taxes, Including Carbon Price
Compared against the national average.

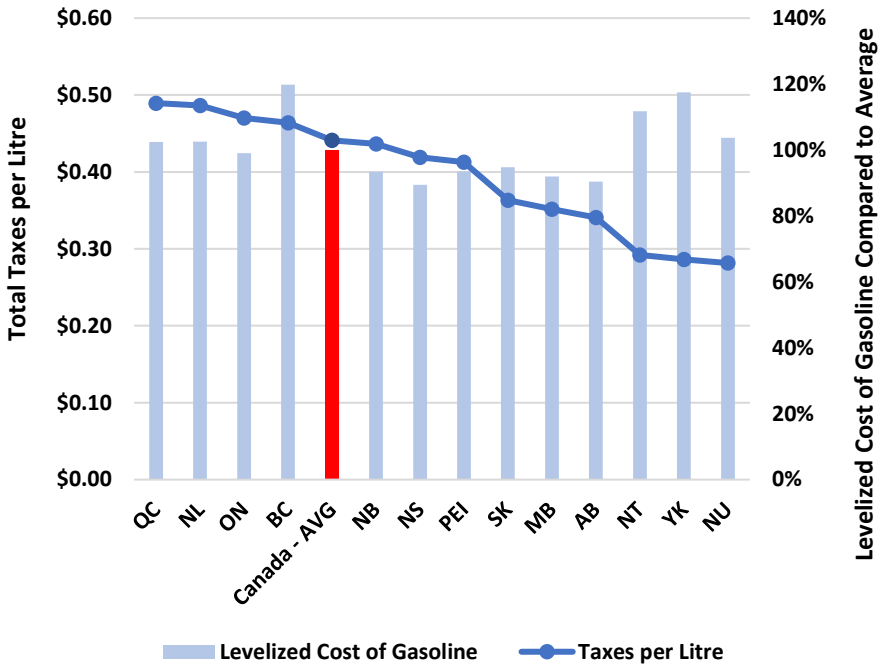


Figure 36: Levelized Cost of Diesel and Total Taxes, Including Carbon Price
Compared against the national average.