WORKING GROUP ON CARBON PRICING MECHANISMS

FINAL REPORT

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EXECUTIVE SUMMARY

On March 3, 2016, Canada's First Ministers, recognizing commitments and actions already taken by provinces and territories, released the Vancouver Declaration on clean growth and climate change which seeks to increase ambition and enhance cooperation in that regard. First Ministers agreed to work together to identify measures that governments could take to reduce emissions and grow the economy in the longer term by establishing working groups in four areas: clean technology, innovation and jobs; carbon pricing mechanisms; specific mitigation opportunities; and adaptation and climate resilience.

The Working Group on Carbon Pricing Mechanisms was tasked with providing this report, which includes options on the role that carbon pricing mechanisms could play in reducing Canada's greenhouse gas (GHG) emissions, including different design options taking into consideration existing and planned provincial and territorial systems.

Section II of the report provides a description of the mandate of the Working Group and the context for the discussion of carbon pricing. Many experts regard carbon pricing as one of the most efficient policy approaches to reduce GHG emissions as it provides flexibility to industry and consumers to identify the least-cost way to reduce their own emissions, and spurs innovation to find new opportunities for emissions reduction.

Section III reviews existing carbon pricing mechanisms and provides an overview of how carbon pricing works to reduce emissions by sending a price signal to the economy as a whole and to various economic actors. This section also looks at the various forms of broad-based carbon pricing mechanisms – carbon taxes, cap-and-trade systems, and performance standard or baseline-and-credit systems – and discusses other mechanisms and systems that reduce GHG emissions and impose an explicit price on carbon like fuel taxes or an implicit price on carbon, such as the closing of coal-fired plants. Finally, the section outlines some of the challenges related to introducing carbon pricing and the role complementary measures can play.

Section IV looks at the main design parameters for broad-based pricing mechanisms. While there are differences in the high level structure of carbon pricing systems, the detailed design of each system can have as much impact on the policy outcomes as the type of system chosen. Many of the same design decisions need to be made, whichever type of system is chosen, including: coverage of emissions, certainties regarding GHG emission reductions or the price signal, administration costs and the burden of compliance, efficiency and flexibility of approaches, related proceeds, and other design parameters. This section also provides an overview of what other countries are doing to price carbon.

Section V considers how carbon pricing can help Canada meet its GHG reduction targets by providing an overview of Canada's projected emissions profile based on the National Inventory Report. To better understand the implications that additional carbon pricing could have in Canada, Environment and Climate Change Canada's EC-Pro model was used to model three illustrative explicit carbon pricing scenarios that are presented in this section:

1. 15/30 price scenario would start at $15 in 2018 and rise to $30 in 2030 in nominal terms.
2. 30/40 price scenario would start at $30 in 2018 and rise to $40 in 2030 in nominal terms.
3. 30/90 price scenario would start at $30 in 2018 and rise to $90 in 2030 in nominal terms.

The model assumes that revenues generated by the carbon price are returned by direct transfer to the household sector in the province or territory where the carbon price was paid, which is not the current practice in any jurisdiction with carbon pricing. All three scenarios result in emissions reductions from the baseline scenario, although none of these scenarios are modelled to provide sufficient reductions to reach Canada's 2030 target of 524 Mt (a 30 per cent reduction below 2005 levels).

To do so, complementary mitigation measures will be required. Compared to the baseline scenario of 815 Mt, the 15/30 price scenario results in a level of GHG emissions in 2030 of 777 Mt (38 Mt below the baseline scenario). The 30/40 price scenario results in a level of emissions for 2030 of 764 Mt (50 Mt below the baseline scenario) and the 30/90 price scenario results in a level of emissions for 2030 of 720 Mt (95 Mt below the baseline scenario). As most computable general equilibrium models would predict, there is not a linear relationship between emissions reductions and the carbon price.

Section VI provides an overview of considerations in the implementation of carbon pricing in Canada. While carbon pricing leads to GHG reductions by internalizing the price of carbon into the cost of goods and services, it would also represent an increase in costs facing some producers and consumers. As such, carbon pricing presents several issues that need particular attention, namely: revenue recycling, impacts on Northern, remote and Indigenous communities, Indigenous Peoples, and competiveness and carbon leakage.

- A carbon pricing mechanism has the potential to raise significant revenues. Decisions around how that revenue is recycled back into the economy will be a central determinant of the overall economic and equity impacts of any policy and can have a significant impact on aggregate emissions outcome. There are three broad policy goals that governments might hope to address using recycled revenues: offset equity and competitiveness impacts created by the carbon price, facilitate the transition to a low-carbon economy, or boost sustainable growth and raise the long-run standard of living (or some mix of those options).

- Unless there are appropriate supporting measures, any carbon pricing mechanism could have disproportionate impacts on Northern, remote and Indigenous communities, as they face unique challenges compared to the rest of Canada. Given geographical realities, these communities could face additional burdens from carbon pricing mechanisms in the context of transportation costs, generation of electricity, heating costs, as well as impacts on local fuel-intensive industries, such as mining operations.

- Representatives from the Assembly of First Nations, the Inuit Tapiriit Kanatami and the Métis National Council highlighted the importance of strengthening the collaboration between government and Indigenous peoples in the development of all climate change-related policies, based on the recognition of rights, respect, cooperation and partnership, emphasizing that climate action should support, rather than jeopardize, the well-being of Indigenous communities, for example, in the areas of energy, food and water access and security.

- Increasing carbon prices to levels well beyond those of our trading partners could create competitiveness concerns in certain sectors. There are a variety of policy tools available to governments to address competitiveness pressures, which could be used in isolation or in conjunction with one another, including differential treatment for affected sectors, revenue recycling, and border tax adjustments.

Section VII evaluates carbon pricing in Canada by reviewing domestic experiences. Some provinces have already moved forward with their own explicit carbon pricing mechanisms, creating different regimes across Canada. Both carbon taxes and emission trading systems (cap-and-trade or performance standard / baseline-and-credit) have been implemented or announced by certain provinces. With existing and decided policies to be implemented, nearly 85 per cent of Canada's economy and population will be subject to broad-based carbon pricing mechanisms by 2017, covering a large share of emissions. All Canadian governments also have extensive experience with taxes on motive fuels that impose an explicit price on carbon, as well as other measures that impose an implicit carbon price.

This section also provides an evaluation of the current approach to carbon pricing in Canada, including a discussion on the similarities between the existing and planned broad-based carbon pricing mechanisms, as well as the existence of different regimes with different: carbon prices, coverage, GHG targets and access to foreign permits. The section concludes with a discussion on measures that could be used for comparing the price, coverage and GHG results of carbon pricing mechanisms, noting that there is no clear best option. Such measures could include a comparison of marginal prices, average effective carbon costs (revenues raised as a proportion of covered emissions), coverage-weighted marginal price (marginal price multiplied by the percentage of covered emissions in the jurisdiction), or trade-adjusted coverage-weighted marginal price (similar to coverage-weighted, but accounting for inter-jurisdictional permits). Alternatively, rather than using price, a comparison of emissions reductions could also be considered as reductions are the ultimate goal of carbon pricing. Comparing the stringency of different systems and the certainty they provide in reducing emissions at the lowest possible cost will be important in assessing the potential role of carbon pricing in a pan-Canadian framework.

Section VIII presents eight principles that need to be taken into account when designing carbon pricing policies:

- be flexible and support existing provincial and territorial actions;
- be considered as a central component of the pan-Canadian Framework;
- have broad coverage;
- be introduced in a timely manner;
- have price increases be predictable and implemented gradually;
- have regular and consistent reporting of emissions coverage;
- minimize international competitiveness impacts and carbon leakage; and
- take into consideration vulnerable groups (e.g., Northern and remote communities and low-income households).

Section IX presents three broad groups of options for carbon pricing, including a brief assessment in relation to the principles for a pan-Canadian approach: (1) a single form of broad-based carbon pricing mechanism that would apply across the country, (2) broad-based carbon pricing mechanisms in all jurisdictions but allowing for flexibility of instrument choice within each province and territory, and (3) broad-based carbon pricing mechanisms in some jurisdictions with the remaining jurisdictions instituting other mechanisms or policies to meet specific GHG reduction targets within their respective jurisdictions.

The options reflect different approaches to the implementation of carbon pricing in Canada. The choice of option should be guided by the commitments made by First Ministers in the Vancouver Declaration.

Regardless of which option is chosen, the working group heard from a number of stakeholders about the importance of two issues: harmonizing the recognition of offset credits and improving the reporting of emissions to ensure a good quality and a similarity between the federal and provincial/territorial emissions data. Harmonizing offset credits across Canada would generally require common standards and processes across jurisdictions. Further, harmonizing GHG measurement, reporting and verification requirements across jurisdictions implementing carbon pricing and other GHG reduction requirements would ease compliance burden and simplify administration (i.e., by being subject to a common set of measurement, reporting and verification requirements, rather than multiple sets of such requirements).

Section X concludes that, in examining the role that carbon pricing is playing and could further play in helping Canada reduce its GHG emissions, on the whole, carbon pricing is one of the more efficient tools available to governments to incent a transition to a low carbon economy. This section notes that carbon

pricing could allow for an increase in the level of ambition in reducing GHGs, promotes clean economic growth, and facilitates the possibility for enhanced cooperation among jurisdictions – but would depend on the tool chosen, the price, the coverage, etc.

1 INTRODUCTION

1.1 Vancouver Declaration

On March 3, 2016, Canada's First Ministers released the Vancouver Declaration on clean growth and climate change. Broadly, the Vancouver Declaration seeks to build on commitments and actions already taken by provinces and territories and the momentum from the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris. The Declaration also seeks to move toward a pan-Canadian framework for clean growth and climate change that will meet or exceed Canada's international greenhouse gas (GHG) emissions targets, and transition to a stronger, more resilient, low-carbon economy – while also improving Canadians' quality of life.

In the Declaration, First Ministers agreed to the following:

- Increase the level of ambition (regarding GHG reductions);
- Promote clean economic growth to create jobs;
- Deliver mitigation actions;
- Increase action on adaptation and climate resilience; and
- Enhance cooperation, including with Indigenous peoples.

In the context of enhancing cooperation, First Ministers agreed to (i) strengthen the collaboration between government and Indigenous peoples on mitigation and adaptation actions, based on the recognition of rights, respect, cooperation and partnership; (ii) ensure flexibility for provinces and territories to design their own policies to meet emission reductions targets, including their own carbon pricing mechanisms, supported by federal investments in infrastructure, specific emission reduction opportunities and clean technology and (iii) work together to identify measures that governments could take to reduce emissions and grow the economy in the longer term by establishing working groups in four areas: clean technology, innovation and jobs; carbon pricing mechanisms; specific mitigation opportunities; and adaptation and climate resilience. Each working group was to assess impacts on economic and environmental outcomes.

1.2 Mandate of the Working Group on Carbon Pricing Mechanisms

The Working Group on Carbon Pricing Mechanisms was tasked with providing a report with options on the role of carbon pricing mechanisms in meeting Canada's emissions reduction targets, including different design options taking into consideration existing and planned provincial and territorial systems. It considered various elements of carbon pricing policy, including coverage, comparability and stringency, as well as market transactions related to mitigation technologies and international trends in carbon pricing and markets.

The Working Group's report also considered the effectiveness of various carbon pricing mechanisms in contributing to the certainty of emission reductions and their efficiency at achieving this objective at the lowest possible cost, and take account of particular challenges, such as those facing Northern, remote and Indigenous communities. Finally, it addressed issues that are particularly important to industry and investors, such as predictability, and approaches to address interprovincial and international competitiveness, including carbon leakage.

As part of its mandate, the Working Group also met with representatives of the Assembly of First Nations, the Inuit Tapiriit Kanatami and the Métis National Council, and received online input from various organizations and individuals who identified issues relevant to Indigenous interests. In addition, the Working Group co-chairs participated in a number of teleconferences with the co-chairs of the other three Working Groups (Specific Mitigation Measures; Jobs and Innovation, and Adaptation) and Indigenous representatives.

This work was jointly overseen by Ministers of Finance and the Canadian Council of Ministers of the Environment, who are both receiving this report.

1.3 Context

Many experts regard carbon pricing as a necessary policy tool for efficiently reducing GHG emissions, including the World Bank, the Organisation for Economic Cooperation and Development (OECD), the International Monetary Fund (IMF) and Canada's Ecofiscal Commission. Carbon pricing is generally considered to be one of the most efficient policy approaches as it provides flexibility to industry and consumers to identify the least-cost way to reduce their own emissions, and spurs innovation to find new opportunities for emissions reduction. Carbon pricing can also allow for alignment of efforts to reduce emissions across jurisdictions, reducing economic distortions and emissions leakage.

There is a widespread trend in favour of carbon pricing throughout the world's economies. An international movement has emerged in recent years, and is growing in strength. A September 2015 World Bank study concluded that more and more national and sub-national governments that are concerned about the increasing costs and risks associated with climate change have decided to take action and adopt carbon pricing.

The share of the world's GHG emissions that is subject to carbon pricing has tripled over the last decade, and, since January 2012, the number of carbon pricing instruments in operation has almost doubled from 20 to 38. Some 40 countries and 23 provinces, states, regions and/or cities on five continents have already implemented such instruments. Nearly 70 per cent have emissions trading systems (mostly cap-and-trade, but also performance standards systems), while 30 per cent or so use taxes and/or levies. Some governments (14) have combined these two broad families of instruments. Taken together, carbon pricing covers about half of GHG emissions in all these jurisdictions, representing around seven gigatonnes of carbon dioxide equivalent (CO_2e) or 12 per cent of worldwide emissions.[1]

In December 2015 in Paris, the World Bank officially launched the Carbon Pricing Leadership Coalition (CPLC), which has the mandate to study and share best carbon pricing practices. CPLC membership includes 20 national governments, including Canada, six subnational governments, including Alberta, British Columbia, Northwest Territories, Ontario and Quebec and numerous companies, including over two dozen Canadian companies representing a wide range of sectors. The CPLC was formed following the September 2014 United Nations Climate Summit, where 74 countries and 22 sub-national governments signed a statement entitled "Putting a Price on Carbon."

Earlier, in 2010, the World Bank had also launched the Partnership for Market Readiness (PMR), an initiative to provide funding and technical assistance to developing countries that have taken steps towards the establishment of carbon market mechanisms. Today, the PMR has 13 donor countries, 16 implementing countries and four technical partners, including Quebec and Alberta.

In addition, the IMF has started to place considerable emphasis on providing technical assistance to countries that are interested in pricing carbon in their economies and in reforming their energy and environmental tax systems. The IMF recently published a study affirming that carbon pricing should be at

1 World Bank, State and Trend of Carbon Pricing 2015.

the forefront of all plans aimed at reducing GHG emissions. The OECD, which brings together many of the world's largest economies, including Canada, came to the same conclusion in 2013, stating that carbon taxes and emissions trading systems are the most economical means of lowering GHG emissions and should become the cornerstone of governmental efforts in fighting climate change.

The private sector has also begun to advocate regarding the need to price carbon. In 2014, 350 institutional investors, managing assets worth more than US$ 24 trillion, asked governments to implement stable, reliable, ambitious and economically significant carbon pricing in order to redirect investments needed to overcome the challenges posed by climate change, which they perceive as a threat to their investments. More than 1,000 companies and investors, including major oil, gas and insurance companies, have signed the above-mentioned World Bank statement. Incidentally, the International Emissions Trading Association, which promotes carbon market mechanisms throughout the world, now includes 150 multinationals from developed countries and emerging economies, 17 years after its founding.

Taken together, the studies referenced above suggest that governments, businesses, and non-governmental organizations internationally are coalescing around two conclusions related to carbon pricing: (1) GHGs can no longer be released into the atmosphere on a large scale with impunity; and, (2) putting a price on emissions is an efficient and cost-effective way to create incentives to reduce their production as well as their consumption, and to reflect the value of the important and sometimes irreversible damage they inflict on the economy, human health and safety, infrastructure, and the environment and ecosystems.

2 REVIEW OF CARBON PRICING MECHANISMS

It is now established and recognized that GHG emissions are one of the main negative externalities arising from human economic activity, including both the production and the consumption of goods and services. In general, externalities refer to situations where the effect of production or consumption of goods and services imposes costs or benefits on others which are not reflected in the prices charged for the goods and services being provided. In other words, absent any other legal or regulatory requirements, the agent that causes negative externalities has no incentive to consider and integrate the impacts and costs it imposes on other agents in its business decisions or household's everyday life. This situation entices this agent to underestimate, or even ignore, the real costs of its actions to society, the economy and the environment.

2.1 How Does Carbon Pricing Work?

In order to allow the market to fully internalize negative externalities caused by pollutants and to overcome what he perceived as a market imperfection, the British economist Arthur Cecil Pigou proposed, nearly a century ago, to price these externalities. Since demand for a good is, in most cases, price sensitive, pricing externalities allows the economic agents to respond efficiently. For GHG emissions, this is typically referred to as a carbon price, reflecting the dominant role of carbon dioxide in total GHG effects and the practice of equating emissions of various GHGs on a CO_2e basis.

The main goal of carbon pricing is to reduce emissions by sending a price signal to the economy as a whole and to various economic actors, in particular, to reduce emissions. The clearer, more consistent, strong and predictable a price signal is in the medium and long term, the greater its efficiency will be as a driver of the change that is needed to transition to a low-carbon economy. By internalizing a carbon price in their daily decision making, this kind of signal incentivizes companies, investors and consumers to change their behaviour. Carbon pricing thus creates economic incentives for economic agents to make more environmentally sustainable strategic choices, to redirect their investments, and to reduce their emissions as well as their carbon footprint, notably by substituting carbon-intensive goods (such as fossil fuels), for goods that have a lower or no carbon content.

Properly quantifying the carbon price needed to reflect the scale of the negative externality is a significant challenge, given the complex global nature of the climate system and the long-term horizons over which emissions affect the system. This quantification is usually referred to as the social cost of carbon, and is typically estimated through economic models. Modelled results have significant uncertainty and variability, and are therefore not typically used directly in setting a carbon price. The price is more often set, either explicitly or through a market, based on the emissions target for a jurisdiction, and evaluation of the economic benefits and risks of policies in the context of policies present in other jurisdictions. Despite uncertainty in what the 'right' price is, carbon pricing is still seen as an efficient tool to encourage emissions reductions and spur innovation.

Raising the carbon-content price of goods and services used by companies encourages them to invest in reducing their carbon emissions by, for example: using renewable or low-GHG energy sources; improving their energy efficiency; upgrading their means of production to, among other things, eliminate energy loss; or, opting for less polluting alternative solutions. In so doing, carbon pricing can also make clean technology financially more attractive or even necessary, provide for the potential of new market opportunities, and stimulate innovation through green technology research, development, and marketing. In addition to encouraging established industries to seek less carbon-intensive methods of operating, carbon pricing can also create demand for low-carbon technologies, fostering new niche industries, start-ups and job creation, and creating new economic growth engines. In short, carbon pricing has the potential for encouraging companies to rethink their procedures and, if needed, reinvent themselves in the immediate and in the long term.

Carbon pricing also incentivizes consumers to make more environmentally friendly decisions. For example, higher gasoline prices encourage public transit and make electric or hybrid vehicles more attractive alternatives for travel and commuting. Households will also opt for low-carbon solutions for home heating or air conditioning and will consume less energy by improving the insulation of their residence. All of these actions, taken together, help reduce GHG emissions. It is important that governments enable consumers to make low carbon choices at an affordable cost.

For governments that are able to put a price on carbon, it can also represent a source of revenue that can be used in different ways according to the economic realities they face. These issues are discussed in detail later in this report.

Although it is generally considered to be one of the least-cost approaches to reducing GHG emissions, carbon pricing can still represent an additional cost to the economy that must either be absorbed or avoided by consumers and businesses, and which will invariably pose challenges, namely for Northern, remote and Indigenous communities. Thus, the introduction of carbon pricing generally leads to a period of transition that could be more or less long and laborious depending on the sectors covered, the presence or absence of similar policies among competitors, and the economic outlook. Governments that put in place carbon pricing must take these factors into account, recognizing that, since the economic, social and environmental costs of climate change impacts will inexorably rise over time if nothing is done to reverse the current trend, it will usually cost less to put a price on carbon now rather than later. In the long term, emissions reduction measures will help improve competitiveness and profitability for actors that take early action to reduce emissions in a global economy in which the prices of energy and carbon are expected to increase. These issues are further discussed later in the paper.

The speed with which the economic transformation necessary to shift to a low-carbon economy can be made, and therefore the length of the transition period necessary to achieve it, will largely depend on the carbon price level and design, and the reaction of the economy in the short, medium and long term. However, the broader the base (i.e., the more sectors and regions it covers) and the more flexibility in the design to respond to economic cycles, the more policy makers will succeed in calibrating the carbon price to achieve maximum success at the lowest possible cost, and the less its weight will be felt – even disproportionately felt – by the various economic actors.

If carbon pricing instruments are well designed and implemented, they can create opportunities to reduce GHG emissions at a lower cost to the community.

2.2 How Can Carbon Be Priced?

2.2.1 Broad-Based Carbon Pricing Mechanisms

There are three main mechanisms that can be used to explicitly apply a broad-based price to carbon: carbon taxes, cap-and-trade as well as performance standards systems.[2] Cap-and-trade systems and performance standard systems can both be considered emissions trading systems. In all systems, carbon is priced such that economic agents are incentivized to reduce emissions whenever the costs of doing so are less than the carbon price. Given the uncertainty in forecasting market responses, carbon pricing systems will differ in terms of the certainty of the emissions outcome and the certainty about the price signal. These uncertainties can be partially addressed through design considerations. Each carbon pricing system has advantages and disadvantages, strengths and weaknesses.

2 Hybrid approaches are also possible where different systems are used to cover different sectors or where systems overlap.

- Carbon taxes (such as the existing tax in British Columbia) put a price on GHG emissions and allow economic agents to change their behaviour in response to the price, thus determining which GHG reductions will take place. The regulated price creates certainty for actors deciding on whether to invest in emissions reduction technologies, meaning that all actors who are able to reduce emissions at a lower cost to avoid paying the tax are likely to do so. Because uncertainty exists about how economic agents will respond, to achieve a specific emissions reduction goal, governments may need to adjust the price (tax rate) over time.

  Carbon taxes can be applied to GHG emissions from fossil fuel combustion by taxing fuels based on their carbon intensity. A carbon tax could be designed to apply more broadly to also include non-combustion emissions (e.g., venting and industrial processes), which could increase administrative and compliance costs.

- Cap-and-trade systems (such as the existing systems in Quebec and Ontario) limit the total amount of GHG emissions by imposing a cap on emissions (both combustion and non-combustion) that is progressively lowered each year over a given period of time, thus providing certainty about the total emissions from a prescribed set of emitters. The broader the coverage, the more efficient cap-and-trade programs become. Emissions allowances are typically distributed to regulated/registered entities through a combination of auction, sales at a fixed floor price, and free allocation. Price controls and the ability to bank allowances can mean that emissions in a given year remain somewhat uncertain, although certainty remains over the different compliance periods.

- Performance standard systems or baseline-and-credit systems (such as the existing and proposed Alberta systems for major emitters) operate by applying intensity targets that set a limit on GHG emissions (both combustion and non-combustion) per production unit, which can be analogous to how allowances are freely allocated in a cap-and-trade system. Targets can be set at a facility or product level. Facilities that do not meet their emissions intensity standards can use a variety of compliance instruments, such as purchasing credits issued to more efficient facilities (i.e., that had emissions below the standard), purchasing offset credits, paying a fixed price to government, etc. Under a performance standard system, GHG emissions levels are largely dependent on changes in levels of production. Because uncertainty exists about how economic agents will respond, to achieve a specific emissions reduction goal, governments may need to adjust the price or standards over time.

Emissions trading systems, like cap-and-trade systems or performance standard systems, allow the price of GHG emissions to be determined by a market where entities can trade emissions allowances to find the most efficient reductions. Companies with the ability to reduce their emissions at lower cost can sell allowances to companies for whom the cost to reduce emissions is higher. Emissions trading allows for direct linkage with systems of similar design and stringency, which can provide access to lower cost emission reductions.

2.2.2 Other Mechanisms and Systems that Reduce GHG Emissions and Impose a Price on Carbon

Governments have developed many other mechanisms that help reduce GHG emissions and impose a price on carbon. These can include:

- Taxes on motive fuels that impose an explicit price on carbon; and

- Measures that impose an implicit price on carbon, like caps on emissions from the electricity sector or the closing of coal-fired power plants; renewable portfolio standards, feed-in tariffs and clean energy standards; new technology development and deployment of innovative technologies through research and development (R&D) programs; investment in infrastructure; vehicle efficiency standards; restrictions on land use planning and, building codes.

MOTIVE FUEL TAXES

Canadian governments have a long history of imposing taxes on the purchase of motive fuels. Although these fuel taxes have not always been imposed to serve environmental purposes and do not reflect the emission intensity of the various fuels, they share common features with a carbon content tax in that they influence behavioral changes in emissions-intensive activities. Table 1 illustrates that motive fuel taxes at both the federal and provincial/territorial levels impose a different price per tonne of CO_2e. These taxes generally only apply to commonly-used motive fuels and a number of exemptions/reduced rates apply to specific economic sectors.

Table 1: Motive Fuel Taxes and Implied CO_2e Prices Based on Global Warming Factors as Published in National Inventory

	Diesel		Gasoline	
	(cents/litre)	(implied $/tonne of CO_2e)	(cents/litre)	(implied $/tonne of CO_2e)
Newfoundland and Labrador	21.5	79.90	16.5*	70.48*
Prince Edward Island	20.2	75.07	13.1	55.96
Nova Scotia	15.4	57.23	15.5	66.21
New Brunswick	21.5	79.90	15.5	66.21
Quebec	20.2	75.07	19.2	82.01
Ontario	14.3	53.14	14.7	62.79
Manitoba	14.0	52.03	14.0	59.80
Saskatchewan	15.0	55.74	15.0	64.07
Alberta	13.0	48.31	13.0	55.53
British Columbia	15.0	55.74	14.5	61.94
Yukon	7.2	26.76	6.2	26.48
Northwest Territories	9.1	33.82	10.7	45.70
Nunavut	9.1	33.82	6.4	27.34
Federal	4.0	14.86	10.0	42.71

*Newfoundland and Labrador's gasoline tax was increased temporarily to 33 cents per litre (equivalent to $140.96 per tonne of CO_2e), effective June 2, 2016. The new rate on gasoline will be periodically reviewed.

Note: These rates do not include regional or city rate variations, which may provide for higher or lower rates than the general rate in each province. The rates also do not account for broad-based carbon prices that may apply in a province or territory.

2.2.3 Common Challenges for Carbon Pricing

Well-designed carbon pricing mechanisms can provide incentives for reducing emissions cost-effectively as well as for investments in low-carbon research and technological innovations. However, there are some issues for which broad-based carbon pricing mechanisms may not be sufficient on their own.

- **Lack of information.** Without sufficient information on low carbon alternatives, emitting sectors and consumers may not be able to respond to price incentives. For example, increased energy efficiency can be a cost-effective way to mitigate GHG emissions, but energy efficiency improvements can go untapped in the absence of relevant information. Labelling programs can help address this issue, for example by informing consumers about the level of energy consumption of appliances.
- **Benefits of an investment do not accrue wholly to the investor.** This is one reason to provide public support to certain types of research and development. Accordingly, there is a role for government investment in infrastructure that supports low-carbon decision-making, such as public transit and transmission networks to connect clean energy generators to the grid.

MEASURES WITH IMPLICIT CARBON PRICING

All Canadian jurisdictions are undertaking at least some initiatives to reduce GHG emissions. Some of these initiatives take the form of regulatory requirements, technology development and deployment, or voluntary actions that citizens and businesses are encouraged to pursue to reduce emissions.

In many cases, requirements to reduce GHG emissions lead to the imposition of higher costs on consumers. In this way, these mechanisms impose an implicit price on carbon. For example:

- Saskatchewan's Petroleum Research Incentive and Enhanced Oil Recovery Royalty encourage industry to develop technology that reduces the environmental footprint of the oil industry, including carbon dioxide enhanced oil recovery in heavy oil. As part of a carbon dioxide enhanced oil recovery project, carbon dioxide is being captured by an oil producer at a commercial ethanol facility and is being stored in a heavy oil reservoir.
- As part of its implicit carbon pricing approach, Nova Scotia has placed a hard cap on its electricity sector, reducing electricity emissions by 30 per cent to date, and which requires the achievement of a 55 per cent reduction in GHG emissions by 2030.
- In 2003 the Government of Ontario announced that it would close all coal-fired power plants in the province. In 2007, the *Cessation of Coal Use Regulations* came into effect, and the last coal-fired plant went offline in 2014.

- **The presence of monopolies and other forms of market power.** Economic actors who possess monopoly market power may impede the effectiveness of an explicit carbon price as a GHG emissions reduction tool, as they can simply pass on the additional carbon price to consumers, without fundamentally changing their processes. Consumers may, nonetheless, still react to the price increase by buying less of their products.
- **Disconnects between carbon price and energy use.** For example, increased electricity prices may not lead a landlord to invest in energy efficiency improvements in a rental property if the tenant pays the heating and power bills. Building codes or incentive measures for landlords to make energy-saving improvements in rental properties, such as the United Kingdom's Landlord's Energy Saving Allowance, can help address this disconnect.
- **Demand inelasticity.** Some activities may not respond to a carbon price in a timely enough manner unless the price is very high. Transportation is an example where emission standards for vehicles or low-carbon fuel standards can ensure emission reductions in the shorter term.

- **Need for certainty.** Regulations may be needed to ensure that certain types of investments are not made or to pursue a specific transformational path. For example, regulations requiring the phase-out of coal-fired electricity generation prevent investments in long-lasting capital stock, and help avoid investment lock-in and stranded assets.
- **No access to lower cost, cleaner alternatives.** Without access to alternatives, or reasonably-priced alternatives, increased carbon prices may lead to little or no reductions in GHG emissions regardless of the assigned carbon price (e.g., electricity generation, heating fuel, and transportation fuel in rural, remote and islanded regions).
- **Incomplete coverage.** It may be impractical to impose carbon pricing on some types of activities. This can be the case for emissions that are hard to quantify (e.g., fugitives) or for some types of diffuse activities for which there is not a practical point at which to impose the carbon price.
- **Lack of capital.** Some actors may not have access to sufficient capital to respond to the price signal that carbon pricing provides. This can be the case, for example, for low-income families that cannot afford to make improvements to vehicles or homes, and for Northern, remote and Indigenous communities that do not have access to alternatives to fossil fuels for heating or electricity.

In such cases, there may be a role for complementary measures. For example, targeted regulations, supported by an underlying carbon price, may be needed for activities that are not amenable to carbon pricing instruments, and to accelerate transformational changes in areas of high price inelasticity. Public investments in R&D and infrastructure, as well as in information programs, can also support transformative low-carbon innovations and enhance the effectiveness of carbon pricing.

Ideally, the resulting suite of policy measures chosen by governments will help ensure a comprehensive and coordinated approach to GHG reductions. As such, in establishing an explicit carbon pricing mechanism, it is important that taxes on motive fuels as well as the role of other existing explicit and implicit carbon pricings and other complementary measures for certain sectors be properly assessed and taken into consideration.

3 MAIN DESIGN PARAMETERS FOR BROAD-BASED PRICING MECHANISMS

While there are differences in the high level structure of carbon pricing systems, the detailed design of each system can have as much impact on the policy outcomes as the type of system chosen. Many of the same design decisions need to be made, whichever type of system is chosen.

3.1 Coverage of Emissions

Regardless of the broad-based carbon pricing mechanism used or whether the carbon price is determined by the market through an emissions trading system or set by government through a carbon tax, the same GHG emissions can be covered. Generally speaking, the main types of GHGs targeted by imposing a carbon price are those designated by the UNFCCC. Emissions are subsequently converted on the basis of their 100-year Global Warming Potential, in order to use CO_2e as a common accounting base. In this way, the price of carbon is applied uniformly and is based on one added tonne of CO_2e to the atmosphere.

- Both a carbon tax and an emissions trading system can be applied across the same economic sectors that are responsible for most GHG emissions (transportation, electricity production, industry, and buildings), so long as the necessary GHG measurement and reporting rules are in place.
- Performance standards with intensity targets are generally used for industrial resource extraction sectors, manufacturing installations and/or electrical production plants.
- Mechanisms such as fuel taxes, or carbon taxes that just apply to motive fuels, only allow for more limited coverage of the economy, usually emissions that are associated with burning gasoline and diesel.

Emissions trading systems normally extend coverage through enabling voluntary reductions in additional sectors not routinely required to measure and report GHGs under reporting rules. This can be the case, for example, in respect of the agriculture and residual materials (waste) sectors.

While emissions quantification is more challenging in these sectors, offset protocols, which should be meeting high environmental quality standards, may be applied to quantify and verify their emissions reductions. These sectors can voluntarily reduce their GHG emissions, quantify the emissions reductions using approved offset quantification protocols, have the reductions independently verified, and offer them, as offset credits, on the market to companies that are subject to these systems.

The cost of offset credits is generally lower than what the companies would need to spend to achieve comparable GHG emissions reductions at their own facilities and may be accepted by the system authority as an instrument that enables them to meet part of their regulatory obligations.

Carbon tax schemes could also include credible offset credits, although additional infrastructure would be needed for their issuance.

3.2 Certainties Regarding GHG Emission Reductions or the Price Signal

As previously mentioned, both a carbon tax and emissions trading systems provide the market with a carbon price that incentivises agents to reduce emissions whenever the costs of doing so are less than the carbon price.

Cap-and-trade systems provide the certainty of knowing that GHG emissions from covered sources will not exceed a threshold, the cap, in any given period of time. Market forces determine the price per tonne needed to achieve the desired emissions level. This price uncertainty can make it challenging for firms and

individuals to choose which investments will be cost effective in the long-run, and for governments to forecast the proceeds such systems will generate.

In order to reduce price uncertainty, a floor price can be introduced in cap-and-trade systems for use during auctions, below which the government will decline to sell the available emissions allowances. This feature makes it possible to maintain a minimum carbon price, ensuring that the entities covered by the system remain incentivized to invest in greener technologies that emit fewer GHGs. Price spikes can also be controlled by creating a reserve of emissions allowances that the covered entities can access at a predetermined price, thereby offering a soft price ceiling if certain conditions are met.

While the underlying market price of fuels can fluctuate greatly, a carbon tax provides price certainty with respect to carbon pricing, as the additional cost to be paid for each tonne of emissions during a given time period is known; however, the level of GHG emissions achieved by the tax remains uncertain. To meet emissions targets, governments need to monitor the impact of the tax on carbon emissions and adjust the rates accordingly. As such, meeting specific short-term emissions targets through a carbon tax can be challenging. In addition, the need to adjust carbon tax rates in response to revealed emissions increases uncertainty about long-term prices.

Performance standard systems can provide some price certainty by allowing companies to purchase credits from the government at a set price per tonne. Performance standards can be stand alone or implemented with an emissions trading system. When implemented with an emissions trading system, facilities or firms would have the flexibility to pay the carbon price or purchase offset credits. Achieving a given emissions level, however, is difficult because the system focuses on attaining a given level of emissions intensity, rather than a given level of emissions. In a similar manner to carbon taxes, the price of the credits and the stringency of the standards can be adjusted over time to achieve a given emissions target.

3.3 Administration Costs and the Burden of Compliance

Broad-based carbon pricing mechanisms will impose administrative costs on both governments and regulated entities. Depending on the complexity of the pricing systems and the stringency of the quantification, reporting and verification requirements, these costs could be more or less burdensome. Implicit pricing mechanisms also have administrative costs for governments and regulated entities.

The administrative cost of implementing a carbon tax is typically low if the tax simply applies to fossil fuels at standard emissions factors. Historically, Canadian governments already have experience in applying this type of mechanism for motive fuels such as gasoline and diesel, but not for other fossil fuels such as natural gas and coal. In order to implement a carbon tax, governments need to determine the coverage, the rate of the tax and how to collect it. They may also need to calibrate the rate to the target emissions level or to align with other jurisdictions on a regular or periodic basis. Complexities may arise from design features such as tax credits or rebates aimed at addressing some competitiveness issues (e.g., for trade-exposed GHG emission intensive industries). If a carbon tax is expanded to include certain non-combustion emissions, administration costs could increase, depending on the coverage.

With respect to a carbon tax applied to fuel use emissions, fuel producers, distributors or end-users are required to pay to the government, at a pre-determined time and manner, the amount of tax that corresponds to their production, sales, purchases, or use of fuels, as the case may be. Depending on the stage at which the tax is imposed, a smaller number of entities being required to report information or remit money under the tax system will generally reduce the overall administrative cost and burden of compliance. However, if the carbon tax is also applied to industrial process, venting or fugitive emissions, companies operating in industrial sectors may also incur administrative expenses, since they may need to measure, verify, and report their emissions.

Implementing an emissions trading system generally requires a supporting administrative structure.

- A government must develop GHG reporting and audit requirements, its scope and its compliance rules; establish a coverage threshold; and set annual emission caps.
- The system must also be administered, which requires among other things an emissions allowances holding and monitoring register, participant registration, market supervision, and holding auctions. In the case of Ontario and Quebec, the administrative efficiency of certain key market functions (such as auction and market monitoring) is greatly enhanced by a common set of service providers that are part of the linkage with California through Western Climate Initiative (WCI) Inc.

Beyond administrative costs and independent of the selected mechanism, companies must meet their regulatory obligations by assuming the carbon cost for each tonne of emissions.

- For companies directly covered by carbon pricing measures issued under regulations, this usually involves a mandatory annual emissions declaration that generally includes a third-party audit to ensure accuracy. This would also apply to a carbon tax that included non-combustion GHG emissions in the tax base under its system.

3.4 Efficiency and Flexibility of Approaches

Optimal carbon pricing systems encourage emissions reductions from those for whom it is easiest and cheapest to reduce emissions. This is achieved by providing a mechanism where all emitters can choose the cheapest reduction opportunities available, even if that opportunity was not previously known to regulators, and high-cost emitters can choose not to reduce their own emissions – if it is more costly for them to do so than to buy surplus allowances from sources that have reduced their emissions, or pay a fixed price to the government.

Cap-and-trade systems can help ensure that a jurisdiction will not exceed a defined GHG emissions cap at the lowest cost – where the actual cost of remaining within that cap remains uncertain. Economic agents that are able to reduce their GHG emissions at low cost can sell unused allowances to others who need allowances and whose reduction costs are proportionately higher.

Emission trading systems, including cap-and-trade and performance standards, have the potential to include participation from more sectors of the economy by providing non-covered sectors with opportunities to sell reductions on the market by means of offset credits. This option is limited however, to sectors that can develop and apply rigorous quantification protocols at a scale to justify the administrative costs.

Carbon taxes generally apply uniformly to all targeted economic agents at a set point in time. They are visible and stable with respect to the price signal and enable companies to take the precise cost into account in decision making. Under a carbon tax, sectors do not have an incentive to reduce their non-taxed GHG emissions, unless offset credits generated by reductions in non-taxed emissions in these sectors are part of the design and accepted in lieu of paying the tax.

The process of price discovery that may be required to achieve a desired level of GHG emissions can be challenging because of the uncertainty of future activity levels and because governments and covered sectors possess asymmetric information, notably regarding the latter's marginal abatement costs and GHG emission reduction potential. In this context, it can be difficult to set a carbon tax to meet a specific emissions goal, or to predict emissions prices and economic impacts in a cap-and-trade system.

In terms of responsiveness to economic circumstances, cap-and-trade systems can be considered to be counter-cyclical. In other words, if the economy slows down and GHG emissions are falling, the carbon market can react and prices will decrease in response. When the economy improves, GHG emissions will generally rise and the price of carbon will automatically increase again. While this buffers the overall cost

exposure of covered entities, it creates a risk to emissions reduction investments. The value of emissions reduction varies over time and actors will therefore have to incorporate the risk of price drops into their decisions, causing a lag or reduction in the activity taken at a given price – which however could be mitigated by the establishment of a floor price.

As noted above, carbon prices or price controls in all pricing systems ideally need to be designed to account for inflation to ensure they maintain the incentive to reduce emissions.

3.5 Related Proceeds

Both emissions trading systems and carbon taxes offer the potential for generating substantial proceeds for governments. Although it is relatively straight-forward to estimate revenues from a carbon tax, forecasting anticipated proceeds from an emissions trading system is more difficult (absent a floor price). The anticipated level of proceeds under an emissions trading system will then mainly depend on the scope of coverage, the stringency of the cap, the availability of banked credits or offsets, and the volume of emissions allowances freely allocated. Under a carbon tax, anticipated revenue essentially relies on the scope of coverage, the tax rate, the level of activity in emitting sectors, and the availability of low-cost reduction opportunities.

3.6 Other Design Parameters

Broad-based carbon pricing mechanisms can be designed with a number of other design parameters in mind, such as transparency and credibility, boundaries and linkages, and complementary policies.

- A transparent price will send a clear signal to the market and consumers, which is an important factor in ensuring that decisions efficiently internalize the impact of CO_2e emissions. Carbon taxes and trading systems provide a transparent price by having an explicit marginal price on one tonne of CO_2e emissions.
- The ability of carbon pricing mechanisms to allow the broadest participation possible helps to reduce the overall cost of emissions reductions. This can be achieved through a variety of means. For example, if other non-covered participants voluntarily reduce emissions and have the ability to trade those reductions as an offset in either a carbon tax system (i.e., an offset in lieu of paying the tax) or as an offset in a cap-and-trade system (i.e., in lieu of an allowance). The ability of carbon pricing mechanisms to link to other systems also helps to achieve this goal (e.g., the ability to trade offsets between jurisdictions for settlement purposes).
- The extent to which other complementary measures can be integrated into a broader carbon pricing mechanism should also be considered (as discussed above).

3.7 Considerations for Choosing a Carbon Pricing Mechanism

Each carbon pricing mechanism has its advantages and disadvantages. The mechanisms and the design of the system details chosen by a government will depend mainly on its objectives in the following areas:

- The desired level of certainty around reduction in GHG emissions in a given time frame;
- The desired clarity and strength of the carbon price signal over time, both for covered sectors and companies and for the economy as a whole;
- The desire to provide GHG reduction opportunities at the lowest cost in order to limit the impact on covered sectors and low-income households, while achieving GHG reduction objectives;
- The desired level of compliance flexibility for covered sectors and companies;
- The interaction with other climate change policies and regulations; and
- The risks to competitiveness of trade-exposed sectors and desired mitigation approaches.

3.8 What Are Other Countries Doing to Price Carbon?

A number of Canada's largest trading partners are using some form of carbon pricing mechanism, the most common of which are carbon taxes and cap-and-trade systems.

- In the absence of support for new legislation, the United States (U.S.) government is relying on the authorities in the *Clean Air Act* to regulate GHG emissions via, notably, the Clean Power Plan, which sets standards for emissions from power plants, and establishes state-by-state emissions reductions goals, and enables compliance by using a cap-and-trade system through a proposed "Model Trading Rule" to guide state-level compliance options. Independent of federal actions, various sub-national governments in the U.S. have established emissions trading requirements. Under the WCI, California has an economy-wide cap-and-trade system that is linked with Quebec and soon with Ontario (expected by 2018). In addition, a number of northeastern states regulate CO_2 emissions from electricity generation under the Regional Greenhouse Gas Initiative which is also a cap-and-trade system.

- Mexico introduced a carbon tax in 2014 and recently announced that it would launch a 12-month pilot program of a cap-and-trade system in November 2016 which will include voluntary participation by up to 60 companies. The cap-and-trade system is to be administered by research firm MexiCO_2 which will verify reported emission levels. It is expected that a full program will be in operation in 2018.

- China, the world's biggest GHG emitter, has announced that, as of 2017, its seven regional GHG cap-and-trade pilot systems currently in operation will give way to a nationwide system.

Annex 1 provides a listing of international carbon pricing mechanisms, as well as some basic parameters of each system. This sample shows considerable variation in how these policies are implemented, with coverage ranging from 8 per cent of total emissions in Japan to 85 per cent of total emissions in California. The price on carbon also varies across jurisdictions, from between US $1 and US $4 per tonne of carbon dioxide in Mexico to as high as US $168 per tonne of carbon dioxide in Sweden.

The international experience shows that tax and emissions trading systems, as well as overlapping trading systems, can and do co-exist in the same jurisdiction. Many European countries use a combination of both tax and cap-and-trade systems.

- France and Ireland introduced a carbon tax, while also participating in the European Union Emissions Trading System (EU ETS) in order to increase the carbon emission coverage.

- The United Kingdom introduced a carbon price floor on fossil fuels used in electricity generation to complement its Climate Change Levy on industry, agriculture and the public sector. The United Kingdom also participates in the EU ETS.

- Norwegian GHG mitigation policies include a carbon dioxide tax, the *Pollution Control Act*, the *Petroleum Act*, and the *Greenhouse Gas Emissions Trading Act*, which collectively cover more than 70 per cent of Norwegian domestic GHGs.

The Paris Agreement, reached in December 2015, recognizes the importance of carbon pricing and market mechanisms to combat climate change. A whole article, Article 6, is dedicated to this in the Agreement. Of the 188 countries that had submitted their intended nationally determined contributions prior to the Conference, 90 mentioned that they intended to use market mechanisms.[3]

As described further below, in 2017, jurisdictions representing nearly 85 per cent of Canada's economy and population will have broad-based carbon pricing mechanisms in place.[4]

3 For more information, see: http://www.ieta.org/resources/Resources/Reports/Carbon_Pricing_The_Paris_Agreements_Key_Ingredient.pdf

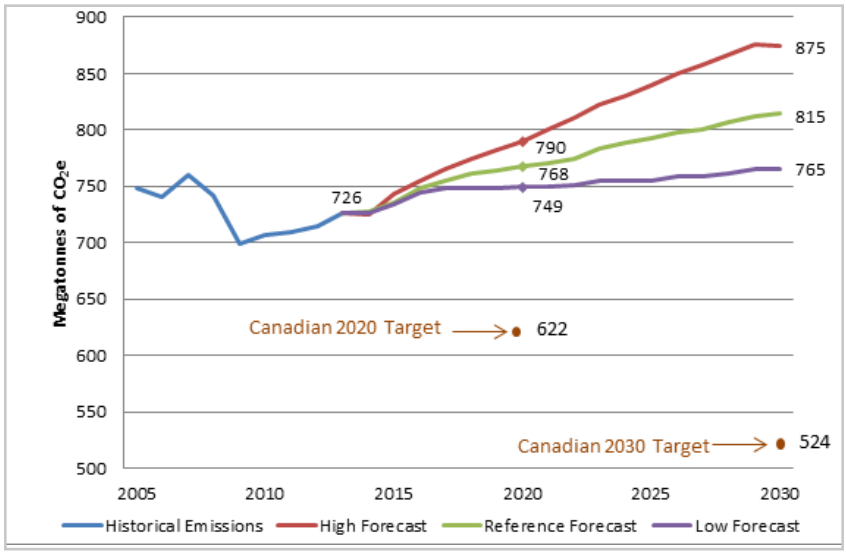
4 Broad-based carbon pricing will not apply to 100 per cent of GHG emissions in any of the provinces with a carbon pricing system. For example, Québec's and Ontario's cap and trade programs cover between 80 and 85 per cent of their overall emissions.

4 HOW CAN CARBON PRICING HELP CANADA MEETS ITS GHG REDUCTION TARGETS?

4.1 Overview of Canada's Emissions Profile

Through the Vancouver Declaration, First Ministers agreed to "implement GHG mitigation policies in support of meeting or exceeding Canada's 2030 target of a 30 per cent reduction below 2005 levels of emissions, including specific provincial and territorial targets and objectives". Figure 1 presents Canada's projected emissions[5] – with three possible scenarios – based on the National Inventory Report. The range in the figure highlights the sensitivity of emissions to broader economic factors – especially the price of oil. The 2030 target would see Canada's emissions reduced to 524 Mt of CO_2e.

Figure 1 – Canada's Projected Emission Profile



Based on projections from Canada's Second Biennial Report on Climate Change, which generally include policies in place prior to September 2015, Canada's emissions are projected to be 9 per cent above 2005 levels in 2030, meaning 291 Mt above Canada's target of 30 per cent below 2005 levels in 2030. Inclusion of other measures, including recently announced additional policy measures in Alberta, British Columbia, Ontario and Newfoundland and Labrador are expected to reduce the forecast emissions and gap to the 2030 target.

5 The data and projection used in this section do not necessarily correspond to those of provinces and territories who compile and produce inventories. There is nonetheless a general consensus that in order to ensure the comparison at the provincial and territorial scale, these data and projections are the only one that can be used at the moment. Work has been undertaken, in partnership, in order to improve the data and projection.

4.2 Illustrative Carbon Price Scenarios for Canada

Current provincial and territorial carbon pricing policies have a wide range of impacts across their respective economies and are contributing to GHG emission reductions in Canada. Increasing the overall level of ambition across the country in order to achieve Canada's GHG emissions targets may require implementing carbon prices where there is none, increasing existing carbon pricing mechanisms, developing additional mitigation measures, or implementing a combination of these approaches.

To better understand the implications that additional carbon pricing could have in Canada, Environment and Climate Change Canada's EC-Pro model was used to model three illustrative explicit carbon pricing scenarios that are presented in this section. These scenarios are meant to broadly illustrate the impacts on the economy of carbon pricing in general at various levels of ambition, rather than to reveal the impacts of any specific policy proposal.

EC-PRO MODEL

The EC-PRO model is a small open-economy recursive-dynamic computable general equilibrium (CGE) model of the Canadian economy. It captures characteristics of provincial production and consumption patterns through a detailed input-output table and links provinces via bilateral trade. Each province and territory is explicitly represented as a region. The representation of the rest of the world is reduced to imports and export flows to Canadian provinces which are assumed to be price takers in international markets. To accommodate analysis of energy and climate policies, the model incorporates information on energy use and GHG emissions related to the combustion of fossil fuels. It also tracks non-energy related GHG emissions. The EC-Pro model, being a CGE model, is an appropriate tool for modelling carbon pricing scenarios, since it allows the entire economy to respond as relative prices change throughout the economy. However, some significant caveats should be noted:

- Results from CGE models should always be interpreted as based on a certain set of assumptions. These assumptions typically vary from model to model, which can lead to different models producing differing results. Model results are therefore most useful when interpreted in relation to other scenarios of the same model, rather than as predictions on an absolute basis.
- CGE models do not typically capture the full range of positive impacts of climate change policies. These might include the development of new green technology sectors; direct benefits on public expenditure, such as those resulting from improved health; or the reductions of societal costs associated with GHG emissions, which are estimated to be $41 per tonne CO_2e on a global basis in 2016 by Environment and Climate Change Canada. In cost- benefit analysis, these positive societal impacts would offset some of the negative economic impacts typically predicted by CGE models.
- Calibrating the model to match the unique characteristics of each province and territory is a major endeavour and federal-provincial-territorial collaboration on modelling approaches is ongoing.[6] Modelling exercises undertaken by individual provinces and territories can focus specifically on these unique characteristics of their energy economy and may provide more robust results for individual regions. The EC-Pro model, on the other hand, has the advantage of explicitly modelling interactions between regions which provides a pan-Canadian perspective. This likely explains many of the differences regarding GHG inventories, projections and impacts which exist when comparing modelling analysis published by federal, provincial and territorial, and non-governmental institutions.
- Additionally, Quebec's and Ontario's participation in an international cap-and-trade system may generate GHG reductions within the system but outside of Canada. The potential GHG reductions realized internationally as a result of the trade of allowances between jurisdictions would not be accounted for by the model.
- The EC-Pro model does not attempt to predict which new technological breakthroughs will materialize in the future. As these new technologies become available, their cost will likely fall and their overall effectiveness improve, thereby leading to more emissions reductions at lower carbon prices than predicted by these models. While the available technologies in the model are limited to those that currently exist, associated performance characteristics (e.g., level of energy efficiency, operating costs and up-front capital costs) improve over the projection period.
- Global commodity prices and carbon policies are assumed to be static. This results in increased leakage and reduced positive technology spillover relative to a global increase in climate policy ambition.
- Provinces and territories may have put in place climate change policies that extend beyond the scenarios discussed below. Moreover, the modelling does not take into account the effect of mitigation policies that could be drawn from the work of the Mitigation Working Group or new provincial/territorial policies having an effect on carbon price or level, and which could also contribute to reaching Canada's GHG emissions reduction objectives

6 Matching the unique characteristics of smaller jurisdictions presents particular differences since some sectors may be comprised of a smaller number of firms. Results for smaller jurisdictions potentially have a large degree of error.

4.2.1 Baseline and Scenarios

The EC-PRO model was calibrated to create a baseline consistent with Canada's Second Biennial Report on Climate Change submitted in February 2016 to the UNFCCC. Apart from emissions data submitted to the UNFCCC, key information used for projecting emissions includes projections of energy demand and supply in line with the National Energy Board, gross domestic product (GDP) and population growth (from Department of Finance and Statistics Canada).

At the time of writing this report, the projected emissions are based on assumptions for 2015 – therefore only policies in place before September 2015 are currently captured in the baseline.[7] Because results are reported relative to a baseline that already contains broad-based carbon pricing actions in Quebec and British Columbia, it should be kept in mind when interpreting results that they do not represent the full effect of the broad-based mechanisms already in place, only the incremental impact from 2015 policies. In addition, the baseline does not capture the significant decline in oil prices, other recent changes to the energy market nor any policies which have been implemented, announced or changed since September 2015.[8] As such, recently announced climate policies, such as cap-and-trade in Ontario and carbon pricing, coal emissions phase-out, methane reduction commitment and oil sands limit in Alberta are not included in the baseline or illustrative scenarios for this modelling exercise. The model also assumes that no additional action on climate change is undertaken in other countries.[9]

Three illustrative carbon price scenarios are modelled with economic and emissions impacts reported in the following sections:

- 15/30 price scenario would start at $15 in 2018 and rise to $30 in 2030 in nominal terms.
- 30/40 price scenario would start at $30 in 2018 and rise to $40 in 2030 in nominal terms.
- 30/90 price scenario would start at $30 in 2018 and rise to $90 in 2030 in nominal terms.

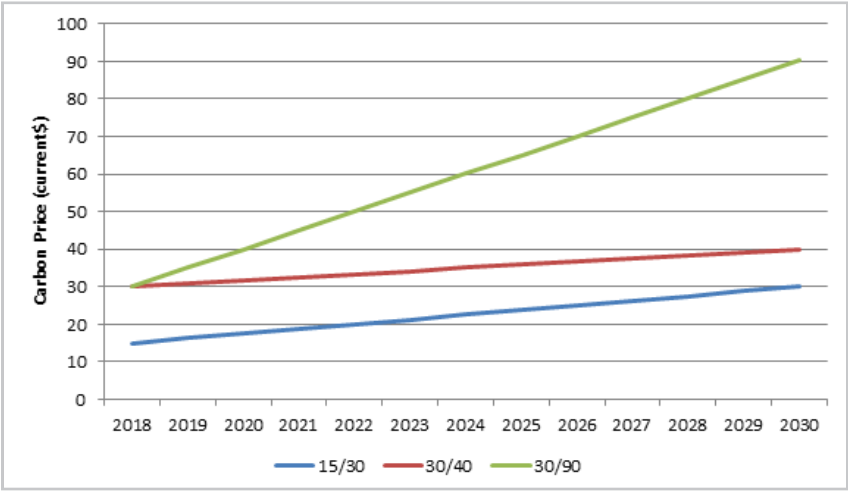
These scenarios are anchored by the highest level of carbon pricing currently in place in Canada - $30 per tonne in British Columbia. Scenario 1 illustrates the impact of carbon pricing in all provinces and territories gradually increasing to $30 by 2030. Scenarios 2 and 3 illustrate the impact of adopting carbon pricing in all provinces and territories at $30 per tonne and increasing this price to $40 and $90 per tonne respectively by 2030. Higher-price scenarios, such as a scenario that achieves Canada's targeted reduction of 30 per cent below 2005 levels by 2030, cannot be realistically illustrated with the simple treatment provided in this section. This is because the model represents the economy as it exists today. At higher carbon prices, the probability that a technological breakthrough or a significant structural change will occur increases; this reduces the value of the modelling results.

7 For example, the baseline for Quebec assumes that the carbon price remains at a price floor of about $20 per tonne in nominal terms in 2030 – although the price should be around $30 per tonne in nominal terms in 2030 with the regulation in place. Therefore, the baseline does not take into account any future increase in the carbon price in Quebec due either to increases in the price floor above what is included in the baseline or higher prices caused by scarcity of allowances in a cap-and-trade system. The baseline for British Columbia assumes that the carbon price remains at $30 per tonne in nominal terms throughout the projection period. The baseline scenario assumed an effective carbon price of $6/tonne ($30/tonne on 20% of emissions) in Alberta.

8 The baseline scenario assumes an oil price of $75/bbl in 2017 rising to $98/bbl (2015 US$) while Alberta's most recent forecast is substantially lower, projecting a price of $45/bbl in the 2016/17 fiscal year, and not hitting $75/bbl before 2020.

9 If other countries were to apply a broad-based price to carbon as modelled in these scenarios, the emissions reductions and economic impacts illustrated in these scenarios could be reduced because of reduced leakage, but emissions reductions could also improve due to increased technology improvement spillover.

Figure 2: Trajectory of the Carbon Price by Scenario



The scenarios assume that the price is applied in a manner that achieves a national price at the given level. In other words, where existing broad-based carbon pricing systems in a given province or territory were in place in 2014, the additional carbon price will be applied only to the extent that it brings the price to the national level.[10] For example, in scenario 15/30, British Columbia is exempted from an additional price since it already is at $30. However, in scenario 30/40, the difference between the national price and British Columbia carbon price is added (e.g., $0 in 2018 and $10 in 2030). For simplicity, this new carbon price is assumed not to interact with existing policies.[11]

For all scenarios, the carbon price is applied to cover all emissions from the combustion of fossil fuels that are relatively easy to price and emissions from industrial processes.[12] The emissions not covered by these scenarios include fugitive emissions, non-energy agricultural emissions (e.g., emissions from livestock, manure management, agricultural soils) and waste (landfills). In 2014, this would have covered over 80 per cent of total emissions in Canada, although coverage would have differed by province and territory based on their emission profile.[13]

In order to simplify the modelling work, no free allowances are issued and revenues generated by the carbon price are returned by direct transfer to the household sector in the province or territory where the carbon price was paid (other possible uses of revenues are discussed in following sections of the report related to revenue recycling and competitiveness). As discussed below, there are many potential policy priorities that governments could pursue in recycling carbon pricing revenue, which would have different emissions and economic impacts across sectors and regions from these illustrative scenarios. A policy that did not recycle revenue within the jurisdiction where it is collected could have substantial distributional and macroeconomic effects, negatively affecting jurisdictions that see a net loss of funds.

10 The new carbon price only tops up existing broad-based carbon prices. It does not take into account other taxes that price carbon, such as motive fuel taxes or other implicit measures.

11 In reality, policies could have important interactions. This will be especially important within cap-and-trade systems where prices adjust to clear the market.

12 Emissions from industrial processes are covered to be consistent with the approaches being taken by current provincial carbon pricing policies.

13 Under these coverage assumptions only 65 per cent of emissions are covered in Saskatchewan and Manitoba, while over 95 per cent of emissions are covered in Yukon, Northwest Territories, and Nunavut.

Finally, all results are presented as relative to the baseline projection rather than the economy as it exists today. For example, Yukon currently generates 95 per cent of its electricity using hydro and as demand has grown in previous years, the government has chosen to invest in new hydro capacity so that hydro's share of electricity generation has actually increased slightly. However, in the absence of any new projects, diesel power would be the least-cost alternative for new generation; modelling was done on the assumptions that no new policy decisions were made on new hydro or other generation projects and that all new generation capacity is met using diesel. As a result, the baseline has diesel accounting for 30 per cent of electricity generation in Yukon by 2030 (even though almost none exists today). In reality, the government of Yukon might choose new hydro builds for a variety of reasons, but those would be considered new policies that are not currently included in the baseline.

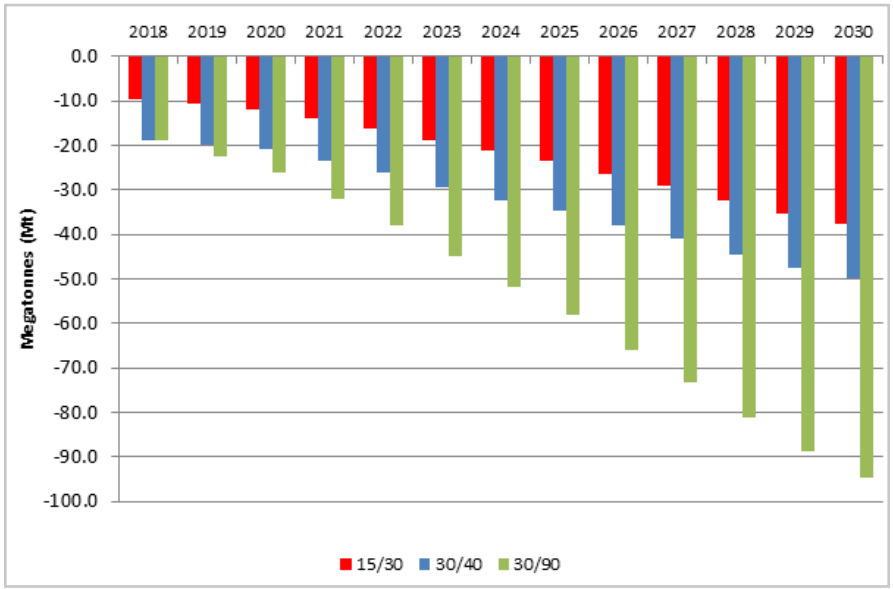
Although none of the scenarios lead to the necessary reductions to meet Canada's mitigation goals, as discussed in a following section, having a carbon price that is significantly higher than our trading partners could increase leakage and further the need to design policies to address competitiveness concerns in order to mitigate the leakage of emissions to other regions.

4.2.2 Estimated Impact on Emissions

Carbon pricing provides an incentive for firms and households to reduce emissions whenever and wherever the costs of emission reductions are less than the costs of paying the carbon price. The amount of emissions in a region will therefore decline as the carbon price rises.[14] As shown in Figure 3, all three scenarios result in reductions at the national level. Compared to the baseline scenario of 815 Mt, the 15/30 price scenario results in a level of GHG emissions in 2030 of 777 Mt (38 Mt below the baseline scenario). The 30/40 price scenario results in a level of emissions for 2030 of 764 Mt (50 Mt below the baseline scenario) and the 30/90 price scenario results in a level of emissions for 2030 of 720 Mt (95 Mt below the baseline scenario).

Importantly, as most CGE models would predict, there is not a linear relationship between emissions reductions and the carbon price. While the carbon price is 2.25 times higher in the 30/90 price scenario in 2030, emissions reductions are only 1.9 times larger than the 30/40 price scenario.

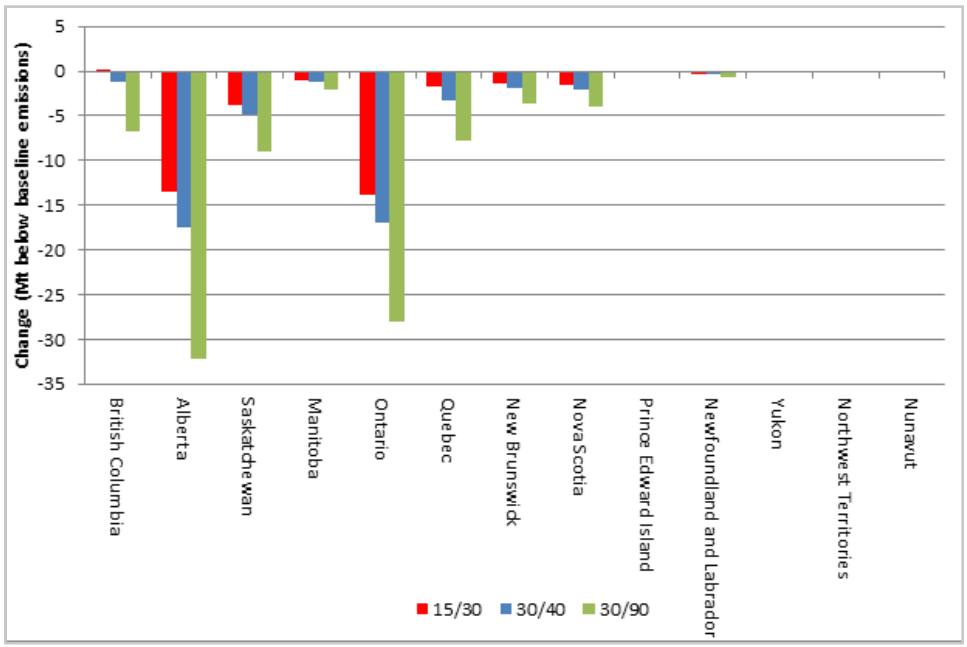
Figure 3: Estimated National Emissions Impacts



14 As discussed in a following section, because trade patterns will also change as a result of carbon pricing, emissions reductions in a specific region will not necessarily represent global emissions reductions.

As mentioned above, a carbon price will incentivize low-cost abatements. However, low-cost abatements opportunities are not necessarily located uniformly across regions. Figure 4 shows the estimated reductions in emissions in each of the provinces and territories (Figure 4a is expressed in megatonnes and Figure 4b is expressed as a percentage from baseline emissions). It is noteworthy that, in response to the 30/90 price scenario, reductions differ significantly from one province to another.[15] This highlights the fact that marginal reduction costs vary depending on many factors, including whether provinces and territories are currently engaged (or are planning to engage) in carbon pricing, and if consistent efforts have been undertaken to reduce emissions in the past.

Figure 4a: Estimated Emissions Impacts (Mt) by Jurisdiction in 2030[16]



15 The relatively large GHG reduction in Nova Scotia is largely attributable to decreased emissions intensity in the electricity sector. By lowering emissions, explicit carbon pricing will interact with Nova Scotia's existing implicit carbon pricing policies in this sector (as discussed above) . Because the model does not capture this interaction, the net effects reported for Nova Scotia in Figure 4 and Appendix 2 are likely overstated.

16 The carbon price applied in these scenarios is reduced in British Columbia (by $30) and in Quebec (by $20) to account for how existing policies were modelled in the baseline. Possible future increases in British Columbia's carbon tax or increases in allowances prices in Quebec above $20 are not included in this calculation. Allowance prices in Quebec will, at a minimum exceed $30 by 2030 given the expected trajectory of the regulation in place in Quebec. In addition, by 2030 scarcity of allowances could result in market prices above the price floor. No adjustment was made to account for Alberta's Specified Gas Emitters Regulation, despite it being included in the baseline scenario (at an assumed effective price of $6/tonne).

Figure 4b: Estimated Emissions Impacts (% of baseline emissions) by Jurisdiction in 2030

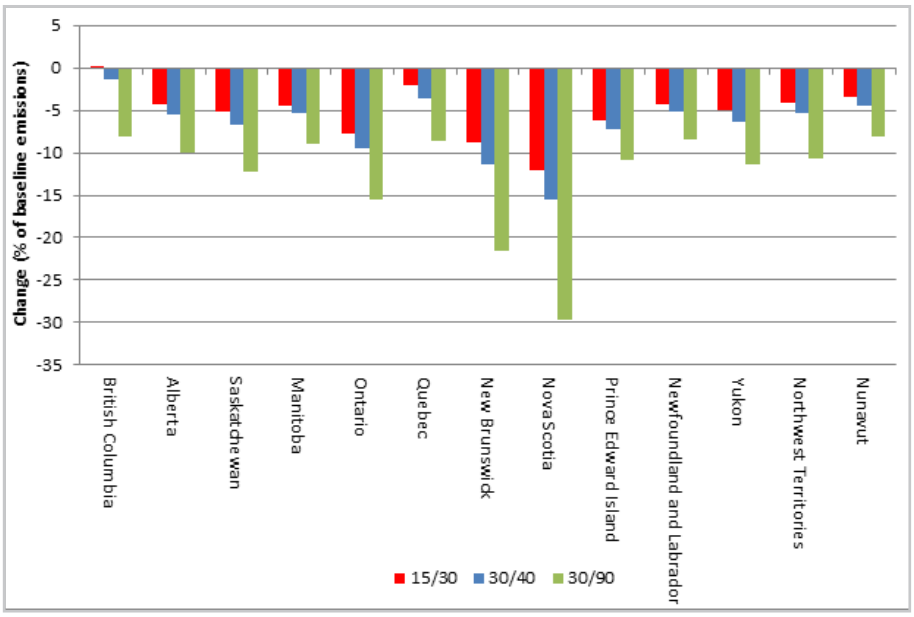
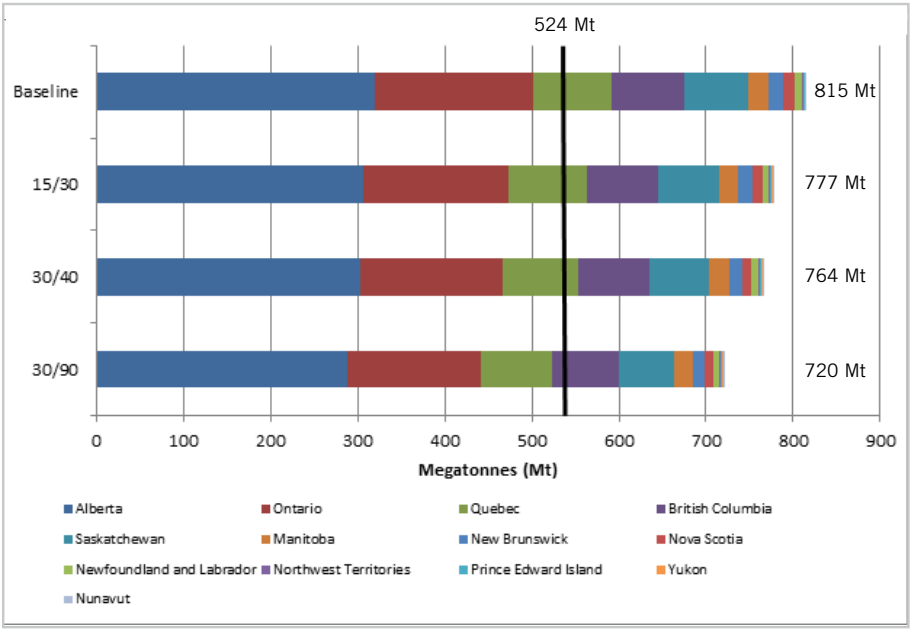


Figure 5 also breaks down emissions by province and territory to illustrate how the overall inventory of emissions changes in response to these scenarios, as well as the magnitude of additional reductions required to achieve Canada's emissions target of 524 Mt by 2030.

Assuming no additional mitigation actions other than those included in the baseline (i.e., in effect prior to 2014), it is estimated that by 2030, Alberta, Ontario, Quebec and British Columbia together would account for 83 per cent of total Canadian emissions. As noted previously, those four provinces will be subject to a broad-based carbon pricing mechanism by 2017. In that context, a large portion of the GHG emission reductions reported in this section would be achieved by the four existing systems if carbon were priced at levels consistent with the prices presented in the scenarios.

Figure 5: Estimated Emission Impacts in 2030



4.2.3 Estimated Economic Impacts

Fully assessing the economic impacts of carbon pricing is complicated. In addition to estimating the costs that pricing will impose on various parts of the economy, it is important to account for the benefits of reducing GHG emissions (including the avoided costs of climate change), certainty of cost of emission for businesses planning investment, long-term financial benefits of transitioning to a cleaner economy, and the potential benefits that may flow from innovations driven by carbon pricing.

Any assessment of the economic impacts of carbon pricing also needs to account for the uncertainties inherent in future economic projections and modelling. Model-based estimates depend on a wide range of assumptions, including a projection of the future economy. Thus, to the extent that underlying assumptions are uncertain or future economic performance differs from the projections embedded in the models used by the working group, the actual economic impacts of carbon pricing will differ from the estimated impacts presented in this section. In particular, while the economic growth projections in the working group's modelling are consistent with the integrated energy, emissions and economic baseline in Canada's Second Biennial Report on Climate Change, different economic assumptions, when projected out to 2030, can result in level values having significant variation (as shown by the range of Canada's projected emissions profile in Figure 1).

Each of the modelled scenarios outlined in this section projects that real GDP will continue to grow over the projection period, albeit at a slower pace than in the absence of carbon pricing. While GDP (in $2011) rises to about $2.6 trillion in 2030 in the baseline, the model estimates that carbon pricing could reduce that by about $7 billion (at $30/tonne) to about $24 billion (at $90 per tonne). This translates into the average yearly growth rate between 2018 and 2030 slowing by 0.02, 0.03 and 0.08 per cent respectively for the different price scenarios. These estimated impacts are below the average revision to GDP growth year over year or the potential effect of fluctuations in world oil prices. Furthermore, these impacts are small compared to the alternative economic assumptions consistent with the high and low emissions scenarios from Figure 1 (where GDP ranges from $2.4 to $2.9 trillion).

Actual economic impacts will be sensitive to the design of the policy. For example, impacts will vary depending on how revenues are recycled. The illustrative carbon pricing scenarios described above assume that revenues are recycled to the household as lump-sum transfers in the jurisdiction where the revenues were collected. If revenues were instead recycled such that 1/3 are used to reduce labour taxes, 1/3 are used to reduce capital taxes and the remaining 1/3 are transferred to households, real GDP impacts from the 30/90 scenario would fall from $24 billion to $17 billion in 2030.

The estimated economic impacts do not take into account the benefits that will result from clean growth policies, including through investments in infrastructure and the development of new green technology sectors. As well, carbon pricing will provide business certainty and help create and attract investment opportunities in Canada and enable export growth of clean tech and services solutions. These positive impacts are not addressed in our models, but can be expected to sustain growth.

Finally, these estimates do not consider the cost of global inaction on climate change. The National Roundtable of Energy and the Environment in its 2011 "Paying the Price" report[17] found that global failure to address climate change could have significant economic impacts for Canada. Its analysis showed that impacts "could range from $21 billion to $43 billion per year by 2050, equivalent to 0.8% to 1% of GDP, depending upon what future global emissions occur and how Canada grows in the meantime."

Economic impacts will likely differ across regions just as differences in the economic structure of jurisdictions led to emissions impacts differing across jurisdictions. Jurisdictions with a relatively large amount of emissions-intensive industries or relatively emission-intensive household sectors will tend to have relatively larger economic impacts than other jurisdictions or ones that already have carbon pricing systems in place.

17 For more information, see: http://nrt-trn.ca/climate/climate-prosperity/the-economic-impacts-of-climate-change-for-canada

5 CONSIDERATIONS IN THE IMPLEMENTATION OF CARBON PRICING IN CANADA

While carbon pricing would help meet GHG reduction targets by internalizing the price of carbon into the cost of goods and services, it would also represent an increase in costs facing some producers and consumers. As such, carbon pricing presents several issues that need particular attention.

5.1 Revenue Recycling

A carbon pricing mechanism has the potential to raise significant revenues.[18] The design decisions around coverage, price and mitigation goal in any system will have a significant impact on the revenue collected. In addition, decisions around how that revenue is recycled back into the economy will be a central determinant of the overall economic and equity impacts of any policy and can have a significant impact on aggregate emissions outcome.

There are three broad policy goals that governments might hope to address using recycled revenues. When comparing various recycling options, it is important to consider them in the context of the policy goal they are meant to address. Governments might choose to recycle revenues to:

- Offset equity and competitiveness impacts created by the carbon price;
- Facilitate the transition to a low-carbon and resilient economy;
- Boost sustainable growth and raise the long-run standard of living of households, including in Northern, remote and Indigenous communities; or
- A mix of those options.

5.1.1 Recycling Options to Address Equity Impacts of Carbon Pricing

Because carbon pricing works by changing the relative price of goods in the economy, firms and households that rely more on carbon intensive goods will face greater impacts than those that rely less on carbon intensive goods.[19] This creates the incentive for firms and households to internalize the cost of carbon into their decisions and reduce their use of carbon intensive goods. However, carbon pricing will systematically impact some subgroups, such as Northern, remote and Indigenous communities, more than others and while the incentives to reduce emissions should be maintained, there exists a rationale to use recycled revenues to limit the impacts on subgroups that are impacted more, not because of their choices but because of their circumstances. These subgroups could be defined based on income, access to lower-cost options, dependence on emissions-intensive industries, or other metrics.

5.1.2 Household Equity Impacts

The level of CO_2e emissions generated by $1,000 of consumption spending does not differ significantly across income quintiles, suggesting that the carbon intensity of the consumption basket does not significantly vary with income. However, lower income households consume a greater share of their income and are therefore disproportionately affected by carbon pricing. A carbon price and a sales tax (including fuel and excise taxes) will thus exhibit a similar degree of regressivity across income groups. The regressivity does

18 Revenue generation from carbon pricing is one component that a government can use in its overall fiscal management. To the extent that carbon pricing will have an impact on other parts of the economy, or revenues from other sources, it may result in reduced revenues elsewhere during the transition to a low carbon economy.

19 The embedded costs in goods and services such as food, water and clothing, as well as motive fuels that could be used, for example, in traditional hunting/fishing activities, could be significantly impacted, which could disproportionally affect Northern, remote and Indigenous communities and increase their dependence on southern imports.

not come from low-income earners consuming relatively more high-carbon content goods but for the same reason as for a sales tax: since the consumption-income ratio is higher for lower income households (as they save less), taxes paid on consumption will necessarily represent a higher proportion of these households' income.

Generally, sales tax regressivity is addressed through exempting some goods (e.g., basic groceries) and through direct transfers to low income households (e.g., Goods and Services Tax (GST) credit). Another possibility would be to means-test subsidies for abatement actions, recognizing that lower income households have less disposable income to invest in energy efficient technology. The need to recycle revenues toward lower income households would be structural rather than transitional.

Furthermore, the recycling of revenues to address equity issues could be implemented though programs specifically designed and focused toward low-income households, including Northern, remote and Indigenous communities, in order to reduce the proportion of the revenue spent on carbon-intensive goods and services. Alberta's planned carbon levy rebates to low- and middle-income households and British Columbia's low income climate action tax credit are two examples of this type of policy.

5.1.3 Sectoral Impacts and Revenue Recycling

Carbon pricing works by making carbon-intensive goods more expensive and carbon-intensive firms less competitive. For this reason, many of the competitive and equity impacts across sectors are a necessary product of a functioning carbon pricing system. As the market adjusts to the reality of carbon pricing, the overall make-up of the economy will change. This will create a period of transition where some firms will need to change production processes and some individuals may need to change employment.

By investing in this transition to address the financial constraints of individuals and firms, governments could potentially limit impacts and speed up the transition to a sustainable low carbon economy. Transitional assistance could include support to adopt lower emitting or energy efficient technology or retraining programs for displaced workers. This will be especially important in communities which are dependent on carbon intensive firms/sectors, such as diesel-dependent communities in Northern and remote contexts.

Special consideration could also be given to the competitiveness impacts of carbon pricing on emissions-intensive sectors with limited ability to pass on increased costs related to carbon prices. (See further discussion below.)

Carbon pricing may result in domestic firms with low emissions intensity losing market share to firms in low carbon price jurisdictions with high emissions intensity, thereby reducing the environmental benefit of the carbon price. Recycling revenues to reduce the competitiveness impacts can potentially improve global climate outcomes. However, any initiative that increases production by emissions intensive domestic firms will make achieving national targets more difficult.

As such, it is important to take considerable care in identifying sectors that may be subject to lost opportunities to foreign competitors as a result of carbon pricing. In addition, policies to help alleviate these impacts should either be transitional in nature or related to the carbon pricing policies of our trading partners.

5.1.4 Recycling Options that Help Transition to a Low Carbon and Resilient Economy

The overall goal of carbon pricing is to reduce emissions. As such, proponents sometimes discuss the virtuous cycle of reinvesting revenues collected by carbon pricing into areas that further reduce emissions or to ensure adaptation and increase resiliency.

That said, carbon pricing itself should provide a robust economic signal that creates the incentives to undertake any abatements that are economical. The impacts of additional incentives to reduce emissions could be less than expected in the cases where: individuals and firms receive incentives for actions they were already going to make because of the price signal; incentives target additional reductions in areas with inefficiently high costs; and, the incentives interact with the carbon pricing mechanism leading to higher emissions elsewhere in the system.

However:

- In practice, it is only possible to price things that are measurable with some degree of certainty. For this reason, it is difficult to price the emissions associated with some sectors of the economy. Despite this fact, these sectors sometimes have many low cost opportunities to reduce emissions. Recycling revenues to incentivize emissions reductions in these sectors could be justified, although complementary regulations that mandate best practices are a potentially more cost-effective way to incentivize emissions reductions in parts of the economy that are not subject to carbon prices.
- Fighting climate change can be considered a technological problem. The world needs new technologies to be developed in order to maintain (and improve) living standards while reducing the amount of GHGs emitted. Unfortunately, two main market failures lead to an inefficiently small amount of green innovation. The first is the knowledge spillover market failure, where innovators are unable to monetize the full value of their innovation. By making incremental improvements, future innovators benefit from having access to existing innovations but also steal market share from the original product. The second market failure is that the benefits to some types of relevant innovation will be global while a carbon pricing instrument will only change demand within the domestic market. Because Canada is a relatively small market, carbon pricing in Canada would have only a modest impact on global green innovation. To incentivize more green innovation, governments could further fund basic research and/or provide additional support for research and development, subject to the availability of appropriate human resources.
- Certain goods in the economy have a public nature and will not be efficiently provided by the market. Governments generally take it upon themselves to provide these goods (e.g., public transit, parks, police and military). Carbon pricing has the potential to increase expenditures associated with providing these goods both by increasing their demand and increasing their costs. For instance, governments may be required to expand the public transit system or the electricity grid to extend these services to a larger part of the population. Some public infrastructure may no longer be consistent with a low carbon economy and may require replacement before the end of its useful life. Alternatively, the costs of governments might increase with the need to reduce emissions in their buildings, vehicle fleets and military. Recycled revenues could potentially be used to offset the costs associated with these expenses.

Recycling revenues to accelerate the transition to a low-carbon economy can provide various benefits. Measures that assist firms to increase energy efficiency could help reduce production costs, make firms more competitive, and improve the overall energy security of the jurisdiction. Programs aimed at fostering green innovation could also contribute to the creation of new technology clusters and green jobs. Recycling revenues into measures that reduce fossil fuel combustion will also have a positive effect on air quality and on public health care expenditures, not to mention the numerous co-benefits on the security and quality of life that stems from actions aimed at improving active and sustainable means of transportation.

5.1.5 Recycling Options that Achieve Stronger, More Inclusive and Resilient Long-term Economic Growth

Given that governments have many competing policy priorities, revenues from carbon pricing could potentially be directed towards areas that are not directly related to climate change. Directing funds towards policies that achieve stronger, more inclusive and resilient long-term economic growth could be justified

regardless of the source of the revenues. Because emissions are partly a function of economic activity, recycling revenues in a way that promotes economic growth will increase the carbon price necessary to achieve a given emissions reduction. However, higher incomes will also have an impact on the ability of households to make investments that lower their emissions.

Economic impacts of carbon pricing are difficult to estimate, as modelling does not take into account uncertainty in economic projections, benefits to the economy, and the cost of not taking climate action. Estimates vary widely, with one of the main factors being how revenues are recycled. In general, the projections showing the smallest impacts on GDP are the ones in which the revenues from carbon pricing are used to reduce distortionary taxes.[20] Generating revenues through a price on carbon provides the opportunity to adjust the overall tax mix in the economy to increase overall tax competitiveness or make the system more equitable. Tax mix changes could be an efficient way to deal with many of the equity issues above.

Other priorities might include stimulating the economy and promoting long-term sustainable growth through targeted investments in infrastructure or improving the current or future fiscal balance of governments.

5.1.6 Considerations

To ensure transparency about the use of the proceeds from carbon pricing, governments could choose to direct all carbon revenues to:

- Revenue neutrality (all revenue from the carbon price is used to lower other sources of revenues, such as in British Columbia); or
- Fiscal neutrality (all revenue from the carbon price is used to either lower other sources of revenue and/or reinvested in new spending associated with climate change, such as in Alberta, Quebec and Ontario).

Revenue recycling could offset much of the economic cost, correct equity impacts or increase emission reductions and help pay for public infrastructure to support mitigation activities and adaptation to climate change impacts, or a mix of these approaches. However, the choice between recycling options requires weighing trade-offs. Different governments at different periods may choose to recycle differently and there may not be one optimal choice.

5.2 Northern and Remote Communities

Unless there are appropriate supporting measures, any carbon pricing mechanism could have disproportional impacts on Northern and remote communities, as they face unique challenges compared to the rest of Canada. Northern and remote communities are generally characterized as permanent or long-term settlements that are not connected to the North American electrical grid or natural gas network.

According to the Natural Resources Canada Remote Communities Database, there are roughly 284 remote communities in Canada. These include communities, settlements, villages or cities, as well as long-term commercial outposts and camps for mining, fishing and forestry activities. Approximately 60 per cent are considered to be Indigenous communities (First Nations, Innu, Inuit, Métis).

Given geographical realities, these communities could face additional burdens from carbon pricing mechanisms in the context of transportation costs, generation of electricity, heating costs, as well as impacts on local fuel-intensive industries, such as mining operations.

20 Recycling revenues to decrease other taxes is a straightforward exercise in CGE modelling. Recycling revenues in ways that promote technology or incentivize additional emissions reductions are computationally more difficult since the effectiveness of these actions depends largely on their design.

5.2.1 Transportation

The vast transportation distances and geographical remoteness of Northern and remote communities necessitates a heavy reliance on air travel and other motive-fuel vehicles and is the major driver of emissions in the transportation sector. Long-distance medical travel is also a necessity for residents living in small, remote communities with limited health care services, as well as for hospital patients requiring medical procedures that are not available locally.

5.2.2 Generation of Electricity

With the exception of a few local hydro grid-tied communities in Yukon, Northwest Territories and Quebec, the vast majority of remote communities across Canada rely on diesel generation for the production of electricity, and there are currently few options for renewable technology substitution (e.g., electricity consumption is far too small to integrate wind energy cost effectively and the technical maximum solar penetration may only displace 2-10 per cent of the annual diesel use). Thus, most of these communities are characterized by a high degree of dependence on imported fuel and high energy costs, which can inhibit the localization of goods and services.

Community isolation also affects the energy source mix for electricity. Interconnecting most communities to a transmission grid is cost prohibitive due to the sheer distance between them and the small population size also prohibits investment into alternatives due to technical and economic challenges of integrating complex multi-source systems into remote communities. [21]

5.2.3 Heating

The majority of homes and buildings in the Territories are heated by diesel or other liquid fuels. In general, reliance on diesel fuel is due to less viable options to ship/transport and consume fuels with lower carbon content (e.g., natural gas, propane, wood pellets). This reliance on diesel is exacerbated by the fact that winters are generally longer and colder in the northern communities, resulting in more days requiring space heating than the average Canadian household. For example, winter temperatures can remain below -40°C for prolonged periods in the Territories, and in other northern communities.

5.2.4 Impacts on Fuel-Intensive Industries

The Northern economy is less diversified than Canada's national economy and the industries that are prevalent are fuel-intensive. For example, mining, quarrying and oil and gas extraction and public administration, accounted for over 40 per cent of the North's GDP in 2011. Further, the transportation and electrical needs for mining can push energy costs to 30 per cent of total operations expenses at a northern mine. While the industrial sector in the Yukon is powered by hydro or diesel, depending on the size of the operation and proximity to the grid, industries in Northwest Territories and Nunavut rely almost exclusively on diesel electricity generation.

21 The establishment of mini and micro grids for remote electrification has been identified as a possible means to facilitate the localization of goods and services.

5.2.5 Considerations for Northern and Remote Communities

These challenges that Northern and remote communities may face do not necessarily preclude the use of carbon pricing mechanisms, however, it will be important to take into account certain considerations in contemplating carbon pricing mechanisms and the recycling of revenues.

- Remote communities that are heavily reliant on carbon-based fuels would be disproportionally burdened by a carbon pricing. Further, these communities, particularly those above the tree line, currently have limited opportunities to reduce their consumption of carbon-based fuels by making use of alternative fuels.
- The embedded costs in goods and services such as food and clothing could be as significant as the direct costs from carbon pricing on energy.
- Inadequate access to capital, low on-reserve investment, and low employment rates impede the ability of vulnerable groups to diversify economies or invest in new infrastructure, which makes it harder to address the increased resources needs associated with mitigating the impacts of climate change.
- Carbon pricing raises the cost of operations and reduces the competitiveness of fuel intensive industries, such as exploration for, and extraction of minerals, oil and gas, which operate in a global economy. (This factor is not limited to Northern or remote communities.)
- Carbon pricing mechanisms could significantly affect the budgets of governments in Northern and remote communities.

Islands and islanded communities, which are not necessarily considered to be Northern or remote, may face similar challenges depending on their isolation relative to the mainland. For example, there may be limited access to alternative fuels or other electrical grids. Further, these communities may face higher transportation costs, and this could have an impact on the cost of all goods and services in those communities.

5.3 Indigenous Peoples

Throughout the engagement process, representatives from Indigenous organizations welcomed the commitment by governments to engage Indigenous peoples in the development of the pan-Canadian framework and supported the goal of building a strong economy while protecting the environment for future generations.

As a guiding principle, Indigenous representatives explained the need for governments to respect the principles of the United Nations Declaration on the Rights of Indigenous peoples, and to take into account Indigenous rights and interests in the development of all climate change-related policies. The importance of establishing “Free, Prior, and Informed Consent” (FPIC) was particularly highlighted for guiding all local, provincial, and national interactions with Indigenous peoples.

Representatives were encouraged that carbon pricing schemes offer Indigenous communities the potential for economic development and also create new opportunities for the deployment and development of green technologies. That being said, representatives emphasized the critical need to work collaboratively to address climate change and its associated impacts on health, wellbeing, and cultural traditions. Indigenous peoples and their traditional practices and cultures are on the front lines in terms of their exposure to the changing climate and should actively participate in a pan-Canadian effort to reduce GHG emissions and adapt to the impacts of climate change. The point was also made that climate action should support, rather than jeopardize, the well-being of Indigenous communities, especially in the areas of energy, food and water access and security. They also suggested that carbon pricing must not be the only strategy for addressing climate change and should be considered one tool among many in developing a long-term strategy for reducing GHG emissions in Canada and transitioning toward a low-carbon economy.

On the design of carbon pricing in Canada, the following key considerations and opportunities were communicated:

- First, the importance of minimizing adverse impacts that carbon pricing could potentially have on the cost of energy in Northern and remote communities that have limited cost-effective options to enhance energy efficiency or switch fuel sources. Further, the recognition that embedded costs in goods and services such as food, water and clothing could also be significantly impacted for certain Indigenous communities.
  - » Fairness and equity should be a central consideration in carbon pricing design to ensure the welfare gap between Indigenous and non-Indigenous communities decreases. Similar to reducing household impacts, this could be done through the design of the carbon pricing mechanism.
  - » Revenues from carbon pricing could also be utilized within communities to subsidize investments such as increased building insulation or the installation of lower carbon or renewable energy sources and infrastructure to replace the diesel generation that presently supplies many Indigenous communities with electrical power, which could lessen the high costs of energy. Where investments cannot effectively be leveraged, revenues could be utilized to offset pricing impacts directly.
  - » The design of a carbon pricing mechanism should support Indigenous communities in the localization of goods and services through clean technology and energy development, which could ultimately lead to reducing or eliminating the reliance on imports and increasing food and water sovereignty.
  - » It was also noted that governments of all levels should be cognizant of the effect carbon pricing could have on operating budgets in order to minimize the impact on resources used to support Indigenous peoples.
- Second, many Indigenous people and communities are interested in the opportunities that carbon pricing may provide for them to benefit economically. This includes participating in emissions reductions activities, the creation of offsets or the recognition of the value of protecting carbon sinks, provided that Aboriginal title and rights and Treaty rights are respected and recognized.
  - » In order to help build capacity and consensus among communities regarding the involvement of Indigenous peoples in the carbon market, representatives identified the need to engage Indigenous peoples early and often in a manner consistent with the principles of "free, prior, and informed consent".
  - » When developing rules to guide the creation of those mechanisms, consideration needs to be given to the participation of Indigenous communities, including policies related to forestry management, biodiversity and other mitigation initiatives.
  - » With respect to potential offset credits, representatives also recommended additional support for corporations that have a revenue sharing agreement, impact benefit agreement or joint ownership arrangement with Indigenous peoples.
- Finally, the importance for all governments to maintain ongoing effective relationships with Indigenous peoples, in compliance with Canada's legal duties and responsibilities under domestic, constitutional, and international law, and for Indigenous peoples to be leaders in the Canadian effort to reduce GHG emissions and fight climate change.
  - » It is important that both Indigenous peoples and governments understand the potential impacts and opportunities that the many aspects of carbon pricing design and implementation may have on Indigenous people and their communities.
  - » To this end, representatives have encouraged governments to provide Indigenous peoples with the necessary information and resources for these communities to actively participate and make informed decisions consistent with FPIC principles.

5.4 Competitiveness and Carbon Leakage

Increasing carbon prices to levels well beyond those of our trading partners could create competitiveness concerns in certain sectors. In particular, certain industries in Canada would face higher direct and indirect production costs, not faced by their international competitors, which could reduce their price competitiveness in domestic and foreign markets. Alternatives to carbon pricing, such as carbon regulations, could also have similar impacts.

When their competitiveness is affected, Canadian firms may face pressure to reduce domestic production, or shift production/investment to a country that has not yet priced carbon at a comparable level (although firms consider many factors when making investment decisions).[22] This could impact jobs and economic activity in Canada, while undermining GHG reduction efforts on a global basis by shifting Canadian emissions to, or increasing emissions in, the other countries – a situation known as "carbon leakage".

The extent to which the competitiveness of a firm is negatively impacted by differential carbon pricing is largely determined by two factors:

- the carbon *emissions intensity* of the firm's production, which is representative of the cost exposure of the firm to carbon pricing; and
- the market power of the firm, or the ability of a firm to pass on increased costs to its buyers without significant loss of market share, which is often measured by the extent of the firm's *trade-exposure*.

Different governments apply different definitions and thresholds of emissions intensity and/or trade-exposure for identifying sectors at risk.[23] Generally speaking, the firms with the most potential for loss of competitiveness or carbon leakage are those in energy-intensive and/or trade-exposed industrial commodity and extractive sectors.

In the Canadian context, the scale of competitiveness impacts on particular sectors will depend on the type and degree of carbon pricing employed. Within an individual sector, impacts will also vary by firm and by province and territory. In considering measures to address the competitiveness impacts of carbon pricing in Canada, it will be important to establish clear criteria and thresholds based on emissions intensity and trade exposure to ensure that measures that address competitiveness are appropriately targeted at sectors subject to the greatest impact. At the same time, the substantial difference that exists across the country in economic and industrial structures will need to be reflected in the policy choices made.

5.4.1 Policy Tools

There are a variety of policy tools available to governments to address competitiveness pressures, which could be used in isolation or in conjunction with one another. Broadly speaking, there are three general approaches:

- Differential treatment for affected sectors;
- Revenue recycling; and
- Border tax adjustments.

22 Many factors can enter into decisions related to shifting of production/leakage, like differentials of labour and energy costs, availability of skilled labour, tax structures, access to markets, etc. Carbon pricing is thus one among many elements that can affect the decision making process of businesses.

23 As noted in a 2015 World Bank report on carbon pricing, while competitiveness pressures/leakage are a real concern for certain sectors, they have not materialized in a broad-based and significant way across jurisdictions that have some form of carbon pricing (for various reasons, including the fact that most of them have a price below $10 per tonne).

5.4.2 Differential Treatment for Affected Sectors

Differential treatment involves specific measures to reduce, eliminate, or offset the direct impact of carbon pricing on production costs for specific sectors. To date, most governments implementing carbon pricing mechanisms have dealt with competitiveness pressures through this approach.

For example, under a carbon tax system, a tax exemption could be fully or partially granted on fuels consumed in production domestically and/or on process emissions by vulnerable sectors (i.e., certain emission sources may have limited ability to reduce emissions without scaling back production). While this mitigates the impact of the carbon tax, the price signal to reduce emissions is effectively removed or weakened for those sectors.

Under a cap-and-trade or performance standard system, competitiveness pressures are addressed by excluding certain sectors from application of the system, or offering free emissions allowances as a design parameter. Further, free emissions allowances can be linked to specific product benchmarks to create a "race to the top" among firms by rewarding production efficiency and emission intensity performance. By granting such treatment, some of the competitiveness pressures in domestic and foreign markets of carbon pricing are mitigated.[24] These approaches both limit the cost impact of carbon pricing on sectors; however, freely allocating allowances offsets the cost impact of the carbon price, while maintaining the price signal and the incentive to reduce emissions. While firms do not incur the full cost of purchasing allowances, the price signal to reduce emissions could be maintained, provided there are incentives to reduce emissions over time (e.g., by reducing the number of free allowances or tying allowances to emissions benchmarks that reward efficiency).

5.4.3 Revenue Recycling

For the purposes of this section, revenue recycling refers to the use of revenues raised from a carbon pricing mechanism to fund measures aimed at offsetting the competitiveness impacts for specific sectors. This can take various forms, such as a reduction in corporate income taxes or funds to assist the transition to, and/or the development of, cleaner technology. Overall, such measures can be designed to further reduce GHG emissions, assist the transition to a low-carbon economy and/or improve the overall competitiveness of certain industries.

In general, economic modelling projections show that impacts of carbon pricing on GDP are smallest when the revenues from carbon pricing are used to reduce broad-based corporate and personal income taxes.[25] While this will improve the international competitiveness of all firms, those with low emissions-intensity will gain more, while tax reductions may not fully offset the competitiveness impacts for emissions-intensive firms or sectors. In addition, benefits can only be realised by those firms that pay corporate income tax (e.g., benefits would not accrue to unprofitable firms).

From an international perspective, targeted revenue recycling that provides a direct benefit to a specific industry or group of industries could be vulnerable to a trade challenge as a trade-distorting subsidy if it results in harm to foreign producers.

24 The choice of a linked system, with the implied lower emission reduction cost ($/t) can also narrow the "asymmetry" in policy conditions that might exist between a jurisdiction and its trading competitors.

25 Supporting studies for Canada include the Canada's Ecofiscal Commission report - CHOOSE WISELY: Options and Trade-offs in Recycling Carbon Pricing Revenues (2016), The David Suzuki Foundation report - Pricing Carbon: Saving Green, a carbon price to lower emissions, taxes and barriers to green technology (2008), and The Resources for the Future paper - Deficit Reduction and Carbon Taxes: Budgetary, Economic, and Distributional Impacts (2013).

5.4.4 Border Tax Adjustments

Border tax adjustments (BTAs) – also referred to as border carbon adjustments (BCAs) – consist of two components:

- "Carbon tariffs" applied on the embedded carbon content of imported GHG-intensive goods. Such carbon tariffs would be administered by the federal government given its jurisdiction for international commerce; and
- A full or partial rebate provided on the carbon price paid in the production of exported goods.

In theory, BTAs are intended to "level the playing field" between domestic producers, whose goods would have an embedded carbon cost, and international manufacturers, whose goods may have a lesser, if any, carbon cost. Specifically, carbon tariffs would ensure that all goods in the domestic market are subject to carbon pricing and mitigate the risk of carbon leakage. At the same time, while carbon tariffs and rebates for exported goods would be a means to limit competitiveness impacts on carbon-intensive sectors in Canada, they would not necessarily contribute to GHG reductions on a global basis.

While carbon tariffs have been the subject of much international debate over the past decade, no country has yet implemented them, favouring rather the use of differential treatment for trade-exposed sectors. As such, there are a number of unsettled trade law and policy issues.[26] Ultimately, World Trade Organization (WTO) legality would depend on the specific design of the carbon tariff, though the WTO has been sensitive to the environmental goals of its member countries.

Carbon tariffs would have to be established at a level equivalent to a national carbon price or at the lowest carbon price of any province or territory in Canada in order to respect international trade (national treatment) obligations. If there is no carbon price in one or more provinces or territories, the carbon tariff would have to be zero.

5.4.5 Takeaway

Differential treatment and revenue recycling have the potential to address competitiveness pressures. In time, border tax adjustments may also prove to be an effective policy measure. The merit of each of these individual policy tools would need to be assessed against specific carbon pricing options and would involve trade-offs between different environmental and economic objectives.

It bears noting that any approach taken to address competitiveness issues that negates the incentive for certain sectors to reduce emissions will require higher carbon pricing across the rest of the economy to achieve the intended emissions outcome.

26 A number of these considerations have been reviewed and analysed in a Canadian context, including Maria Panezi "When CO_2 Goes to Geneva: Taxing Carbon across Borders — Without Violating WTO Obligations." CIGI Papers No. 83. Waterloo: Centre for International Governance Innovation (CIGI).

6 EVALUATING CARBON PRICING IN CANADA

6.1 Domestic Experiences in Carbon Pricing

Some provinces have already moved forward with their own explicit carbon pricing mechanisms, creating a variety of different regimes across Canada. In Canada, both carbon taxes and cap-and-trade systems have been implemented or announced by various provinces. All Canadian governments also have extensive experience with direct pricing of fuels or implicit carbon pricing mechanisms.

6.1.1 Carbon Taxes in Canada

British Columbia introduced a carbon tax in 2008 at a rate of $10 per tonne of CO_2e. This rate was increased by $5 per year up to 2012, reaching $30 per tonne of CO_2e. The tax is revenue neutral, as all the revenue it generates is returned to businesses and individuals in the province through other tax reductions and rebates. The tax applies to all fuel used in the province, covering about three-quarters of provincial GHG emissions. Specifically, the tax applies to all liquid, gaseous, and solid fuels, including gasoline, diesel, natural gas, coal, propane, home heating fuel, ethanol, and renewable diesel fuel purchases. As these fuels generate different amounts of GHG emissions, the carbon tax is applied at varying rates.

Alberta has also announced that it will be implementing a new carbon levy on transportation and heating fuels, including diesel, gasoline, natural gas and propane. The levy will apply as of January 1, 2017 at a rate of $20 per tonne, and will increase to $30 per tonne on January 1, 2018. The government has also indicated that the funds will be used to: diversify the economy by investing in renewable energy, bioenergy, and technology; spending on green infrastructure like transit; and improving energy efficiency of homes, communities, and businesses. Support will also be provided to households and businesses through lower-income rebates, a reduction in the small business tax rate, and funding to assist coal communities, indigenous communities, and other communities requiring adjustment assistance.

6.1.2 Cap-and-Trade Systems in Canada

Quebec introduced a cap-and-trade system in 2013, which covers business emitting 25,000 metric tonnes or more of CO_2e per year and fuel distributors selling more than 200 litres of fuel. The system covers about 85 per cent of Quebec's GHG emissions. Under the system, Quebec sets a cap on emission units that it will put in circulation each year, which will gradually decline over time. Trade-exposed industrial emitters receive most of their emission units free of charge, and the rest are sold at auction, which includes a price floor that increases annually by 5 per cent plus inflation – currently units are trading close to the floor price of about $16 per tonne of CO_2e. All proceeds from the auction go to the Quebec Green Fund and are earmarked for the financing of various initiatives contained in the 2013-2020 Climate Change Action Plan. Since January 1, 2014, Quebec's cap-and-trade system has been linked to California through the WCI. The linkage enables firms regulated by Quebec's system to purchase and use California's permits for compliance in Quebec, and vice versa.

Ontario' new cap-and-trade regulation – supported by its new *Climate Change Mitigation and Low Carbon Economy Act* – took effect on July 1, 2016. The first compliance period will begin on January 1, 2017. Similar to Quebec, the program will cover businesses emitting 25,000 tonnes of CO_2e per year, including distributors of heating fuels and suppliers of transportation fuels selling more than 200 litres of fuel. The program is expected to cover between 80 and 85 per cent of Ontario's emissions. Proceeds from the auctions are expected to go to investments to support GHG reduction initiatives, such as home and business energy efficiency, innovation funding, transit, and clean technology. Ontario has announced its intention to link with Quebec and California.

6.1.3 Performance Standard Systems in Canada

Alberta has priced GHG emissions since July 1, 2007 through the *Specified Gas Emitters Regulation*, which applies to all facilities that emitted more than 100,000 tonnes CO_2e in any year since 2003. This covered approximately 50 per cent of Alberta's emissions. This regulation includes compliance flexibility mechanisms for regulated facilities that enable Alberta's carbon offset and emissions performance credit markets, as well as an option to pay a fixed carbon price to government for emissions in excess of facility limits. The price per tonne of emissions started at $15/t CO_2e and was raised to $20/t for 2016 and $30/t for 2017, along with increases in the stringency of facility emissions limits. Revenue collected under the *Specified Gas Emitters Regulation* is all put into the Climate Change and Emissions Management fund which invests in emissions reduction and climate change adaptation measures. As of 2018, this will transition to a product-based performance standard system.

As of January 2016, British Columbia set a price on emissions from liquefied natural gas (LNG) facilities, in addition to carbon tax payable. Under the *Greenhouse Gas Industrial Reporting and Control Act*, LNG facilities are required to meet an emission limit of 0.16 tonnes of CO_2e per tonne of LNG produced (tCO_2e/tLNG). This includes emissions associated with the production of LNG and transmission of electricity used by an LNG facility. Facilities emitting below the emissions limit are eligible for credits which may be traded. Facilities emitting above the limit can achieve compliance through using credits, purchasing offsets or contributing $25 per tonne into a technology fund which will invest in emission reductions. Compliance costs may be partially offset for LNG facilities with emissions over 0.16 tCO_2e/tLNG but less than 0.23 tCO_2e/tLNG through the LNG Environmental Incentive Program. Modelling 2030 emissions indicates that the LNG benchmark would cover approximately 5 per cent of total British Columbia emissions in 2030 assuming no policy changes for the rest of the economy.

In June 2016, the Newfoundland and Labrador House of Assembly passed a bill that will regulate large industrial GHG emissions (i.e., industrial facilities that emit 25,000 tonnes of CO_2e or more). The legislation provides for at least two years of emissions monitoring to help form reduction targets. Industrial facilities are to achieve prescribed annual GHG emission reduction targets each year. Facilities may achieve the target by reducing emissions or using GHG reduction credits, which includes payment to a fund that supports emissions-reduction technology.

6.1.4 Other Carbon Pricing Systems in Canada

All Canadian governments have also made large-scale use of fuel taxes (see Table 1) or putting in place implicit carbon pricing mechanisms. For example, Nova Scotia has designed a set of implicit carbon pricing mechanisms which have reduced its total GHG emissions by almost 30 per cent since 2005. It imposed a hard cap on its electricity sector, to achieve 55 per cent reductions in GHG emissions by 2030. It also adopted a Renewable Portfolio Standard which has resulted in Canada's second highest level of wind power in its electricity mix (after Prince Edward Island), and it prescribed more electricity efficiency (now achieving 1 per cent/year load reductions); banned organics from landfills; and invested in Canada's largest expansion of the national grid in years.

Since 2010, British Columbia has imposed a price on GHG emissions from all provincial public sector organizations including ministries, school districts, post-secondary institutions, Crown corporations and health authorities. Provincial public sector organizations are required to have net-zero emissions, except for school buses and transit buses, through GHG emissions reductions and the purchase of offsets. The offset price for provincial public sector organizations is $25 per tonne of CO_2e. This price is in addition to the provincial carbon tax payable. However, school districts are eligible for a grant equal to the carbon taxes they paid directly. British Columbia has also established the Carbon Neutral Capital Program, which provides annual funding to school districts, health authorities, universities and colleges to improve the energy

efficiency of their facilities. This funding is generally equal to or greater than the offset payments these public sector organizations make each year.

6.2 Evaluation of Current Carbon Pricing Approaches in the Pan-Canadian Context

A number of jurisdictions have introduced some form of carbon pricing, whether it is a carbon tax, a cap-and-trade, a performance based standards system, taxes on fuels or an implicit carbon pricing tool to reduce GHG emissions. Together, these actions are having an impact on Canada's GHG emissions reduction targets.

There are a number of similarities between the broad-based carbon pricing mechanisms that have been implemented or announced by provinces in Canada. For example, broad-based carbon pricing mechanisms in Canada:

- Attempt to correct a market failure by providing an incentive to businesses to develop and invest in technologies which save energy or reduce emissions, as well as providing an incentive to consumers to choose lower emissions goods and services.
- Take advantage of market efficiencies by providing flexibility on how to achieve emissions reductions.
- Generate revenues for government, which can be used to address potential adverse impacts on lower income individuals and families, including Northern, remote and Indigenous communities, and business competitiveness.

Those jurisdictions with broad based carbon pricing have designed their systems to meet environmental objectives while recognizing their own unique needs.

As a result, there are multiple regimes in Canada with multiple prices, minimal linkages among systems and a different scope of coverage among jurisdictions. Some jurisdictions have no broad-based carbon pricing regime. There is also access to foreign emissions permits in certain provinces.

6.2.1 Multiple Regimes

There is now a variety of carbon pricing mechanisms in Canada – both explicit and implicit. Each regime has its own set of criteria, including coverage, reporting requirements, timing of payments (e.g., embedded as a carbon tax or settled at the end of a multi-year compliance period using emissions allowances), the ability to use offset credits, etc. Other jurisdictions have no explicit carbon price, but in some cases have implemented measures that translate into an implicit carbon price.

The variety of approaches reflects the unique emissions profiles and unique economic structures of Canada's provinces and territories. Climate policy is not a one size fits all approach.

This multiplicity of regimes may not present concerns for some communities, households and businesses, including some of Canada's largest emitting industries. Indeed, in the electricity sector, provincial systems have minimal linkages and different administrative structures (crown corporations, markets, etc.) and power generating companies generally operate in a single province or territory and need only comply with a single regime.

However, for businesses that operate across the country, the existence of significantly different carbon pricing regimes (or none at all) across provinces and territories can increase their compliance costs.

6.2.2 Multiple Carbon Prices

The multitude of carbon pricing regimes also creates a range of effective carbon prices (both explicit and implicit) across the country, which impacts the incentive effects faced by businesses and consumers. In the absence of a comparable carbon price across Canada, some low-cost emission reduction opportunities may be missed. In their place, governments and industry may have to rely on higher-cost, less efficient reduction approaches.

Multiple prices (or no price in some cases) also impacts the ability of jurisdictions that have carbon pricing mechanisms to increase their price at a pace that exceeds others out of competitiveness concerns (i.e., if one province or territory chooses to significantly increase its carbon price vis-à-vis other jurisdictions, it could put certain firms at a competitive disadvantage within the country). To the extent that other jurisdictions' lack of similar pricing results in other jurisdictions not increasing their own rates more aggressively, this will have an impact on Canada's overall emissions reductions. In other words, lack of carbon pricing in some jurisdictions could actually impact other jurisdictions' emissions reductions, creating the same competitiveness concerns inside Canada that exist internationally.

6.2.3 Access to Foreign Permits in Certain Provinces

Some provinces have chosen to access international permits through trade, whereas other provinces have not. For example, Quebec's linkage to the California emissions permit market means that California emission permits can to be used to satisfy Quebec's annual cap-and-trade regulations, (and vice-versa). This linkage provides such provinces access to a broader pool of possibly lower-cost reductions but, as in any partnership, requires agreement among members before making any important changes like imposing a higher carbon price. This linkage will affect the flexibility of these two jurisdictions to unilaterally alter their carbon pricing mechanisms significantly.

6.3 Comparing the Stringency of Pricing Mechanisms

There are a number of ways to compare the stringency of carbon pricing mechanisms and no clear best option. While this report does not seek to recommend a measure for comparing stringency, this section provides a brief overview of some potential methods for making such a comparison. (These methods draw heavily on work done by Canada's Ecofiscal Commission.[27])

It should be noted that irrespective of the methodology preferred, some adjustments need to be considered to account for non-broad-based mechanisms that impose an explicit price on carbon – such as motive fuel taxes.

6.3.1 Marginal Price

The most straight-forward method to compare carbon pricing mechanisms is to consider the marginal price of carbon in that jurisdiction (i.e., the price that individuals/firms consider when buying or emitting their next unit of GHGs). This measure represents the marginal price to reduce one tonne of emissions as a result of the carbon pricing mechanism. For example, under a carbon tax, the marginal price would generally be the tax rate that applies, while under a trading system, the marginal price would generally be the market price for a compliance unit.[28] (Marginal price is different from average price, in that it does not take into account any exemptions from which some emitters may benefit).

27 Ecofiscal Commission, "Comparing Stringency of Carbon Pricing Policies", July 2016.

28 It is not an easy task to compare allowances prices to carbon tax rates, because the allowance price – if reflecting the market price of a larger market bringing together linked jurisdictions – will be different than a price applied only in the jurisdiction. Ontario recently undertook an evaluation of the tool to achieve its target. The analysis compared a linked cap-and-trade program with an unlinked cap-and-trade program and a carbon tax. According to that analysis, both the allowance price in an unlinked cap-and-trade and a carbon tax necessary to achieving Ontario's emission reduction commitments greatly exceeded the allowance price of a WCI-linked system.

While this method is simple, comparing on marginal price alone does not take into account the emissions covered by the carbon pricing mechanism (which also has an impact on overall reductions of emissions achieved). For example, under this approach, a carbon pricing mechanism with a marginal price of $40 per tonne of CO_2e that covers 75 per cent of emissions would be considered to be less stringent than a carbon pricing mechanism with a price of $100 per tonne of CO_2e that covers only 10 per cent of emissions, even though the total proceeds from the carbon price would be three times greater under the first system. Emissions reductions achieved will also be impacted by both price and coverage.

6.3.2 Average Effective Carbon Cost

Another way to easily compare carbon pricing and coverage across jurisdictions is to use a proxy by measuring the average effective carbon cost, which is the ratio of revenues from measures that put a price on carbon – therefore influencing the consumer's decision making process – to total emissions of GHG (i.e., average effective carbon cost = sum of all revenue derived from pricing GHG emitting products / GHG emissions of a jurisdiction). With this method of calculation, the effective carbon cost corresponds to an average economy wide price per tonne. The average effective carbon cost could be calculated just for regulated entities when considering competitiveness impacts on a sector or for the entire jurisdiction when considering cost to the economy.

Motive fuel taxes, sales taxes (federal and provincial) on fuels and revenues from a carbon tax, cap-and-trade or performance based system would be the main revenue sources to consider in calculating the effective carbon price. To this may be added revenue from various regulations that affect the consumer's decision to participate in producing GHG emissions. For example, additional registration fees for large cylinder capacity vehicles or additional taxes on fuel to fund local public transportation send a price signal on carbon pollution and could therefore be included in the calculation.

6.3.3 Coverage-Weighted Carbon Price

Another simple method to compare carbon pricing mechanisms could be to take into account coverage (i.e., emissions that face a price incentive for reduction) and marginal price by using a "coverage-weighted" carbon price. This could be calculated by taking the marginal price of carbon and multiplying it by the percentage of emissions that the carbon pricing mechanism covers. For example, a marginal carbon price of $40 per tonne of CO_2e that covers 75 per cent of emissions would have a coverage-weighted price of $30 per tonne of CO_2e ($40 X 0.75). This approach would take into account the coverage of a carbon pricing mechanism in addition to its price, thereby allowing some rough comparisons between systems.

Under this approach, a carbon pricing mechanism would be considered to have an increased stringency through an increase in either the marginal price per tonne of CO_2e or the coverage of the carbon pricing mechanism. Also, it is important to note that the coverage is not affected, under a cap-and-trade system or performance standard system, if an amount of carbon permits are freely allocated to emitters and the incentive to reduce emissions is maintained by the possibility to sell those permits.

6.3.4 Trade-Adjusted Coverage-Weighted Carbon Price

This approach would be similar to the coverage-weighted carbon price, but would also account for permits/ reductions from other jurisdictions, in cases where a system has inter-jurisdictional linkages, such as Quebec's and Ontario's systems. Linked systems allow for inter-jurisdictional trade in permits, which essentially means that reductions made outside the system can be used for compliance purposes within that system.

Like the coverage-weighted carbon price, this approach could be calculated by multiplying the marginal carbon price by the domestic covered emissions plus inter-jurisdictional permits (including offsets) as a percentage of total domestic emissions (i.e., marginal price X (domestic covered emissions + inter-jurisdictional permits)/total domestic emissions). Under this approach, an assessment of stringency would include the impact of the systems on international emissions.

As climate change is a global issue, the objective with linked systems is to reduce emissions at the lowest cost wherever the emissions are. Not including inter-jurisdictional emissions reductions could understate the coverage and the stringency of linked systems.

6.3.5 Comparing Emission Reductions

Rather than using price as a metric for comparing stringency of systems, another approach could include comparing the amount of GHG emission reductions relative to a no policy scenario that resulted, or are expected to result, from a specific system. For example, this could include modelling the impacts (either ex-post or ex-ante) on GHG emissions of a carbon pricing mechanism in one jurisdiction against the impacts on GHG emissions of another mechanism in the same jurisdiction. This approach would rely on modelling, as it would require estimating the amount of GHG reductions associated with a given policy.

This approach could allow for a comparison of stringencies of a number of policies, rather than just explicit carbon pricing mechanisms (e.g., the impact of regulations and revenue recycling on GHG emission reductions), but is subject to the uncertainties and assumptions necessary to model.

6.3.6 Conclusion

As described above, comparing stringency is not straight-forward and it can be accomplished by using price metrics or emissions metrics. Other measures of stringency should also be further developed, which could take into account both pricing (implicit and explicit) and other policies that reduce emissions. In the end, all of these methods require careful interpretation and agreement on the underlying assumptions used in determining the measure of stringency of a given system. Nonetheless, being able to have a rough measure of the stringency of a system will be important in assessing the role of carbon pricing in the meeting Canada's emission reductions targets as part of the broader pan-Canadian Framework, and the comparability between the different systems.

Comparisons of stringency should acknowledge the risk of leakage: one system might seem more stringent, but if it leads to an increase in emissions elsewhere because of businesses moving to a country where there is no or a lower price on carbon, then it could have less or a similar effect than a lower cost system.

7 PRINCIPLES FOR A PAN-CANADIAN APPROACH

First Ministers recognized that:

- all governments have an important role in the global effort to reduce GHG emissions, and that a number of provinces and territories have already joined or are exploring entry into regional and international efforts to reduce GHG emissions;
- carbon pricing mechanisms are being used by governments in Canada and globally to address climate change and drive the transition to a low carbon economy;
- provinces and territories have been early leaders in the fight against climate change and have taken proactive steps, such as adopting carbon pricing mechanisms, placing caps on emissions, involvement in international partnerships with other states and regions, closing coal plants, carbon capture and storage projects, renewable energy production (including hydroelectric developments) and targets, and investments in energy efficiency; and
- the federal government has committed to ensuring that the provinces and territories have the flexibility to design their own policies to meet emission reductions targets, including their own carbon pricing mechanisms, supported by federal investments in infrastructure, specific emission reduction opportunities and clean technologies;

and committed to transition to a low carbon economy by adopting a broad range of domestic measures, including carbon pricing mechanisms, adapted to each province's and territory's specific circumstances, in particular the realities of Canada's Indigenous peoples and Arctic and sub-Arctic regions.

In keeping with these commitments of the Vancouver Declaration, the following principles were used in guiding the development of options for the Working Group on Carbon Pricing Mechanisms:

- The pan-Canadian framework for Clean Growth and Climate Change should be flexible, and should recognize and further support existing carbon pricing policies already implemented or in development by provinces and territories.
- Carbon pricing, being widely recognized as an economically efficient policy tool, should be considered as a central component of the pan-Canadian Framework.
- Carbon pricing coverage should be applied broadly so that the incentive it provides to reduce GHG emissions is applied to as many goods and sectors in the economy as possible.
- Carbon pricing policies should be introduced in a timely manner in order to minimize new investment into assets that will become stranded and maximize cumulative emission reductions.
- Carbon price increases should occur in a predictable and gradual way to limit economic impacts and allow businesses and households time to plan and adjust with limited uncertainty.
- Reporting on carbon pricing policies, in terms of coverage, stringency and associated emissions reductions, should be consistent and made on a regular basis, and in a manner that is transparent and verifiable.
- Carbon pricing policies should minimize competitiveness impacts and carbon leakage. In this regard, carbon pricing policies in Canada, including explicit and implicit pricing mechanisms, should be reasonably comparable in price or stringency across the country to mitigate such impacts between provinces and territories. Those carbon pricing policies should also be designed to mitigate international competitiveness and carbon leakage pressures.
- Carbon pricing policies, including their revenue recycling components, should strike a balance between applying the polluter-pays principle and avoiding a disproportionate burden on vulnerable groups (i.e., emission-intensive/trade-exposed industries, northern and remote communities, and low income households).

8 OPTIONS

8.1 Role of Carbon Pricing Mechanisms in Pan-Canadian Framework

This report has examined carbon pricing and has identified various pricing mechanisms, including the major broad-based mechanisms: a carbon tax, a cap-and-trade system and a performance standard system. The report has also demonstrated that carbon pricing can lead to significant, economically efficient reductions in GHG emissions provided that the price signal is strong enough and the coverage is wide enough. As presented earlier, some provinces have already settled on a strong carbon price signal. With existing and decided policies to be implemented, nearly 85 per cent of Canada's economy and population will be subject to broad-based carbon pricing mechanisms by 2017.

As outlined in the previous section, the Vancouver Declaration indicates that "the provinces and territories have the flexibility to design their own policies to meet emission reductions targets, including their own carbon pricing mechanisms." In addition, First Ministers committed in the Vancouver Declaration "to transition to a low carbon economy by adopting a broad range of domestic measures, including carbon pricing mechanisms, adapted to each province's and territory's specific circumstances."

The working group has identified three broad groups of options for carbon pricing: (1) a single form of broad-based carbon pricing mechanism that would apply across the country, (2) broad-based carbon pricing mechanisms in all jurisdictions but allowing for flexibility of instrument choice, and (3) a range of broad-based carbon pricing mechanisms in some jurisdictions with the remaining jurisdictions instituting other mechanisms or policies to meet specific GHG reduction targets within their respective jurisdictions.

These options reflect different approaches to the implementation of carbon pricing in Canada. The choice of option should be guided by the commitments made by First Ministers in the Vancouver Declaration.

As per the design parameters and considerations above, a number of specific options would need to be considered within each of these broad groups of options, including the type of carbon pricing mechanism(s) to apply, the coverage and price/stringency of the metric, the level and certainty of mitigation that will be achieved by the option, how to address competitiveness and leakage risk, the use of revenue, and how to protect vulnerable groups and Northern, remote and Indigenous communities. Where the option includes the possibility that different jurisdictions will implement comparable pricing mechanisms, consideration will need to be given to adopting a measure to compare the stringency of all forms of carbon prices, including motive fuel taxes and implicit prices, and a system to ensure ongoing comparability. The implementation of any option should also reflect the commitments for a partnership with Indigenous peoples based on recognition of rights, respect and cooperation.

The broad groups of options are described below, including a brief assessment in relation to the principles for a pan-Canadian approach to carbon pricing (as discussed in the previous section), as well as potential considerations for provinces and territories with existing or planned carbon pricing mechanisms.

8.1.1 Single Type of Broad-Based Carbon Pricing Mechanism in All Jurisdictions

A single type of broad-based carbon pricing mechanism, such as a carbon tax or an emissions trading system, could be introduced throughout Canada.

- **Supportive of existing pricing policies:** Unless agreed to by provinces and territories with existing or planned mechanisms, by requiring that a single broad-based carbon pricing system apply in all jurisdictions across Canada, this option is not consistent with the principle of flexibility and support for existing or planned carbon pricing policies.

- **Central feature:** Under this option, the carbon pricing mechanism would apply across all jurisdictions. Whether it is a central component for increased ambition would still depend on the price level and coverage of the mechanism and the reductions achieved.[29] If applied to all sources whose emissions can be calculated using robust methods, such a mechanism could apply to between 70 and 80 per cent of total emissions in Canada. Application to such a wide range of goods and services could allow carbon pricing to function as a central component of the pan-Canadian Framework, depending on the level of the carbon price, the coverage and the emissions reduction over time.
- **Cost-effectiveness:** A single carbon pricing mechanism across Canada could be more efficient than having multiple regimes across provinces and territories. However, to be efficient, the regime would have to be flexible enough to accommodate for the variations among the provincial and territorial economies. As well, moving from multiple existing regimes to a single regime would impose significant costs on businesses and governments in some jurisdictions already active in carbon pricing during the transition. The choice of instrument could also provide for linkages to other systems outside of Canada.
- **Timely and predictable:** in order to minimize these transition costs, jurisdictions would need a reasonable period to transition into the single/harmonized regime. The system could then provide for carbon price increases that occur in a predictable and gradual way to limit economic impacts, either through agreement on price increases in each individual province and territory or through increases applied in a national mechanism that would apply to all provinces and territories. A transition period would also be required for provinces and territories to incorporate the single/harmonized regime into their plans for reducing GHG emissions and implement mechanisms for revenue recycling. Thus, this is likely the least timely option.
- **Clarity/transparency:** A single form of carbon pricing mechanism, in terms of coverage, stringency and associated emissions reductions, would provide greater clarity in terms of its application across Canada, as all provinces and territories would be using the same common elements. The clarity and transparency would depend somewhat on the pricing mechanism chosen and the complexity of design.
- **Competitiveness issues:** This approach could address potential domestic competitiveness issues, including through differential treatment, revenue recycling and/or potentially through border tax adjustments (BTAs). As explained above, to abide by international trade obligations, BTAs would not be possible for products that are exempted from coverage in any part of Canada. It may be more difficult to address local competitiveness issues through differential treatment under a single system than an option where provinces can have different systems that are tailored to their economies.
- **Vulnerable groups:** Revenue recycling decisions could be made by each jurisdiction, allowing each government to strike a balance between applying the polluter-pay principle and avoiding a disproportionate burden on vulnerable groups.

29 As this approach could replace some of the existing and planned provincial and territorial carbon pricing measures, the increase in ambition would need to be measured against existing or planned coverage and price in Canada. Furthermore, to the extent that this approach affected international linkages or the GHG results spurred by the tool, existing provincial emission reduction targets may be impacted.

8.1.2 Broad-Based Carbon Pricing in All Jurisdictions with Flexibility on Instrument Choice

Under this option, broad-based carbon pricing with a broadly comparable level of price, coverage, or emissions reduction would apply throughout Canada – but with flexibility on instrument choice within each province and territory.

- **Supportive of existing pricing policies:** By providing flexibility on instrument choice, this option is more flexible and would recognize and support existing or planned carbon pricing policies.
- **Central feature:** This option would ensure that carbon pricing is used throughout Canada, and could play a central role in the pan-Canadian Framework, as it is already doing or will do by 2017, when nearly 85 per cent of Canada's economy and population will be subject to broad-based carbon pricing mechanisms.
- **Cost-effectiveness:** Implementing carbon pricing regimes in provinces and territories that do not already have a mechanism would impose transition costs on businesses and governments. Multiple pricing regimes would not necessarily reduce the effectiveness of carbon pricing, and would preserve the instrument choice made by some provinces and territories based on the specificities of their economies. In addition, with comparable price and coverage, such an approach would ensure that carbon pricing would apply broadly to cover as many goods and services as possible and that emitters faced similar carbon costs, thereby favouring the efficiency of the various carbon pricing mechanisms. It could also allow for linkages between some or all jurisdictions. However, the existence of multiple carbon pricing mechanisms could increase administrative costs for businesses operating in multiple provinces or territories (and already facing diverse conditions across the country) compared to a single form of broad-based carbon pricing mechanism. For example, there could be differences in reporting requirements, timing of payments, refund mechanisms, registration requirement, etc. Therefore, under this option, federal, provincial and territorial governments should aim at minimizing the administrative cost on industry. As well, this option could also provide for linkages to other systems outside of Canada.
- **Timely and predictable:** As this option would build on existing systems, there would be no delay in introducing pricing and no impediment to timely, predictable and gradual increases in prices to limit economic impacts for those who already have a system.
- **Clarity/transparency:** The existence of multiple regimes would present challenges in terms of clarity's for Canada's approach as a whole. As discussed earlier in this report, there are also various metrics that can be used to compare the stringency of different carbon pricing mechanisms. If carbon pricing is to play a consistent role in GHG mitigation in all provinces and territories, governments may need to agree on common metrics to be able to compare their actions.
- **Competitiveness:** By enabling each jurisdiction to design its own carbon pricing mechanism, this option would give jurisdictions flexibility to address competitiveness issues through differential treatment and revenue recycling. To abide by international trade obligations, BTAs on imports would only be possible for products that had an explicit carbon price in all provinces and territories and would have to be set at the lowest carbon price across provinces and territories.
- **Vulnerable groups:** jurisdictions would have the flexibility to design their carbon pricing mechanisms, including their revenue recycling components, in a manner that strikes a balance between applying the polluter-pay principle and avoiding a disproportionate burden on vulnerable groups.

8.1.3 Broad-Based Carbon Pricing or Reductions Targets

Under this option, some jurisdictions would have a broad-based carbon pricing mechanism while the remaining jurisdictions would either choose to implement one or to use other policies or mechanisms, including implicit pricing mechanisms, to reach equivalent policy stringency or a specific GHG emissions target. Additional contributions to Canada's mitigation objectives would rest on existing carbon-pricing mechanisms where the price rises, on future mechanisms that could be added, as well as on current and future complementary mitigation measures.

- **Supportive of existing pricing policies** – By not imposing specific carbon pricing policies, this option is flexible and recognizes and supports existing carbon pricing mechanisms already implemented or in development by provinces and territories.
- **Central feature:** Given that this option would not lead to consistent pricing and coverage across provinces and territories, like the existing situation in Canada, emitters would face different carbon costs across jurisdictions, thereby potentially limiting the efficiency of carbon pricing systems for Canada as a whole. Further, carbon pricing may not be applied to as many goods and sectors as possible, which would decrease the effectiveness of carbon pricing in providing a similar incentive to reduce GHG emissions across Canada. Under this option, broad-based carbon pricing could continue to play an important role in the pan-Canadian Framework, but would not necessarily be the principal component for added GHG reductions.
- **Cost-effectiveness:** The existence of multiple carbon pricing mechanisms and other policies could increase administrative and compliance costs for businesses operating in multiple provinces or territories compared to a single form of broad-based carbon pricing mechanism, and could lead to higher cost reductions being pursued in some jurisdictions or sectors. To the extent that provinces and territories adopt approaches that are specifically tailored to their economic situations, overall efficiency could be improved. This option could provide for limited linkages to other systems outside of Canada.
- **Timely and predictable:** In provinces with carbon pricing mechanisms, increases in carbon prices could occur in a predictable and gradual way. Given the level of flexibility, this option may not be seen as predictable in jurisdictions that do not currently have commitments for how policies will evolve over time.
- **Clarity/transparency:** Having multiple ways to deal with climate change would result in a more complex set of tools to account for at the international level for Canada. Use of some implicit carbon pricing mechanisms could also add complexity to reporting on carbon pricing policies, in terms of coverage/stringency and associated emission reductions.
- **Competitiveness:** To abide by international trade obligations, BTAs on imports would not be possible if one province or territory does not assign an explicit carbon price to a given good. Under explicit carbon pricing schemes, provinces and territories would have full flexibility to use differential treatment and revenue recycling. In this scenario, this issue is mostly left to provinces and territories to resolve and use differential treatment and revenue recycling. As well, longer term interprovincial competitiveness issues will have to be monitored and potentially addressed if the stringency of carbon pricing measures diverge too greatly among provinces and territories. Furthermore, it may be difficult to address potential competitiveness issues arising from implicit pricing measures.
- **Vulnerable groups:** This approach reduces options for policy design to strike a balance between applying the polluter-pays principle and avoiding a disproportionate burden on vulnerable groups, as there may be no associated revenues with which to address these issues. That said, this approach allows provinces and territories, with the choice of tools that fits best their reality, to account for their vulnerable groups or to address specific issues.

8.2 Offset Credits, Common Reporting and Emissions Data Quality

Regardless of which option is chosen, the working group heard from a number of stakeholders about the importance of two issues: harmonizing the recognition of offset credits and improving the reporting of emissions to ensure a good quality and a similarity between federal, provincial and territorial emissions data.

An offset credit represents one tonne of GHG emission reductions generated from activities not covered by GHG regulations (approximately 80 per cent covered) and that would not have occurred without the incentive created by an offset system. In order to be considered valid, offsets must meet criteria set by a program authority, including the measurement and verification requirements. The quality of offsets is dependent on the criteria set by the program authority, which can vary from program to program. After they are issued by a program authority, offset credits can usually be purchased and submitted by entities to meet regulatory requirements under certain conditions.

Some offset programs already exist in Canada for regulatory compliance purposes (British Columbia, Alberta and Quebec) and others are being implemented (Ontario) or planned (Newfoundland and Labrador). These programs are not harmonized, with the important exception of Quebec and Ontario who are working to fully harmonize their offsets approach along with the more general system linkage. Due to the varying stringency and design of policies across jurisdictions, harmonization or linkage might be complicated. Common reporting requirements can be valuable, regardless of whether credits are traded.

The main benefit of allowing offsets to be traded across provincial boundaries is the potential increase in GHG reductions in sectors not covered by GHG regulations. Individual offset project proponents would have access to a broader potential market, thus giving them increased certainty of finding a buyer and reducing the risk of investing in an offset project. Offset project proponents and verification bodies would also benefit from a common set of offset rules and standards across the country.

Harmonizing offset credits across Canada would generally require common standards and processes across jurisdictions. Some jurisdictions may also require harmonized reporting of jurisdictional emissions to avoid double counting of reductions, and/or harmonized policy stringency prior to participating in offset trade. Harmonized criteria and processes would provide assurance to regulatory authorities that each offset generated by a Canadian system represents one tonne of GHG reductions or removals that is real, additional, permanent and verifiable, clearly owned and generated in adherence to approved protocols.

A harmonized offset system could be achieved by an agreement among provinces and territories for common rules and recognition, or by creating a centrally-administered system that would be run by one or more provinces or territories or by the federal government. These protocols should also be based on the best practices laid-out in scientific literature. To be valid in existing provincial or territorial systems, protocols as well as offsets credits mechanisms would need to abide by the definitions and criteria already developed.

In the course of our work, the Working Group heard from a number of businesses about the need to harmonize GHG measurement, reporting and verification requirements across jurisdictions implementing carbon pricing and other GHG reduction requirements in order to ease compliance burden and simplify administration (i.e., by being subject to a common set of measurement, reporting and verification requirements, rather than multiple sets of such requirements). Indeed, harmonizing these requirements would be advantageous for several reasons:

- First, it would assure comparability in the measurement and reporting of tonnes reduced for different carbon pricing and regulatory requirements.
- Second, such harmonization is a prerequisite for the linking of carbon pricing mechanisms across jurisdictions, given that units for a one tonne reduction would be understood to be equivalent, irrespective of the jurisdiction in which the reduction is generated.

- Finally, harmonized GHG measurement and reporting requirements would reduce the administrative burden on regulated entities and verification bodies, since the methodology and work done to measure and report GHG emissions for one jurisdiction could be replicated for purposes of reporting to another jurisdiction. For example, a natural gas distributor that operates in all provinces would be able to apply the same reporting rules, formulae and templates for the purposes of multiple reporting obligations.

This work has to be undertaken with respect of the roles and responsibilities of every jurisdiction, while being closely linked with the best practices at the international level which also aim to have worldwide comparable data.

9 CONCLUSION

The Working Group on Carbon Pricing Mechanisms has examined the role that carbon pricing is playing and could further play in helping Canada meet its GHG emissions targets. On the whole, carbon pricing is one of the more efficient tools available to governments to incent a transition to a low carbon economy, allowing for an increase in the level of ambition in reducing GHGs, promoting clean economic growth, and the possibility for enhanced cooperation among jurisdictions.

Nevertheless, an economic transition may impact parts of the economy and the country differently, so this report examines the potential impact of carbon pricing on households and business, and further considered the particular challenges facing Northern, remote and Indigenous communities. Some options have been described as to how these impacts may be addressed.

The working group has considered different design elements for a pan-Canadian framework for clean growth and climate change, and has identified eight principles for implementing carbon pricing, reflecting the commitments of the Vancouver Declaration. These principles should be key considerations moving forward, recognizing that there is a trade-off to be made between economic efficiency for Canada as a whole, reducing GHG emissions, and maintaining successful systems already in place in respect to roles and responsibilities of the federal, provincial and territorial governments. This is reflected in the three options presented by the group.

The Working Group on Carbon Pricing Mechanisms is pleased to present this report to the Ministers of Finance and the Canadian Council of Ministers of the Environment and trust that it will inform Ministers as they move towards an agreement on, and implementation of, a pan-Canadian framework for clean growth and climate change that will meet or exceed Canada's international GHG emissions targets, favour intergovernmental collaboration and ensure a transition to a stronger, more resilient, low-carbon economy – while also improving Canadians' quality of life.

10 ANNEX 1 – INTERNATIONAL CARBON PRICING MECHANISMS

Table A1: International Cap-and-Trade Systems

Systems	Jurisdictions	Year in Place	Coverage	Allocation
European Union Emissions Trading System	European Union	2005	45% of total emissions	100% auction for electricity production in utilities Some free allowances for heat production and for industrial participants through benchmarking
Swiss Emissions Trading Scheme	Switzerland	2008	10% of total emissions	Free allocation based on industry benchmarks Sectors at risk of carbon leakage receive 100% of the benchmark Other industry sectors receive a linearly decreasing share of free allowances (80% free in 2013, decreasing to 30% in 2020) No free allocation for power sector
California Cap-and-Trade Program	California	2012	85% of total emissions	Auctioning for electricity producers and fossil fuel distributors A portion of allowances, which declines annually, is freely allocated to aluminum, lime, cement, chemical, petrochemical, metallurgy, mining, pelletizing, pulp, paper, petroleum refining sectors
Regional Greenhouse Gas Initiative	North-East and Mid-Atlantic states in the U.S.	2009	20% of total emissions	Auctioning

Source: World Bank, State and Trends of Carbon Pricing 2014

Table A2: International Cap-and-Trade Systems (continued)

Systems	Jurisdictions	Year in Place	Coverage	Allocation
Kazakhstan Emissions Trading Scheme	Kazakhstan	2013	50% of total emissions	Free allocation based on grandfathering of historical emissions for the first three years (2013-2015)
New Zealand Emissions Trading Scheme	New Zealand	2008	50% of total emissions	Auctioning Free allowances provisions for pre-1990 forest landowners completed
Tokyo Cap-and-Trade Program	Tokyo (Japan)	2010	8% of total emissions	Auctioning
Target-Setting Emissions Trading Program in Saitama	Saitama (Japan)	2011		
Kyoto Emissions Trading System	Kyoto (Japan)	2011		
Guandong Pilot Emissions Trading System	Guandong (China)	2013	42% of total emissions	Auctioning
Shanghai Pilot Emissions Trading System	Shanghai (China)	2013	50% of total emissions	
Tianjin Pilot Emissions Trading System	Tianjin (China)	2013	60% of total emissions	
Beijing Pilot Emissions Trading System	Beijing (China)	2013	50% of total emissions	
Shenzhen Pilot Emissions Trading System	Shenzhen (China)	2013	38% of total emissions	
Hubei Pilot Emissions Trading System	Hubei (China)	2014	35% of total emissions	
Republic of Korea Emissions Trading Scheme	Republic of Korea	2015	60% of total emissions	Free allocation via grandfathering for existing facilities and benchmarking used for new entrants

Source: World Bank, State and Trends of Carbon Pricing 2014

Table A3: International Carbon Taxes

Jurisdictions	Year in Place	Coverage	Price
Australia[30]	2012-2014	60% of total emissions	About US$21.54 per tonne of CO_2e in 2013
Denmark	1992	45% of total emissions	About US$31 per tonne of CO_2 in 2014
Finland	1990	15% of total emissions	Heating fuels: €35 per tonne of CO_2 in 2013 Liquid traffic fuels: €60 per tonne of CO_2 in 2013
France[31]	2014	35% of total emissions	€14.5 per tonne in 2015
Iceland	2010	50% of total emissions	US$10 per tonne of CO_2 in 2014
Ireland	2010	40% of total emissions	€20 per tonne of CO_2 in 2014
Japan	2012	70% of total emissions	US$3 per tonne of CO_2 in 2014
Mexico	2014	40% of total emissions	Between US$1 and US$4 per tonne of CO_2 in 2014 (depends on the fuel type and usage)
Norway	1991	50% of total emissions	Between US$4 and US$69 per tonne of CO_2 in 2014 (depends on the fuel type and usage)
Sweden	1991	25% of total emissions	US$168 per tonne of CO_2 in 2014
Switzerland	2008	30% of total emissions	US$68 per tonne of CO_2 in 2014
United Kingdom	2013	25% of total emissions	£9.55 per tonne of CO_2 in 2014

Source: World Bank, State and Trends of Carbon Pricing 2014

30 On July 1, 2012, Australia introduced a cap-and-trade system for facilities that emitted 25,000 tonnes or more of carbon dioxide equivalent annually. The system was designed for a two-stage implementation, beginning with a fixed carbon price applying to units in the first years, then transitioning as of July 1, 2015 into a cap-and-trade system with unit prices to be set by the market. Before July 1, 2015, the system operated largely like a carbon tax on carbon emissions. However, the whole system was repealed effective July 1, 2014 and as such, units were never traded by the market or their amount capped by the government.

31 France's carbon tax, or Contribution Climat-Énergie, consists of a 3-year stage increase in existing taxes on fossil fuels. The first increase in 2014 was €7 per tonne of carbon dioxide equivalent but did not apply to motive fuels and heating oil. The second and third increase of €7.5 in 2015 and 2016 apply to all fuels, with the result that France will argue to have a €22 (about CND$31) carbon tax by 2016.

11 ANNEX 2 – SUMMARY OF PUBLIC SUBMISSIONS

As part of the process to develop a pan-Canadian Framework for Clean Growth and Climate Change, Canadians were invited to share their views on the issues being studied by the four working groups established by First Ministers. A public engagement was launched on April 22, 2016.[32] Submissions were received from a variety of stakeholders, including non-governmental organizations, business groups and academic researchers. However, the vast majority of submissions came from ordinary citizens seeking to play a role in the development of Canada's approach to clean growth and climate change.

Most of the submissions addressed mitigation issues but many submissions still addressed carbon pricing directly or indirectly.

11.1 Carbon Pricing

Overall, participants in the engagement process supported the idea of putting a price on carbon to reduce Canada's GHG emissions.

This said, concerns were raised about the impact of carbon pricing on low- and fixed-income Canadians and the need for carbon pricing to be fair for current and future generations. Equally, some participants questioned whether a carbon price would be sufficient to meaningfully reduce Canada's GHG emissions, suggesting that regulatory instruments should be considered instead. Still other interveners suggested that:

- a carbon tax of $50 per tonne of CO_2 would be damaging to the economy and would be too low to achieve any significant reduction in GHG emissions;
- burning fossil fuels is a necessity to maintain the standard of living of Canadians; and
- Canadians are already paying too many taxes.

Among the majority that supported the use of carbon pricing, there was backing for both a carbon tax and a cap-and-trade emissions allowance system. This said, a larger number of participants in the engagement process expressed a preference for some form of national carbon tax.

11.2 Carbon Tax

Those Canadians supporting a carbon tax suggested that it could:

- be less complex to implement and easier to administer on an ongoing basis, than a cap-and-trade system;
- have a wider scope of application than regulations which may not cover all emissions sources; and,
- be made revenue-neutral as is the case for the carbon tax in British Columbia.

On the issue of the rate of the carbon tax, there were a number of submissions that suggested that it be set at a starting rate of $30 per tonne of GHG emissions and increase over time according to a pre-determined schedule. Several submissions argue for the rate increases to be published in advance to allow purchasers of new products, such as vehicles, to know the expected operating costs of those products over their useful lives. It was also suggested that manufacturers should be required to indicate the amount of carbon emitted in producing and distributing their products as well as the associated carbon tax incurred though the production and distribution process.

32 http://letstalkclimateaction.ca/canada-s-approach-to-climate-change

11.3 Cap-and-Trade System

Those Canadians supporting a cap-and-trade emissions allowance system suggested that it could:

- directly cap Canada's GHG emissions and thus achieve some certainty with respect to the emission-reduction outcome; and,
- benefit from the European Union's experience with its Emissions Trading Scheme.

It was also suggested that the cap-and-trade system be implemented as far upstream as possible in order to capture large GHG emitters while minimizing the number of firms involved in the system. This, it was argued, could lower administrative costs for government and reduce the potential compliance burden for smaller businesses.

11.4 Use of Revenues from Carbon Pricing

A number of participants in the engagement process support using the revenues generated by carbon pricing to reduce other taxes (e.g., personal and corporate income taxes) and be revenue neutral as in British Columbia. Some argue, however, for using part of those revenues to assist low-income households who might be disproportionately impacted by the implementation of carbon pricing policies.

Other suggestions for using carbon pricing revenues include:

- financing "green" infrastructure investments (e.g., public transportation, building retrofits);
- providing financial incentives to consumers and businesses to implement renewable energy and energy efficiency technologies;
- retraining workers to integrate into the new, low-carbon economy; and
- undertaking research on emerging "green" technologies.

As a complement to the generation of revenues though carbon pricing, several submissions also argue for the elimination of subsidies and tax preferences provided to the fossil fuel industry.

11.5 Other Suggestions

It is worth noting that submissions on carbon pricing often included other tax and non-tax proposals for addressing GHG emissions.

Indeed, in general, there seemed to be recognition among participants in the engagement process that adopting a multi-pronged approach, involving a carbon pricing instrument and other policy instruments such as regulation, mitigation policies or elimination of some subsidies, may be needed to achieve green growth and climate change objectives.

12 ANNEX 3 – SUMMARY OF CONSULTATIONS WITH EXPERTS AND STAKEHOLDERS

12.1 Consultations with Invited Experts

The Carbon Pricing Mechanisms Working Group invited a number of experts (see table below) to meet with the working group to discuss issues and considerations related to the role that carbon pricing should play in the pan-Canadian Framework.

Invited Experts	
Stewart Elgie	University of Ottawa, Smart Prosperity
Nancy Olewiler (remote)	Simon Fraser University
Maria Panezi	Centre for International Governance Innovation
Mark Purdon (remote)	Institut québécois du carbone, Université de Montréal
Christopher Ragan	McGill University, Ecofiscal Commission
Nicholas Rivers	University of Ottawa
Dave Sawyer	EnviroEconomics

The experts were asked to consider the following questions:

- What are the most important issues that need to be taken into account when designing carbon pricing policy tools?
- Many factors affect the competitiveness of businesses across jurisdictions. In your opinion, how important a factor is "carbon pricing"? What are the best options to address competitiveness issues associated with carbon pricing?
- In your opinion, which kind of certainty – price or emissions – is most important? What is the appropriate trade-off between these two fundamental design elements?
- How much notice should governments reasonably give consumers and industry on the expected trajectory of a cap or tax rate in order to provide investment certainty?
- What is the most effective use (or mix of uses) of potential carbon pricing revenues? Should the priority be placed on minimizing the economic impacts for businesses and consumers, reducing distortionary taxes, or facilitating further emissions reductions?
- Should there be greater consistency across the different carbon pricing regimes in Canada – with varying coverage, reporting requirements, different GHG reduction targets and carbon prices (or no price nor target at all)? If so, what options are there to act without compromising actions already taken by provinces and territories?
- What role should carbon pricing play in Canadian efforts to reduce GHG emissions and to support a transition to a low-carbon economy compared to other targeted and focused mitigation approaches?

A summary of the main themes are presented below.

Carbon pricing should be a central component in reducing Canada's emissions

The experts generally agreed that, amongst all policy instruments, carbon pricing should play an important role in Canadian efforts to reduce GHG emissions, particularly as it would send a clear and ongoing price signal to reduce emissions.

Some experts argued that regulations can be a useful complementary tool to carbon pricing, while others cautioned against overuse of such measures, as regulations may not send a strong price signal to consumers

and they would have little or no incentive to demand less of the regulated products. For example, if a performance standard was adopted for a particular industry, it would only affect the GHG intensity of that industry and the costs may not "trickle down" to consumers.

It was also noted that regulations may not create any incentive to reduce emissions beyond what is required. Further, regulations could actually, in some cases, have a limited, if not negative impact on GHG reductions. It was given as an example that adopting regulations requiring carmakers to manufacture more efficient cars could actually create an incentive to drive more as the result of the car's higher fuel efficiency.

Pricing should be consistent and coverage should be as broad as possible

It was argued that cost-effectiveness should in fact be a main objective in the design of carbon pricing tools. The experts generally agreed that, in theory, the best cost-effectiveness tool for Canada as a whole could be a single national carbon price managed by the federal government for it would guarantee price consistency. It was recognized, however, that many provinces and territories have had climate policies for years, including broad-based pricing mechanisms for British Columbia and Quebec, while Alberta and Ontario will in 2017.

The experts also generally agreed that broad-based carbon mechanisms that cover the largest range of emissions possible could result in effective policies that achieves GHG emission reductions at the lowest possible marginal cost of abatement, while recognizing that carbon tax, cap-and-trade and performance standard might have some different results depending on their design parameters.

It was asserted that a large carbon price on a small portion of the emissions would be far costlier for the economy than a small carbon price on the vast majority of emissions, thus identifying that price cannot be the sole policy consideration and that coverage and GHG reductions also need to be part of the equation in the design of the different tools.

Carbon prices should be predictable and timely

The experts agreed that predictability is a crucial element in the development of carbon pricing tools, and that it may be achieved by communicating clear policy objectives. Some viewed expectations of the carbon price, as well as planned increases in the carbon price, as being one of the most important elements of carbon pricing and that any system must be designed to anchor expectations. It was noted that clear expectations of the price of carbon would promote certainty and would therefore allow private sector investments to react to the future carbon price (e.g., emitters may be more inclined to make investments in cleaner technologies in the short-term if there is a greater level of certainty about future carbon prices in the long-term).

With respect to the trade-off between price and emissions certainty, there was a general consensus that as long as carbon pricing tools are broad-based, maintain marginal cost signals and are designed to efficiently achieve the lowest marginal cost of abatement, a carbon tax or cap-and-trade should have broadly similar effects on the economy.

There was also general agreement that governments should provide information on the expected trajectory of a cap or tax rate with as much notice as possible in order to provide investment certainty. The general consensus was that more time is always better, but that that should not delay the adoption and implementation of a carbon pricing mechanism. In fact, it was noted that the longer governments delay implementation of a carbon pricing tool, the costlier it could be to reach Canada's 2020 and 2030 GHG targets.

Overall, experts believed that implementing a carbon price as soon as possible, even if it were at a low price, is the optimal path forward. They argued that the price could then be ramped up over time and emphasized the importance of establishing a predictable price path that could be adjusted accordingly.

Carbon pricing should recognize competitiveness issues

The experts generally agreed that carbon pricing mechanisms should consider the impact on the competitiveness of businesses across jurisdictions, but that it was important to maintain the marginal cost on carbon emissions. It was noted that some emissions-intensive industries could be particularly impacted if measures are not taken to limit the distortion they may face when competing against foreign companies that may not be subject to the same carbon price signal. The extent to which they may be impacted would be dependent on the price level and their emissions intensity relative to their competitors. It was emphasized, however, that governments should not necessarily presume that there will be negative competitiveness impacts for any particular sector.

While revenue recycling was also proposed as a policy tool, BTAs[33], along with relief for exporters, were touted as important considerations for a carbon pricing strategy across Canada. It was noted that under the WTO, legality will depend on their specific design, though WTO has been sensitive to the environmental goals of its member countries in the past. For that reason, some argued that it would be easier to defend BTAs under a cap-and-trade system for they also directly serve the purpose as an environmental compliance tool to achieve GHG targets.

Nonetheless, BTAs were recognized as being complex and the experts suggested that BTA may not necessarily have to be implemented at the same time as the carbon price and worried that putting too much emphasis on BTAs could delay the adoption of carbon pricing. However, there was concern that providing relief to exporters would reduce the incentive for them to innovate and lower their carbon emissions.

It was also suggested that BTAs could first be adopted on only one or a few goods based on the ease with which it can be adopted as well as the magnitude of the domestic impact. Others disagreed with such an approach, arguing that adopting BTAs for the goods of only one or a few sectors at a time could create inequities between affected industries.

Use of revenues

In terms of the most effective use, or uses, of potential carbon pricing revenues, the general consensus seemed to be that the debate around how best to use the revenues should not be the central focus of carbon pricing.

It was noted that carbon pricing revenues are no different from any other government revenues, and there would be no advantage to earmarking these revenues. There was some concern that making revenue recycling decisions a part of the carbon pricing process would take the discussion away from carbon pricing's core purpose – to reduce GHG emissions.

However, it was also noted that, while the use of revenues is a secondary discussion, committing to revenue neutrality may be a powerful tool to ensure acceptability.

Some experts noted that governments should be careful with their use of carbon pricing revenues to avoid being offside with the WTO. To this end, revenues can be used to provide general tax relief, such as through reductions in corporate income taxes, but they cannot be directed at specific industries, as that may be considered a subsidy by the WTO.

33 During the session with the experts, border tax adjustments were referred to as border carbon adjustments. For consistency with the rest of this report, border tax adjustments is used here.

12.2 Stakeholder Engagement: Key Themes from Carbon Pricing / Mitigation Roundtables

The Working Group on Carbon Pricing Mechanisms, together with the Working Group on Specific Mitigation Opportunities hosted three roundtables with stakeholders and national Indigenous Organizations on June 7 (Montreal), June 8 (Ottawa) and June 21 (Vancouver), 2016. Participants at the roundtable sessions were highly engaged, and brought forward a wide variety of issues, considerations, and ideas. Some of the key messages that emerged from these sessions are summarized below.

- There was broad agreement on the need for ambitious climate change action, but a range of perspectives on priorities and next steps.
- Participants identified opportunities for emissions reductions across all sectors of the economy, and pointed to several cross-cutting enabling conditions – such as investment in clean electricity, inter-jurisdictional transmission grids and vehicle charging infrastructure to prepare for more electric vehicles, updated building codes and adequate access to capital to allow businesses to invest in new technologies.
- There are a number of emerging trends that could be accelerated to drive deeper emissions reductions. These include: urban densification; social innovation and the sharing economy; consideration of financial liabilities and investment risks related to climate change; and, changing business models, such as the move towards a circular economy.
- Individual Canadians can be agents of change. Public outreach and education efforts are needed to make people aware of the impacts of their choices and to build broad support and understanding of the actions being taken. Policies should avoid hidden costs in order to send clear signals to consumers; however, there is also a need to make low-carbon choices convenient and attractive. Governments have a responsibility to lead by example.
- Environmental, economic, and social criteria need to be balanced when evaluating policies. In addition to metrics, such as total costs and emissions reductions (e.g., cost per tonne), other considerations include potential for transformative change, competitiveness impacts, potential for job creation and skills development, social acceptability, and impacts on vulnerable populations. High-quality data and consistent reporting on progress is needed to develop and evaluate policies effectively and to inform data-driven decisions.
- Some key areas of potential partnership with Indigenous people include enhancing carbon sinks, electricity and distributed energy production, particularly in Northern and remote communities.
- Some participants suggested that Canada could consider purchasing internationally transferred mitigation outcomes (ITMOs) to help meets its climate change targets, provided that sufficient investments are also made in achieving domestic emissions reductions. Some participants suggested that there may also be potential for Canada to receive credit for exporting low-carbon technologies, products, or resources.
- Effective climate change policy requires a full suite of tools, including regulations, incentives, elimination of fossil fuel subsidies, outreach and education, and investment in research and development. Carbon pricing is a key tool, but complementary measures are also needed to reach emissions that are not effectively addressed through pricing. Rather than being prescriptive, governments should focus on achieving emissions reduction outcomes.
- When designing climate policies, governments can either choose to use carbon pricing as the main driver for GHG reduction (high carbon price, few complementary measures) or decide to rely on a wider array of measures (low carbon price, multiple complementary measures).
- There was broad agreement on: the need for a carbon price that is high enough and that increases over time to change behavior without decreasing public support; the importance of price foreseeability for business; the need to consider carbon leakage if Canada's prices are too high; the value of learning from international

experiences with different carbon pricing approaches; and, ultimately the need for the carbon pricing mechanism to deliver real emission reductions.

- Competitiveness needs to be carefully considered, both in terms of impacts of new costs on industry, as well as steps industry can take to enhance its competitiveness in a carbon-constrained world. Emissions-Intensive and Trade-Exposed sectors should be clearly defined and regularly reviewed.
- There is a need for policy coherence, including between carbon pricing and other mitigation policies, and between policies developed by different orders of government (federal, provincial, territorial). A patchwork of systems across the country can be difficult for business but can co-exist and might be a good way to evaluate down the road what would work best to achieve real GHG reductions. Identifying and addressing unintended barriers or areas of overlap between policies is a key challenge.
- A collection of approaches, including infrastructure spending, regulations, and carbon pricing are needed to achieve step changes, such as a transition to low-carbon fuels.