



CARBON TAXATION

The Canadian experience

Robert Lyman

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About the author

Robert Lyman is an economist with 35 years' experience as an analyst, policy advisor and senior manager in the Canadian federal government, primarily in the areas of energy, transportation and environmental policy. He also has eleven years' experience as a private consultant, conducting policy research and analysis on energy and transportation issues as a principal on the ENTRANS Policy Research Group. For the last five years, he has been a frequent contributor to the publications of the Friends of Science, a Calgary-based independent organisation concerned about climate change-related issues. He resides in Ottawa, Canada.

Executive summary

'Carbon pricing' refers to a set of measures by which governments attempt to raise the cost to consumers of fossil fuel products and services. The aim is to encourage reduced emissions of carbon dioxide and equivalent greenhouse gases. The use of such measures is based upon both economic theory and endorsement of the concept by international institutions. According to the theory, a pricing approach, using taxes or permit prices in an emissions trading system, allows the 'social costs' of environmental damage to be reflected in consumer prices, and thus encourages consumers and businesses to seek out the lowest-cost ways to reduce emissions. This is contrasted with regulations and other 'direct action' measures by which governments make the decisions as to how energy supply and demand should change to meet environmental objectives.

The government of Canada's national pricing framework allows each provincial and territorial jurisdiction to decide how it will implement carbon pricing, while at the same time setting certain minimum conditions that must be met. Jurisdictions may use either carbon taxes or emissions trading ('cap and trade') systems. For larger industrial emitters, they may also employ output-based pricing systems (OBPSs). An OBPS imposes fees on firms that do not meet prescribed levels of emissions intensity in their production processes.

The framework requires steadily rising prices for the effective tax, levy or emissions trading. Starting price at \$10 per tonne of CO₂ equivalent in 2018, it must increase by \$10 per tonne per year until it reaches \$50 per tonne in 2022. (Except where indicated, prices and costs in this report are presented in Canadian dollar terms.) The systems must include 'revenue recycling', returning a portion of the revenues received from carbon pricing directly to the public. If, in the judgment of the federal government, a province or territory's regime does not meet these conditions, the federal government will impose a 'backstop' system. The backstop system has two components: a carbon levy applied to fossil fuels and an OBPS.

The provincial regimes differ in terms of price levels, coverage, exemptions, use of carbon taxes or emissions trading (Quebec alone has chosen emissions trading), OBPSs, and approaches to revenue recycling. The federal government backstop will apply in Ontario, New Brunswick, Manitoba and Saskatchewan. It will not apply in Alberta, at least until 2021.

Generally, there has been too little experience with Canadian carbon pricing regimes to assess empirically whether they have been successful in meeting their objectives.

While few economists would object in principle to the view that higher prices are likely to reduce the quantity demanded of a good, it is difficult to distinguish the effects of changes in relative prices caused by carbon taxes from the effects of the many other emission-reduction policies and programs in place. The problem of attribution is especially complex with respect to the transportation sector.

The federally-determined schedule of tax increases to 2022 provides certainty, as does the use of fuel conversion factors as set by the United Nations Framework Convention on Climate Change. It seems highly likely that, if present policies continue, the carbon tax rates will rise significantly in future. A respected private sector-sponsored think tank, the Ecofiscal Commission, foresees taxes reaching \$130 per tonne by 2030 and potentially rising much higher after that.

Canada's primary energy consumption in 2017 was 349 million tonnes of oil equivalent (Mtoe). Of this total, fossil fuels accounted for 227 Mtoe, or 65%. The effects of carbon pricing on end-use costs will be felt both directly, as a result of increased fuel prices, and indirectly, as a result of the effects of higher prices on the transportation of goods and services and the

passthrough of higher general business costs in product prices.

The British Columbia carbon tax was introduced in 2008 and for the first four years it was acclaimed for its success in reducing gasoline consumption and related emissions. In fact, according to Statistics Canada, gasoline consumption in British Columbia only declined from 4,530 cubic meters in 2008 to 4,504 cubic meters in 2012, a reduction of just 0.6% over four years. In the first four years after Quebec began participating in an emissions trading system in 2012, it reduced emissions by 5.2 MtCO₂e. That is a 6% reduction from 1990 emission levels, only part of which was due to carbon pricing.

Environment and Climate Change Canada (ECCC) projects that carbon pricing will reduce Canada's GHG emissions in 2022 by 80 to 90 Mt from the levels that would otherwise occur. That exceeds the emissions now attributed to all light-duty vehicles in Canada. The \$50 per tonne carbon tax increase to 2022 is equivalent to 11 cents per litre of gasoline, or about 8% of the pre-existing pump price. It stretches belief to claim that what amounts to about an 8% increase in prices would have an effect equal to eliminating all light-duty vehicles from the roads.

By 2030, ECCC projects that the combined effects of carbon pricing and 'complementary measures' will be to reduce emissions from 704 Mt in 2016 to 583 Mt in 2030; carbon pricing alone would reduce them by about 160 Mt from the previously projected levels. That would entail an annual average reduction of 8.6 Mt, almost double the previous fastest rate. Yet this would still leave Canada's emissions 70 Mt above the national target.

The carbon pricing system being implemented in Canada departs from the model suggested by economic theory in important ways. The rates of Canadian levies and permit prices bear no relationship to the 'social cost of carbon', a concept that itself is extremely difficult to define in practice. Further, with well over 600 'complementary measures', it is clear that carbon pricing is being used to supplement, not replace, the many other regulatory and administrative interventions of governments.

Carbon prices in Canada will far exceed those that apply among its principal trading partners, thus placing Canadian firms at a competitive disadvantage and likely leading to the loss of economic activity (and emissions generation) to other jurisdictions.

Economic theory would call for the revenues from carbon taxes to be returned to the general economy in the least economically disruptive ways, ideally through reductions in the rates of other generally-applied taxes such as corporate income taxes. In fact, the revenue recycling approach used invites a question. If rebates are such a good idea, and if partial refunds could more than compensate taxpayers yet leave a surplus in the Treasury, why hasn't the government used the same approach with other taxes? The obvious answer is that, despite government claims, the rebates will not compensate households for the full economic cost of paying the tax.

Three provinces – Saskatchewan, Ontario and New Brunswick – have filed appeals to the courts, seeking judgments that the federal legislation authorising the implementation of the carbon pricing regime is unconstitutional and has no force and effect. As a result of the April 2019 election in that province, Alberta may file a similar appeal.

In summary, carbon pricing is promoted as an economically efficient, low-cost, socially benign and administratively simple way to achieve large reductions in greenhouse gas emissions. In Canada, it has been none of those things.

For these and other reasons, carbon pricing faces an uncertain future. While there is general support among the Canadian population to 'contribute' to reduced global greenhouse gas emissions, there is widespread skepticism that carbon taxes will achieve this goal. Three

provinces have challenged the constitutionality of the federal legislation, and two more may do so soon. If that occurs, provincial governments representing almost 60% of the Canadian population will stand in opposition to the current federal regime.

1 Overview

The Canadian setting

Canada's greenhouse gas emissions are the results of its unique geographic, demographic, climatic and economic circumstances. It has one of the largest landmasses in the world; at 10 million square kilometres, it is second only to the Russian Federation. The distance from the Atlantic to the Pacific coast is over 5,400 km, stretching through six time zones. The population of over 37 million is mostly located in cities in the southern regions, but much of the rural population is located in remote areas, and the distances between major urban centres is so great that most travel between them takes place by aircraft. Canada is also the fourth coldest country in the world, after Kazakhstan, Greenland and the Russian Federation; the winters are long and the mid-winter temperatures often drop to 30 or 40°C below zero.

However, Canada is also one of the wealthiest countries in the world, with an average per-capita annual income in 2018 of \$55,800. The economy is diverse, led by a large service sector. Unique among industrialised countries, however, the manufacturing, construction, mining, oil and gas, and forestry sectors still represent about 30% of the economy. The population is also growing rapidly, driven by immigration levels of over 300,000 per year.

Canadians are used to having conditions of plenty, whether that applies to land, resources, or income. For years, public policies were specifically designed to keep the prices of raw materials and energy as low as possible while maintaining security of supply. All of these factors naturally lead to high per-capita energy consumption and related greenhouse gas emissions.

Canada reports its greenhouse gas emissions in the National Inventory Reports (NIRs) issued by Environment and Climate Change Canada (ECCC). The NIR is issued in the spring of each year, with estimates of greenhouse gas emissions for two years earlier (that is, the 2017 NIR included emissions estimates for 2015). According to the NIR, Canada's greenhouse gas emissions rose from 603 million tonnes of carbon dioxide equivalent (MtCO₂e) in 1990 to 732 MtCO₂e in 2005, before declining to 682 MtCO₂e in 2009. After that, emissions rose gradually to 716 MtCO₂e in 2013 and 2014, before declining to 704 MtCO₂e in 2016. Figure 1, reproduced from the NIR current to 2016, shows the breakdown of Canada's emissions by sector as defined by the Intergovernmental Panel on Climate Change for 2016.

Figure 2 shows changes in Canada's greenhouse gas emissions by economic sector in selected years. It illustrates the steady decline in emissions from electricity generation, which is largely due to the phase out of coal-fired power plants in Ontario and Nova Scotia, as well as the structural decline in heavy industry. The most significant growth has occurred in the emissions from oil and gas production and transportation. This data gives important insights into the challenges involved in efforts to reduce emissions.

An equally important set of political challenges is revealed by a breakdown of emissions by province, as shown in Table 1. The majority of the Canadian population lives in the provinces of Ontario, Quebec and British Columbia, but the largest sources of emissions are in the oil- and gas-producing areas of Alberta and Saskatchewan. In addition, many of Newfoundland's future economic opportunities lie in the exploitation of the offshore conventional oil and gas fields there. Under Canada's constitution, the ownership and management of subsoil resources rests with the provincial administrations, not the federal government. Efforts to reduce greenhouse gas emissions therefore impinge on the ability of these provinces to benefit from the development and use of these resources; there is a fundamental conflict of interests.

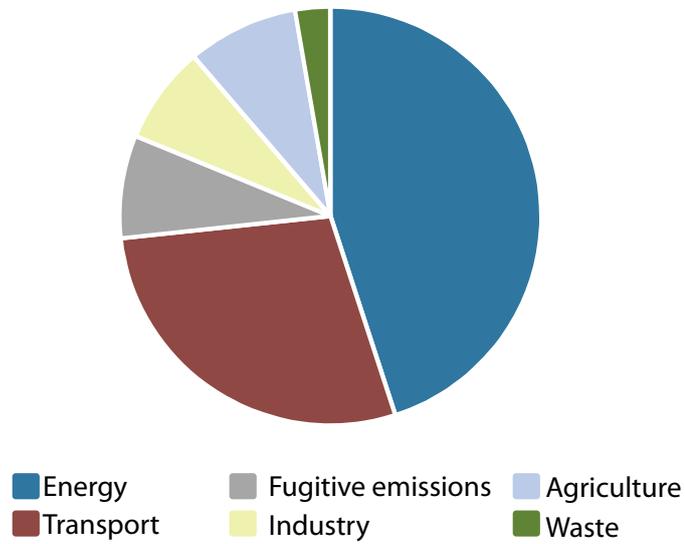


Figure 1: Canada's annual greenhouse gas emissions by sector, 2016.
Source: Environment and Climate Change Canada.

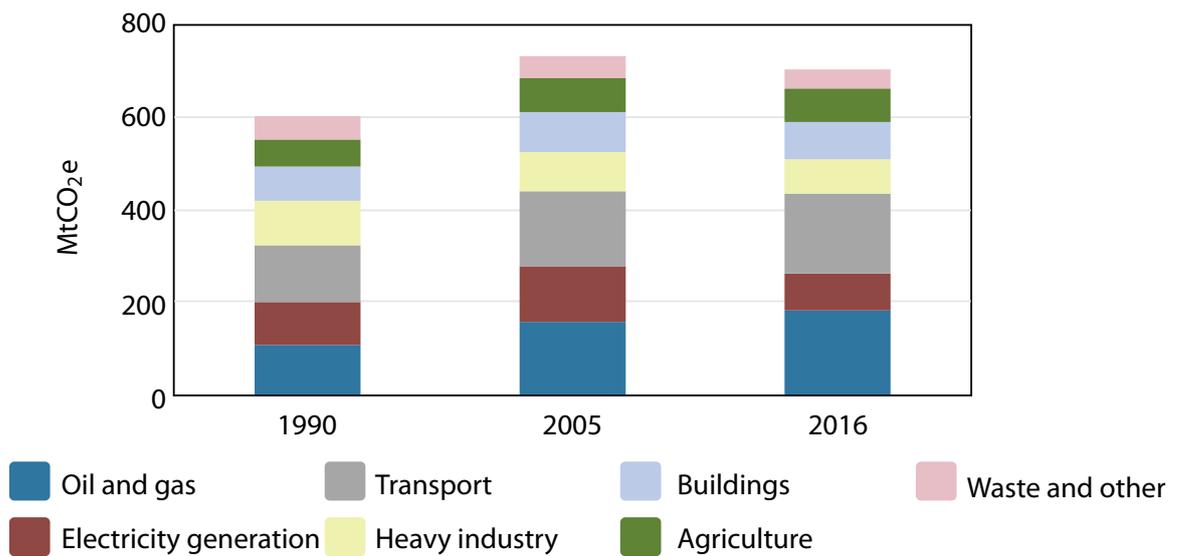


Figure 2: Changes in sectoral emissions in recent years.
Source: Environment and Climate Change Canada

Table 1: Greenhouse gas emissions by province and territory.

Province/territory	Emissions MtCO ₂ e	Change 2015–16 %
Newfoundland	10.8	+9
Prince Edward Island	1.8	-10
Nova Scotia	15.6	-33
New Brunswick	15.3	-24
Quebec	77.3	-11
Ontario	160.6	-22
Manitoba	20.9	+4
Saskatchewan	76.3	+11
Alberta	262.9	+14
British Columbia	60.1	-5
Yukon	0.4	-19
Northwest Territories	1.6	+3
Nunavut	0.7	+58

Source: Environment and Climate Change Canada.

In an April 2018 poll conducted by Abacus Data for the Ecofiscal Commission, a private sector-sponsored think tank that advocates carbon pricing, Canadians expressed quite different views on climate change and the possible mitigation options, depending on which questions they were asked. On the basic issue of whether they believed that human-caused climate change is real, 28% said that the evidence is conclusive and another 33% described the evidence as 'solid'. Nearly a third said that they were not convinced. Thirty percent said that if the earth is warming, it is due to natural patterns in the earth's environment. Sixty percent wanted government to focus more on policy to reduce emissions, a reduction from 69% in 2015. When asked what were their top public-policy priorities, however, Canadians ranked improving health services at the top and climate change near the bottom. While 78% said they had a positive view of carbon pricing, opposition to the policy has been a significant factor in recent provincial elections in Ontario and Alberta; the party opposing federal carbon taxes won in each case.

The Canadian climate-policy context

Canada has been an active participant in international discussions on climate change since the issue first gained prominence in the late 1980s. In 1992, Canada joined with other OECD countries in adopting the political goal of stabilising greenhouse gas emissions at 1990 levels by the year 2000. In 1997, as part of the commitments under the Kyoto Accord, Canada agreed to reduce greenhouse gas emissions by 6% below 1990 levels by 2008–2010. Successive governments introduced a wide range of regulatory and funding measures to reduce emissions, but neither the 2000 nor 2008–2010 targets were met. During the Conference of the Parties to the Framework Convention on Climate Change in Copenhagen (COP15) in 2009, Canada agreed to an even more stringent target, requiring reduction of greenhouse gas emissions by 17% below 2005 levels by 2020. Finally, pursuant to the discussions that preceded COP21 in Paris in 2015, Canada committed to reduce greenhouse gas emissions

to 30% below 2005 levels by 2030.

The Liberal Party of Canada was elected as the federal government in October 2015, with a commitment to take more aggressive action to reduce greenhouse gas emissions. In December 2015, Prime Minister Justin Trudeau met with all provincial and territorial premiers to adopt the Vancouver Declaration on Clean Growth and Climate Change. In that declaration, the leaders agreed to work together to take 'ambitious' action to meet or exceed the 2030 target. The declaration was followed soon after by the adoption of the Pan-Canadian Framework on Clean Growth and Climate Change, an overarching policy framework to reduce emissions across all sectors of the economy. The framework stated that it was 'designed to achieve the behavioral and structural changes needed to transition to a low-carbon economy'. It included over fifty measures, under four pillars:

- carbon-pollution pricing
- complementary actions to reduce emissions
- adaptation and climate resilience
- clean technology, innovation and jobs.

In subsequent reports on progress in implementing the framework, the Canadian government has emphasised that pricing carbon pollution is central to the plan.

The rationale for carbon pricing

The Canadian government's move to institute carbon dioxide taxation and emissions trading systems is based upon both economic theory and the endorsement of the concept by international institutions. 'Carbon pricing' is, of course, a misnomer, as it is not carbon that is being priced but rather the carbon-dioxide-equivalent greenhouse gas emissions associated with different sources of energy consumption. For the purposes of this paper, however, the term 'carbon pricing' will be used.

The terminology used to describe carbon pricing can be confusing. The actual mechanism used to put a price on emissions may be a tax or a 'levy' imposed on the fuel producer, distributor or consumer. It may be a fee that is charged to a large industrial or utility plant operator because the operator failed to meet an efficiency standard imposed by regulation. It may also be the price of a permit for the right to emit as determined under an emissions trading system; an emissions trading system in turn is a regulatory system in which a cap, or regulatory limit, is placed on the quantity of emissions that a covered facility may emit in a certain time period (typically, one year). Those who cannot meet this limit by other means must negotiate to buy sufficient allowances, or permits, to meet the limit.

The use of carbon pricing has been endorsed by many academic sources, such as the Ecofiscal Commission. In a report published in 2018,¹ the Commission set out the public rationale for carbon pricing:

A central advantage of carbon pricing is that it works with market incentives by encouraging businesses and households to seek out the lowest-cost way to reduce emissions. Emitters are not all the same, and carbon pricing takes advantage of these differences to minimise the cost of reducing emissions...

Done right, carbon pricing changes household and business behavior, reduces greenhouse gas emissions, and provides an incentive for the development and adoption of the technologies that can play a key role in the low-carbon economy. In addition...carbon pricing will achieve these outcomes at a lower economic cost than other policies.

Together, this means that carbon pricing can support both a clean economy and a prosperous economy. It achieves these goals by charging incentives and unleashing market forces. It lets businesses and individuals identify the best ways to reduce greenhouse gas emissions and at the times and places that are right for them. And it doesn't require governments to identify and enforce specific ways to reduce emissions.'

In the same report, it noted long-term as well as short-term benefits.

Carbon pricing will have another lasting effect: it will create long-term incentives for the innovation of low-emissions technologies...it creates expectations in the present and drives emissions reductions today, it also creates expectations for higher carbon prices in the future. In response, innovative engineers and entrepreneurs have strong and rising incentives to develop technologies that reduce greenhouse gas emissions even further.

Finally, the Commission contrasts the benefits of carbon pricing with other approaches to emissions reduction:

Carbon pricing isn't the only option available to policy makers committed to reducing greenhouse gas emissions. In particular, command-and-control regulations are an alternative. This kind of policy requires businesses or individuals to adopt specific technologies or achieve certain levels of emissions performance...Command-and-control regulations generally cost more than carbon pricing because they provide far less flexibility to businesses and households, and they typically ignore the important differences among them. Such regulations require specific actions or outcomes from specific firms or groups, regardless of their different abilities to achieve these outcomes.

It is noteworthy that the praise for carbon pricing is based on the assumption that it is implemented as an alternative to command-and-control regulations.

The Ecofiscal Commission's conditional support for carbon pricing as an approach to greenhouse gas emissions reduction is echoed by a range of international organisations, including the World Bank, the Organization for Economic Cooperation and Development, and the International Monetary Fund.

2 The performance of carbon pricing regimes in Canada

With the exception of the provincial carbon pricing regimes in British Columbia and Quebec, the federal and provincial regimes in Canada can fairly be described as being in their infancy. There has been too little experience with them to assess empirically whether they have been successful in meeting their stated objectives. This, however, has not prevented their proponents from doing so.

The problem of assessing performance is complicated by the absence of clear short-term objectives for the carbon pricing regimes and the difficulty in determining their consequences given the large number of factors in play.

In a report prepared by the Auditors General of all Canadian jurisdictions in March 2018,² it was concluded that more than half the governments did not have overall targets for reducing greenhouse gases and, of those that did, only two were on track to meet them. Canada and the governments of British Columbia, New Brunswick, Newfoundland and Labrador, and Ontario have emission-reduction targets for 2020, but these differ widely. For example, they do not even use the same base years, some using 1990 and others 2005. Only Canada, New Brunswick and Ontario have emission-reduction targets for 2030, and in the case of Ontario the target is a legacy of the former government, and will almost certainly be disavowed by

the current one. To complicate the task of assessing the results of carbon pricing, none of the carbon pricing regimes currently in place states which portion of the 2020 or 2030 targets will be achieved specifically through carbon pricing.

The proponents of carbon pricing often attribute to it the recent changes in energy demand. While few would challenge the assertion that increased prices have an effect on the demand for a fuel, there are clearly important differences in the responsiveness of demand for different fuels to price changes (their 'elasticity' of demand). Many studies have been done of the elasticity of demand for energy products in different countries, with a particular focus on motor fuels, and with widely diverging results. The few recent studies of the elasticity of energy demand in Canada show that, in the short term, demand for energy products is largely inelastic, so assuming constant supply, any energy price shock is borne by consumers.³ A recent metastudy based on international conditions concludes that the price elasticity of energy demand is between -0.21 in the short term and -0.61 in the long term.⁴ The higher the long-term elasticity, the higher will be the demand reduction resulting from a carbon tax but the worse will be the social costs of taxation.

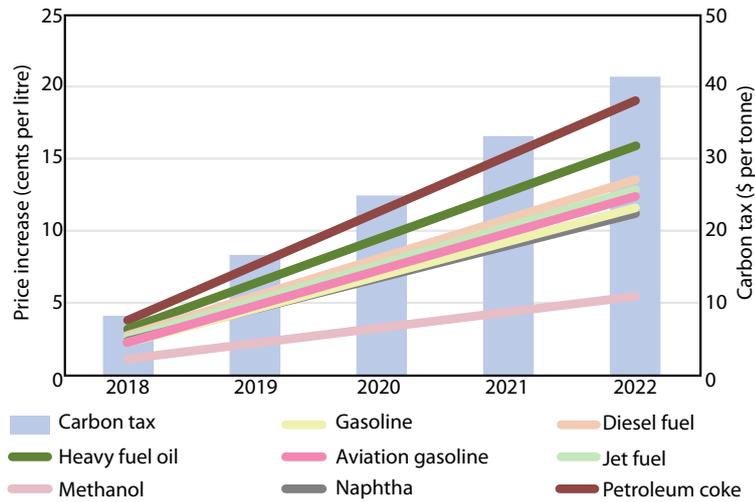
It is difficult, moreover, to distinguish the effects of changes in relative prices caused by carbon taxes from the effects of the many other policies and programs now in place. In a recent report to the United Nations, the government of Canada listed over 300 current policies and measures to reduce greenhouse gas emissions.⁵ There are at least as many of these 'complementary measures' in place in the provinces and territories, as described in a 2017 report of the Canadian Council of Ministers of the Environment.⁶ Canadian municipalities have added many more. There is no single national inventory of these measures nor any system by which to assess whether they are effective, cost-effective or duplicative.

The problem of attribution is especially complex with respect to the transportation sector. Proponents of carbon taxes almost always illustrate their benefits in terms of reduced gasoline consumption or a reduction in the number of cars on the roads. However, current government policies include the heavy sales and excise taxes on motor fuels, as documented by the Canadian Taxpayers Federation.⁷ Added to this are motor vehicle fuel efficiency standards of constantly increasing stringency, extensive subsidies for alternative vehicle fuels and for electric vehicle purchases, extremely high subsidies for mass transit systems, and extensive public information programs, all aimed at reducing vehicle use and fuel consumption. Amid this virtual cascade of governmental interventions, one has to wonder how it might be possible to attribute fuel-use changes to carbon pricing alone. Such efforts must further disentangle the effects on fuel consumption of changes in income and demographics, both of which can have important effects on fuel consumption.

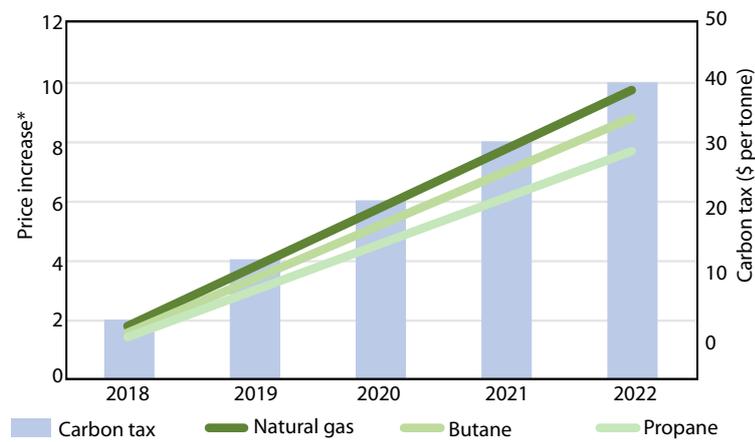
The following comments, therefore, should be viewed against a background of uncertainty.

Effect on prices

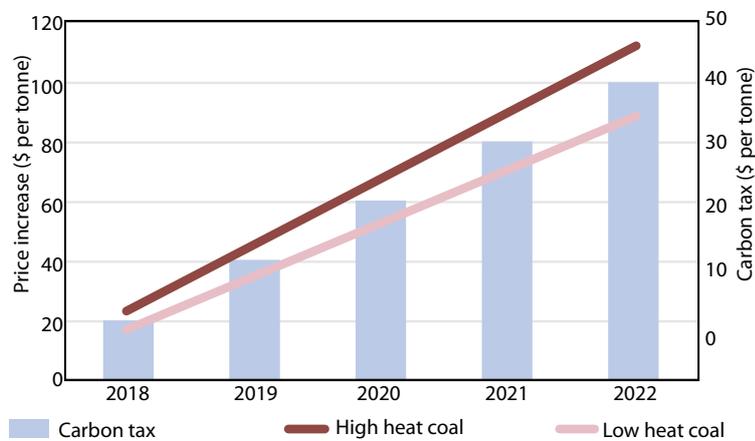
It is possible to calculate the likely effect of carbon dioxide tax rates on the prices of specific energy products provided one assumes that the rates are applied in a way that exactly matches the carbon content of the fuels. Figure 3 shows the price increases that would result from the proposed carbon tax (levy) rates in Canada over the period to 2022. While these increases may have marked effects for some fuels, in the case of motor fuels the variation in product prices will likely be well within the bounds that consumers have experienced over



(a) Liquid fuels



(b) Gaseous fuels



(c) Solid fuels

Figure 3: The effect of carbon taxes on fuel prices.

*For butane and propane, cents per litre, but for natural gas, cents per cubic metre.

Source: Environment and Climate Change Canada.

the past two decades as a result of changes in crude oil prices and general economic conditions.

The Canadian government has declared that it will not announce the levels of future carbon taxes until after it has completed a review near the end of the current planning period (in 2021 or 2022). It is reasonable to assume that this judgment will be made in the context of the progress that has been made in reducing greenhouse gas emissions so as to close the 'gap' between current emissions and the targets for 2030 and beyond.

Given the ambitious 2030 target and pressures for even tougher ones in future, it seems highly likely that the federal government, if it continues with present policies, will establish a schedule of continuing rises in carbon tax rates. One can only speculate concerning the pace at which such increases might occur. The Ecofiscal Commission has, for planning purposes, sometimes used the assumption that rates might continue to rise at \$10 per tonne per year, reaching \$130 per tonne by 2030. That would equate to taxes of 30.3 cents per litre of gasoline, 35.6 cents per litre of diesel fuel and 25.5 cents per cubic meter of natural gas in 2030.

The likely effects of carbon taxes on consumer prices can be viewed from two quite different perspectives. One is the total tax take by Canadian governments. The Canadian Taxpayers Federation report calculated that the average gasoline price in Canada in 2018 was \$1.35 per litre; sales, excise, transit and carbon taxes constituted 45 cents of that, which equates to a carbon tax of \$192 per tonne, a tax that is not imposed on other fossil fuels. The use of motor gasoline, and to a lesser extent that of diesel fuel, is thus already heavily taxed, and the demand for it is well below what it would be if prices were determined exclusively by market conditions. Indeed, in 2018, total federal and provincial tax receipts from gasoline and diesel fuel were over \$24 billion.

A different perspective can be given by comparing Canadian motor fuel prices to those in the high-tax jurisdictions of Europe. The average Canadian gasoline price of \$1.35 per litre in 2018 equates to €0.90 per litre. That compares to average March 2019 petrol prices of €1.39 per litre in Germany, €1.41 per litre in the United Kingdom, €1.51 per litre in France and €1.67 per litre in Norway. Adding a \$130 carbon tax would only raise average Canadian gasoline prices to about €1.25 per litre. (One might note, parenthetically, that higher motor fuel taxes have not induced Europeans to stop driving, give up internal combustion vehicles or commute exclusively by public transit.)

Effect on consumers

The effect of carbon pricing on consumers will depend on their consumption habits. Those who use more carbon-based fuels, directly or indirectly, will pay more than those who use fewer.

It is difficult to find up-to-date statistics on primary energy consumption in Canada. Data from one online source is shown in Figure 4. According to the Canadian National Energy Board,⁸ total demand for refined petroleum products in Canada in 2017 was 1.8 million barrels per day (MMb/d). Gasoline and diesel fuel are the most-used products, accounting for 44% and 29% of total refined petroleum product demand. In other words, most oil is used for transportation. Other products, including heavy fuel oil, asphalt, and lubricants accounted for the remaining 27%. Canada consumed an average of 10.1 billion cubic feet per day (Bcf/d) of natural gas in 2017. Consumption of gas was divided among industry (6.7 Bcf/d), the commercial sector (1.8 Bcf/d) and the residential sector (1.6 Bcf/d).

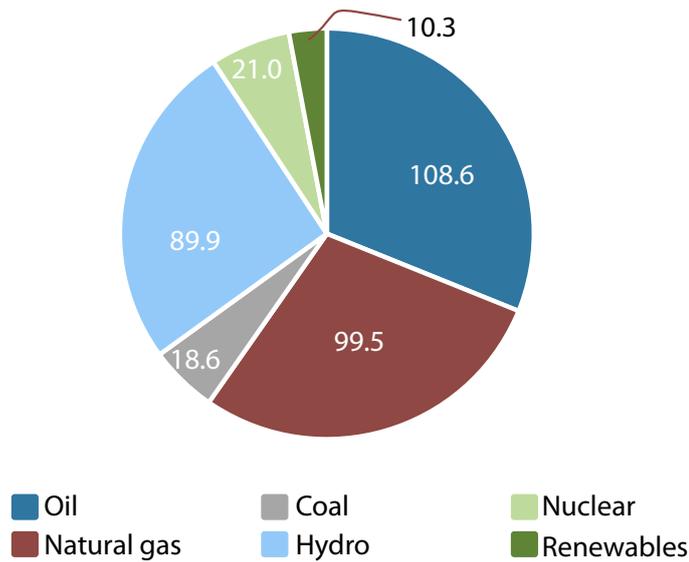


Figure 4: Primary energy use in Canada in 2017.
Figures are Mtoe.

The effects of carbon pricing on end-use costs will be felt both directly, as a result of increased prices of the fuels consumed, and indirectly, as a result of the effects of higher energy costs on the transportation of goods and services and the passthrough of general business costs in the form of higher product prices. While the calculation of direct costs is relatively straightforward, there is some debate as to how to assess the indirect costs. The estimate depends largely upon one’s assumptions concerning whether firms will be able to pass on all, or substantially all, of the tax increases in the form of higher prices to their customers. There has been relatively little academic analysis in Canada of the effect on businesses if they are unable to pass on the costs in the face of steadily rising carbon tax rates.

Figure 5 indicates the projected rebate per household over the next four years of the carbon pricing program, according to estimates published by Environment and Climate Change Canada.⁹

Effect on emissions

To date, most efforts to assess the effect of carbon pricing on greenhouse gas emissions have focused on the experience of British Columbia (BC). The claims of success there by the provincial government were repeated by diverse sources, ranging from the *New York Times* and the *Guardian* to the Organization for Economic Cooperation and Development and the World Bank. More recently, the Ecofiscal Commission has praised the British Columbia carbon tax as evidence that such taxes are effective in reducing emissions. The Sustainable Prosperity think tank reported in 2012 that, during its first four years, the BC carbon tax had reduced provincial gasoline demand by 17%.

As with other measures of effectiveness, it is difficult to clearly attribute results due to the many factors in play. The BC tax was introduced in 2008, in the midst of a global recession when energy demand was naturally falling due to the decline in overall economic activity. As has become clear, however, there are good reasons to question the claims about the early

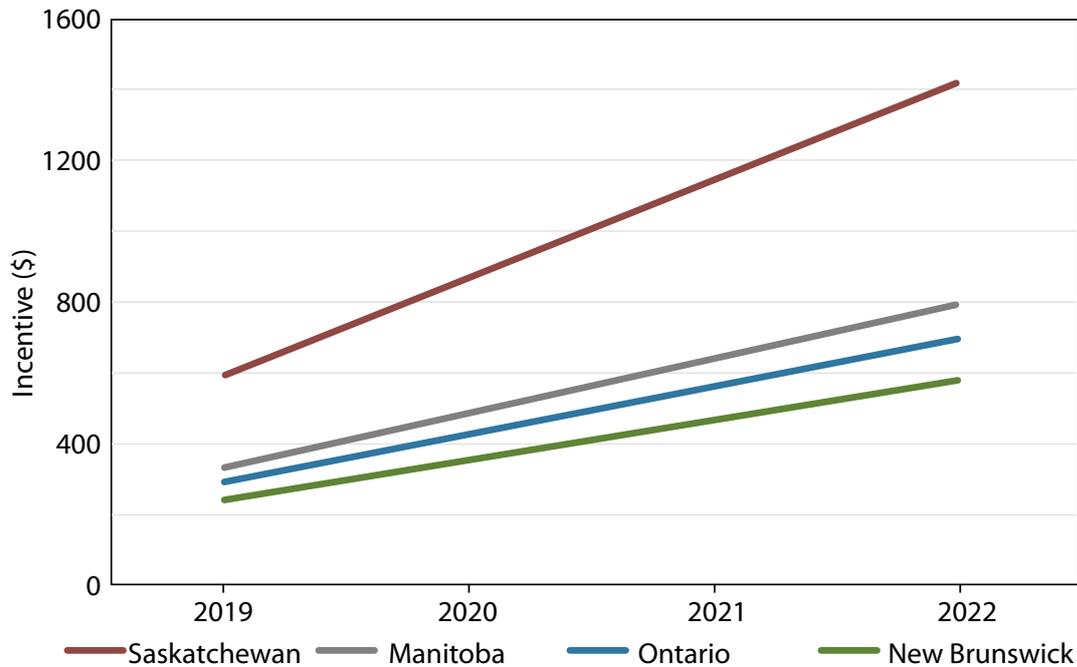


Figure 5: Average climate action incentive payment per household.
Environment and Climate Change Canada

impact of the tax.

One reason relates to the conventional understanding of the price elasticity of demand for transport fuels. BC's carbon tax rose from \$10 per tonne of carbon dioxide equivalent in 2008 to \$30 per tonne in 2012. That is equivalent to a tax of 6.67 cents per litre for gasoline. The average provincial price for gasoline in 2012 was \$1.39 per litre, so the carbon tax was about 5% of the price. Standard measures of elasticity indicate that a 1% increase in price produces considerably less than a 1% reduction in demand. It would be unprecedented if a 5% increase in price yielded a 17% reduction in demand.

In fact, according to data from Statistics Canada, gasoline consumption declined from 4,530 cubic meters in 2008 to 4,504 cubic meters in 2012, a decline of only 26 thousand cubic meters, or 0.6% in four years.

Marc Lee, senior economist for the Canadian Centre for Policy Alternatives and a supporter of carbon taxes, published a critique of BC's system in 2016.¹⁰ He noted that:

- between 2010 and 2014, BC's growth in real GDP was 11%, better than Ontario (8%) and Quebec (6%), but worse than its neighboring western provinces of Saskatchewan (15%) and Alberta (22%);
- while BC's greenhouse gas emissions declined after the recession began in 2008, they rose from 2010 to 2013 (they have remained essentially flat since then);
- BC's per capita greenhouse gas emissions have been on a steady downward trend since at least 2001 'due to shifts in industrial structure, growing urbanisation of the province's population and perhaps due to other taxes that preceded the carbon tax.'

The province of Quebec has been implementing its 2013–2020 Climate Change Action Plan for six years. The plan includes both participation in the Western Climate Initiative with the State of California (and the related emissions trading scheme) and several other regu-

latory and program measures. Quebec's situation is unique in that the province is already the lowest emitter of greenhouse gases on a per-capita basis in Canada, due to its wealth of hydro-electricity energy supplies. The transport sector accounts for 42% of emissions, industry 30% and the residential, commercial and institutional sector 11%. The focus of emission-reduction efforts has thus been on the transport sector.

In its public reports on progress in reducing emissions, the Quebec government indicates that emissions declined from 89.5 megatonnes (MtCO₂e) in 1990 to 77.3 MtCO₂e in 2016, a fall of 12.2 MtCO₂e. If one examines the yearly emissions totals, they show that most of the emissions reduction (7 MtCO₂e) occurred in the period from 1990 to 2012. After the Climate Change Action Plan and emissions trading system began, emissions declined by 5.2 MtCO₂e over four years, and only part of this was due to carbon pricing.

Effect on attainment of emissions reduction targets

As noted previously, Canada is committed to reduce its greenhouse gas emissions by 30% below 2005 levels by 2030. In 2005, Canada's emissions were 732 MtCO₂e. A 30% reduction would thus mean emissions of 513 MtCO₂e. In 2016, Canada's emissions were 704 MtCO₂e, so there is a considerable gap between recent emissions and the target.

In its most recently published analysis,¹¹ ECCC was optimistic concerning the effects of current policies.

A price on carbon could cut carbon pollution across Canada by 80 to 90 million tonnes in 2022, once all provinces and territories have systems that meet the federal standard. This is equivalent to taking 23–26 million cars off the road for a year or shutting down 20–23 coal-fired power plants for a year. Without this contribution, more costly regulatory interventions would be needed to meet our target.

While the ECCC analysis did not provide the detailed data upon which this estimate is based, it includes a graph contrasting the scenarios with and without carbon pricing. The graph shows national greenhouse gas emissions declining from about 730 MtCO₂e in 2018 to about 680 MtCO₂e in 2022. The '80–90 MtCO₂e emissions decline by 2022' thus must refer to a cumulative, rather than annual, decline over the period.

In Chapter 5 of its report to the United Nations on projections to 2030, ECCC provided more details.¹² This report sets out scenarios, one 'with measures' and one 'with additional measures', emphasizing that both are for illustrative purposes only. The 'with measures' scenario included the results of actions taken by governments, businesses and consumers over the two years preceding 2017. It does not include all of the measures taken or proposed under the Pan-Canadian Framework. The 'with additional measures' scenario takes into account those additional measures that are under development but not fully implemented, including pan-Canadian carbon pricing.

The 'with measures' scenario, according to ECCC, would result in Canadian greenhouse gas emissions of 722 MtCO₂e in 2030, well below the 815 MtCO₂e case in which no measures were taken, but much higher than the 2030 target (stated as 517 MtCO₂e in the report). The 'with additional measures' scenario would result in Canadian emissions of 583 MtCO₂e, 139 MtCO₂e below the 'with measures' scenario, but still well above the 2030 target. The implication is that, under the 'with additional measures' scenario, complementary measures will reduce emissions by about 59 MtCO₂e and carbon pricing will reduce them by about 80 MtCO₂e. This is in addition to the 80–90 MtCO₂e emissions reduction that ECCC projects in the period from 2018 to 2022.

It is very difficult to reconcile the sectoral emissions reductions included in the ‘with additional measures’ scenario with the implied effectiveness of carbon pricing. Table 2 shows the difference in emissions by economic sector projected by ECCC under the ‘with measures’ and the ‘with additional measures’ scenarios.

Table 2: Canadian greenhouse gas emissions forecasts.

Sector	With measures	With additional measures	Difference
	MtCO ₂ e	MtCO ₂ e	MtCO ₂ e
Agriculture	72	71	1
Buildings	83	71	12
Electricity	46	21	25
Heavy industry	97	93	4
Oil and gas	215	192	23
Transportation	155	143	12
Waste and others	53	51	2
Purchases of international allowances		-59	59
Total	722	583	139

Source: Table 5:28 of the ECCC report to the UNFCCC.

The largest differences between the two scenarios are in the projections of emissions from the electricity and oil and gas sectors. In the case of electricity, almost all the additional emissions reductions will be the consequence of accelerating the phaseout of coal-fired power plants. In the oil and gas sector, carbon-dioxide-equivalent emissions are, in fact, projected to grow from 143 MtCO₂e in 2015 to 187 MtCO₂e in 2030, while methane emissions are projected to decline from 45 MtCO₂e in 2015 to 27 MtCO₂e in 2030 due to the introduction of more stringent regulations. It is not at all clear from this data how carbon pricing will play a major role in prompting emissions declines.

It is striking that ECCC projects a relatively small reduction in transportation emissions. The ‘with additional measures’ scenario includes not only the increase in carbon taxes but also further regulatory and program measures specifically aimed at reducing transportation-related emissions. Yet the combined effect of regulations, subsidies and taxation directed at transportation emissions is projected to be a reduction of only 12 MtCO₂e from the previously projected total of 143 MtCO₂e, a decline of 8.4% over 12 years. One might allow for this on the basis of the low elasticity of demand for transportation fuels, as a carbon tax of \$50 per tonne adds only eleven cents per litre, or 8.2%, to the average price of gasoline (in 2018). Nonetheless, with the transportation sector yielding so little, one must wonder in which sectors the price elasticity of demand is considered likely to be so much higher.

In summary, ECCC’s own analysis concludes that the carbon pricing policies as announced to date, even when combined with a host of other measures under the Pan-Canadian Framework, will not attain the 2030 emissions reduction target. In fact, even the effects projected in ECCC’s analysis seem very optimistic given the relatively low price elasticity of energy products.

Research by the Conference Board of Canada has concluded that much higher carbon prices would be required to attain existing emission-reduction targets.¹³ An internal report

of ECCC estimated that reaching Canada's targets would require the price of carbon dioxide to reach \$100 per tonne by 2020 and climb to between \$200 and \$300 per tonne by 2050.¹⁴

Looking to 2030 and beyond, there are political pressures for Canada to adopt progressively more stringent emissions reductions targets. The Intergovernmental Panel on Climate Change Special Report issued in September 2018 warned that to stay on a path consistent with the 1.5 degree warming scenario, all countries should aim to reduce emissions by as much as 45% below 2005 levels by 2030 and to achieve 'net zero' emissions by 2050. Several cities in Canada have declared a 'climate emergency' and said that, among other things, carbon pricing must be increased to achieve the goals advocated by the IPCC.

It is essential, in the face of such demands, to recognise the limits imposed by technology as well as markets on the speed with which energy transitions can occur.¹⁵ In many cases, the technologies that would be required to allow large reductions in energy consumption or substitution to alternative non-carbon fuels are either not yet proven scientifically or not yet commercially viable. This is particularly the case in the transportation sector. Carbon prices in the range of \$30–50 per tonne may stimulate some efficiency and substitution effects, but they cannot stimulate into existence electric heavy-duty vehicles and aircraft or produce the scientific breakthroughs needed to make grid-level electricity storage economic. It takes many decades to completely change energy-use patterns and the related infrastructure. When the alternatives are not available, raising energy costs through carbon pricing will only impoverish a country's citizens or drive its businesses into insolvency.

The growing magnitude of carbon pricing revenues

As noted previously, the schedule of carbon price increases under the federal Canadian framework now extends only to the end of 2022, by which point the rate will be \$50 per tonne of carbon dioxide equivalent. It is broadly recognised that those rates are not high enough – even with a wide range of 'complementary measures' – to attain the 2030 target and certainly not to attain the much more stringent targets advocated by environmental groups. While one can only speculate about future carbon tax rates, there seems little doubt that if the current government remains in office (indeed, if any federal government other than one in which the Conservative Party holds a majority is in office), rates will continue to rise. It may be useful to offer a simple illustrative estimate of the revenues that could accrue to Canadian federal, provincial and territorial governments in future.

Let us assume that the carbon levy and effective output-based price rises to \$130 per tonne by 2030, the figure used by the Ecofiscal Commission. Assume further that emissions coverage, now roughly 81% under the federal backstop, increases to 90%. Emissions decline to the level projected by ECCC in its 'with additional measures' scenario (583 MtCO₂e), but no more. In this scenario, the emissions subject to pricing would be 525 MtCO₂e. At \$130 per tonne, that would yield over \$68 billion in revenues to governments. Sixty-eight billion dollars is equal to about 45% of total federal government revenues in 2018, or one and a half times the revenue now received by the Canadian government annually in corporate income taxes. By comparison, Canadian government equalisation payments to the provinces in 2018 were just under \$19 billion. The carbon tax revenues would greatly expand the flow of funds from citizens to governments and thereby potentially enlarge the role that governments play in the economy.

International comparisons

The best source of information on the use of carbon pricing regimes, which includes both carbon dioxide taxation and emissions trading, is the World Bank Report on Carbon Pricing 2018. According to that report, as of May 2018, carbon pricing initiatives had been implemented or were scheduled for implementation in 51 jurisdictions. There were 25 emissions trading systems, mostly located in subnational jurisdictions (states, provinces or municipalities), and 26 carbon dioxide taxes primarily implemented at a national level. Two thirds of the jurisdictions are in Europe. Within the Americas, Canada, Mexico, Colombia, Argentina and Chile have implemented or have scheduled carbon pricing regimes, as well as California, Washington and Massachusetts in the United States. China has initiated carbon tax regimes too, but the rates of tax vary significantly within its regions.

The rates used in carbon tax regimes vary widely, from a low equivalent to US\$1 per ton in Mexico and Poland to a high of US\$139 per ton in Sweden. Within western Europe, the rates range widely as well, with one group of countries using rates of US\$9 per ton or less, and most others with rates in the range of US\$16–29 per ton. In Japan, the city of Tokyo has had an emissions trading system since 2010; the average standard transaction price in 2018 was US\$5.89 per ton.¹⁶

Canada's principal international trade partners are the United States, China, Japan and Mexico. Almost 78% of Canada's \$377 billion in exports in 2017 went to the United States and China. Neither jurisdiction is implementing a federal carbon tax, although in China various provincial carbon taxes average about US\$2 per tonne.¹⁷ In the circumstances, it seems highly likely that the increasing burden of carbon taxes on Canadian firms will affect their ability to compete in foreign markets and to attract foreign investment in future.

3 Critique of the current carbon pricing regime

This section will seek to answer five questions:

- Does the design of the Canadian carbon pricing system align well with what is suggested by economic theory?
- Does the Canadian carbon pricing system serve the objectives of revenue neutrality?
- What may be the consequences of differences among the current federal and provincial regimes?
- What are the political and legal controversies that may affect the future continuity and viability of the system?
- How much administrative and political discretion will be available to those who will govern the pricing regimes?

Carbon taxes and economic theory

The claims of the Canadian government and of the Ecofiscal Commission that the carbon pricing regime now in place in Canada is strongly supported by economic theory receive very little discussion or debate in the Canadian media. For the most part, the Canadian public appears to believe that carbon pricing is an economically efficient way to reduce greenhouse gas emissions.

The public rationale for carbon pricing, however, has not gone unchallenged, either on theoretical or practical policy grounds. Perhaps the most prominent voice of dissent in the Canadian academic community is Professor Ross McKittrick of the University of Guelph. In several articles and one major report,¹⁸ he has acknowledged the potential economic benefits that might flow from a globally-applied and properly calculated carbon price. However, he emphasised that such a beneficial outcome is not guaranteed; rather, certain rules must be observed in order for carbon pricing to have its intended effect of achieving the optimal balance between emissions reduction and economic growth.

- Carbon pricing works when applied as a substitute, not complement, to other emission-reduction measures. If, instead, carbon pricing is simply added on to an existing emissions-regulating regime, it will fail to have its desired emissions-rationing effects and even cause damage to the economy.
- In theory, the price of carbon should be set according to the 'social cost of carbon', or the estimated present value of the impact that an emitted tonne of carbon today will have on humans in the future. In fact, current estimates of that social cost vary widely, and the methodology for calculating them are much affected by different judgements about the climate's sensitivity to increased carbon dioxide concentrations and which discount rates to use.¹⁹ There is no connection between the social cost of carbon and the currently planned carbon taxation rates in Canada.
- Carbon taxes increase production costs and decrease real wages elsewhere in the parts of the economy affected, thus changing the deadweight losses associated with pre-existing taxes. Tax increases have the effect of cancelling some existing economic activity; if, for example, there is a 30% deadweight loss from an existing tax, \$1.30 in economic welfare was lost to provide the last dollar of tax revenue. This is sometimes referred to as the marginal cost of public funds (MCPF). Referring to analysis by Agnar Sandmo, McKittrick argued that the optimal tax on emissions would need to be deflated by the magnitude of the MCPF.²⁰
- The primary theoretical purpose of carbon taxes is to price emissions, so that competitive markets can perform their function of finding the most efficient means of changing the emissions level. Logically, they should not be designed to achieve a specific volumetric emissions reduction target.
- The revenues raised by carbon taxes should be returned to the economy in the least economically disruptive ways. This includes leaving it to the market to identify and implement the cheapest abatement options, not empowering governments to subsidise the energy sources that have been rejected by the market because of their non-competitive costs.

Other economists have added to these concerns. Kenneth Green, writing under the auspices of the Fraser Institute, discussed the threat of 'carbon leakage', which occurs when firms reorganise or relocate operations to avoid the carbon tax.²¹

While the federal carbon tax includes measures to mitigate competitiveness concerns for emissions-intensive and trade-exposed industries, the government's approach targets high-emitters, meaning that service and low-emitting manufacturers will pay more in energy costs thanks to the carbon tax.

Economist Robert Murphy, in examining the system for carbon pricing in Alberta,²² echoed the concerns voiced by Ross McKittrick and Kenneth Green, and added a few more.

If governments are going to levy carbon taxes to address the 'negative externality' of greenhouse gas emissions then some important steps to increase the benefits (in terms of mitigated climate change) and to minimise the economic harm are: (1) ensure a wide base for the carbon tax's application to minimise 'leakage' of emissions into neighboring carbon-tax-free jurisdictions; (2) let the 'price on carbon' do the work of incentivising households and individuals to cut back on emissions in an efficient manner, rather than having policy makers issue top-down edicts either for specific technologies or emissions targets, and (3) don't spend the incoming carbon-tax receipts but instead use them to cut marginal rates in taxes on labour and, especially, on capital.

It is difficult to assess the magnitude of the carbon leakage problem in terms of the loss of investment and economic activity to other countries that has been directly or indirectly caused by carbon pricing or, more generally, climate change policy in Canada.

The interaction between carbon taxes and the so-called 'complementary measures' deserves far more attention and concern than it has so far received, either in the media, academia or political circles. As noted previously, at least 300 complementary regulatory and program measures exist at the federal level, and an equal or larger number exist at the provincial government level, yet both levels of government intend to introduce new measures to accompany carbon taxes, rather than repealing any. The measures are far-reaching and highly intrusive in the economy, for example:

- regulations on fuel efficiency
- targeted research, development and demonstration funding
- direct subsidies to electric vehicles and to renewable energy production and purchase
- prescribed procurement practices by governments
- extensive social marketing campaigns.

There is no inventory of all the measures taken, no analysis of their cost-effectiveness or interaction, and no assessment of the possibility of duplication. There is no indication so far as to when or whether any of the complementary measures will be ended if the carbon tax is, as claimed, successful in reducing emissions. What we have instead is the combination of an idealised simplification of the tax system and the entrenchment of special privileges for certain interest groups.

Despite their appeal to academics and think-tank staff, carbon taxes have proven consistently unpopular in Canada. This is likely because, by design, they are intended to make fossil fuels more expensive, thus depriving the consumer of their benefits. Canada's pattern of energy-related greenhouse gas emissions offers a stark reminder that, apart from transportation, emissions levels are largely dictated by the location of and nature of energy production. Much of the country enjoys access to bountiful sources of hydroelectricity. In Alberta and Saskatchewan, the bounty is a geological one, namely immense oil, natural gas and coal resources. Carbon pricing, and greenhouse gas emissions reduction policies in general, must inevitably have their largest and most negative impacts on the west.

Environmental levies are intended as a way of reducing the harm caused by pollution (I will leave aside the question as to whether carbon dioxide can rightly be described as 'pollution'). If they succeed in sharply reducing emissions, they will generate no significant revenue in the long term. If they succeed in generating revenue, it means they do not cause emissions to fall by much. There is no escaping the dilemma, but for politicians and lobby groups the short-term gains seem often to outweigh any consideration of the medium- or longer-term consequences.

Revenue neutrality

It is virtually certain that a carbon tax, unaccompanied by other tax reductions, will have a negative effect on the general economy. Indeed, to elaborate on one of the points raised by Professor McKittrick, carbon taxes cause a double harm. They impose a cost on all consumers and they interact with the pre-existing, distortionary taxes on labour and capital and make them more damaging. The carbon tax raises consumer prices and effectively reduces the after-tax earnings of labour and capital, acting as its own tax on these things, but with the difference that it is concentrated in particular areas and regions rather than being spread uniformly.

Will the recycling of carbon tax revenues under the Canadian system help? Many studies, especially those examining the United States, have compared the economic effects of various recycling approaches, usually assuming that all of the revenues taken in by governments will be returned to the general economy through some mechanism.²³ The general consensus of such studies is that the optimal approach would be to reduce the general corporate income tax rate and that the worst result would be gained via lump-sum payments to individuals or households. Studies generally focus on the question of whether the net effect on national income over time is positive or negative, not on the distribution of effects among different groups or regions.

Unfortunately, the federal carbon pricing system relies on lump-sum handouts to recycle the revenue, thus embedding the worst of the available options. Further, the backstop regime that will apply in at least four provinces and two territories pays lip service to the goal of revenue neutrality but, at its best, would return only 'most' (sometimes estimated at 90%) of the revenues received to the provinces and to households in the form of rebates.

The federal government approach to carbon pricing clearly is not designed to achieve revenue neutrality. The non-rebated portion of the revenue received from fuel charges will be given to targeted beneficiaries, such as schools, colleges and universities, hospitals, municipalities, small and medium-sized businesses, not-for-profit organisations and indigenous communities. Most of the funds raised by the OBPS that will apply to large emitters will go to various undefined emissions-reduction measures. Apart from these funds, the federal government will keep the revenues received from the General Sales Tax (GST). The GST is a 5% tax that is imposed on the final price for a good or service. The GST is imposed on the carbon tax-paid price; it is, in other words, a tax on a tax. The Parliamentary Budget Office, which reports to Parliament, not the executive branch of the federal government, estimates that the potential GST revenues to the Canadian federal government will be in the range of \$264–313 million in fiscal year 2018–19, and will go on increasing after that.²⁴

The provinces that administer their own carbon pricing regimes often pay only lip service to revenue neutrality, or in the case of Quebec, ignore it altogether. Most provinces use the proceeds for a wide range of politically appealing expenditure initiatives, or for expenditures that please the municipalities (like light rail transit) but have only modest impacts on emissions reduction. They are taking different approaches to how they will tax and how they will rebate, if at all, which makes this subject very complicated. In some cases, only 70% or less of the emission sources will be taxed. In others, special exemptions, often politically motivated, will be given. There will be plenty of room for 'administrative discretion' as to who qualifies for a rebate and by how much. Finally, governments probably will keep ever more of the revenues as the carbon tax rates go higher.

The use of rebates is being used to make the case that the carbon pricing system is 'not

a revenue grab'. Using the proceeds in this way, however, raises a question. If rebates were such a good idea, and if partial refunds could more than compensate taxpayers yet leave a surplus in the Treasury, why hasn't the government used the same approach with every other tax? The obvious answer is that, despite government claims, the rebates will not compensate households for the full economic cost of paying the tax.

Whatever the theoretical merits of adding revenue recycling to carbon pricing, one should be mindful of the practical, real-life experience of jurisdictions with carbon pricing regimes around the world. In other jurisdictions, initial statements of intention to fully or partially recycle such revenues have often not been borne out in practice. The Institute of Climate Economics (14CE) is a think tank based in Paris, France. It is funded by the French development agency and Morocco's Caisse de Depot et Gestion. In October 2017, it published the results of a study of the use of carbon dioxide pricing in the 40 countries in the world in which they then existed.²⁵ The Institute found that, on a global scale, only 29% of the revenues raised were recycled into the economy in the form of tax exemptions. Thirty-four percent were used to subsidise programs that would reduce greenhouse gas emissions. The largest share, 37%, were allocated to the general budget.²⁶

Ultimately, the distributive effects of carbon pricing and rebates may become the most important political issue in Canada. It cannot be denied that those targeted to bear the burdens of much higher taxes – consumers, fossil fuel producers, emissions-intensive manufacturing and resource industries and the provinces where these dominate the regional economy – will be worse off by far; that is the result of significantly increasing the tax burden. The consequences in a country like Canada, where distance and the historic imbalance in political power has long bred regional alienation and sometimes separatist sentiment, may be very dangerous indeed.

The discretionary power accorded to officials

One implicit advantage of carbon pricing is supposed to be the simplicity of the system; that is, a single price that guides buyers' and sellers' decisions on energy sources and does not require constant adjustments and discretionary decisions by politicians and the officials who administer the system. The Canadian system, however, is anything but simple, both because of the number and diversity of regimes and because of the number of decisions that it places in the hands of system designers and administrators.

For example, federal officials must make decisions on the following matters:

- how to reconcile differences between the federal government framework, including carbon levies and OBPSs, and those of the provinces, and if reconciliation is not possible, what interventions to make;
- which sectors, groups and fuel uses will be granted exemptions from the carbon levy;
- which emissions intensity standard will be applied for each type of industrial activity; inclusion may mean the difference between commercial survival and bankruptcy for individual firms;
- how to change the sector and firm emissions intensity standards over time to reflect 'best-in-class';
- which types of emissions reduction activities and trading permits will qualify as 'offset credits' for the OBPS.

In addition, Federal officials, and probably politicians, will have to decide which industrial sectors qualify as being in the 'high competitive risk' category that will allow them to operate under a lower threshold of emissions subject to output-based pricing, and provincial officials will have to make similar decisions with respect to their OBPSs and emissions trading systems where these apply.

The federal government department making these decisions will be ECCC. Especially as the stringency of emissions standards increase and the price of carbon taxes and permit prices rise, the department responsible for environmental policy will be tasked with making some of the most important energy and economic policy decisions of the Canadian federal government.

This would be a daunting task for any group of officials, especially in a period when, since the mid-1990s, there has been a general concern expressed about the degrading of the policy capacity of Canadian federal government departments due to successive funding cuts.²⁷ The Environment Department traditionally was considered a scientific agency, not one responsible for major economic policy decisions. It also is one with very close ties to environmental non-governmental organisations in Canada. Whether ECCC is the correct body to wield such enormous power over the Canadian economy is an important issue of governance that will probably rise in prominence as time goes on.

Political and legal challenges

The Canadian federal government adopted the *Greenhouse Gas Pollution Pricing Act* on 21 June 2018. Part 1 of the Act levies charges on fuel delivered, used, brought into, or produced in a listed province and combustible waste burned in a listed province. Part 2 established an OBPS for industrial greenhouse gas emissions and levied a charge on facilities that emit greenhouse gasses in a quantity that exceeds their emissions limit.

Sections 165 and 188 of the Act require the Minister of National Revenue to distribute the revenues raised by the charges levied under the Act to the province in which they were levied or to other prescribed persons or classes of persons.

Sections 166 and 189 of the Act permit the Governor in Council to determine in which provinces the Act will apply, taking into account, as the primary factor, whether the federal government considers provincial pricing mechanisms for greenhouse gas emissions to be sufficiently stringent.

Three provinces – Saskatchewan, Ontario and New Brunswick – have filed appeals to the courts, seeking judgments that the Act is unconstitutional and has no force and effect. With the victory of the United Conservative Party in the Alberta election in April 2019, it seems likely that the government of that province may file a similar appeal.

The following is not a legal analysis of the positions of the parties in the cases before the courts, but simply a short description of the main positions taken.

The provincial government of Saskatchewan argued its case before the Saskatchewan Court of Appeal in February 2019. It asked the court to determine whether the Greenhouse Gas Pollution Pricing Act was unconstitutional, in whole or in part. In support of its case, it argued that the carbon levy is an unfair, uneven, illegal tax, and that it violates provincial jurisdiction. Specifically, it argued that the federal government cannot impose a policy that treats provinces unequally, and that to do so 'disregards fundamental principles of Canadian constitutional law, in particular, the principles of federalism'. The government of Canada responded that the legislation falls under its jurisdiction under the 'peace, order and good

government' clause of the Canadian Constitution, because carbon emissions are a matter of 'national concern'. The federal position is not based on arguments concerning the federal government's powers of taxation, apparently because the federal government does not wish to call pricing carbon dioxide emissions a tax. The Court issued a 3–2 split decision on 3 May 2019, finding that the Greenhouse Gas Pollution Pricing Act was not unconstitutional in whole or in part. The Saskatchewan government has indicated that it will appeal the decision to the Supreme Court of Canada.

The government of Ontario filed a reference to the Ontario Court of Appeal, also arguing that the federal government's legislation was unconstitutional. Ontario argues that placing a price on greenhouse gas emissions is not authorised by the 'national concern' part of the 'peace, order and good government' power. As greenhouse gas emissions can arise from almost any economic activity, Ontario argues that expanding the scope of the 'national concern' power to regulate that activity 'would represent an unprecedented and unwarranted intrusion into provincial jurisdiction', and 'erode the constitutional balance inherent in the Canadian federal state'. Even if the legislation falls within the scope of federal powers, Ontario argues that it does not authorise regulatory charges, which the province views simply as disguised taxes.

The government of New Brunswick supported the Saskatchewan government's case before the Saskatchewan Court of Appeals. It argued that the federal legislation 'overreaches and invades provincial competence to an unacceptable degree'. While it supported the authority of a province to create carbon pricing measures tailored to its circumstances, it stated that 'the federal Parliament has submitted a vague stringency standard for any meaningful cooperative model for greenhouse gas emissions reduction'. Thus, 'local solutions have been rejected without regard for local economic realities or constitutional authority'.

The Government of Manitoba has previously commissioned a legal opinion by Bryan Schwartz, a University of Manitoba legal scholar, on the constitutionality of the federal legislation. Schwartz concluded that the federal government had the authority to impose a carbon tax on Manitoba and other provinces, but the provinces have a good legal argument that they should have the authority to design their own carbon pricing plans. It is not yet clear whether Manitoba will file its own appeal against the federal legislation.

If Alberta were to join the provinces opposed to the federal legislation, it would have political, if not legal, importance in the period leading up to a federal election in Canada in the fall of 2019.

4 Conclusion

Carbon pricing is promoted as an economically efficient, low-cost, socially benign and administratively simple way to achieve large reductions in greenhouse gas emissions. However, in Canada, it has been none of those things.

The Canadian carbon pricing system departs in several important respects from the theoretically ideal model embraced by many economists. Notably, the rates bear no relationship to the notional social costs they are intended to represent. They supplement rather than replace a host of government regulations and subsidy programs broadly referred to as 'complementary measures'. The regime's effects will vary considerably across Canada and will fall most heavily on consumers, businesses and regions with energy-intensive industries. Carbon pricing will impose a large and growing competitive disadvantage on Canadian firms.

The record of efforts to offset the adverse social effects of carbon pricing through ‘revenue recycling’ indicates that governments in most provinces will continue to retain a large portion of the revenues received and to spend them on political initiatives and favoured groups.

To date, carbon pricing has had generally limited effects in reducing emissions, as would be expected based on current estimates of the price elasticity of energy products and services. ECCC’s projections of the emission-reduction effects of carbon prices to 2022 are almost certainly too high. The department’s projections to 2030 indicate that, even with much higher prices and the implementation of all complementary measures announced to date, the 2030 emissions reduction target will not be met.

For these and other reasons, carbon pricing faces an uncertain future. While there is general support among the Canadian population to ‘contribute’ to reduced greenhouse gas emissions, there is widespread scepticism that carbon taxes will achieve this goal. Three provinces have challenged the constitutionality of the federal legislation, and two more may do so soon. If that occurs, provincial governments representing almost 60% of the Canadian population will stand in opposition to the current federal regime.

Appendix: Details of the pan-Canadian pricing regime

The Federal government carbon pricing framework

In October, 2016, the Canadian government announced its proposals for a pan-Canadian approach to pricing carbon. Under this approach, the ten provinces and three territories would have flexibility in deciding how they would implement carbon dioxide pricing; that is, they could use a system of carbon dioxide taxes or they could implement an emissions trading, or ‘cap and trade’, system under which the price of carbon would be set in competitive markets based on the trading of emissions permits. The framework, however, imposed some conditions on the provinces and territories:

- Provinces can meet the benchmark via a price-based system (i.e. a carbon tax or levy) or via an emissions trading (cap-and-trade) system.
- The emissions subject to the regimes are based on a common and broad set of emission sources.
- The government established a ‘coverage benchmark’ – the minimum scope of emission sources that provincial regimes must include. The coverage benchmark is defined as ‘...substantially the same sources as the British Columbia carbon tax’.
- Jurisdictions must continually increase the stringency of their regimes via minimum pricing increases for pricing systems and, for emissions trading systems, declining annual caps in emissions that correspond to projected reductions resulting from pricing systems. The price per tonne of emissions started at a minimum of \$10 (all figures in Canadian dollars) in 2018 and rises by \$10 per year to reach \$50 per tonne by 2022.
- The emissions trading systems also need a 2030 emissions reduction target at least as ambitious as Canada’s 2030 target, whereas pricing systems only need annual increases in price.
- Revenues from carbon pricing would remain with the provinces and territories of origin. The provincial and territorial governments may use these revenues as they see fit.

- The overall approach will be reviewed before 2022 to ensure that it is effective and to confirm future price increases.

The federal government also enunciated a number of principles that should govern the provinces' and territories' approach to carbon pricing:

- Carbon pricing should be introduced in a timely manner to minimise investment in assets that could later become stranded and to maximise cumulative emission reductions.
- Carbon price increases should occur in a predictable and gradual way to limit adverse economic impacts.
- Reporting on carbon pricing policies should be consistent, regular, transparent and verifiable.
- Carbon pricing policies should minimise competitiveness impacts and carbon leakage, particularly for trade-exposed sectors.
- Carbon pricing policies should include revenue recycling to avoid a disproportionate burden on vulnerable groups and indigenous peoples.

The inclusion of 'revenue recycling' among these principles indicates the Canadian government's recognition that without some recycling, the public opposition to new taxes on energy consumption was likely to be so severe as to potentially impair the workability of the regime.

In spite of these common benchmarks and principles, the current Canadian carbon pricing regime is very much a patchwork of different approaches. Consistent with the 'flexibility' principle, each province and territory is able to implement a carbon taxation or emissions trading system, although in some cases special arrangements were negotiated that resulted in quite different regimes.

Notably, the Canadian government has stated that it will provide (i.e. impose) a 'backstop system' for provinces and territories whose systems do not 'align with' the benchmark. The backstop will also supplement systems that do not fully meet the benchmark, for example by expanding the sources covered by the provincial or territorial regimes. The backstop is composed of two key elements:

- a carbon tax, or levy, applied to fossil fuels
- an OBPS for industrial facilities that emit above a certain threshold, with an opt-in capability for smaller facilities with emissions below the threshold.

Both the carbon tax and the OBPS price emissions on a carbon-dioxide-equivalent basis, using the United Nations Framework Convention on Climate Change (UNFCCC) reporting system. These apply to seven greenhouse gases.²⁸ For purposes of the backstop, emissions are converted to a carbon-dioxide-equivalent basis.

The Federal carbon dioxide levy

The carbon levy will apply to liquid, gaseous and solid fuels (see Figure 3 above). In most cases, the levy will be paid early in the supply chain by the producer or distributor. The final user thus will not see the tax applied. For purposes of the levy, use will generally include fuel that is combusted, vented or flared. Fuel used as a raw material, diluent or solvent in a manufacturing or petrochemical process in a way that does not produce heat or energy will

not be subject to the levy. The levy will apply to fuel that is produced, imported or brought into a backstop jurisdiction.

Relief or exemption from the levy will be provided in certain cases. These include:

- fuel used at a facility whose emissions are accounted for under the OBPS;
- gasoline and diesel fuel used by registered farmers in certain farming activities;
- fuel exported from the backstop jurisdiction;
- fuel used as international aviation and marine fuels;
- fuel used as a raw material, diluent or solvent in a manufacturing or petrochemical process that does not produce heat or energy;
- fuel purchased by visiting military forces and diplomatic representatives;
- fuel in sealed, pre-packaged containers of one litre or less; and
- the biofuel portion of blended fuels.

The Federal output-based pricing system

An OBPS is designed to create an incentive for large greenhouse gas emitters to reduce their emissions, while partially protecting them by exempting them from paying a carbon tax on their fossil fuel consumption. The Canadian government system requires that each jurisdiction under it impose emissions restrictions on its industrial facilities that emit 50 kilotonnes (kt) or more of carbon dioxide equivalent per year. These restrictions will not apply to facilities in specifically listed sectors such as buildings (including municipal buildings, hospitals, universities, schools and commercial buildings), waste and wastewater, regardless of the quantity of their emissions. Facilities in industrial sectors that emit less than 50 kt of carbon dioxide equivalent per year will be able to 'opt in' to the OBPS.

Under the OBPS, an emissions intensity standard will be established by regulation for each type of industrial activity. Facilities in the system that emit more than the limit that corresponds to the relevant emissions-intensity standard must submit 'compliance units' or pay the carbon tax equivalent to make up the difference. Facilities that emit less than the limit that corresponds to the relevant emissions-intensity standard will receive 'surplus credits' from the government of Canada. These can be banked for future use or traded to another participant in the OBPS.

Compliance units are thus surplus credits from a previous year, purchased credits or offset credits. ECCC will issue surplus credits to a facility after confirming that the facility's reported emissions for the previous year were less than its limit. Surplus credits may be banked or traded. The rules governing the trading of credits have not yet been published.

Offset credits can be generated from voluntary activities. These are described as:

... those that are not subject to greenhouse gas emissions reduction regulations, that are not required by law, that have not been supported by government financing, and that go beyond 'business as usual' practices. The federal government will develop rules to determine which offset credits can be accepted for compliance under the OBPS, which could include foreign compliance units (referred to as 'internationally transferred mitigation outcomes'). This will be informed by the pan-Canadian offsets framework being developed by the Canadian Council of Ministers of the Environment.

The OBPS will be quite complex. It will apply to two types of greenhouse gas emissions from industrial facilities:

- those from fuel combustion (i.e. similar to the carbon levy)
- ‘synthetically-produced’ emissions from industrial processes and product use.

The latter can include any of the seven UNFCCC greenhouse gases. The OBPS will also apply to other greenhouse gas emissions such as process emissions and emissions from solvent use. The only significant exception is fugitive and venting emissions of methane from oil and gas facilities. These are excluded from the OBPS as they are separately covered under different government of Canada regulations.

The output-based standards will be set for each type of activity or product (e.g. tonnes per carbon dioxide equivalent per megawatt hour of electricity). Each standard will be set by ECCC at a level that represents the ‘best-in-class’ performance, defined as the top quartile or better in order to drive reduced emissions intensity ever higher. Penalties will be imposed on emitters based on their emissions rising over a certain percentage of the industrial average of their sector. Emissions over 80% of an industrial sector’s average will be penalised. In addition, four industrial sectors have been identified as being in a ‘high competitive risk’ category, which allows them the less stringent emissions cutoff of being taxed only when their emissions rise over 90% of their industrial sector’s average. These sectors are the manufacturing of cement, iron and steel, lime and nitrogen fertilisers.

The annual greenhouse gas emissions limit for a facility will be the sum of the emission limits for all activities that the facility undertakes. Thus, for a single product facility, the annual emissions limit will be based on the applicable output-based standard and the facility’s total output.

The provincial and territorial carbon pricing regimes

British Columbia

The province of British Columbia was the first to implement carbon dioxide pricing, in 2008. The rate was set at \$30 per tonne from 2012 to 2018. It increased to \$35 per tonne in April 2018 and then to \$40 per tonne the following year. It will continue to increase annually by \$5 per tonne until the rate is \$50 per tonne in 2021. This illustrates that the pan-Canadian framework sets a minimum, not a maximum tax rate. The agricultural sector is exempt from the tax.

In 2016, British Columbia also introduced an OBPS for specified industries. This currently applies to the liquified natural gas (LNG) sector only; other sectors may be added in future. Under this system, firms that exceed the output-based emissions limit must pay \$25 per tonne of carbon dioxide equivalent for the portion of the emissions exceeding the limit.

Alberta

In 2016, the province of Alberta implemented an emissions trading system and a carbon tax called the Specified Gas Emitters Regulation (SGER). This was replaced in January 2018 by the Carbon Competitive Incentive Regulation (CCIR). The CCIR is a baseline-and-credit emissions trading system using sector-based product benchmarks. It covers facilities that emit at least 100 kt of carbon dioxide per year, so it is a form of output-based pricing. Smaller facilities from certain sectors can opt into the CCIR. Emission intensity performance standards have been developed for facilities that produce ammonia, ammonium nitrates, coal, cement, electricity, hardwood and softwood pulp, hydrogen, industrial heat, oil sands in-situ

bitumen and petroleum refining. Facilities exceeding their sector benchmarks can comply with CCIR using credits generated at other facilities or Alberta-based offset projects. They can also contribute \$30 per tonne to Alberta's Climate Change and Emissions Management Fund. Facilities not covered under the CCIR are covered under the Alberta carbon tax. Alberta's carbon tax, launched in 2017 with a rate of \$20 per tonne, increased to \$30 per tonne in 2018. The United Conservative Party, elected as government of Alberta in April 2019, is committed to oppose the federal government's carbon pricing policy. As of writing, the new government has not yet announced the specific steps it will take to do so.

Saskatchewan

Saskatchewan has not signed the pan-Canadian framework, and continues to challenge the Canadian government's constitutional authority to impose a carbon dioxide tax. Nonetheless, in December 2017 it proposed a new baseline-and-credit emissions trading system. This system would cover industrial facilities that emit over 25 kt of carbon dioxide equivalent per year, but the upstream oil and gas and electricity generation sectors would be exempted. The baseline would be set in terms of a product-specific emissions intensity benchmark, not an absolute emissions level. Thus facilities could meet their compliance obligations by reducing their emissions intensity below the baseline. Those exceeding the baseline could comply by purchasing approved offsets or paying into a provincial technology fund. Saskatchewan has not specified the rate to be charged for excess emissions. Emitters also would be able to comply by using various market mechanisms under the Paris Agreement, thus possibly using international credits.

Manitoba

Under the Made-in-Manitoba Climate and Green Plan, announced in 2017, the Manitoba government announced its intention to implement both a carbon tax and an OBPS (a baseline-and-credit emissions trading system). In its view, this was more suited to the province's conditions than the federal government plan. This system would apply to facilities emitting over 50 kt of carbon dioxide equivalent annually, but the rate charged for excess emissions has not been specified. In October 2018, Premier Brian Pallister announced that Manitoba would no longer include a carbon tax in its plan. Effective 1 April 2019, therefore, the federal government backstop regime applied in Manitoba.

Ontario

Ontario launched an emissions trading system in January 2017, and in January 2018 linked its regime with those of the province of Quebec and the state of California, an arrangement referred to as the 'Western Climate Initiative'. Following the election of a new provincial government in 2018, however, Premier Douglas Ford announced that his government would eliminate the emissions trading system, withdraw from the Western Climate Initiative and bring a constitutional challenge against the federal carbon tax. As of 1 April 2019, the federal backstop regime applied in Ontario.

Quebec

Quebec has operated an emissions trading system since January 2013. It linked its system with that of the Western Climate Initiative a year later. The Quebec system issues three types of emission allowances:

- emissions units distributed free of charge, auctioned off or sold by mutual agreement by the provincial government
- offset credits stemming from greenhouse gas emission reductions in sectors not subject to the cap-and-trade system
- credits for early reductions.

Emission-intensive sectors subject to international competition receive a portion of free allowances. Eligible sectors include: aluminium, lime, cement, chemicals and petrochemicals, metallurgy, mining and pelletising, pulp and paper, petroleum refining, and others. The government sets a cap on the number of emissions units that it will put in circulation each year, and the cap drops each year. According to statistics published in 2017, the Quebec system covers 149 facilities (74 industrial facilities and 75 fuel distributors). The general effect of linking with the California system so far has been to reduce the allowance price paid by Quebec firms. The unweighted average auction price for allowances purchased in 2018 was \$19.30 per tonne. Quebec's emissions trading system covers nearly all combustion emissions in the province. In contrast to the federal government and most other provinces, Quebec does not provide an exemption for fuels used by farm vehicles.

New Brunswick

In December 2016, New Brunswick proposed a climate change action plan that included ambitious emission-reduction targets but omitted the use of carbon taxes. It proposed, instead, to transfer part of the revenues received from the existing gasoline and diesel fuel excise taxes to a climate change fund. In October 2018, the federal government announced that the proposed provincial plan was insufficient. Consequently, effective 1 April 2019, the federal backstop regime applied in New Brunswick.

Nova Scotia

Nova Scotia's emissions trading system went into effect on 1 January 2019. The system will have many design features similar to those of Quebec. However, the credits generated in Nova Scotia can only be traded within the province. Only about 24 of the largest emitters in the province will be covered by the emissions trading system, and Nova Scotia Power, the provincial electric utility, will receive about 90% of its credits for free, and fuel suppliers will receive about 80% of their credits for free. The provincial government estimates that the effect on consumers will be far lower than in other provinces.

Prince Edward Island

The government of Prince Edward Island, Canada's smallest province, negotiated an agreement with the federal government that allows, in effect, for a two-year deferral in the application of the federal backstop regime. Effective, 1 April 2019, a provincial 'carbon levy' applies to 26 fuels, but exemptions apply to farmers, fishermen, aboriginals and others. In

return, the province will offset the increase in gasoline and diesel fuel prices by reducing the provincial excise taxes on these fuels by 3 cents per litre. There will be no federal rebate.

Newfoundland and Labrador

The government of Newfoundland and Labrador negotiated an agreement with the government of Canada to implement, effective 1 January 2019, a hybrid approach to the use of carbon pricing. The approach includes the use of performance standards for large industrial facilities and large-scale electricity generation, and imposition of a carbon tax on transportation building fuels, electricity generation and other fuels combusted in the province. The carbon tax coverage includes about 33% of emissions and the performance standards cover about 43%. To ensure compliance with the performance standards, firms will be required to pay fees equal to the federal carbon tax rates for any emissions that exceed the standard. Home heating fuels will not be taxed. Some provincial fuel taxes will be eliminated and replaced by comparable federally-mandated carbon taxes. There will be a long list of exemptions from the carbon tax, including firms in the agriculture, fishing and forestry industries, offshore petroleum and mineral exploration, and methane from venting and fugitive emissions in the oil and gas industry.

Yukon

Effective 1 July 2019, the federal backstop regime will apply in the Yukon Territory.

Northwest Territories

Effective 1 July 2019, the federal backstop regime will apply in the Northwest Territories. The tax will not apply to aviation fuel. The carbon taxes paid for fuel to produce electricity, almost all of which is diesel-generated, will be rebated to the Northwest Territories Power Corporation in order to ensure that consumer electricity rates do not rise.

Nunavut

Effective 1 July 2019, the federal backstop regime will apply in Nunavut.

Application of the Federal backstop

In summary, the government of Canada has confirmed that the federal backstop will be implemented in the provinces of Ontario, New Brunswick, Manitoba, and Saskatchewan, and in the territories of Yukon and Nunavut. The application of the backstop in Prince Edward Island will be deferred until 2021. The federal government has agreed to provide certain backstop relief to Yukon and Nunavut, in recognition of the unique circumstances in these areas.

For Ontario, New Brunswick, Manitoba and Saskatchewan, the OBPS started applying from January 2019, and the carbon levy from April 2019. The OBPS and carbon levy will start applying in July 2019 for Yukon and Nunavut. The OBPS started applying in Prince Edward Island in January 2019.

The federal backstop will not apply to British Columbia, Quebec, Nova Scotia, Newfoundland and Labrador, and Northwest Territories. Under the present carbon pricing regime in Alberta, the federal backstop will not apply, at least until 2021. Alberta's price on carbon is

now set at \$30 per tonne of carbon dioxide equivalent, which satisfies the backstop pricing requirement until the end of 2020. Absent any further action by the Alberta government, therefore, the federal backstop will begin to apply there effective 1 January 2021.

Revenue recycling under the backstop regime

The government of Canada has stated that its backstop will be revenue-neutral.²⁹ Accordingly, it is committed to return direct revenues from the backstop system to the jurisdiction of origin. While the advocates of carbon taxes have emphasised the benefits of revenue recycling, the Canadian government has not placed any restrictions on how the provinces may use, or 'recycle', the funds.

In October, 2018, the government announced how it will use the proceeds from the revenues it receives in the provinces subject to the backstop regime. Most of the funds will be provided in the form of a 'Climate Action Incentive' payment. The amount of the incentive will vary by province, depending on its mix of energy sources. Most of the funds that the federal government receives from the fuel charges (i.e. the carbon levy) in a province will be returned to residents there through income-tax rebates. The remainder of the revenue received from fuel charges will be provided in grants to targeted beneficiaries, such as schools, colleges and universities, hospitals, municipalities, small and medium-sized businesses, not-for-profit organisations and indigenous communities. Direct proceeds from industrial facilities under the federal OBPS 'will be directed to supporting reductions in greenhouse gas emissions in the province',³⁰

To illustrate how the proposed approach will operate in the province of Ontario, during the first year (2019) the payments made will include:

- \$154 for a single adult or the first adult in a couple
- \$77 for the second adult in a couple or, in the case of a single parent, the first child
- \$38 for each child in the family (starting with the second child for single parents)
- a supplement equal to 10% of the total payment for residents of small and rural communities.

Large businesses will receive no Climate Action Incentive payments.

Revenue recycling under provincial regimes

Provincial governments operating carbon pricing regimes have tended to use very different approaches. When its carbon tax was first implemented in 2008, the government of British Columbia enacted four offsetting tax measures that included a reduction in the bottom two personal income tax rates, a reduction in the general corporate income tax rate, a reduction in the small business income tax rate, and the introduction of the low-income climate action refundable tax credit. These four measures offset enough revenue to make the carbon tax revenue neutral in its first years (indeed, the tax reductions more than offset the revenues received). In 2013/14, the first fiscal year, with the carbon tax at \$30 per tonne, the provincial government began to use pre-existing tax reductions in calculating revenue neutrality. It is questionable whether such pre-existing tax reductions, presumably introduced for other reasons, should be counted in the calculation of revenue neutrality. Without these 'adjustments', the carbon tax yields a net revenue increase for the provincial government

of \$377 million in 2013/14 and 2014/15 combined. The net revenue balance has continued to increase since then. With the election of a new provincial government led by the New Democratic Party and Green Party in 2017, the commitment in principle to – and the legal requirement for – revenue neutrality has been dropped.

The Alberta Climate Leadership Plan claims to be revenue neutral, but departs from this principle in important respects. It includes some rebates for lower- and middle-income families (i.e. no generalised reduction in tax rates) but also adds in several program spending initiatives in other areas. In Budget 2018, for example, of the \$1.72 billion spent under the plan, \$536 million funded rebates and tax reductions, but the rest went to other areas:

- \$458 million to infrastructure and transit;
- \$215 million to energy efficiency;
- \$214 million to fund the ‘electricity transition’ (i.e. the elimination of coal-fired power generation and the subsidisation of renewable energy generation and related facilities);
- \$183 million for innovation and technology;
- \$49 million to indigenous communities;
- \$62 million to ‘other investments’.

Quebec has made no commitment, even in principle, to revenue neutrality. The funds it has received from the sale of emissions allowances are directed primarily to the Quebec Green Fund. The Green Fund is used to finance a number of environmental policy initiatives, of which greenhouse gas emissions reduction is the primary one. Under the province’s 2013–2020 Climate Change Action Plan, it spends the fund on 20 programs, including 150 ‘actions’ to reduce greenhouse gas emissions and adapt to climate change. Of the \$3.7 billion committed, \$1.5 billion focuses on public transit, \$240 million on other forms of transportation and \$377 million on improving the energy efficiency of businesses and buildings. The rest is divided among various measures including fostering technological development, supporting municipal initiatives, and raising public awareness.

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28. Carbon dioxide, methane, nitrous oxide, perfluorocarbons, hydrofluorocarbons, sulphur hexafluoride, and nitrogen trifluoride.

29. Revenue neutrality is different from revenue 'recycling'. As well explained by the Fraser Institute, 'Revenue neutrality specifically requires that the revenues generated from implementing one tax (or an assortment of taxes) are used to reduce other taxes equal to the value of the new revenue being generated. In other words, revenue neutrality requires that the government not increase its revenues through the imposition of a new tax. Revenue recycling, on the other hand, refers to only the designated use of revenues, and does not require that the revenues be used to offset other taxes.'

30. This is a direct quote from the backgrounder published by Environment and Climate Change Canada in October 2018. The vagueness of the statement indicates that the government will retain broad discretion as to how it uses the funds.

About the Global Warming Policy Foundation

The Global Warming Policy Foundation is an all-party and non-party think tank and a registered educational charity which, while openminded on the contested science of global warming, is deeply concerned about the costs and other implications of many of the policies currently being advocated.

Our main focus is to analyse global warming policies and their economic and other implications. Our aim is to provide the most robust and reliable economic analysis and advice. Above all we seek to inform the media, politicians and the public, in a newsworthy way, on the subject in general and on the misinformation to which they are all too frequently being subjected at the present time.

The key to the success of the GWPF is the trust and credibility that we have earned in the eyes of a growing number of policy makers, journalists and the interested public. The GWPF is funded overwhelmingly by voluntary donations from a number of private individuals and charitable trusts. In order to make clear its complete independence, it does not accept gifts from either energy companies or anyone with a significant interest in an energy company.

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