

IQCarbone

Institut québécois du carbone

David Houle *Research director*

**With the financial participation of:
The Mowat Centre for Policy Innovation**

**Increasing the Resilience of Carbon Pricing Policies in
Canada: A National Framework.**

Working paper n.1, Collection Economy and Society

March 20, 2015

Résumé

Depuis les années 2000, les politiques en changements climatiques, en particulier celles utilisant des instruments de marché, se sont surtout développées dans le contexte canadien au niveau provincial. Le Québec a mis en oeuvre dès 2007 une modeste taxe sur le carbone alors que l'Alberta a lancé, la même année, un système de plafonnement et d'échange de droits d'émission sur une base d'intensité. L'année suivante, en 2008, la Colombie-Britannique a adopté une taxe carbone à impact fiscal neutre. La taxe carbone du Québec a éventuellement été remplacée par un système de plafonnement et d'échange de droits d'émission mis en oeuvre en 2013. Pour sa part, le Manitoba a adopté une taxe sur le carbone limitée aux achats de charbon en 2011. Pour sa part, bien que l'Ontario est considérée, et maintenant reconsidère via des consultations publiques, l'utilisation d'instruments de marché pour réduire ses émissions, la province n'a pas pour l'instant procédé à leur mise en oeuvre. Malgré le fait que les provinces ont dicté jusqu'à maintenant le développement des politiques en changements climatiques, est-il possible de concevoir un rôle pour le gouvernement fédéral? Ce rapport affirme que c'est effectivement le cas. Il est désormais trop tard pour adopter une politique fédérale de tarification du carbone qui viendrait complètement remplacer les politiques adoptées par les provinces. Cependant, le gouvernement fédéral devrait travailler en collaboration avec les gouvernements provinciaux afin que toutes les émissions canadiennes soient couvertes par un tel instrument. Pour accomplir cette tâche, Ottawa pourrait adopter des mécanismes de tarification du carbone qui seront appliqués seulement dans les provinces qui n'ont pas encore adopté de telles politiques ou pour les secteurs qui ne sont pas couverts par les politiques provinciales existantes. Par exemple, deux mécanismes de tarification du carbone pourraient être créés, l'un pour le secteur du transport (ex. une taxe carbone sur les carburants) et un autre pour les émissions industrielles et celles du secteur de la production d'électricité (un système de plafonnement et d'échange de droits d'émission). Les provinces qui n'ont pas adopté de mécanisme de tarification du carbone ou un instrument qui couvre seulement un de ces secteurs pourraient soit: i) collaborer avec le gouvernement fédéral pour mettre en oeuvre ces mécanismes fédéraux sur leur territoire ou 2) adopter des mécanismes de tarification du carbone qui couvrent l'ensemble des secteurs. Les provinces qui ont déjà mis en oeuvre des instruments de tarification du carbone couvrant l'ensemble de leurs sources d'émissions devraient toutefois être exemptées (ex. le Québec) alors que celles qui ont mis en place un mécanisme couvrant en partie leurs émissions pourraient recevoir une exemption partielle pour les secteurs couverts (ex. la Colombie-Britannique pour le transport et l'Alberta pour les procédés industriels et la génération d'électricité). Bien que l'harmonisation des

politiques de tarification du carbone au Canada sera très complexe, étant donné la variation importante présente entre les mécanismes mis en oeuvre à ce jour, le cadre national proposé ici est un premier pas dans cette direction et offre une première solution partielle aux problèmes de fuites du carbone et d'équité inter-provinciale.

Summary

Since the mid-2000s, climate change policy in Canada, especially the use of market-based instruments has developed mainly at the sub-federal level. Quebec implemented a first modest carbon tax in 2007, while Alberta launched the same year an intensity-based emissions trading system. It was followed by British Columbia's decision to implement a revenue-neutral carbon tax in 2008. The Quebec's carbon tax was eventually replaced with an emissions trading system, launched in 2013. Manitoba also adopted a narrow-based carbon tax on coal in 2011. Although Ontario has been considering the adoption of emissions trading, and now is reconsidering it through public consultations, it has not been implemented yet. In such a policy landscape dominated by the provinces, is there a role for the federal government? This report contends that there certainly is. It is now too late to adopt a federal carbon pricing policy that would entirely replace existing provincial initiatives. However, the federal government could nonetheless work in collaboration with the provinces to make sure that all significant Canadian emissions are covered by a carbon price. For that purpose, Ottawa could create carbon pricing mechanisms that would apply to provinces that have yet to adopt such policies or to the sectors that are not covered by existing provincial carbon pricing policies. For instance, two national carbon pricing mechanisms could be created, one for the transportation sector (ex. a carbon tax on fuels) and one for industrial processes and electricity generation (ex. a cap-and-trade system). Provinces that have not adopted any carbon pricing mechanism or adopted instruments that cover only one of these sectors could either collaborate with the federal government to see these policies implemented in their jurisdiction or adopt their own comprehensive carbon pricing policies. Of course, provinces that have already adopted similar policies covering the near totality of their emissions (ex. Quebec) should be completely exempted from any new federal carbon pricing mechanism. Other provinces, that have adopted carbon pricing but only for some sectors would receive a partial exemption for these sectors (ex. British Columbia for the transportation sector and Alberta for industrial processes and electricity generation). Although harmonization of existing Canadian carbon pricing policies will be very complex, given the important differences among carbon pricing mechanisms implemented so far by the provinces, such a national framework would

be a first step in that direction in making sure that most (if not all) Canadian emissions are effectively priced, which help address crucial issues such as carbon leakage and distributive fairness among provinces.

À propos de l'Institut québécois du carbone

L'Institut québécois du carbone est un organisme à but non-lucratif qui vise à encourager et à diffuser les recherches portant sur les politiques en changements climatiques au Québec et au-delà. À cette fin, l'Institut proposera des recherches originales et innovatrices qui se distingueront par leur qualité et leur rigueur scientifique. L'Institut se veut également le plus important regroupement de spécialistes, d'experts et d'universitaires travaillant sur les politiques en changements climatiques au Québec et ailleurs.

About l'Institut québécois du carbone

The Institut québécois du carbone is a non-profit organization whose objective is to promote and disseminate research on climate change policy in Quebec and beyond. To this end, the Institute offers original and innovative research that will be distinguished by its quality and scientific rigor. The Institute also seeks to become one the largest group of specialists, experts and academics working on climate change policy in Quebec and elsewhere.

À propos de l'auteur

David Houle, BA, MA, PhD (ABD) est le directeur de la recherche (société et économie) à l'Institut québécois du carbone et un doctorant au Département de science politique et à l'École de l'environnement de l'Université de Toronto. Il a reçu plusieurs bourses du Conseil de recherches en sciences humaines du Canada (CRSH), du Fonds québécois de recherche sur la société et la culture (FQRSC) et de l'Université de Toronto. Ses recherches sont principalement axées sur les politiques des gouvernements nationaux et sous-nationaux en matière de changement climatique et de polluants atmosphériques. Il est le co-auteur de contributions sur ces sujets publiés aux Presses de l'Université Laval et UBC Press et dans des journaux scientifiques incluant le *Journal of Public Policy*, *Globe - Revue internationale d'études québécoises* et *Télescope : Revue d'analyse comparée en administration publique*.

About the author

David Houle, BA, MA, PhD (ABD) is the research director (society and economy) of the Institut québécois du carbone and a PhD candidate (ABD) at the Department of Political Science and the School of the Environment at the University of Toronto. His current research focuses on climate change market-based instruments at the sub-federal level. Other interests include environmental policy, comparative public policy, and Canadian politics. David's recent publications include *Policy Image Resilience, Multidimensionality, and Policy Image Management: A Study of US Biofuel Policy in the Journal of Public Policy* (2014), with Grace Skogstad and Matthieu Mondou and *Climate compared: Sub-federal Dominance on a Global Issue*, with Barry Rabe and Erick Lachapelle, *In Canada Compared*, UBC press (2014).

Clause de non-responsabilité

Les opinions exprimées dans ce rapport appartiennent à l'auteur et ne reflètent pas nécessairement celles de l'Institut québécois du carbone ou de ses partenaires.

Disclaimer

Any opinions stated herein are those of the author and do not necessarily reflect the opinions of the Quebec Carbon Institute or its partners.

Droits d'auteur

Ce travail est protégé par la licence Attribution-Pas d'utilisation commerciale-Pas de modification 4.0 de Creative Commons. Pour consulter cette licence, visitez (en anglais): <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Copyrights

This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit: <http://creativecommons.org/licenses/by-nc-nd/4.0/>



Référence:

Houle, David (2015). Résilience des politiques de tarification du carbone: une approche pan-canadienne. Institut québécois du carbone. Document de travail, n.1, Collection Économie and Société. Montréal, Québec.

Should be cited as:

Houle, David (2015). Increasing the Resilience of Carbon Pricing Policies in Canada: A National Framework. Quebec Carbon Institute. Working paper, n.1, Collection Economy and Society. Montreal, Quebec.

Contents

1	Introduction	7
2	International Context	8
3	Canadian Context	9
4	Carbon Pricing	11
4.1	Carbon Pricing in the World	11
5	Carbon Pricing in Canada	12
5.1	Carbon Taxes	12
5.2	Emissions Trading	13
6	Supporting Emerging Carbon Markets	14
6.1	Complementary Policies	16
6.2	Climate Exchanges	18
6.3	Linking Carbon Markets	20
6.4	What Role for the Federal Government	23
6.5	Current Federal Climate Change Regulation	24
6.6	National Framework to Support the Development of Carbon Pricing .	25
7	Policy Recommendations	27
7.1	Provincial governments	27
7.2	Federal government	28
8	Recommandations	29
8.1	Gouvernements provinciaux	29
8.2	Gouvernement fédéral	30
9	Bibliography	31
	Acknowledgment	

1 Introduction

Since the mid-2000s, climate change policy in Canada has developed mainly at the sub-federal level, as provincial governments put in place innovative policies centered on carbon pricing mechanisms (NRTEE, 2012; Houle, 2014). The objective of these policies is to provide incentives to consumers, public institutions, and businesses to reduce their emissions of greenhouse gases (GHG) (Stern, 2007). These emissions are believed to be the main driver behind the observed changes to Earth's climate, which will intensify if atmospheric concentrations of GHG are not stabilized over the next few years (IPCC, 2014). In order to achieve this objective efficiently, implementing long-term and increasing carbon prices is a first necessary step (Stern, 2007). However, the implementation of such policy, which may have an important impact on vulnerable groups, such as low-income households, and energy intensive industries and the transportation sector, requires that governments take action to promote the durability of carbon pricing mechanisms. Measures to address these impacts include: 1. developing complementary programs to help consumers, institutions, and industries to make the transition to low carbon technologies; 2. expanding the scope of sub-federal carbon pricing mechanisms; 3. linking and harmonizing existing carbon markets; and 4. creating institutions to support them, including climate exchanges. In other words, carbon pricing is only one of the elements of a general strategy to address climate change and complementary measures must also be developed to support technological innovation and remove obstacles to behavioural changes (Stern, 2007: 369). In doing taking these actions, governments can promote the resilience of carbon pricing policy and secure the necessary cooperation for their implementation.

Although not yet involved in the development of carbon markets in Canada, the federal government could play a positive role. Federal government's intervention, which should be done in consultation with the provinces, should be aimed at alleviating the concerns related to competitiveness and carbon leakage that arise from differences in carbon pricing policies between provinces. Such actions could include providing additional resources to provinces for complementary policies or the creation of federal policies aimed at helping citizens and businesses to make investments to reduce their carbon footprint. The federal government could also create a national climate change policy framework, which would include carbon pricing mechanisms for provinces that have yet to adopt such policies. Under such national framework, provinces would have the option of either developing their own carbon pricing scheme or participating to the national framework. Rather than attempting to design a top-down approach to climate change policy, the federal government should encourage the bottom-up

dynamic that has emerged over the last decade. Although linking the existing sub-federal carbon markets would present many important advantages, such endeavour will be challenging to accomplish given the differences between the existing provincial carbon pricing policies. As a first step, the objective of the federal government should be to focus on making sure that a carbon price is applied to all significant Canadian emissions, starting with provinces where no carbon pricing mechanism has been implemented yet and with sectors that have been omitted under existing provincial carbon pricing instruments.

2 International Context

In parallel to the release of the fifth assessment report of the Intergovernmental Panel on Climate Change, urging the international community to do more about climate change, a momentum is building in favour of a new climate change treaty, which should succeed to the Kyoto Protocol, which ended in 2012. It started with the decision taken in December 2011 at the Durban Climate Summit to propose a platform for enhanced actions, which recognized the gap between the aggregated impact of countries pledge to reduce emissions and what is needed to limit the increase of global temperature to 1.5 or 2 degrees Celsius. The Durban Platform of Enhanced Action aims at developing a new agreement with legal force under the United Nations Convention on Climate Change (UNFCCC) to deal with climate change beyond 2020. The international community has remained on that path and an agreement is expected to be concluded during the Paris Climate Summit, which will take place from November 30 to December 11 2015.

The European Union already committed to a new and more ambitious target of reducing its GHG emission by 40 percent at 1990 level by 2030 (European Commission, 2014). On November 12 2014 China and the United States concluded an agreement to increase their ambition on climate change. In a nutshell, the agreement stipulates that the United States will reduce its GHG emissions by 26-28 percent at 2005 levels by 2025 while China committed to peak its emissions and to increase the share of non-fossil fuels in primary energy consumption to 20 around percent by 2030 (Office of the White House Press Secretary, 2014). These developments created additional pressures for developed nations, especially Australia, Japan, and Canada, which have been less inclined to take on additional commitments during recent international negotiations. Canada position appears increasingly precarious after its decision, shortly after the 2011 Durban Climate Summit, to abandon its commitment to the Kyoto Protocol and given the absence of ambitious climate policy at the federal level.

3 Canadian Context

Canada's objective under the Protocol, agreed in 1997 and ratified in 2002, was a 6 percent reduction of its emissions from 1990 levels during the 2008-2012 compliance period. However, before renouncing its commitment under Kyoto, the government of Canada accepted a new target at the Copenhagen Climate Summit in 2009: to reduce its GHG emissions 17 percent below 2005 levels by 2020. Such objective is less ambitious than the previous Kyoto objective, representing a slight increase in Canadian emissions relative to their 1990 levels. However, even such limited reduction objective appears out of reach in the framework of existing federal climate change policy. Although Canadian emissions have decreased in 2008 and 2009, in the midst of the latest financial crisis, they have increased from 2010 to 2012 and remain far above both Kyoto and Copenhagen Canada's targets (Environment Canada, 2014).

At the sub-federal level however, it is possible to observe much variation between the Canadian provinces. While the Maritime Provinces, Quebec, and Ontario have reduced or stabilized their emissions since 1990, Western provinces' emissions have increased, in some cases drastically, 72 percent above 1990 levels in Saskatchewan and 46 percent in Alberta.

When taking into consideration economic growth it can be observed that a handful of provinces have experienced economic growth while reducing their emissions from 2007 to 2012. They include Prince Edward Island, Nova Scotia, Quebec, and British Columbia. Among provinces that have experienced more than 10 percent economic growth over this period, only Manitoba succeeded in reducing its emissions. Alberta's emissions remain relatively stable during this period (0.8 percent increase) while Saskatchewan emissions grew by almost 4 percent (Environment Canada, 2014). Manitoba, Alberta, Quebec, and British Columbia have all adopted innovative climate change policy including carbon pricing mechanisms, which might contribute to explain their success in reducing or stabilizing their emissions while engaging their economies on the path of economic recovery. Although few studies have been conducted on the effectiveness of carbon pricing policy in Canada, at least one have found that the BC carbon tax had a positive impact on fuel consumption, which has fallen by 17.4 percent on a per capita basis (Elgie and Wesanko, 2013).

However, many other factors can explain the recent evolution of GHG emissions and several provinces have reduced the carbon intensity of their electricity generation, usually by switching to less carbon intensive electricity production, including natural

Table 1. GHG emissions and GDP growth, in percentage from 2007 to 2012

Provinces	GHG emissions change	GDP change
NFL	-17.5	-7.6
PEI	-7.2	5.9
NS	-18.5	5.6
NB	-17.2	1.2
QC	-9.1	6.4
ON	-16.9	3.7
MB	-2.8	11.2
SK	3.5	12.8
AB	0.8	11.5
G BC	-2.9	6.1

Source: Environment Canada, 2014

gas and renewable energy, as illustrated in table 2. Electricity generation is indeed an important source of emission reductions in Nova Scotia (45 percent of all emissions reduction from 2007 to 2012), in New Brunswick (46 percent), and in Ontario (33 percent)(Environment Canada, 2014).

Although reduction in the energy sector can be accomplished relatively easily by using cleaner sources of energy, reducing emissions in other sectors, including the industrial and transportation sectors, is much more challenging as it involves influencing the behaviour of a vast array of societal actors. While several provinces experienced a reduction of their industrial emissions in the midst of the most recent economic recession, only in the case of British Columbia does the transportation sector represents the most important source of emission reductions, presenting 42 percent of all emission reductions from 2007 to 2014. Transportation is of course the target of the BC carbon tax while industrial process emissions are not covered by the instrument. In the case of Alberta, most of the emission reductions have occurred in electricity generation (58.3 percent) and fossil fuel production and refining (30.3 percent), two sectors targeted by Alberta’s GHG emissions regulation. These examples show the potential offered by provincial climate policy to further reduce GHG emissions.

Table 2. Carbon Generation Intensity (in grams of CO₂e/kWh)

Provinces	2008	2012	Variation
AB	940.0	820.0	-120.0
NB	520.0	420.0	-100.0
NS	790.0	700.0	-90.0
ON	170.0	96.0	-74.0
BC	28.0	8.2	-19.8
MB	12.0	3.4	-8.6
PEI	28.0	22.0	-6.0
NFL	21.0	20.0	-1.0
QC	2.5	2.9	0.4
SK	710.0	750.0	40.0

Source: Environment Canada, 2014

4 Carbon Pricing

Carbon pricing policies use market-based instruments (MBIs), such as carbon tax and emissions trading, to implement a price on carbon emissions from various sources, including the industry, electricity, or transportation sectors. MBIs can be defined as “regulations that encourage behaviour through market signals rather than through explicit directives regarding pollution control levels or methods.” (Stavins, 2005: 1) The advantages of using MBIs become especially clear when we compare these instruments to other forms of government intervention such as command-and-control regulation or voluntary programs. MBIs provide the financial incentives necessary for behavioural changes while allowing for maximum flexibility as to how individuals and organizations choose to achieve emission reductions (Stern, 2007).

4.1 Carbon Pricing in the World

More than 300 MBIs have been adopted or implemented worldwide at the national or sub-national level since 1991, including emissions trading systems, white certificates (energy efficiency certificate trading systems), green certificates (renewable energy certificate trading systems), and taxes related to climate change, which include carbon taxes and tax incentives. Most of these emerged after 1999, two years after the adoption of the 1997 Kyoto Protocol. The protocol included three flexibility mechanisms, emissions trading (ET), Clean Development Mechanism (CDM), and Joint Implementation (JI). By mid-2000s, the implementation of a carbon price was

understood as the first essential element of climate change policy (Stern, 2007: 349). As of 2012, 63 percent of these MBIs were in force, while the implementation of 14 percent had come to a close, 18 percent were superseded, and 5 percent were planned (IEA and OECD, 2013). More recently, the implementation of market-based climate policies have been considered in developing nations as well, including China, where experimentation took place at the local level.

5 Carbon Pricing in Canada

Although the issue of carbon pricing was discussed at the federal level from time to time, only provincial governments in Canada have implemented such policy. Canadian provinces have used four different mechanisms to put a price on carbon including: cap-and-trade system, credit-based emissions trading system, revenue neutral carbon tax, and revenue enhancing carbon tax.

5.1 Carbon Taxes

Carbon taxes can be broadly defined as taxes directly related to the amount of GHG released, when they are applied to industrial emissions, or indirectly when the tax is applied to the carbon content of fuels. The main settings (or characteristics of a carbon tax include: 1) the level of the tax (expressed in terms of dollar per tCO₂e), 2) the activities (or the fuels) targeted (or coverage), including the exemptions granted to some industries or specific groups; 3) and how the revenues of the carbon tax are used. These settings vary for each specific carbon tax. Three provinces implemented carbon taxes, including British Columbia, Quebec, and Manitoba. Quebec's carbon tax is the first MBIs implemented by a provincial government to address the issue of climate change. While Manitoba and British Columbia carbon taxes are still in force, Quebec phased out its carbon tax, which was replaced by a more comprehensive emissions trading system.

The tax base is much larger in the case of British Columbia's revenue neutral carbon tax and the Quebec's carbon tax (officially named the Annual Duty to the Green Fund), than in the case of the Manitoba. Manitoba's emissions tax applies only to less than 1 percent of the provincial emissions, targeting different types and grades of coal. In the case of Quebec's carbon tax, it applies to coal and various fossil fuels, which account for 55 percent of Quebec's emissions. In contrast, the BC carbon tax applies to twenty fuels, including jet and aviation fuels, which represent on average 68 percent of the emissions of the province (Houle, 2015). The prevailing carbon

price also varies from 3 dollars per tonne of carbon dioxide equivalent (tCO₂e), in the case of Quebec's carbon tax, to 30 dollars per tCO₂e in the case of the BC carbon tax. The latter instrument was first implemented at the level of 10 dollars per tCO₂e in 2008, then increased to 20 dollars per tCO₂e in 2009, and finally reached 30 dollars per tCO₂e in 2010.

Finally, the fiscal use of the carbon taxes' revenues varies. While the British Columbia government adopted a wide range of fiscal measures to offset the tax increase created by the implementation of the carbon tax, a strategy often referred as revenue neutrality, a similar commitment is not present in other provinces. For instance, in Quebec, the 1.102 billion dollars of additional revenues brought by the carbon tax has been used to finance its climate change action plan (Purdon et al., 2014; Houle, 2015). In the case of Manitoba's emissions tax on coal, the measure brought to the province 753,267 dollars in 2012 and 1,701,447 dollars in 2013 (Houle, 2015). The Manitoba government committed to use all the revenues from the tax to encourage the transition from coal to alternative energy, more specifically to 'carbon neutral biomass energy' (Government of Manitoba, 2012).

5.2 Emissions Trading

In the case of a cap-and-trade system, an overall limit to GHG emission is set and emitters must secure emission allowances or credits for the total amount of GHG emissions they are producing. Such system has been implemented in Quebec since January 2012. Named the *Système de plafonnement d'échange et droits d'émission* (SPEDE), it has been developed in the framework of the Western Climate Initiative (WCI), a regional partnership that also involves California. Emissions trading has also been considered by Manitoba, British Columbia (both since 2007) and Ontario (since 2008), which have participated to various degree to the WCI process. Although in all three cases much of the necessary regulatory framework has been adopted, these provinces have yet to implement emissions trading.

Credit-based emissions trading system set a performance objective is set for every individual industries. When a specific industry overshoot its emission reduction objective, it generates emission credits that can be traded with companies that have not met their performance standard, such system has been implemented in Alberta since 2007 by the adoption of the Special Gas Emitters Regulation (SGER). A proposal for a carbon pricing mechanism has also emerged in Saskatchewan in 2009, which presents some similarities with Alberta's SGER as both systems include a

contribution to a technology fund as a compliance mechanism. Instead of achieving the performance standards, Alberta's industries can purchase an unlimited amount of technological credits for a fixed price of 15 dollars per tCO₂e.

Quebec's and the Alberta's emissions trading systems present important differences. First, while the Quebec's system is based on an overall absolute emissions cap, which will be progressively reduced, Alberta's system is based on carbon intensity target established for each regulated facility. Second, although the coverage of both systems started at more or less the same level, encompassing 30 percent (in Quebec) and 40 percent (in Alberta) of total provincial emissions, starting on January 1, 2015 Quebec's SPEDE entered its second phase and now include the transport sector. It will then become the most comprehensive provincial carbon pricing mechanism and cover 80 percent of all Quebec's emissions (Purdon et al., 2014). Third, the method of allocation for emission credits and allowances is very different. The most important impact of that difference is that while a finite amount of credits is allocated in Quebec, the supply of credits available in Alberta is unlimited. For example, while Quebec limits the number of offset credits that can be purchased by regulated facilities to cover their emissions, there is no such limit in Alberta. Furthermore, while only a very limited number of offset protocols have been approved in Quebec, Alberta developed a vast array of protocols in various sectors, which also increases the supply of offset credits. In addition, in Alberta, regulated industries have always the option to purchase technology fund credits to the cost of 15 dollars per tCO₂e, which prevents any increase of the carbon price above that level and provides certainty. In the case of Quebec, a floor auction price has been implemented. However, allowance prices can increase although the Quebec regulation includes mechanism to increase the supply of allowances if the their price during auctions exceed 40 dollars per tCO₂e (Houle, 2015).

6 Supporting Emerging Carbon Markets

In order to achieve emissions reduction in the timeframe and the scale required, carbon pricing mechanisms must be supported by policies aimed at accelerating the adoption of low carbon technologies (Stern, 2007: 393-454; NRTEE, 2009: 75-87). Although carbon pricing might contribute to the commercialization of these technologies, by rendering carbon intensive technologies and energy sources more expensive to use, many uncertainties and risks are still present and could prevent their funding and their development. One solution is for governments to bear part of the risks by subsidizing their development, demonstration, or commercialization. Alternatively,

regulation can be adopted to remove the most carbon intensive technologies from the marketplace, accelerating the adoption of cleaner ones (Stern, 2007: 393). These are examples of policy that complement the adoption of MBIs, accelerating the transition to a low carbon economy.

Additionally, robust institutions should be created with the purpose of providing information about transactions, quantities and prices prevailing in carbon markets and enforce compliance (Stern, 2007: 382). The absence of such information can hinder the development of carbon trading markets by increasing transaction costs and create volatility (Stern, 2007: 374). Finally, linking carbon markets allow broadening their scope and diversifying the industries that are involved. Different industries have different constraints and opportunities related to emission reductions, which tend to lower overall compliance costs and reduce volatility (Stern, 2007: 375).

Although provinces, especially British Columbia and Quebec, have proposed a vast array of complementary policies (British Columbia Ministry of Environment, 2008), their implementation has proceeded more slowly than expected, especially in Quebec where important resources have been available for this purpose for a long time (Cinq-Mars, 2012) but have been allocated only recently. Concerning institutions to support provincial carbon market, much have yet to be accomplished.

Furthermore, much of the financial institutions necessary to support carbon markets in Canada have yet to emerge. Early ventures in climate exchanges, including the Chicago Climate Exchange and the Montreal Climate Exchange have been abandoned. However, this was before the adoption of emissions trading regulation by Canadian provinces and US states. Although it is possible that governments would want to continue to control the auctioning process, carbon exchanges could be used to increase transparency in the secondary markets, where allowances secured during auctions can be resold. Finally, although linking subnational carbon market should be an important long-term objective, to foster their development and address issues such as competitiveness and carbon leakage, important political, legal, and technical barriers will need to be overcome.

The integration of regional carbon markets should be an important objective of the next international treaty on climate change, which should emerge in Paris in 2015 but could take effect only in 2020. International commitments from Canada and the United States could allow sub-federal governments access to international carbon markets. In the short term, the inclusion of additional provinces and states

in existing regional carbon markets, such as the Western Climate Initiative, seems to be the best way to broaden the scope of these markets. The federal government could play an important role in encouraging provincial governments to adhere to regional carbon market. This would be discussed further in the next section of the report.

6.1 Complementary Policies

Complementary policies are implemented to address carbon market failures, created by their redistributive effects or participants' lack of information. In doing so, complementary policies promote cost-effective reduction of emissions by: i) accelerating the adoption of low carbon technologies, ii) communicating to the public the importance of carbon pricing policies, and iii) expanding the scope of climate change policy to sectors not covered by MBIs.

The implementation MBIs does not have the same impact on all industries. Some industries, especially energy intensive and trade exposed (EITE) industries, can experience an important increase of their costs, while their international competitors may not have to face the same constraints. Such a situation can lead to carbon leakages, as EITE industries may decide to move out of jurisdictions that have implemented market-based climate policy, although studies suggest that only a few industries, including aluminum, oil refining, pulp and paper, and chemical products are vulnerable to foreign competition in the context of rising energy price (Stern, 2007). However, in the Canadian context, these industries represent important economic activities. In order to alleviate their competitiveness concerns and avoid carbon leakage, and associated lost of economic opportunities and employment, one solution is to design MBIs in such a way that it reduces the compliance costs of these industries, by providing them free emission allowances or exemptions. However, this strategy can have serious consequences on the effectiveness of MBIs, as free allowances can reduce incentives to reduce emissions and create a barrier to the arrival of new players in the regulated industries, restricting competition. In doing so, it can protect companies with outdated technologies. An alternative approach, which preserves the integrity of carbon pricing mechanisms, is to grant assistance to EITE industries by financing technologies or by building infrastructures that can help them reduce their emissions and therefore demand for allowances or their production costs.

Other complementary instruments will attempt to address the distributive effects caused by the implementation of MBIs, especially for vulnerable groups such as low-

income families and small businesses, while still encouraging them to reduce their carbon footprint. Governments can also contribute to the diffusion of low carbon technologies by changing their procurement policy, in favor of energy efficient and low carbon products, and take into consideration GHG emissions in governmental planning and project approval processes.

Ultimately the choice of which complementary policies to adopt should depend on the context of each jurisdiction. Governments should aim to develop complementary policies in sectors that contribute the most to overall emissions and present low-cost reduction opportunities. Usually transportation and electricity generation should be targeted first as barriers to the deployment of new technologies are more important in these sectors. Also, the transportation sector does represent a significant part of emissions in all Canadian provinces. However, some provinces, especially Quebec, Manitoba, British Columbia, and Newfoundland and Labrador rely heavily on low carbon and renewable energy to produce electricity. In these provinces, measures aimed at increasing energy efficiency contribute only marginally to emission reductions.

Complementary policies can be designed to target many sectors and use different kind of instruments. Complementary policies have been developed in Quebec, California, and British Columbia. However, a recent report from Quebec's environmental commissioner is a reminder that their design and implementation require constant efforts. Although many complementary policies have been announced in Quebec, few appear to have been implemented since the start of the emissions trading system and information about them as been found to be lacking (Cinq-Mars, 2012). In its December 2014 economic update, the Quebec Minister of Finance, announced a series of measures aimed at helping small businesses, especially in the manufacturing sector, to adjust to the new carbon market, by providing tax breaks and improve their energy efficiency.

These measures could answer some of the problems raised in a recent report from the *Commission sur les enjeux énergétiques du Québec*, which has relayed the competitiveness concerns of some Quebec industries, notably the province's fossil fuel distributors and asked the implementation of Quebec's cap-and-trade system to be delayed until Ontario adopted a similar scheme (Commission sur les enjeux énergétiques du Québec, 2014). However, the case of British Columbia, where a wide range of complementary policies have been developed, shows their importance to secure both the cooperation of the private sector and public opinion support for MBIs (Houle, 2014).

Measures adopted in British Columbia included specific assistance for some industries, a commitment to carbon neutrality for public institutions, a carbon offsets market helping the industry finance their emission reductions, and fiscal measures to reduce income and corporate tax and to support low-income families (British Columbia Ministry of the Environment, 2008). It should be mentioned that, in the context of British Columbia, given the government’s carbon neutrality commitment the public sector is the main buyer of carbon offsets, which in fact is another way for the government to finance industry’s carbon emission reduction projects. This method however created an important financial pressure on public institutions, which must find room in their budget to pay for the carbon offsets or make investments to reduce their emissions.

6.2 Climate Exchanges

Besides adopting complementary policies, governments can also improve the functioning and resilience of carbon markets by creating institutions to support them. One example is the creation of carbon exchanges. For instance, Quebec and Alberta have implemented emissions trading and use various methods to grant allowances and credits to regulated facilities ¹. In Quebec, regular auctions provide an opportunity for buyers to acquire important quantities of emission allowances. However, auctions only involve a fraction of all the transactions related to the Quebec carbon market, what is sometimes designed as the primary market. If market participants wish to resell them or buy additional credits or allowances, which is generally known as the secondary market, they have to do it on an individual basis and seek interested parties. These transactions are private and information on them is not publicly available. It is very likely that they involve complex contracts and long negotiations. Sometime provincial governments have created crown corporations, such as the British Columbia Pacific Carbon Trust, or private ventures have emerged, such as Québec’s Coop Carbone or Alberta’s Climate Central, to provide information about reduction opportunities and carbon offsets. However, no central marketplace currently exists to regroup buyers and sellers of carbon credits. The negotiation of these private contracts must be repeated each time, creating transaction costs. As the demand for emission credits and allowances increase, they are expected to increase in importance.

¹Several distinctions can be made between credits and allowances. In the Alberta’s SGER, emission units are generally called credits, either performance, offset, or fund, depending of the way they were initially obtained. In the case of Quebec, emission allowances are purchased during auctions or granted for free by the government. The expression credits is usually reserved for offset credits.

An alternative is to create a marketplace where transactions are facilitated and information, including quantities and prices, are available. This would allow reducing the costs associated with the secondary carbon market and reduce the costs associated with transactions between sellers and buyers. Such carbon stock exchange is already in place in the European Union, the European Energy Exchange (EEX), which trade European Union Allowances (EUAs), Certified Emissions Reductions (CERs), and derivative financial products. In the North American context, the Chicago Climate Exchange was created in 2003 but closed in 2010. A joint venture of the CCX and the Montréal Climate Exchange was created in 2008, the Montréal Climate Exchange (MCeX). However, the key difference was that, at the time, the credits sold in the CCX were generated on a voluntary basis by the private sector, in the absence of governmental regulation. Although some financial actors have been interested to participate to Quebec and California auctions, no climate exchange in Canada has emerged. Although governments might want in the near future to keep a tight control on the primary market, they might benefit from the experience of the financial sector by involving them in the secondary market. Of course, to create interest, credit and allowance prices, along with the demand for these instruments, would have to be high, which is not currently the case as auction prices remain close to the floor prices in Quebec and are capped in Alberta. In the case of Quebec, the situation should improve, as a smaller percentage of allowances are now granted for free as the cap-and-trade system is entering its second phase, which started in January 2015. In the second phase, the coverage of the regulatory market increased from 30 to 80 percent of all provincial emissions.

In Alberta, without significant modification to the design of the system, such as increasing both the ceiling price and the emission reduction targets, the interest of the financial institutions in the secondary carbon market will likely remain low. The 40-40 proposal was made by the Alberta government to increase the price of fund credits, which act as a ceiling price, to 40 dollars per tCO₂e (currently 15 dollars per tCO₂e) and increase intensity target to 40 percent from 12 percent under the current rule. Such proposal however was opposed by the oil and gas industry, which instead proposed a 20-20 formula (Vanderklippe, 2013). However, to date, no progress seems to have been made in implementing either reforms.

6.3 Linking Carbon Markets

Linking existing carbon markets to other subnational, regional, or international carbon markets is important to increase the efficiency and resilience of market-based climate policies. Also, since climate change is truly a global issue, any reduction makes the same contribution to address the problem, regardless of where it takes place. Therefore, governments and industries are justified to seek the cheapest reductions possible, wherever they might be. Linking carbon markets, especially with jurisdictions where low-cost reductions can be found is a way to increase the cost-effectiveness of emissions trading and reduce compliance cost (NRTEE, 2009: 65-66). This is especially true for Quebec, where the costs of abatement of GHG emissions is relatively high, given that per capita emissions in the province are among the lowest in North America, which can be explained by its use of hydroelectricity (Purdon et al., 2014). By contrast, Alberta's electricity sector remains the most carbon intensive among all Canadian provinces, despite recent progress. It is very likely that many low-cost reduction opportunities remain in this province.

Another advantage of linking carbon markets is to improve liquidity, especially in the secondary market, which can provide a greater price certainty and reduce price fluctuations (NRTEE, 2009: 65). In Alberta, the fact that regulated installations can purchase an unlimited quantity of technology fund credits at the price of 15 dollars per tCO₂e to meet their obligation means that the government have already provided price certainty although such a low price limits the effectiveness of the pricing mechanism.

However, by comparison to the situation prevailing in Alberta and from an industry perspective, linking carbon markets is more important in Quebec, as the carbon price paid by market participants is dominated by auction results, which are hard to predict since auction prices depend on the number of participants, the demand for allowances, and confidential bidding strategies. In the first phase of the implementation of Quebec's SPEDE, the number of free allowances received was enough to meet most of the needs of regulated facilities (Houle, 2015). In the future, as the number of free allowances is reduced, the demand for allowances during auctions will most likely increase and auction prices could become harder to predict. The presence of a well-functioning secondary market and link with California carbon market could contribute to stabilize overall compliance costs and help participants to compensate potential sudden spike in Quebec's auction prices.

Although linking carbon markets is desirable, at least in the case of emissions trading systems similar to the one implemented in Quebec, several political and legal obstacles can prevent jurisdictions to link their respective carbon markets. The experience of Quebec and California in linking their markets provides an example of overcoming such difficulties. Quebec and California governments are working toward a regional cap-and-trade system despite changes in governing political parties and early opposition from some business interests. This requires a level of inter-party consensus on climate change that has been rarely observed among Canadian provinces and US states. To often, cap-and-trade programs have been abandoned following changes in governing parties, in governor or premier, or simply in the legislative control of the governing party, as it was the case after the 2011 Ontario election in which the Liberal party was able only to form a minority government. Quebec and California have also continued to work toward a regional cap-and-trade despite the fact that other partners, including Ontario, Manitoba, and British Columbia, have failed so far to carry out their initial commitment (Rabe, 2013, Houle, 2014).

Moreover, Quebec and California have worked toward designing compatible cap-and-trade programs with similar rules, although some differences subsist, including in the allocation methods, the complementary policies adopted, and the ambition of their respective reduction targets. For instance, while the California regulation allows the oil and gas sector to receive free allowances, the Quebec regulation reserves such allowances for the manufacturing sector only. Furthermore, Quebec's emission reduction target is -20 percent below 1990 levels by 2020 while California's objective is simply to reduce its emissions to 1990 levels in the same timeframe (Purdon et al. 2014).

In the case of Alberta, the extent to which its credit-based emissions trading program could be linked with other carbon markets is uncertain. So far, the government of Alberta has remained committed to an unilateral approach to climate change policy implementation. However, if linking Alberta's emissions trading system with other carbon markets, either domestic or international, would be seriously considered, several modifications would have to be made to Alberta's regulation. As it is, the number of emission credits, which can be created in Alberta's carbon market appears virtually unlimited. For the few years for which data are available, the number of performance credits account for about 17 to 21 percent of all emission credits needed by regulated facilities (Houle, 2015). The government of Alberta has also approved 34 offset protocols, which as been used to generate 7.84 million offset credits, which is the equivalent of a third (35 percent) of all the carbon credits needed

from 2007 to 2009. Finally, companies have purchased 12.5 million of technology fund credits over the same period, which satisfied 56 percent of total demand for carbon credits. Furthermore, the fact that both offset and fund credits, not taking into consideration performance credits, represent 94 percent of the credits needed by regulated installations suggests that: i) trade between targeted facilities is relatively rare perhaps due to important transaction costs, and ii) that the current system over-allocate carbon credits.

In order to link the Alberta's emissions trading system with other systems, a necessary first step would be to limit the availability of emission credits, by setting an overall cap on the amount of credits available. This could be achieved by: 1) limiting the number of offset credits which can be purchased by regulated facilities, 2) limiting the amount of performance credits available, these credits however could still be provided on the basis of the environmental performance of each installation as measured by their carbon intensity in relation with either their past performance or the average carbon intensity of their industrial sector, and 3) by limiting the number of fund credits than can be purchased. Additionally, a proportion of the fund credits could be auctioned, which would bring additional revenues to compensate for the fact that a limit would be present on the total quantity of fund credits that can be sold. Finally, Alberta has authorized a much greater number of offset protocols than Quebec and California. Alberta's expertise in that field could be helpful but a compromise has to be made, as Quebec and California have been very prudent in authorizing offset protocols. Such reforms would make Alberta's system much more effective, likely to control the growth of GHG emissions. It would also be a first step toward a greater compatibility with the Western Climate Initiative framework and could be a basis for negotiations aimed at creating a linkage between Alberta, Quebec, and California. Although legal and technical obstacles could be addressed, the possibility of linking Alberta's carbon market with others have not been publicly discussed, as the province remains committed to a made-in-Alberta approach. One argument against the linkage would be that opening Alberta's carbon market might create a capital flow from the provinces to its partners. However, such flow already exists as many projects funded by Alberta technology funds, the Climate Change and Emissions Management Corporation (CCEMC), are located outside Alberta. It is the CCEMC policy to fund projects anywhere as long as they can be applied to emission reductions in Alberta. Finally, it is possible that Alberta's facilities will be able to offer low-cost reduction opportunities and attract investments.

Up to this point, the discussion has focused on subnational linkages. However, another possibility is to link subnational systems with international carbon markets, including the European market, which offers European Union Emission Allowances (EUAs), and the market created by the Clean Development Mechanism (CDM), which provides Certified Emission Reduction (CERs). In the current context, such linkages would be difficult. In both cases, the prices of emissions allowances are below the floor prices of both Quebec and California carbon markets. Although this would decrease compliance costs, such credits could flood the relatively small Quebec market and disrupt auctioning. In the case of the EU ETS, recent regulatory changes have contributed to increase allowance prices, they nonetheless have remained below WCI floor prices. Additionally, both emissions trading mechanisms have been developed under the Kyoto Protocol, from which the Canadian federal government has withdrawn. However, it remains that linking existing subnational systems to well-functioning international carbon markets should nonetheless be an important long-term goal to increase the resilience and cost-effectiveness of market-based climate policies in Canada. The current climate change negotiations offer opportunities for Quebec and California to increase the international profile of their initiatives and to build the necessary framework to accomplish these linkages in the future. A renewed commitment from Canada and the United States to an international multilateral climate change regime would help them make their case for the inclusion of subnational market in the new treaty that should emerge in Paris in 2015.

6.4 What Role for the Federal Government

The federal government has sent contradictory signals concerning MBIs. In 2007, the newly elected conservative government published *Turning the Corner*, a proposal for a national regulatory framework creating an emissions trading system for large final emitters, major Canadian industries (Government of Canada, 2008). During the 2008 federal election and in other occasions, the conservatives denounced the intention of the Liberal Party to adopt a revenue-neutral carbon tax, called the Green shift, while also opposing New Democratic Party's proposal to adopt a national cap-and-trade system. However, shortly after the election of President Barack Obama in November 2008, senior cabinet ministers openly discussed the possibility of implementing a continental cap-and-trade system in partnership with the United States (Canadian Press, 2008). Such system was never implemented. The US federal government was unable to make any progress in that direction despite the fact that the US House of Representatives successfully adopted a cap-and-trade legislation,

the Waxman-Markey bill (H.R. 2454) in June 2009, before the Copenhagen Climate summit. The proposal was abandoned in July 2010 while it was, along with similar legislations, considered by the Senate.

Despite the lack of progress in implementing MBIs, the federal government has increasingly recognized that provincial market-based climate policy, along with other measures taken by the provinces, significantly contribute to emission reductions in Canada (Office of the Auditor General of Canada, 2012). For instance, in a recent report on Canada's emissions trend, Environment Canada takes into consideration the impact of nineteen provincial measures on emissions, including provincial MBIs, which contribute to reduce the gap between expected emissions and its 2020 target (Environment Canada, 2014: 59). This gap however remains substantial, as Canada must still found 122 MtCO_{2e} of reduction to achieve its own revised objective (Environment Canada, 2014: 4). Despite their contribution to Canada's emission reductions, the federal government has not been actively supporting the development of provincial MBIs. In order to complement its sector-by-sector approach, the federal government could adopt a national climate change policy framework, which would support the implementation of carbon pricing mechanism by the provinces.

6.5 Current Federal Climate Change Regulation

The federal government is committed to a sector-by-sector regulatory approach, which was first adopted shortly after Canada's ratification of the Kyoto Protocol, when a Large Final Emitters (LFE) regulation was proposed. A similar proposal was published in 2007 in the *Turning the Corner* climate change policy framework under the leadership of the newly elected Conservative government. Although the principle of a sector-by-sector approach remained an emissions trading system was never implemented. However, the federal government has developed regulation for the transportation and the electricity sectors. Other regulations targeting the oil and gas sector, natural gas-fired electricity, and EITEI have been at the conceptual stage from some time, with the objective of publishing proposals in the Canada Gazette Part I by late 2012. So far, none of these regulation proposals have been published. Furthermore, Premier Minister Harper in his comments delivered to the House of Commons on December 9 2014 made clear that he had no intention of imposing climate regulations to the oil and gas sector. This admission places the Federal government in a difficult position internationally. Without additional action, Canada will fall short of its 2020 objective, setting aside the question of whether the current target will be enough to match new commitments made by other developed nations,

including the United States, during the upcoming Paris climate conference or future climate negotiations.

6.6 National Framework to Support the Development of Carbon Pricing

So far, federal regulations adopted are expected to generate only 38 MtCO₂e of emission reductions. The Canadian target for 2020 as been recently calculated to be 612 MtCO₂e and emissions are expected to grow to 862 MtCO₂e if no further actions are taken. Once taking into consideration all federal and provincial policies implemented, Environment Canada claims that 128 MtCO₂e of reduction have been made, presumably most of them generated by provincial climate change policy including MBIs, leaving a gap of 122 MtCO₂e. In parallel to continuing its efforts to implement sector per sector approach, the federal government could also develop, in collaboration with provincial government, a national climate change policy framework, which would support the use of MBIs at the provincial level.

Several studies summarized by the former National Roundtable of the Environment and the Economy (NRTEE) have suggested that an unified carbon pricing mechanism for Canada would allow to achieve emission reductions at a lower cost and that fragmented carbon pricing policies will create many significant administrative challenges if an attempt to harmonization is made (NRTEE, 2009: 23-25). As the NRTEE expected half a decade ago, provincial MBIs do apply various carbon prices, have different scopes, and diverse rules of compliance. That is, despite the fact that British Columbia, Manitoba, Ontario, and Quebec, along with California, have attempted to develop common rules for emissions trading. However, given the urgency of reducing GHG emissions, keeping Canada's 2020 target in mind—and possibly additional reduction commitments that will have to be made to remain consistent with our main economic partners—starting anew is not a viable option. Instead, the federal government should attempt, as the new US EPA regulation in the electricity sector is proposing, to promote and support the use of MBIs at the subnational level while adopting the long-term goal of harmonizing provincial climate policies. In order to do that, a national climate change policy framework should be adopted based on a broad federal-provincial agreement on the necessity to apply a carbon price to emissions from the sectors responsible for majority of Canada's emissions, including transportation, industries, and electricity generation. Although such a federal-provincial agreement could seem at first glance far-fetched, it should be mentioned that: i) most Canadian provinces, including the most likely to resist such

agreement, have either implemented carbon pricing or seriously considered it (NRTEE, 2009: 23-24), ii) virtually all Canadian industrial sectors have supported some form of carbon pricing mechanism (Belfry, 2012), and finally, iii) Canadian public opinion remains favourable to carbon pricing (Lachapelle et al., 2012). Such agreement would contribute to address the concern of carbon leakage and competitiveness among Canadian provinces while also encouraging provinces that have already made steps toward the adoption of such instruments to complete their implementation.

Federal and provincial governments should also cooperate to implement MBIs to cover the transport, industry, and electricity sectors for all provinces. Each province would have the choice to either adopt its own carbon pricing instruments to cover its GHG emissions in the three sectors or to cooperate with the federal government to implement national carbon pricing mechanisms. For that purpose, a series of bilateral agreements between each province and the federal government could be concluded, specifying, among other things, how the revenues from the instruments will be shared and used.

A first relatively easy measure to implement would be a national carbon pricing mechanism, targeting the transportation sector, which could take the form of a carbon tax or a revenue-neutral carbon tax, which should be harmonized with the British Columbia's carbon tax in the long term, but could be implemented in several phases. Such tax could be collected in a manner similar to existing federal and provincial fuel taxes. Provinces that have adopted comprehensive emissions trading system, such as Quebec, or carbon taxes already covering the transportation sector, such as British Columbia, would be exempted.

Then, for the industrial and electricity sectors, the federal government could propose to the provinces to collaborate to the implementation a cap-and-trade system for Large Final Emitters, which have not yet regulated their industrial and electricity GHG emissions, similar to the one proposed by the *Turning the Corner* framework. To make this regulation more effective, an auctioning mechanism could be added along with a hard cap on emissions at the national level. Such national cap on emissions would avoid determining specific shares of emission reductions to be accomplished by each participating province, an issue that have prove difficult to resolve both in theory and in practice (Macdonald et al. 2013). Provinces that have already implemented a carbon pricing mechanism for their industrial or electricity production sectors, including Quebec and Alberta, would be exempted.

Finally, the federal government using either its own revenues or the revenues gathered through the adoption of MBIs in participating provinces could focus on the adoption of complementary policies aimed at accelerating the adoption of low-carbon technologies. Such policies could be either implemented nationally or in each province in the framework of bilateral agreements.

7 Policy Recommendations

In order to increase the resilience of existing Canadian carbon pricing policies and their effectiveness and to support their development, provincial and federal governments can adopt several measures. Including the following actions:

7.1 Provincial governments

1. Implementing complementary policies, to accelerate the adoption of low carbon technologies. While provinces such as British Columbia and Quebec would do well to focus such policies on the transportation and industrial sectors (especially energy intensive trade exposed industries); provinces where emissions related to electricity generation are high, such as Alberta, should focus policy action there.
2. Complementary policies should provide assistance to industries and groups that will be the most impacted by the implementation of carbon pricing mechanisms. They should be designed in anticipation of potential negative policy feedback regarding MBIs, which could create political pressure to suspend their implementation.
3. In cooperation with the financial sector, provinces implementing emissions trading systems should support the creation of climate exchanges and a secondary market for carbon allowances. Such exchanges would regroup emission credits buyers and sellers, with the objective of lowering transaction costs associated with the secondary market and providing transparent information on transactions.
4. Provincial governments that have implemented market-based climate policy, including Alberta and British Columbia, have sometimes adopted an unilateral carbon pricing mechanism. Such provinces should engage with other governments to expand the scope of their policy and create opportunities to link their carbon pricing mechanisms with other similar initiatives. Moreover Ontario, British Columbia, and Manitoba have already invested considerable time and effort in the development of emissions trading regulations as part of the Western Climate Initiative (WCI) framework. Implementing these regulations would radically increase the scope of the WCI, strengthening the most comprehensive emissions trading system implemented in North America to date and contribute to address carbon leakage concerns.

5. Although the prospect of successful international linkages outside the WCI framework appears limited for Canadian provinces in the present context, the current UN climate change negotiations leading up to Paris 2015 is an opportunity for such subnational carbon pricing mechanisms to be recognized. Linkages between subnational, national, regional, and international initiatives at this occasion are considered by many to be crucial for the development of a bottom-up approach to market-based climate policies.

7.2 Federal government

1. Although the opportunity to implement a single national carbon pricing mechanism has now passed, the federal government could nonetheless adopt, in a consultation with the provinces, a national framework to support provincial, market-based climate policy.
2. As part of the national framework, the federal government could provide additional resources to provincial governments to develop MBIs and complementary policies.
3. The federal government could also offer a choice to provincial governments to either (i) adopt MBIs that cover their industrial, electricity generation, or transport related emissions or (ii) cooperate with Ottawa in implementing federal carbon pricing mechanisms for these sectors in their province.
4. Quebec, which has already adopted a comprehensive emissions trading system covering both transportation and industrial emissions, would be exempted from new federal carbon pricing policies?though, of course, the Quebec government should continue to provide assurances that its climate policy is effective.
5. Provinces such as Manitoba, Alberta, and British Columbia would receive partial exemptions, as they have already adopted MBIs covering at least one sector. However, the federal government could offer to implement complementary carbon pricing mechanism for sectors not currently covered by existing policy including: Alberta's transportation sector, British Columbia's industrial sector, and Manitoba's transportation and industrial sectors. Others provinces, including Ontario, Saskatchewan and the Maritime Provinces would not receive any exemptions and could either cooperate with the federal governments or develop their own MBIs, preferably in the framework of already existing multilateral regional initiatives or consistent with other provincial initiatives, especially the British Columbia carbon tax.

8 Recommandations

Les gouvernements provinciaux et fédéral peuvent adopter plusieurs mesures afin d'augmenter la résilience des politiques canadiennes de tarification du carbone et leur efficacité, ainsi que de soutenir leur développement. Ces actions incluent les mesures suivantes:

8.1 Gouvernements provinciaux

1. Mettre en oeuvre des politiques complémentaires afin d'accélérer l'adoption de technologies à faible émission de carbone. Bien que les provinces comme la Colombie-Britannique et le Québec devraient se concentrer sur les secteurs du transport et industriel, en particulier les industries grandes consommatrices d'énergie orientées vers l'exportation, les provinces où les émissions liées à la production d'électricité sont élevées, comme l'Alberta, devraient plutôt se concentrer sur ce secteur.
2. Des politiques complémentaires devraient fournir une aide aux industries et aux groupes qui seront les plus touchés par la mise en oeuvre de mécanismes de tarification du carbone afin d'éviter de créer une pression politique en faveur de la suspension de la mise en oeuvre des instruments de marché.
3. En coopération avec le secteur financier, les gouvernements provinciaux qui ont mis en oeuvre des marchés de droits d'émission devraient soutenir la création de bourses du climat et d'un marché secondaire pour les crédits de carbone. Ces bourses du climat devront regrouper les acheteurs et les vendeurs de crédits de carbone avec l'objectif de réduire les coûts de transaction associés au marché secondaire et en fournissant des informations transparentes sur les transactions.
4. Les gouvernements provinciaux qui ont mis en oeuvre des politiques climatiques fondées sur les instruments de marché, y compris l'Alberta et la Colombie-Britannique, ont parfois adopté ces mesures de manière unilatérale. Ces provinces devraient s'engager avec d'autres gouvernements afin de lier leurs mécanismes de tarification du carbone avec d'autres initiatives similaires. Par ailleurs, l'Ontario, la Colombie-Britannique et le Manitoba ont déjà investi temps et efforts dans le développement de systèmes de plafonnement et d'échange de droits d'émission dans le cadre de la Western Climate Initiative (WCI). La mise en oeuvre de ces systèmes augmenterait radicalement la portée de la WCI renforçant le plus ambitieux marché du carbone de l'Amérique du Nord. Cela contribuerait également à lutter contre les fuites de carbone entre les provinces.
5. Bien que la perspective de créer des liens avec les marchés internationaux du carbone semble limitée pour les provinces canadiennes dans le contexte actuel, les négociations internationales entourant la Plate-

forme de Durban pour une action renforcée crée une opportunité pour reconnaître les mécanismes de tarification du carbone infranationaux. Soulever la question des liens entre les initiatives locales, nationales, régionales et internationales à cette occasion sera crucial pour le développement d'une approche décentralisée des politiques climatiques de marché.

8.2 Gouvernement fédéral

1. Bien qu'il ne soit désormais plus possible de mettre en oeuvre un mécanisme national de tarification du carbone unique, le gouvernement fédéral pourrait néanmoins adopter, en consultation avec les provinces, un cadre national pour la mise en oeuvre d'instruments de marché dans les provinces.
2. Par ailleurs, le gouvernement fédéral pourrait fournir des ressources supplémentaires aux gouvernements provinciaux pour élaborer des politiques complémentaires aux instruments de marché.
3. Le gouvernement fédéral pourrait aussi offrir le choix aux gouvernements provinciaux d'adopter des instruments de marché pour couvrir leurs émissions industrielles, celles liées à la production d'électricité et au secteur du transport ou de coopérer avec Ottawa pour mettre en oeuvre un mécanisme de tarification du carbone pour ces secteurs dans leur province.
4. Le Québec, qui a déjà adopté un système d'échange de droits d'émission couvrant à la fois le transport et les émissions industrielles devrait être exempté de toutes nouvelles politiques de tarification du carbone.
5. Les provinces comme le Manitoba, l'Alberta et la Colombie-Britannique qui ont déjà adopté des instruments de marché recevraient des exemptions partielles. Cependant, le gouvernement fédéral pourrait offrir à ces provinces la possibilité de participer à des mécanismes de tarification du carbone nationaux pour les secteurs non couverts actuellement par leurs instruments, incluant: le secteur du transport en Alberta, le secteur industriel en Colombie -Britannique, et les secteurs du transport et de l'industrie au Manitoba. Les autres provinces, dont l'Ontario, la Saskatchewan et les provinces maritimes, ne recevraient pas d'exemption et pourraient soit coopérer avec le gouvernement fédéral ou développer leurs propres instruments de marché, de préférence dans le cadre des initiatives régionales multilatérales déjà existants ou d'autres initiatives provinciales compatibles.

9 Bibliography

- Belfry, Kaija Monroe. 2012. "Risk and Advantage in a Changing Climate: Business Preferences for Climate Change Policy Instruments in Canada." Faculty of Graduate Studies, The University of British Columbia.
- Braathen, Nils Axel. 2013. Pricing Carbon: Policy Perspectives. OECD.
- British Columbia Ministry of Environment. 2008. Climate Action Plan - Phase One. Government of British Columbia.
- Canadian Press. 2008. "Canada to push climate agreement with Obama government." CBC News, November 5.
- Cinq-Mars, Jean. 2012. Rapport du Vérificateur général du Québec à l'Assemblée nationale pour l'année 2011-2012: Rapport du commissaire au développement durable. Rapport du commissaire au développement durable.
- Commission sur les enjeux énergétiques du Québec. 2014. Maîtriser notre avenir énergétique: pour le bénéfice économique, environnemental et social de tous.
- European Commission. 2014. 2030 Framework for Climate and Energy Policies.
- Environment Canada. 2014. National Inventory Report 1990-2012: Greenhouse Gas Sources and Sinks in Canada.
- Gouvernement du Québec. 2014. Règlement concernant le système de plafonnement et d'échange de droits d'émission de gaz à effet de serre. Chapter Q-2, r. 46.1.
- Government of Alberta. 2007. Specified Gas Emitters Regulation. Alberta Regulation 139/2007.
- Government of Canada. 2008. Turning the Corner. Regulatory Framework for Industrial Greenhouse Gas Emissions.
- Government of Manitoba. 2012. Manitoba's Report on Climate Change for 2012: Progress Update on Manitoba's Emissions Reductions.
- Hansjürgens, Bernd, ed. 2005. Emissions Trading for Climate Policy: US and European Perspectives: Cambridge University Press.
- Houle, David. 2014. Obstacles to Carbon Pricing in Canadian Provinces. Sustainable Prosperity.
- Houle, David. 2015. Carbon Pricing in Canadian Provinces. University of Toronto.
- Houle, David, Erick Lachapelle, and Barry G. Rabe. 2014. "Climate Compared: Sub-federal Dominance on a Global Issue." In Canada Compared, edited by Luc Turgeon, Martin Papillon, Jennifer Wallner and Stephen White. UBC Press.
- IPCC. 2014. Climate Change 2014: Synthesis Report. Summary for Policymakers.
- International Energy Agency (IEA) and Organisation for Economic Co-operation and Development (OECD). 2013. Addressing Climate Change: Policies and Measures Databases.

Lachapelle, Erick, Christopher P. Borick, and Barry G. Rabe. 2012. "Public Attitudes toward Climate Science and Climate Policy in Federal Systems: Canada and the United States Compared." *Review of Policy Research* 29 (3): 334-357.

Lamhauge, Nicolina, and Anthony Cox. 2013. *Climate and Carbon: Aligning Prices and Policies*. OECD.

Legislative Assembly of Saskatchewan. 2009. *An Act respecting the Management and Reduction of Greenhouse Gases and Adaptation to Climate Change*. Bill no. 95.

Macdonald, Douglas, and et al. 2013. *Allocating Canadian Greenhouse Gas Emissions Reductions Amongst Sources and Provinces*. University of Toronto.

Ministère du Développement durable de l'Environnement et des Parcs du Québec. 2013. *Le Québec en action vert 2020: Plan d'action 2013-2020 sur les changements climatiques, phase 1*. Gouvernement du Québec.

National Round Table on the Environment and the Economy (NRTEE). 2009. *Achieving 2050: A Carbon Pricing Policy for Canada*. Technical Report.

National Round Table on the Environment and the Economy (NRTEE). 2012. *Reality Check: The State of Climate Progress in Canada*.

Office of the Auditor General of Canada. 2012. *Chapter 2: Meeting Canada's 2020 Climate Change Commitments*.

Office of the White House Press Secretary. 2014. *U.S.-China Joint Announcement on Climate Change*. The White House.

Purdon, Mark, David Houle, and Erick Lachapelle. 2014. *The Political Economy of California and Québec's Cap-and-Trade Systems*. Sustainable Prosperity.

Rabe, Barry G. 2013. "Reverse Diffusion and the Durability of State Cap and Trade Policy." 2013 Annual Meeting of the American Political Science Association, Chicago.

Stavins, Robert N. 2005. "Experience with market-based environmental policy instruments." In *Handbook of Environmental Economics: Valuing Environmental Changes*, edited by Karl-Göran Mäler and Jeffrey R. Vincent. Elsevier.

Stern, Nicholas. 2007. *The Economics of Climate Change*. The Stern Review. Cambridge, UK; New York Cambridge University Press.

Vanderklippe, Nathan. 2013. "Alberta, industry face wide gap on carbon tax." *The Globe and Mail*.

Acknowledgments

This report was rendered possible thanks to the generous financial support of the the Mowat Centre for Policy Innovation and my colleagues at l'Institut québécois du carbone, including Simon-Phillipe Breton, Mark Purdon, and Marc Sauriol-Francovic. I would also like to thank Yannick Dufresne, Douglas Macdonald, Matthew Mendelsohn, and Grace Skogstad for their comments. All errors remain mine.