1

Introduction and Overview

Thomas J. Courchene and John R. Allan

INTRODUCTION

The nations of the world will gather shortly in Copenhagen to attempt to map out a global strategy to combat the threat of catastrophic global warming. With the Obama administration committed to the adoption of an effective policy to combat climate change and China belatedly signalling at least some recognition that progress on the climate-change front must involve the major emerging economies, there is now some prospect that the unworkable voluntarism of the Kyoto I approach to countering climate change will be superseded, in Kyoto II, by a new and more effective international agreement. Leaving on the sideline, as Kyoto I did, the countries responsible for some three-quarters of the annual additions to greenhouse gas (GHG) emissions, the need for change could not be clearer. What form change may take, however, is anything but clear, as is the policy that Canada will bring to the bargaining table. Particularly complicating the latter is the fact that in Canada and the United States (whose position will strongly influence that of Canada) it is the second tier of government – the provinces and the states – that have taken the initiative and the lead in developing and adopting policies to combat climate change; the federal governments in both countries have been policy laggards.

Further complicating the development of Canadian climate-change policy is the fact that, constitutionally, responsibility for the environment is shared between both levels of government. By itself, this need not be problematic: the federal government, for example, could ensure an adequate pan-Canadian response to the climate challenge and, with strong leadership, co-ordinate this national response with those of participating provinces. Unfortunately, absent strong federal leadership and given increasing provincial impatience with the failure of the federal government to respond in what was seen as a timely and adequate manner – or possibly to forestall such a response – a hodgepodge of largely uncoordinated provincial initiatives has been established. The unfortunate end result has thus been an environmental Balkanization of the Canadian economy.

These and other related issues were the focus of a conference on Carbon Pricing and Environmental Federalism organized by the Institute of Intergovernmental Relations and co-sponsored by the Queen's Institute for Energy and Environmental Policy and by Sustainable Prosperity. The

University. The structure of the conference is reflected in the arrangement of the present volume. Part II, consisting of three chapters, provides a context for the chapters that follow, while Part III focuses on the challenges of carbon pricing in a federal setting complicated by the fact that some countries may not adopt, at least at this time, GHG-reducing policies. Part IV is devoted to an examination of the political challenges in the way of effective policies, while Part V examines the constitutional issues operative in Canada and the possible constraints on policy arising from Canada's membership in the WTO. The political economy of climate change is the subject of the two chapters in Part VI, while in Part VII the final two chapters consider how Canada and the world may move forward in this highly contested area of policy.

PART II: CARBON PRICING: SETTING THE STAGE

The volume opens with three background papers. The first, by Bob Page, is an historical, policy and intergovernmental overview of Canada's experience post-Kyoto climate change. The second, by Nic Rivers is a review of Canadian environmental policy as well as a simulation that generates ballpark estimates of the carbon price needed to bring Canada in line with its Kyoto commitments. (Indeed, it is probably more accurate to say that Rivers' estimates are "out of the ballpark" if the comparison is the range of carbon prices in the various government proposals.) The third paper is more along the lines of an analytical framework in that author Chris Green makes a cogent argument that climate change is inherently a technological challenge rather than a carbon pricing challenge.

The Canadian Policy Struggle with Climate Change: Setting the Context for Carbon Pricing (Bob Page)

Climate change may or may not be the most pressing societal challenge but, as Bob Page's lead paper makes very clear, it is far and away the most complex challenge. Page provides the reader with a *tour d'horizon* of the manifold ways by which the climate-change tentacles impinge on virtually every facet of Canadian public policy, including resource/energy policy, jurisdictional issues (inter-provincial and federal-provincial), global issues (Kyoto and the developed/developing nations), the WTO and the trading regime, revenue sharing from carbon pricing (again inter-provincial and federal-provincial), income distribution issues across citizens, Canada-U.S. relations (including protectionism), as well, of course, the set of issues associated with carbon pricing itself (carbon taxes vs C&T, carbon capture and storage, carbon offsets, conservation, etc.). In addition to weaving the above elements into an historical-cum-public-policy overview of the climate-change dossier, there is a sub-plot to Page's analysis, namely, the conflict between the fossil-energy (and particularly the oil sands) provinces on the one hand and the Kyoto-friendly provinces on

the other, a conflict replete with the potential for triggering another NEP-type donnybrook.

Page's reflections on the Kyoto process that left Canada "alone in the Americas with Kyoto obligations!" are especially revealing. Given Canada's position as an emissions-intensive resource exporter and as a country with high population growth, the Kyoto process placed Canada (and the energy-exporting provinces) at a "fundamental disadvantage". An integral part of this disadvantage was that similarly-positioned Australia (a relatively small, open, resource-intensive economy) was assigned a target for 2008-12 that was 8 percent *above* its 1990 emissions, whereas Canada's target was 6 percent *below* its 1990 emissions. Page goes on to note that the Chrétien Liberals finally did respond to this by proposing that Canada be granted special CO_2 export-offset credits that would have raised its permitted emissions by 25 percent, but the European Union and the United States vigorously opposed this, so the matter was quietly dropped.

In the second half of his paper Page addresses a set of thorny issues relating to carbon pricing, the first of which is environmental protectionism:

> While the semantics of the Kyoto negotiations were environmental, the working assumptions were those of trade and competitiveness. Environmental protectionism was evident in the strategy of both the United States and the European Union. The latter wanted to saddle the U.S. producers with additional environmental costs, whereas George Bush cited these costs in rejecting Kyoto.... This environmental protectionism took on a new and more sinister twist in ... January 2008 [when] the European Union announced it would apply a "carbon tariff" on imports from countries with less stringent carbon-emission controls. They argued that they were now forced to establish a "carbon equalization system" to protect E.U. jobs and products from developing countries with no carbon costs or countries like Canada that were not meeting their Kyoto commitment. The World Business Council for Sustainable Development warned its members of the coming "Trade War over Carbon". Carbon taxes can have a variety of forms, including that of protective tariffs, a form that currently seems to be gaining momentum in both the European Union and the United States.

A second highlighted problem area is the oil sands. Again, Page's own words merit quotation:

> The oil sands are a key factor in any carbon pricing debate. Their future expansion complicates Canada's ability to meet its targets for 2020. While technology, such as carbon capture and storage, will help in the long term, it will be some years before the infrastructure is in place and the technology will be commercial. The dilemma is that the public expects emission cuts almost immediately while the technology will take a decade or more to implement. This time gap is at the centre of the Canadian carbon management dilemma. The greatest current threat to the oil sands is potential loss of U.S. markets with new U.S. environmental legislation. The December 2007 U.S. Energy Independence and Security Act (section 526) forbids American government, its agencies, or the armed forces from purchasing high carbon fuel products like

and-trade system. Without the U.S. market, the potential for the oil sands does not extend beyond the current levels of production.

A further problem area discussed by Page relates to the challenges on the intergovernmental relations front. Many of these are distributional and, therefore, zero-sum in nature. For example, Quebec wants to be able to sell hydro-offset credits within any national C&T system while Alberta wants all the revenues arising from trading in its permits to stay within Alberta's boundaries. Page's concern with respect to this and similar interprovincial and federal-provincial conflicts is that we lack an effective institutional mechanism like a refurbished Canadian Council of the Ministers of the Environment to handle these controversial, overarching issues that beset climate-change policy.

Current Federal and Provincial Approaches to Climate Change Mitigation: Are We Repeating Past Mistakes? (Nic Rivers)

Whereas Bob Page provides an historical/public-policy overview of the climate change challenge, Nic Rivers offers a comprehensive factual and empirical assessment of Canada's past, present and prospective performance on the carbon-pricing and carbon-abatement fronts. Rivers begins his analysis with a review of the federal government's climate-change history in terms of its commitments, polices and emissions. Over the period from the 1990 *Green Plan* through to the 2008 *Turning the Corner*, Ottawa developed six climate-change packages. Except for a series of voluntary programs and subsidies, the common denominator of all six was/is *non-implementation*. As a result, Canada's emissions have continued to rise to the point where they are now 25 percent above 1990 levels and still rising. Rivers then presents the results of several simulations directed to calculating the carbon price required to have been implemented in 2000 in order to meet the Kyoto commitments by 2010: ignoring the highest and lowest prices, the remaining five range from $99/tonne to $137/tonne, essentially an order of magnitude higher than the $15/tonne proposed in *Turning the Corner*.

Since Ottawa and all provinces have target emissions levels for 2020, Rivers then focuses on a comparison between these targets and projected emissions. Comparing provincial targets for 2020 to actual 1990 emissions, Saskatchewan and Alberta have targeted for an increase (11.7 percent and 34.3 percent respectively), while the other provinces have targeted for decreases between 5 percent and 15 percent. He then simulates 2020 emissions on a "business-as-usual" basis. Given the targets and the business-as-usual emissions levels in 2020, Rivers calculates the marginal price of carbon that would be required if the provinces were to achieve their own targets. These range from roughly $150/tonne for SK and AB (in part because they committed themselves to less aggressive targets), and from $219 to $286 for the remaining provinces, with a $230 carbon price for Canada as a whole.

Rivers' comments on this as follows:

> The European Union Emission Trading System, currently the largest carbon market in the world, has had prices averaging roughly $15-25/tonne over the last three years. Several European countries have imposed carbon taxes of up to $50/tonne on certain activities. The carbon price that is estimated here to be required to meet commitments made by the provincial and federal governments would therefore dwarf the carbon policies already adopted in Europe, the current leader in climate change policy.

Rivers also notes that the existing carbon prices/taxes in Canada fall far short of what would be required to meet targets. For example, despite the fact that the BC carbon tax is ten times that of Quebec, it is not much more than a tenth of what would be required for BC to meet its own commitments by 2020.

In his conclusion Rivers offers the following observations:

- Compared to a decade ago, the provinces are now important climate-change players and will not easily be sidelined by Ottawa;
- There is a recognition that deep emissions cuts will require compulsory policies like carbon taxes and C&T systems;
- Current policies at both levels of government are much less stringent than will be required to meet the commitments made by those governments; and
- Finally, given the above, it is certainly valid to debate whether such dramatic targets should be met. Rivers concludes on this issue with "whatever the benefits of emissions abatement, it is almost certain that they are large enough to warrant application of an emission pricing policy that begins today at a modest level and rises over time to a more substantial level".

These and other issues analyzed by Rivers receive further elaboration in other chapters in this volume, including the paper by Chris Green, to which we now turn, and Appendix 2.

Carbon Pricing and the Technology Imperative (Christopher Green)

Even if carbon prices were to achieve their requisite levels, à la Nic Rivers' modeling, Chris Green argues forcefully that this would not suffice to achieve announced targets since, at base, "climate change is essentially an energy technology problem":

> Pricing carbon, however desirable, is not sufficient to stabilize climate (that is, stabilize the atmospheric concentration of greenhouse gases) without new, scalable, and breakthrough technologies. In *global* terms, pricing carbon without also *directly* addressing the energy-technology challenge is a bankrupt strategy. Yet it is carbon pricing on which most economists and recently converted environmental advocates dwell.

"huge emissions reductions attributable to technological change", reductions that are assumed to occur "spontaneously", as it were. Hence, the presumed policy role is to close the remaining climate-change gap between these business-as-usual estimates and the emissions target.

Green notes, however, that the policy gap defined in this manner substantially underestimates the true climate-change gap because the amount of technological change already embedded in the business-as-usual estimates overstates what is likely to materialize autonomously:

> Where technologies (i) take many years, even decades, to develop, (ii) are uncertain of success, and (iii) if successful are often characterized by benefits that are far from being fully appropriable, more than the market is needed to convince entrepreneurs to make large upfront investments in R&D many years in advance of any possible return. If current governments cannot commit (distant) future governments to cover anything more than the cost of production of successful technologies, then we have a *time inconsistency* that renders it highly unlikely that the private sector will be willing to make the required *upfront* investments in R&D.

In other words, there is no assurance that the technological changes that occur from year to year will produce anything like the large emission reductions attributed to the technological change already subsumed in these business-as-usual simulation models.

Given the above analysis, it may not be surprising that Green's view is that the combination of carbon pricing and emissions targets is sending us down the wrong track. He is particularly concerned with the problems associated with C&T approaches:

> I would submit that there is something inconsistent about using cap and trade where technological change is crucially important. The arrival of new, scalable technologies is inherently uncertain, so that using cap and trade to meet *date-specific* emission-reduction targets is virtually certain to produce *ad hoc* decisions. For example, pressure to meet emission targets may lead to hasty adoption of inferior technologies ("first generation" biomass in the form of corn for ethanol is an example) or to *temporary* means of reducing emissions simply to meet the target. It is also questionable how far support for cap and trade will go when it dawns on the public that the only sure beneficiaries are financial markets that broker the trades and that are able to capitalize on the inherent price volatility of a quantity-based (fixed supply) approach to carbon pricing. A further nightmare occurs if speculators are able to engage in temporary price manipulation (and take-and-run profits) by buying up a significant share of permits before dumping them. Real world rather than textbook cap and trade assures neither price nor volume certainty, and this fact almost certainly implies important economic inefficiencies. Not much to like here!

Green's preferred way forward is along the following lines:

> If climate change is essentially an energy-technology problem, then I submit

> targets and no need for cap and trade. What is needed is the widespread adoption of a *low* carbon tax, one that gradually rises over time. The purpose of the carbon tax/fee is to finance an *up-front*, long-term, global effort on the energy technology and infrastructure front. *Commitments* to a gradual increase in the tax/fee send a forward price signal to deploy effective, scalable, competitive, and transferable technologies as they reach "the shelf". Policies that attempt to short circuit this process by setting near- or medium-term emission reduction targets and mandates will be ineffective – or quite likely destructive of long-term efforts to reduce emissions and stabilize climate. Predictably, failure of climate policies will create increasing pressure to consider the adoption of one or another proposal to "geo-engineer" the atmosphere. That brings us face-to-face with still another "inconvenient truth".

These arguments by Green find resonance in the chapter by Rick Hyndman in the following section.

PART III: CARBON PRICING: ANALYTICAL PERSPECTIVES

The paper by Thomas Courchene and John Allan addresses the mechanics of carbon taxation and cap-and-trade systems within the Canadian federation and the international trading environment. Rick Hyndman's contribution elaborates on a creative carbon-pricing system that embodies elements of both carbon-tax and cap-and-trade models.

Carbon Pricing and Federalism (Thomas J. Courchene and John R. Allan)

The role of the chapter by Courchene and Allan (henceforth C&A) is to elaborate on the various approaches to carbon pricing and on the manner in which they interact with Canadian federalism and with multi-level governance generally. After noting that a pure carbon tax will generate carbon price certainty but uncertainty in terms of emissions reductions and that a pure C&T system generates certainty in terms of emissions reduction but at an uncertain carbon price, the authors focus on selected aspects of the two models.

Their preferred carbon-tax model is what they refer to as a carbon-added tax/tariff (CATT), which is a carbon tax analogue of a GST or VAT:

- Under such a system, there will be a tax on the carbon emissions that are added at each stage – hence the "carbon-added" label.
- As the product completes each stage of the production/distribution process, it is taxed on its carbon footprint to that point, and a credit claimed for the carbon taxes on earlier stages. In consequence, only the carbon added in each stage ends up being taxed at that stage.

- Hence, when the product is sold at the final stage, the tax is on the *cumulative* value of carbon emissions, i.e., the sum of the carbon-added taxes at each stage.
- As with the GST, in the case of exports the taxes accumulated to the point of export will be rebated, so that the carbon tax does not diminish our international competitiveness.
- Relatedly, the carbon tax will be levied on the accumulated carbon footprint of each import, including that arising from transporting the product to Canada, thereby safeguarding our competitiveness in Canadian markets.

On the C&T front, the most common version involves setting an overall emissions cap, allocating emissions permits (typically free of charge) to producers up to the overall limit or cap, and requiring firms to buy from other firms any permits required for emissions beyond their allocated limit. This latter feature is the "trade" component of C&T. The genius of the cap-and-trade system is that the overall emissions limit will in fact be attained while the carbon price determined by permit trading will be that which minimizes the cost of emissions reduction and maximizes output.

C&A note that both models can be complemented with carbon offsets (e.g., Kyoto's CDMs (clean development mechanisms) or those for CCS (carbon capture and storage)). And one can even generate hybrids – a C&T model with the government willing to supply carbon offsets a given price is, at this limit, effectively a carbon tax at the specified price. A major difference between the two systems is that border-tax adjustments (BTAs) within a carbon-tax system, and especially within a CATT system, are likely to be more acceptable to the WTO than they would be as part of a C&T system, particularly one in which a major significant proportion of permits are not auctioned. Turning to the federal dimension, both the provinces and Ottawa have engaged in or proposed C&T and carbon-tax systems (e.g., BC and Quebec for carbon taxes and Alberta for C&T at the provincial level, and, at the federal level, Dion's *Green Shift* for carbon taxes and the Conservatives' *Turning the Corner*).

C&A then focus on three areas/issues that are serving to severely complicate Canada's ability to achieve Kyoto-type emissions targets. The first is that since the typical time frames for meeting targets are appropriately very long (e.g., reduce emissions by 60-70 percent by 2050) and since these targets are expressed in absolute levels, countries such as Canada, with higher population growth rates, will face higher *effective* emissions targets. The second design failure is that natural-resource-exporting countries like Canada are enabling the importing countries to appear environmentally benign because Kyoto assigns the carbon footprint arising from the *production* of these resource exports to the originating country, when the footprint should be assigned to the importing countries where the emissions-intensive resources are consumed. The third highlighted problem area is ocean shipping. Since the enormous carbon footprints from ocean shipping are ignored under Kyoto, all countries become, in terms of their carbon footprints, essentially equidistant from the United States, thus negating the advantage that proximity to the United States should

> ...there is no equivalent on the environmental front to the more than 50-year history of federal-provincial fiscal relations dating from the inauguration of the equalization program in 1957. Fiscal federalism includes scores of meetings of federal and provincial bureaucrats each year. The processes of fiscal federalism also include a host of federal-provincial agreements on equalization, on tax-collection harmonization, on a national tax collection agency (the CRA) and even on securing the internal social, economic and fiscal unions. However, over the foreseeable future environmental federalism will likely become every bit as important as fiscal federalism. Indeed, it may embrace key aspects of fiscal federalism. Given this, and the reality that the political and institutional machinery in the area of environmental federalism ranges from weak to non-existent in comparison with the fiscal federalism infrastructure, both Ottawa and the provinces (individually and/or via the Council of the Federation) need to take immediate steps to deepen the intergovernmental infrastructure relating to the substance and the processes of environmental federalism. ...Addressing climate change is a sufficiently daunting challenge in its own right without the complication of tolerating the reality that the structures and processes of environmental federalism are in a state of disarray. Phrased differently, we will have made progress on the climate-change front when "environmental federalism" takes its rightful place in our policy vocabulary.

Carbon Pricing as if GHG Mitigation Matters (Rick Hyndman)

Rick Hyndman's sobering message in terms of relying primarily on carbon pricing to achieve the near-term 2020 targets is that "you can't get there from here". For example, while the 2009 report of the Canada's NRTEE concludes that a carbon price in the range of $100-150/tonne is required, this is not only well above the price that our governments are willing to live with but higher still than what the public will bear. Along similar lines, Hyndman then uses the Kaya identity to show that the GDP contraction that would be required to achieve the U.S. targets under the original Waxman-Markey bill would be in the order of $12-13 trillion over the 2011-2020 period – again well above what the government and the public would tolerate. But if carbon targets are unachievable domestically, might the solution be to take advantage of some version of Kyoto's Clean Development Mechanism (CDM) which would allow developed countries to purchase low-cost carbon reductions from developing nations? Hyndman's answer is no: apart from the political difficulty of having monies for purchasing these (often unverifiable) CO_2 allowances flow to other nations, there simply will not be enough of these CDM offsets to go around.

In the face of public opposition to any significant carbon price and the corresponding unwillingness to submit to the requisite output reductions to achieve announced targets, what then are the alternatives? Hyndman suggests two complementary ways out – i) increased support for low-carbon-emission technology development, and ii) a creative system of carbon pricing for large energy-intensive exporting industries, one that would provide an appropriately high marginal carbon price to guide the technology investment choices but

without the high average costs that would flow from more traditional C&T models.[1] As an aside, readers will recognize that Hyndman's view that GHG mitigation is "fundamentally a technology challenge" parallels Chris Green's "technology imperative".

In terms of i) above, Hyndman's way to reconcile a publicly acceptable, low initial price on carbon emissions with the need for large investments in low-carbon-emissions technology is to implement a low-level carbon price on GHG emissions in order *to raise revenues for funding technology R&D.* Hyndman's example uses a $5.00/tonne price which, in the United States, would generate $24 billion annually. His related recommendation is that it is very important to put in place the right governance of these funds. The revenue should go into a technology development trust fund to support the research, development and deployment of transformative technologies and be managed by an independent board, with a public interest mandate, and at arm's length from governments and political interference. (Given the magnitude of the *public* funds that would be raised by even a modest carbon charge, and the possibility of self-serving behaviour by the representatives of emissions-intensive industries who would undoubtedly be represented on the board, some review mechanism to ensure the realization of the public-interest mandate would appear to be clearly essential.) He then adds that "perhaps some revenue should be diverted to provide aid to poor countries to develop cleanly, including national programs to reverse deforestation".

In the penultimate section of his paper, Hyndman offers a proposal for ii) above, i.e., for what he calls the energy-intensive, trade-exposed (EITE) sectors. The essence of the proposal is to generate, at the same time, a high *marginal* price for carbon emissions in order to provide appropriate incentives for investing in low-carbon-emitting technologies and a much lower *average* carbon price in order that the EITE sectors can maintain international competitiveness and minimize production leakage to other countries.

Under his proposed approach an intensity-based performance standard would be set for each major EITE sector, and only firms with emissions intensities in excess of that standard would be subject to taxation, and this – although at a relatively high marginal rate – only on their excess emissions. Should a firm have an emissions intensity less than the performance standard, the resulting emissions "deficiency" could be sold (i.e., traded) at the carbon price established under the system. The (relatively) high *marginal* carbon price would be the price relevant to decisions respecting levels of emissions and investments in emissions-reducing technology – so the economic incentives would be correct – while the affected firms would have to pay the relatively low liability attributable to the taxation of only the excess emissions. The result would thus be a relatively low *average* tax rate or charge that would not impair the international competitiveness of the firm or sector or cause production to move to environmental havens with lax environmental standards. Moreover,

[1] It is the case, however, that the same disparity between average and marginal carbon prices may be achieved under C&T if only a relatively small fraction of allow-

with an intensity-based system, as output increases over time, so too would the untaxed emissions; the system would thus operate more flexibly than one with an absolute (i.e., fixed) cap. If the resulting increase in total emissions were deemed excessive, it could be counteracted by lowering the performance standard – which would have the effect of reducing the "free allocation" and increasing the proportion of emissions subjected to the carbon charge – or by raising the marginal carbon charge.

In summary, Hyndman offers a flexible set of proposals designed to work around the myriad of political and economic constraints (domestic and international) associated with the more traditional proposals for pricing carbon.

PART IV: FEDERALISM, MULTI-LEVEL GOVERNANCE AND CARBON PRICING

Given that it has been the sub-national governments in both Canada and the United States that have been driving climate change, it is clear that the federal or intergovernmental dimension of carbon-pricing policy has to be addressed and assessed. To this end, Kathryn Harrison compares the influence of multi-level governance on climate change in Canada, the United States and the European Union, while Barry Rabe focuses on how the dynamics of federalism shape the making of U.S. climate-change policy.

Multi-Level Governance and Carbon Pricing in Canada, the United States, and the European Union (Kathryn Harrison)

In considering whether federalism or multi-level governance facilitates or deters the adoption of policies to reduce greenhouse gas emissions, Kathryn Harrison's analysis leads her to conclude that, for the European Union, it has facilitated "multi-lateral reinforcement":

> ...the impact of multi-level governance in the European Union has been largely positive. Various climate-policy leaders have emerged over time among the member states, and that horizontal dynamic has been matched vertically by activism from the European Council of Ministers, Parliament, and Commission. In response, the European Union has made the greatest progress in adopting policy reforms to price carbon, most notably through its Europe-wide Emissions Trading System.

In the case of the United States, she concludes that federalism has fostered "state action":

> In the United States, federalism also has had a positive impact in facilitating policy innovation and diffusion at the state level, albeit in the face of a policy vacuum at the national level. With respect to carbon pricing, some (though not all) state governments are collaborating to create regional emissions-trading

In Canada, however, the result is a "joint decision trap":

> In contrast, in Canada the impact of federalism on climate policy has on balance been negative to date. As in the United States, there has been a dearth of action at the national level, but until quite recently Canadian provinces did not respond unilaterally to the same degree as their U.S. counterparts. Federal and provincial governments were deadlocked over how to respond to climate change for almost two decades. Provincial policy innovations have emerged since 2006, led most notably by British Columbia's adoption of a carbon tax and the commitment by BC, Manitoba, Ontario, and Quebec to join with U.S. states in emissions trading. However, those reforms have not diffused to provinces that account for half of Canada's current emissions and the majority of its projected emissions growth.

In her analysis, Harrison distinguishes between interprovincial or horizontal relations on the one hand and federal-provincial or vertical relations on the other. The former can lead to what has come to be called competitive federalism, which can lead to a "pull from the top" or a "race to the bottom". The latter (vertical relations) can lead to the establishment of national standards (which would preclude a race to the bottom). It can also lead to creative and positive-sum intergovernmental cooperation (which Harrison refers to as "horizontal innovation and vertical backup and coordination") or it could lead to the opposite, with the two levels reduced to policy deadlock. She then applies these and other features of her framework to the climate-change history of Canada, the European Union and the United States, with the resulting broad conclusions elaborated in the above quotations.

In somewhat more detail, the actual division of powers in these jurisdictions also played an important role in determining the different outcomes. Confirming the observations by Barry Rabe (see below), Harrison notes that "the long-standing role of state governments in fulfilling federal mandates contributed significantly to the states' administrative capacity to respond to climate change unilaterally, including their familiarity with market-based instruments". In the E.U. case, the fact that regulatory decisions are made by the E.U. Council of Ministers via a "qualified majority vote" facilitated the adoption of the ETS, particularly since the larger states, which carry a greater weight in the qualified majority system, were supportive. And most intriguingly, "the fact that E.U. *taxation* policies, in contrast to regulation, do require unanimity explains the European Commission's greater success with the ETS than in its earlier proposal for a carbon tax". Finally on the Canadian front, given the fact that resources are owned by the provinces, "it is hardly surprising that federal-provincial consensus has been unattainable".

A further important factor relates to the regional distribution of the costs of GHG reductions. In both the European Union and the United States the largest and wealthiest states are "green and keen" (United Kingdom and Germany, and California and New York respectively). In contrast, Alberta accounts for only 10 percent of the Canadian population but roughly one-third of Canada's emissions and over half of its projected emissions growth, while Ontario continues to resist efforts to strengthen emission standards for the transportation sector, which

> As a result, the costs of reducing Canada's greenhouse gas emissions will inevitably be borne disproportionately by Alberta, absent a massive compensation program funded by taxpayers in other provinces. Thus, while windfall reductions in the European Union are concentrated in two powerful member states, in Canada the costs of reducing greenhouses gas emissions are disproportionately concentrated in two influential provinces – provinces that to date have exercised an effective veto over measures affecting the industries that are the lifeblood of their economies.

It is hard to disagree with her concluding comment with respect to the Canadian scene: "The regional distribution of costs combined with the division of powers with respect to natural resources suggest that federalism will continue to pose a challenge to Canada's ability to respond to climate change for years to come."

The Intergovernmental Dynamic of American Climate Change Policy (Barry G. Rabe)

Barry Rabe begins his chapter by noting that "perhaps the biggest single surprise as climate policy has continued to evolve is that in the American case and many others it is becoming increasingly evident that climate policy constitutes an issue of federalism or multi-level governance". By way of elaborating on this theme, in particular the bottom-up approach to climate change that characterizes the United States, Rabe cross-classifies the U.S. states in to high and low emitters on the one hand, and high and low climate-change-policy activists on the other. Clearly the most important of the twelve low-emitting/high-policy states is California, which has "set in motion a carbon cap-and-trade program with wider scope than attempted in any western democracy to date". In addition to taking credit for being "first movers", these states can play a role as policy innovators for others to copy, as was the case when the Obama administration embraced California's vehicle-emissions policy, and may well be the case should Washington follow the examples of California-led WCI and New York-led RGGI and implement a national C&T system. Finally, self interest is never far from the surface, as Rabe notes by pointing out that these states will insist on maintaining 1990 as the policy baseline and on obtaining credit in any national scheme for achieving early reductions.

The 10 states that fall in the high-emissions/high-policy category "tend to view themselves as "mini-Californias", supporting cutting-edge policy experimentation and in the vanguard of national leadership on the climate-change issues". But Rabe reminds us that self interest dictates that they will want to be protected against penalty for any substantial emissions growth (and preferably shift the baseline to 2000) and will want be rewarded for early policy adoption in any future federal climate legislation. More problematical are the 22 states that fall into the category of low emissions and low policy activism, in part because they represent 44 senate seats, which is generally sufficient to block discussion on any legislative proposal. Substantively, Rabe notes that "not only is their emissions growth high and policy adoption minimal, but they may

well-being ... and they are likely to oppose any policy that would impose significant costs on them and would be particularly mindful of possible redistributive effects that could result from mandates to purchase carbon credits, offsets, or renewable energy credits from outside their state and region.

Finally there are 7 states where there has been virtually no adoption of GHG policies and yet all have emissions rates well below the national average. Rabe points out that in most of these states their low carbon emissions are due to economic stagnation (e.g., Michigan). Therefore:

> ...such states will want to make sure that any future policy accords them maximum "credit" for their low rates of emissions growth. Hence, the 1990 baseline will remain sacrosanct and states in this quadrant will welcome any opportunities for credit-trading programs that could deal them a favourable hand, similar to Eastern European nations and Russia which have attempted to maximize the value of their "hot air" credits.

With the above as backdrop, Rabe turns his attention to the disconnect between those policies that are economically desirable and those that are politically feasible. In particular, "those policies that tend to maintain the strongest base of support from policy analysts appear to have the greatest difficulty of being adopted by state legislators and governors", and vice versa. For example, leading economists tend to champion carbon taxes, but no state has opted to make a carbon tax the cornerstone of its climate-change policy. On the other hand, Renewable Portfolio Standards (RPSs) rank low in effectiveness but appear to be the approach of choice for the majority of states.

PART V: CARBON PRICING: CONSTITUTIONAL AND INSTITUTIONAL PERSPECTIVES

The first of the two related goals of this section is to address the constitutional limits to the authority of federal and provincial governments to regulate CO_2 emissions via carbon taxation or C&T regimes. Stewart Elgie deals with the constitutional basis for legislating emissions trading (C&T systems) and Nathalie Chalifour does the same for carbon taxation. Because the constitutional underpinnings of carbon pricing are largely unexplored the authors are forced to break new ground. The result is a set of creative and insightful analyses that, in our view, will serve to inform future court decisions in these areas. The second role of this section is to broaden the analysis of the legitimacy of carbon pricing to embrace potential institutional constraints as they relate to international trade and, in particular, to the operations of the WTO. Here, Andrew Green holds the pen.

Carbon Emissions Trading and the Constitution (Stewart Elgie)

Stewart Elgie begins his assessment of the federal authority to legislate with respect to emissions trading (i.e., C&T systems) by focusing on the two federal powers that would appear most likely to support C&T legislation – the "Peace, Order and good Government" (POGG) or national-interest provision of the preamble to s.91 on the one hand, and the Criminal Law power, s.91(27), which has been used to justify the federal *Canadian Environmental Protection Act* (CEPA) on the other. However, Elgie then suggests two other possibilities: i) because emissions are inherently international, let alone interprovincial, trading in emissions might well fall under the federal Trade and Commerce power, s.91(2); and ii) the Supreme Court might recognize a federal treaty-implementing power (relating to the Kyoto protocol or its successor) in terms of emissions trading, even though this would mean revisiting the 1937 *Labour Conventions* case that gave Ottawa the power to sign treaties that bound the provinces but not the authority to implement those provisions of the treaty that fell under provincial jurisdiction.

Elgie's conclusion in relation to the federal government's authority to legislate with respect of emissions trading runs as follows:

> To sum up, federal legislation to regulate carbon emissions and trading would test the current boundaries of federal constitutional powers. Under any of the four powers reviewed, it would require the courts to answer questions that have not yet been answered – in some cases very significant questions. Up to now, Canada's courts have been able to skirt around the hard questions about the federal government's environmental powers; they have given answers that sufficed for the statute at issue, but which left larger questions unanswered ... Climate change legislation is likely to force these hard questions onto the front burner. Its implications – both ecological and economic – are far reaching. It seems clear that national measures, as part of a larger global effort, are needed to address the problem – and in particular to put a price on carbon. Canada's courts will have to decide if our federal government has such powers. My view is they probably will say yes, provided the federal law is drafted to minimize unnecessary intrusion into provincial powers.

In terms of assessing the constitutional case for provinces to mount C&T systems, Elgie begins by noting that the federal government's apparent authority to legislate over carbon emissions trading does not preclude valid provincial legislation. Beyond this, he recognizes that "the provinces have broad authority to address many aspects of GHG emissions through other provincial powers, including electricity generation, transportation, the construction of buildings and homes (energy efficiency), forestry, agriculture, etc. – all of which are grounded in clear provincial powers". However, this authority may not extend to regulating GHG emissions trading per se since the impacts are largely global, not provincial. Or as Elgie puts it, the issue is "whether a provincial scheme that included *inter*-provincial (or international) emissions trading would be seen as constitutionally valid". His view is that the provincial authority over extra-provincial carbon trading is doubtful, since inter-provincial trade is an area of

that the two levels of government could enact coordinated legislation that would integrate federal and provincial GHG trading regimes across the country.

The Constitutional Authority to Levy Carbon Taxes (Nathalie J. Chalifour)

Nathalie Chalifour's contribution is three-fold: "i) to analyze the federal and/or provincial governments' constitutional authority to implement carbon taxes; ii) to draw upon this constitutional analysis to highlight those design features of a carbon tax that might render it *intra vires* of the implementing jurisdiction; and iii) in light of the above, to evaluate the constitutionality of the Quebec and BC carbon taxes".

In terms of Ottawa's authority to levy carbon taxes, Chalifour conclusions can be summarized as follows:

> While the federal taxation power, s.91(3), is clearly a necessary condition for levying a carbon tax, it is not likely to be sufficient since it would be difficult to demonstrate that a carbon tax had revenue raising as its dominant purpose.
>
> While regulation of GHG emissions under the Canadian Environmental Protection Act (CEPA) is justifiable under the federal criminal power, s.91(27), "it seems unlikely that a stand alone carbon tax would fall under the scope of this power given that it is far from a prohibition coupled with a penalty", which are the criteria for relying on s.91(27).
>
> More likely is the federal trade and commerce power, s.91(2), since a federal carbon tax would be of a nature "that the provinces jointly or severally would be constitutionally incapable of enacting and that the failure to include one or more provinces ... in a legislative scheme would jeopardize the successful operation of the scheme".
>
> Along similar lines, "one could argue that carbon taxes are one of the most economically efficient and likely effective means of reducing GHG emissions (and thus addressing climate change), which could argue in favour of a national interest justification", i.e., POGG.

Chalifour's analysis of the provinces' authority to levy carbon taxes leads to the following observations:

> As was the case for the federal government, the greatest hurdle to relying on provincial taxation powers (s.92(2) or the resource taxation power s.92A(4)) would be convincing the courts that the pith and substance of a provincial carbon tax was revenue raising.
>
> A more likely authority is the provincial licensing power s.92(9). And in order to bring a carbon tax within the scope of the licensing power, a province would need to design the charge as apart of a comprehensive code of GHG regulation. In line with the second of the three objectives of her paper, Chalifour argues that this is what BC and Quebec have done in order to enhance the likelihood that their taxes will be viewed by the court as *intra vires*.

Her conclusion merits quotation in full:

> While there are innumerable considerations involved in the selection and design of policy instruments to address climate change, jurisdictional authority is a critical factor in Canada. This paper has shown that both the federal and provincial governments have jurisdiction to implement carbon taxes, as long as they are carefully designed to fit within the appropriate powers. However, it has also shown that the federal and provincial taxation powers – which are often the first to come to mind as possible justifications – are not the optimal sources of authority for a carbon tax. Federally, I have argued that carbon taxes would find their strongest source of authority under the national concern branch of the POGG power, with possible justification under the criminal law and trade and commerce powers depending on design and, of course, court interpretation of those powers. The taxation power is a possible source, but least likely of those analyzed. Provincially, I have argued that the power to charge license fees offers the best source of authority, though there may be room to find authority within the property and civil rights and, possibly, the taxation powers. And indeed, examining the Quebec and BC carbon-tax measures showed that they are best justified under the licensing power (and were probably designed with this in mind).

Carbon Pricing, the WTO and the Canadian Constitution (Andrew Green)

Andrew Green's contribution has a two-fold objective: i) to provide valuable insight into the role and practices of the WTO, and ii) to focus on the principles that the WTO is likely to bring to bear on climate-change policies as they relate to the global trading system. Given that the WTO rules can be viewed as a quasi-constitutional set of constraints on the climate-change policies of domestic governments, Green achieves i) above by exploring the similarities and differences between the Canadian Constitution and WTO agreements and the resulting implications for carbon-pricing policies in Canada. However, our focus here will be on ii), and in particular on border tax adjustments (BTAs).

By way of elaboration, Green notes:

> BTAs may be used to attempt to overcome the political disincentives to putting in place climate policies and to provide an inducement to other countries to take action. They do so by reducing the competitive disadvantage for industries in countries with strict climate policies. BTAs can be placed on either imports or exports. BTAs on imports are taxes on imports from countries with less stringent climate policies. BTAs on exports are rebates of or exemptions from taxes the domestic producers paid under climate policies. In either case, the general principle is that the BTA cannot exceed the level of tax paid if the good were bound for domestic consumption.

He goes on to note that BTAs, as the name implies, may be used to adjust for the competitive impacts of taxes. However, these BTAs would need to be limited to "indirect" taxes, i.e., those that are levied on products rather than on producers

view is that BTAs related to a carbon taxation regime would likely be permissible under the WTO.

More controversial is whether BTAs could be used for emissions trading systems:

> For BTAs on imports [under C&T systems], the BTA can only offset an "internal tax or other charge". The question then is whether the emissions trading program can be considered an "other charge". There is not much WTO case law on the nature of "other charge". It will depend on the nature of the trading scheme. If the permits are auctioned or firms are required to purchase permits over an allocated level, a panel may view the requirement to purchase a permit as being in the nature of a "charge". If the permits are given away for free, the issue is even more uncertain. A panel could view the provision of permits as a form of subsidy to the recipients as opposed to a charge. Whether panels will find BTAs can be used for emissions trading schemes is therefore uncertain.

In terms of the Waxman-Markey bill – which intends to require importers to purchase emissions units rather than to pay a tax – Green points out that this raises further questions, not the least of which is whether a requirement to purchase allowances constitutes a relevant tax or charge that can be imposed at the border. Green rounds out this discussion of BTAs on C&T systems with the following:

> BTAs relating to emissions trading programs seem even less likely in the case of exports. BTAs on exports can offset a "duty or tax". While an emissions trading program could be seen as a charge, it seems less likely to fit within the apparently narrower terms "duty or tax".

The above analysis referred to products. Green then asks if the same analysis can be carried over to how the products are made, i.e., to "process and production methods" (PPMs). For example, can otherwise indistinguishable steel as a final product be subject to differential BTAs based on carbon emitted in the production process. The WTO is even less clear on this. Green does point out that that the United States used BTAs to impose a charge on imports of ozone-depleting substances and rebated the tax on exports, but the tax was never challenged at the WTO.

Beyond these technical issues, Green introduces the reader to many operational issues with respect to the WTO. For present purposes, one will have to suffice. While the WTO agreements do impose limits on types of BTAs members may put in place, it is not clear that all countries face the same incentives to comply if they are running afoul of the WTO. For example: "if the U.S. public, for example, feels sufficiently strongly about either climate change or the unfairness of the United States taking action on climate change while other countries appear not to be, the U.S. government may not respond to countermeasures by removing non-compliant BTA provisions". Further, it is much more difficult for smaller countries to maintain measures that do not comply with WTO commitments.

Green concludes by offering the suggestion that countries should work toward a multilateral agreement that would take the form of detailed rules about when BTAs can be used and whether they can cover emissions trading and can take account of PPMs in other countries.

PART VI: THE POLITICAL ECONOMY OF CLIMATE CHANGE

This section offers two quite different perspectives on cap-and-trade approaches to carbon pricing. The contribution by Bryne Purchase argues that while carbon taxes are economically superior to C&T regimes, they are politically inferior. Matthew Bramley accepts the inevitability of C&T, and then proceeds to articulate a "pure" version of what such a regime should strive for.

The Political Economy of Carbon Pricing in North America (Bryne Purchase)

The central argument in the contribution by Bryne Purchase is that "politics" cannot be taken out of the policy decisions relating to carbon pricing and climate change. Indeed, he asserts that "more fundamentally, it is the structure of the political market place that determines instrument choice". At the level of the voting public in most or all of the developed world, this is reflected in a political preference for C&T over carbon taxes. In other words, the "technical superiority" of carbon taxes is overwhelmed by the supposed advantages of C&T, and this despite the fact that the latter tends to be characterized by limited coverage, rent seeking, volatile carbon prices, high administrative costs and an inability to extend C&T internationally. Purchase recognizes that this preference is due in part to the very transparency of carbon taxes: voters know that they will bear the incidence of the tax, and even in the presence of revenue recycling they believe they will be net payers. He notes that in spite of the reality that, with the same sector coverage and with the same emissions targets, both carbon taxes and cap and trade imply the same carbon price. The perception or, rather, misperception remains that C&T is all about regulating and taxing large polluting businesses and not ordinary citizens. Purchase then advances a further reason: "The fact that cap and trade requires a new private army of auditors, lawyers, and market experts also creates a powerful professional constituency in its favour."

Purchase then shifts attention to the reality that Canadian federal politics relating to carbon pricing is not conducive to national leadership in spite of the fact that Ottawa has the constitutional authority to implement a national program. As he makes clear by means of various examples, a major part of this has to do with the profoundly divergent interests of the provinces – most particularly those of the energy-producing provinces as against, say, the hydro provinces like Quebec and Manitoba – and with the related reality that the provinces own their natural resources and the revenues derived therefrom. Especially intriguing is that he relates these interests to party politics:

> The three mainstream national political parties also have serious "legacy" constraints on their ability to lead aggressively on this issue. The Conservatives have their power base in the most "at risk" part of the country. The NDP still must appeal to what is left of unions in heavy industry and, of course, to the urban and rural poor. The Liberals have the heritage of the National Energy Policy and Western alienation. And all parties hope to grow in Ontario, a province already undergoing profound economic dislocation.

Purchase concludes this discussion of Ottawa's role in climate change with the following observation:

> Curiously, it was the National Energy Program and the political reaction to that policy that led to the Canada-U.S. Free Trade Agreement, with its Energy Chapter, subsequently confirmed under NAFTA. A North American market in natural gas as well as oil has emerged. As a result, a national energy policy no longer makes any sense compared to a North American energy policy.

The important implication of this is that by attaching ourselves to the U.S. policy framework, as we appear to be doing, Ottawa can rise above the "tortuous and highly risky Canadian political scene" and, as Purchase notes, allow federal politicians to claim that "the devil made me do it"!

Finally, Purchase turns his attention to the politics of climate change south of the border and internationally. One example must suffice. Purchase suggests that, in understanding the politics of U.S. climate change, one might cut to the chase and focus on two high-polluting sectors (electricity production and transportation) and one key region (the Great Lakes Region – Indiana, Ohio, Wisconsin, Michigan, Pennsylvania and Illinois). Within that region, the percentage of coal-fired electricity generation ranges from a low of 48.5 percent in Illinois to 95.8 percent in Indiana. And these same states are the home of the "Detroit three" automakers and their just-in-time parts suppliers. If one adds to this that these 6 states have 12 Senators between them, that they are relatively heavily unionized, and that all went Democratic in the last election, it should not be surprising that a carbon tax is not the instrument of choice, nor that auctioning of permits under the proposed C&T is limited to at most 15 percent of emissions.

The key messages in the Purchase contribution are worth repeating, namely, that "carbon taxes are unambiguously technically superior but perhaps politically inferior", and that when the policy issue at hand is as important and as pervasive in its impacts as is carbon pricing, it may well be the political market place that determines instrument choice.

Key Questions for a Canadian Cap-and-Trade System (Matthew Bramley)

Matthew Bramley's contribution takes the form of a [Pembina Institute] position paper on the desired features of an effective cap-and-trade system. His two organizing principles/questions are: i) Will the cap-and-trade system help us

transform our energy system? and ii) Will the value of carbon (or the resulting revenues) be distributed rationally and fairly?

In respect of the former, Bramley notes that there is a huge gap in terms of the carbon price recommended by, say, the NRTEE, and what is happening on the ground (e.g., the Waxman-Markey bill). He draws from a recent C. D. Howe Institute study to argue that issues related to competitiveness and leakages are likely to be small and should not stand in the way of a high carbon price. Moreover, the resort to offsets as a way to achieve a lower carbon price is questionable, primarily because only a fraction of CDM projects actually reduce emissions. With respect to oil sands (the "elephant in the room") Bramley notes:

> ...the rapid expansion of oil sands production and the high cost of reducing the associated emissions are responsible for driving up Canada's "marginal cost of abatement" of greenhouse gas emissions, which translates into the need for a high carbon price to reduce them. The Pembina Institute believes that it is unfair for the oil sands sector to create a significantly higher carbon price and consequent costs for all other sectors. To prevent this, we believe that the use of carbon capture and storage, or a technology achieving equivalent emissions levels, should be mandatory for all new oil sands operations. New oil sands operations without carbon capture should be viewed as unacceptable in the same way that new coal-fired electricity generation without carbon capture is now widely seen as unacceptable in light of what we know about climate change.

Finally, since Canada is more likely to meet its targets with a cap on 85 percent of our emissions than with a cap on just 50 percent of emission, a C&T system must be as broad as feasible.

Regarding the distribution of carbon value (the value of emission allowances) Bramley offers the following perspective:

> Governments can distribute the carbon value in two forms – by handing out allowances free of charge, or by auctioning off allowances and handing out the proceeds in dollars. People tend to think of these two options quite differently, but they are financially equivalent, because allowances can be converted into dollars – on a carbon exchange or through a broker – at any time. If a firm receives carbon value in the form of free allowances, this is just as much a subsidy as if it receives carbon value in the form of dollars, as a grant or a tax break.

Among the priorities for distributing carbon value should be: prevention of leakage, protection for low-income Canadians, addressing regional balance, investments related to GHG reduction, and technology transfers to developing countries. While Bramley would prefer 100 percent auctioning of allowances, he does recognize that a case can be made for some version of a production subsidy in order to prevent carbon leakage to other jurisdiction. Finally, Bramley is skeptical of producers being able to purchase emissions credits from technology funds (which are allowed under both the federal and Alberta proposals). Apart from the fact that these are "investments in an unknown amount of future reductions occurring at an unknown date", he adds:

> Alberta's greenhouse-gas regulations allow unlimited payments into a technology fund as a compliance option. It was noted above that they distribute most of the carbon value straight back to the industrial emitters through the use of emissions intensity targets set at a level close to business-as-usual emissions. Of the remaining carbon value, most is paid into the technology fund. Since a majority of the fund's board members represent or have recently retired from heavy industry interests, distribution of this value is likely to be dominated by those interests.

In anticipation that the centerpiece of the Copenhagen deal might well be some form of a cap-and-trade system, Bramley views embracing the above proposed system as "a crucial determinant of Canada's credibility at Copenhagen ... and a key test of whether the government now recognizes the scale and urgency of the threat of climate change".

PART VII: SUMMING UP AND A LOOK AHEAD

In his role as rapporteur, Peter Leslie offers "Carbon Pricing: Policy and Politics". This is a most comprehensive, carefully-reasoned, and, indeed, insightful and creative contribution. We are most thankful for the major effort that Peter put into this summary paper. However, given our position as both editors and authors, we are leaving to readers the pleasure of perusing Peter Leslie's integrative interpretation of the above contributions, replete with a looking forward perspective.

Post-Copenhagen Addendum

The final chapter in this volume is an Epilogue written by Nancy Olewiler after the conclusion of the Copenhagen Conference. In it she identifies both the successes and, especially, the failures of Copenhagen and explores the implications that may be drawn from the largest conference ever on climate change. In more detail, Olewiler begins her paper by articulating the five main components of the Copenhagen Accord. She then distils from the Copenhagen experience four principal lessons: establishing targets is a very challenging strategy; a debate framed as the economy versus the environment is a false dichotomy; regional inequality and diversity constitute a huge barrier to agreement on climate change; and a combination of policies is needed to tackle climate change.

In the final section of her chapter Olewiler takes these lessons and combines them with various perspectives adopted from the papers in this volume to outline a broad climate-policy strategy for Canada. Without elaboration, the key aspects of the strategy are: dump the 2020 target; implement a low-rate carbon that will rise over time; recycle the revenue by tax reductions to individuals and businesses and by funding low-carbon technology projects; and invest in forest management, starting with the territorial lands of Canada's First Nations

independent Canadian action, both with respect to timing and design, than is implied by the Government's stated intention of moving in lock-step with the United States.

APPENDICES

Rounding out the volume are two appendices, both drawn from publications already in the public domain. The first of these is the Executive Summary of *Achieving 2050: A Carbon Pricing Policy for Canada,* the 2009 report of the National Round Table on the Environment and the Economy (NRTEE). The second Appendix is adopted from the October 29, 2009 TD Economics Special Report *Answers to Some Key Questions about the Costs of Combating Climate Change: A Summary of the Pembina/David Suzuki Foundation Paper.*