

**CLIMATE CHANGE, COMPETITIVENESS
AND ENVIRONMENTAL FEDERALISM:
THE CASE FOR A CARBON TAX**

By

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Introduction and Overview¹

Carbon pricing, whether via carbon taxes or cap-and-trade systems, is clearly the flavour of the season. With its 2007 *Turning the Corner* regulatory framework the federal government has committed itself to a 20% cut in 2006 GHG² emissions by 2020, in part by promising to introduce a carbon intensity (i.e. emissions-per-unit) cap and permit trading system in 2010. Ottawa's 2008 policy update promises carbon capture and storage requirements for the oil sands, as well as several command and control measures (no dirty coal electricity plants after 2012, and vehicle emission standards). Alberta became the first jurisdiction in North America to implement a soft (intensity-based) cap-and-trade regime in 2007. However, the permit trading area is limited to Alberta and the price of the permit is effectively capped at \$15/tonne since emitters can purchase carbon offset credits at this price from an R&D fund for low-carbon technologies. Beyond this, both Alberta and Ottawa intend to grandfather existing industry players by distributing the initial allocation of permits (in line with current activity) free of charge rather than auctioning them, leaving the emissions market apply only to "Additional" permits. While this tends to be standard practice thus far in cap-and-trade systems, the preference on the part of most environmental groups is to "Auction" the initial permits (See appended Tableau 1 for information relating to cap-and-trade systems). Some or all of these feature led Jeffrey Simpson (2008) to declare Alberta's approach to be "utterly untenable."

¹ It is a pleasure to thank my Queen's colleague John Allan for valuable comments and suggestions in preparing this paper/address. In parts, the analysis draws heavily from our joint work (Courchene and Allan, 2008, and Allan and Courchene, 2008). The usual caveat applies.

² "Carbon" and "greenhouse gases (GHGs)" are used interchangeably in this paper.

By way of a relevant aside, mention of California is warranted in the Canadian context because it is arguably the driving force behind vehicle emissions standards and because its proposal to disallow the importation of fossil energy whose production releases GHG emissions above a certain level has no doubt help trigger the Alberta and Ottawa tar-sands emissions controls, weak as these measures have been to date.

With its 2007 levy of 0.8 cents on every litre of gas and 0.9 cents on each litre of diesel fuel, Quebec became the first jurisdiction in Canada (indeed in North America) to impose a carbon tax. This is an origin-based carbon tax and it is levied against about 50 large emitters and distributors.

However, Canada's carbon pricing star is surely British Columbia. The province has introduced a destination (consumption) based carbon tax of \$10/tonne to apply to all fuels (e.g., the tax on gasoline will be 2.4 cents per litre and 2.76 cents for diesel fuel). This price will rise to \$30/tonne by 2010. The further innovation in BC is to make this tax *revenue neutral*, namely to use the carbon-tax revenue to reduce personal and corporate taxes and to provide low-income tax credits to help offset the rise in fuel prices³. B.C. and Manitoba also stand out as the first two Canadian members of a California-led group of 7 western states (known as the Western Climate Initiative, WCI) that has embraced a cap-and-trade system to reduce members' GHG emissions by 15% of 2005 levels by 2020.

The most recent development, and perhaps the most surprising, is the agreement between Ontario and Quebec announced at their joint cabinet meeting (June 2, 2008) to launch a cap-and-trade system anchored around the original Kyoto 1990 benchmark. The remarks by Premier Jean Charest indicate that the intention is to establish a market-based trading system to cut GHG emissions that will hopefully lay the groundwork for a national cap-and-trade system with more teeth than the current federal proposal. Earlier

this year Quebec became a member of the WCI (Ontario has observer status). One might also note that, thanks to Quebec's hydro-electric power among other factors, the province has already met the 2008-12 Kyoto targets and, therefore, is in a strong position to push hard on the climate-change front.

This is the current state of play in what will undoubtedly rank as the most controversial and surely the most complex constellation of policies ever contemplated in Canada, and one that Peter Lougheed has already predicted will be far more contentious than the NEP. My role will be to focus on the features of a carbon tax/carbon tariff approach (and to a lesser extent of cap-and-trade systems) in the context of addressing several of these complicated and contentious policy areas: the free-rider problem and international competitiveness, the Canada-US interface, the looming federal-provincial battle over jurisdiction, policies and instruments, the on-going Kyoto reality that developing countries should be exempted from formal climate change requirements, the already problematical regional and industrial confrontations that probably cannot be avoided, and the role of carbon pricing and taxing in the context of \$130/barrel oil.

Canada and Kyoto

My launch point into this broad-ranging set of issues is hardly original, namely to argue Canada's approach to Kyoto was a triumph of moral voluntarism over rational analysis. From Simpson *et al* (2007, 249-50):

Canada made a commitment at Kyoto that was the most difficult and expensive in the world. It took no account of our economic growth, population growth, cold temperature, vast distances and fossil fuel production; it contravened our federal system, because Ottawa broke a fragile federal-provincial consensus on the eve of the negotiations. So the first lesson must be to remember these factors -- and therefore undertake commitments and implement serious domestic policies that take

these distinctly Canadian factors into account, because no other country has all of these characteristics.

By way of some elaboration, over the 1990-2005 period Canada's average annual growth rate was just over 1%, about 22 times that of France, four times that of Germany and five times the average Italian growth rate. For comparable Kyoto absolute targets, this effectively sets the bar significantly higher for Canada than for the slower growth European countries. Moreover, the selection of 1990 as the Kyoto benchmark is very beneficial to Germany. When the two Germany's were re-united the newly merged country inherited the Soviet-era plants that generated pollution levels that were extraordinary by Western standards. By simply closing these plants or by upgrading them to Western norms, Germany achieved its 2008-12 Kyoto emissions targets by 1992!

(http://www.numberwatch.co.uk/german_kyoto_protocol_hoax.htm).

Harrison and Sundstrom (2007) elaborate further, noting that Germany's "windfall reduction" also applied to the UK (because of its on-going conversion from coal to offshore gas) and to Russia (because of economic collapse and the unwinding of heavy polluting industries. To present a more realist analysis, they present GHG comparisons on a per capita basis (Table 1), on which they comment as follows (Harrison and Sundstrom, 2007, 14):

While there is tremendous variation in performance, from a 33% decline in emissions in Russia to a 27% increase in Canada [column 1], the variation in population growth evident in the next column suggests that emissions trends reflect more than just policy efficacy. Canada, the US, and Australia have experienced much greater increases in emissions in large part because they have experienced much greater population growth than other jurisdictions. Indeed, when one compares trends in *per capita* emissions [column 3], it is striking that the only country to see a decline other than the three that experienced "windfall" reductions (Germany, the UK, and Russia) is the US, which has been vilified for its decision not to ratify the Kyoto Protocol. In fact, with the exception of Germany and the UK, the rest of the EU has experienced per capita emissions comparable to Canada and Australia [compare the last row of column 3 with the first two rows, TJC].

Assigning Resource Emissions

A further problem with Kyoto emissions standards, at least from my perspective, is that fossil-fuel and resource-based countries are, arguably, unfairly assigned the carbon emissions arising from the *production* of these exported resources. Hence Russia is assessed the carbon footprint for supplying much of the EU with their fossil energy. This means that if two countries have the same consumption patterns but one produces its own fossil fuel and the other imports all its fuel, the latter would be assigned a much lower carbon footprint. To illustrate the point at issue an example is in order. Suppose Canada produces 100 barrels of oil and exports 60. The carbon footprint of using (consuming) the 60 barrels will be assigned to the importing country and the footprint of the 40 barrels will be assigned to Canada. However, the carbon cost of *producing* these 100 barrels will be assigned to Canada. In my view, the carbon footprint of producing 60 of these barrels should be assigned to the consuming country. On this score, it obviously helps that there is a base year (1990) for the targets, but the reality is that the carbon footprint relating to the production of the dramatic rise in consumption [on China's part, for example] of Canadian resource exports will be assigned to us, when a case can be made that a goodly portion should be assigned to China. To anticipate the ensuing analysis, one presumed advantage of the carbon-added tax is that the *entire* carbon footprint of a product will be assigned on a destination or consumption basis.

Exempting Developing Countries: Climate Change Issues

The final bit of backdrop relates to the Kyoto decision to put binding constraints only on the

developed countries. The developing countries mantra was, in effect “we were not a major part of the cause of any climate change problem, so why should we be a major part of the solution?” Along these lines, the 1991 Beijing Ministerial Declaration on Environment and Development asserted that responsibility for the emissions of greenhouse gases should be viewed both in historical and cumulative terms, as well as in terms of current emissions. Specifically, the view was that equity considerations dictate that those developed countries that have contaminated most should contribute most. Similarly, the 1997 Brazilian Protocol proposed linking each country’s responsibilities in the anthropogenic part of climate change to its current and earlier emissions. In the event, the Kyoto Protocol reflected these historical moral obligations. As of the end of 2007, 175 countries ratified Kyoto. Of these 175, only 37 developed countries (plus the EU as a party in its own right) were required to reduce greenhouse gas emissions to the levels specified for each of them in the treaty. As for the remaining 137 developing countries that have also ratified the protocol (including Brazil, China and India), these countries have no obligation beyond monitoring and reporting emissions.

Even if one were to hold the view that, on moral and equity grounds, the developed nations must bear the lion’s share in terms of combatting climate change, there are two fundamental problems with the Kyoto approach. The first, and most important of the two, is that if addressing climate change is left only to the developed or industrial countries, then the world will not be able to avoid the environmental tipping point. By way of elaboration, consider China. In 2004, annual CO₂ emissions (in millions of metric tons) were 6,049 and 5,010 for the US and China respectively. However, by 2006 the Netherlands Environmental Assessment Agency ranked China as #1 in CO₂ emissions. Moreover, China is already the largest user of coal and is planning to open at least one new coal-fired power plant every week for the

foreseeable future.

In more aggregate terms, in 2004 non-OECD emissions of carbon dioxide exceeded OECD emissions for the first time. (*International Energy Outlook 2007*) And by 2030 CO₂ emissions from the non-OECD are projected to be half again as large as those from OECD countries (i.e. 57% larger). Writing in the New York Times, Andrew Revkin (2007) provides yet another perspective on the developing/developed nations' role in addressing climate change:

Even if the established industrial powers turned off every power plant and car right now, unless there are changes in policy in poorer countries the concentration of carbon dioxide in the atmosphere could still reach 450 parts per million -- a level deemed unacceptably dangerous by many scientists -- by 2070. If no one does anything, that threshold is reached in 2040.

John Allan and I (2008) concluded our recent *Financial Post* op ed with the following stark contrast: "In Ontario we lament the delay in closing a few coal-fired generating plants, while China's development plan calls for opening 560 such plants between now and 2012."

Exempting Developing Countries: International Competitiveness Issues

The second reason why full exemption of the developing nations is problematic relates to "free-riding." As we outlined elsewhere, there are two sorts of free-riding:

The first is that firms in non-signatory countries, or non-complying countries, will have an advantage in terms of exporting to complying countries, and to international markets generally. The second is that firms in complying countries will have enhanced incentives to outsource from, or offshore to, non-complying countries, and then re-export back to their home countries, thereby avoiding the domestic environmental regime. Moreover, as China, Brazil, India and the others continue their economic ascent, these free-riding concerns of complying countries will be correspondingly magnified and will surely test the resolve of those countries to hold to their commitments (Courchene and Allan, 2008, 60).

It is not obvious that challenging Kyoto on this issue should be viewed as the developed world turning its

back on the developing world (by using climate change as the new protectionist instrument). After all, China for example has, via export surpluses with the developed world, accumulated over a trillion US dollars of foreign exchange, much of this earned from the exports of foreign multinationals operating in China. Phrased differently, the US and the EU have opened their domestic markets to Chinese exports (and much of this at a value for the Chinese Renminbi that was and remains hugely undervalued), so that any general charge of economic discrimination against the developing regions would seem hard to sustain. In any event, the reality is that if addressing climate change requires the developed countries to put their global economic competitiveness at risk, then many more countries than the US will remain off-side.

The Case For A Carbon Tax: The Tradeables Tier

It was this constellation of challenges (as well as interprovincial and federal provincial challenges elaborated later) that led John Allan and I to propose a two-tier approach to climate change. The first is what might be called the “tradeables tier,” and the second tier can be referred to (with some degree of misrepresentation) as the “non-tradeables tier.”

The tradeables tier would consist of a destination-based (consumption-based) tax on the carbon footprint of all goods and services, domestic and foreign. One variant of this would be what we call a “carbon-added tax” that would be the carbon equivalent of a traditional value-added tax (a European VAT or a Canadian GST). Under such a system, there will be a tax on the carbon emissions added at each stage. As the product moves through the various stages the taxes levied in previous stages are rebated, so only the carbon added in a particular stage is taxed at that stage. Hence, when the product reaches the final stage, the tax is on the cumulative value of carbon emissions, i.e., on the sum of the amounts of carbon

emissions added at each stage. As with the GST, the tax accumulated to the stage where the product is exported will be rebated so that the carbon tax does not impact our international competitiveness. Relatedly, a carbon tax will be assigned on all imports in line with the aggregate amount of carbon emissions (including those arising from transporting the product to Canada). Thus, *the carbon-added tax is export-import neutral* (it does not affect the international competitiveness of Canadian production in either domestic or external markets.). The carbon tax on imports will be identical across countries (e.g., \$40/tonne) and be the same as the domestic tax. However, similar imports from different countries may carry different carbon taxes depending on their carbon emissions prior to landing in Canada. Given that value-added taxes are fully acceptable under WTO rules (indeed, they are not even considered as “border adjustments” since they are effectively regulated/imposed in the domestic production/consumption process), our assumption is that carbon-added tax should, in principle, fall within WTO guidelines. Measurement problems will likely be severe (depending on how detailed the classification is) so that international agreement here may be more difficult. However, the increasing concern about carbon has already launched a “carbon auditors” industry that may well make the measurement issues less severe than they might at first appear.

Another perspective here is that since most exports come from global multinationals, the international component of the carbon tax can be viewed in the first instance as a tax on the carbon footprint created by these global multinationals and one assumes that they will select future production locations in order to reduce their carbon footprint (and thereby reduce the carbon tax). One also assumes that all nations will recognize that reducing carbon emissions will make them more attractive places for production and export.

Prior to focussing on the second tier of our model, it is convenient to devote attention to an alternative carbon tax model proposed by Jack Mintz and Nancy Olewiler -- a model that has attracted considerable media attention and is rumoured to be informing the Liberal Party's environmental policy.

The Mintz-Olewiler Proposal

The Mintz-Olewiler carbon tax model would convert the 10¢ per gallon federal tax on gasoline to a carbon tax equivalent (roughly \$42 per tonne of CO₂). This carbon tax of \$42 per tonne would be then be extended to include heating oil, natural gas, coal, etc., which will ensure a level playing field across alternative fuels. Over time this \$42 per tonne carbon tax could increase in line with the dictates of the climate-change policy. Mintz and Olewiler follow the B.C. model of having the resulting significant increase in revenues (potentially in the \$15 billion range) returned to the form of income tax reductions or tax relief for low-income Canadians so that, overall, the carbon tax becomes revenue neutral.

Given that this \$42 per tonne carbon tax relates to the carbon emissions that will result from utilizing these fossil fuels for motive transportation (gasoline), for generating electricity (coal), for heating (coal, natural gas, heating oil) etc., there is also a need for some upstream tax to take account of carbon emissions that result from the production processes for creating these fossil fuels in the first place (refineries for oil, and gas, etc.). Mintz and Olewiler are silent on this particular issue, but since their underlying principles include broad-based taxation and export-import neutrality one presumes that these carbon emissions would also be taxed at \$42/tonne and then become incorporated in the prices of the fossil fuels. Because these upstream and downstream taxes would not be integrated along the lines of our carbon-added tax, some sort of specific import tariff will be necessary for imported fuels that have not been subject to the \$42/tonne tax at

the production end in the exporting country (and one needs to find some way incorporate the shipping footprint as well). It may be more difficult to obtain WTO agreement for this import tariff than would be the case under a carbon-added tax. Ideally, the solution would be some international harmonization of environmental taxes. While the carbon-added-tax model is, arguably, a preferred model analytically, the Mintz-Olewiler model may be more amenable politically and practically since it is limited at its core to primarily taxing the carbon arising from consuming fossil energy. The explicit recommendation for the tax to be revenue neutral may also be an attractive feature in terms of public acceptability. Note that one could also apply revenue neutrality to the carbon-added tax model.

The Case For A Carbon Tax: The Non-Tradeables Tier

While the first tier deals with tax measures relating to the tradeables sector domestically and internationally, the second tier would focus on environmental policy relating to the non-tradeables economy and domestic infrastructure more generally. The emphasis here could be on command and control measures (emissions caps, automobile emissions standards, energy efficient appliances) as well as on policies that reduce emissions related to the provision of electricity and transportation. Since tier one largely eliminates international free-riding, a Kyoto-type approach may be suitable for this second tier. Specifically, while it would be important to try to strive for binding commitments from all countries, the developing countries could be accorded some second-tier flexibility. Beyond this, there should be commitments on the part of developed nations to provide funding for the transfer of state-of-the-art carbon-reducing technologies to developing countries. In addition, there will presumably be interest in the developing countries to reduce the carbon content of their infrastructure and economic system since this will make their economies more

attractive to global capital for exporting, outsourcing and off-shoring tradeables.

Carbon Taxes and Federalism

I now want to turn to the federal-provincial and interprovincial implications of alternative policy approaches to climate change. The status quo, albeit only emergent, already is showing signs of dissonance on both the economic and political (intergovernmental) fronts. With Alberta imposing an origin-based emission charge (essentially a tax on production of carbon) and with B.C., among others, imposing a destination-based carbon tax (essentially a tax on consumption of carbon), the stage is set for an interprovincial “battle royale” with Ottawa apparently happy to oversee all of this from the sidelines. My view is that a national carbon tax is the appropriate integration approach and this for several reasons. The first is that there is a very important substantive and harmonization dimension at play here that requires some overarching federal presence. Second, since a carbon tax is an indirect tax, Ottawa has the constitutional right to levy such a tax (although there will surely be court challenges based, in part at least, on Section 92A dealing with resources). Third, there is also a key international dimension at play -- the provinces have no authority to levy import tariffs and therefore no ability to ensure the export-import neutrality that is so essential to maintaining competitiveness. With the recent Ontario-Quebec commitment to mount their own cap-and-trade (C&T) system, the stage is set for competing C&T systems, hence, there will be a domestic equivalent to the above international harmonization issue, namely that provinces cannot levy import levies against goods from other provinces. This is yet another reason for a federal presence and, of course, another dimension of potential interprovincial and federal-provincial conflict.

However, there is no reason why Ottawa could not work very closely with the provinces and the

Council of the Federation. Moreover, there is nothing that prevents Ottawa from sharing the carbon tax revenues with the provinces on a derivation basis (e.g., on the basis of what was actually collected in the province). One might refer to this as the “harmonized carbon tax” (named after the combined Ottawa-provincial HST (Harmonized Sales Tax) that exists in NL, NS and NB).

These recommendations with respect to carbon taxation can be cast in a different light by noting, first, that the costs of carbon emissions are borne by all Canadians and, second, it would therefore seem appropriate that any revenues arising from carbon abatement ought to be distributed in a manner that relates to consumption rather than to production. Suppose the opposite was the case, namely that revenues from pollution abatement went, via origin-based emission taxes, to the energy provinces. This would mean that not only would the energy provinces be receiving the rents/royalties from fossil energy but, as well, they would also be receiving the revenues from carbon abatement taxes. Given the long-standing (and still ongoing) equity issue relating to the funding of energy royalties in the equalization program, an origin-based emissions tax that would accrue to the energy provinces would dramatically exacerbate an already acute interprovincial (horizontal imbalance) problem. Arguably, therefore, a nationally-run, destination-based carbon-tax regime with provincial revenue-sharing seems to be a viable policy option on this score because the revenues from carbon abatement policies would be distributed across the provinces in line with carbon consumption. Ottawa may want to pursue a revenue-neutral strategy for its share of the carbon tax (say 50% for illustrative purposes), but the provinces should be free to dispose of their revenues as they see fit.

I hasten to note that none of this is intended to downplay the key role of the provinces in addressing climate change. Indeed the appropriate appreciative note should be along the lines of “Thank goodness for the provinces!,” It is intriguing that in both Canada and the US the sub-national governments are bravely and

creatively carrying the policy ball for climate change, while their respective federal governments are either or both politically and ideologically unable to assume the leadership on this file. However, the above analysis is intended to voice concern that the longer that Ottawa remains on the sidelines, the more intractable the federal-provincial and interprovincial dimensions of climate change policy will become, as Peter Lougheed has forewarned us. Part of the challenge here is that the roughly 50-year history of federal-provincial fiscal relations dating from the inauguration of the equalization program in 1957 has no equivalent on the environmental side. However, over the foreseeable future *environmental federalism* will likely become as important as fiscal federalism. Given this, and the reality that the political and institutional machinery in the area of environmental federalism is weak to non-existent in comparison with the fiscal federalism infrastructure, both Ottawa and the provinces (individually or via the Council of the Federations) need to take immediate steps to deepen the intergovernmental infrastructure relating to the substance and the processes of environmental federalism.

Carbon taxes vs. Cap-and-Trade Systems

Why would Canada opt for a carbon tax or a carbon-added-tax when there seems to be a growing consensus in favour of a cap-and-trade system? This is especially true in the US where an earlier cap-and-trade system successfully addressed the acid rain problem caused by SO₂ emissions. While there is some evidence that a carbon tax is drawing increasing attention at the analytical/conceptual level in the US, cap-and-trade systems still dominate the policy agenda.. The recent Quebec-Ontario C&T proposal adds to the likelihood of a C&T system. The principal rationale for favouring a carbon tax over a C&T system is that the latter typically deals only with large emitters at the production end and does not address the

consumption level, so that some version of a carbon tax is necessary in any event. A second rationale is that C&T systems can easily fall prey to the influence of these large emitters (i.e., lobbying for free initial distribution of permits to existing players, ensuring that there is a price cap on the permit price). Were all permits subject to auction, big industry may look much more kindly on a carbon-added tax. In other words, the problem with C&T systems is that it may not live up to the recommended approach outlined in Tableau 1. Third, and more positively, a carbon tax should be able to be married to a C&T system. One approach would be to combine a destination-based carbon tax with a cap-on-trade system for large emitters. Indeed, B.C. seems committed to doing just this, so that we may have a real live experiment to learn from. The bottom line here, however, is that we need more analytical and policy research on how these two systems can be integrated so that the resulting harmonization is effectively three-fold; federal-provincial, interprovincial, and international. While I am a believer in the proposition that for policies to be national they need not be central, in this area where domestic and international intergovernmental issues may be front and centre it seems inevitable that Ottawa must play the lead role.

Carbon Pricing and \$130 Oil

Should the implementation of a carbon tax take into consideration the level and recent history of energy prices. The theoretical answer may well be “no.” After all, the oil price is set internationally by market forces, presumably with little reference at any point in time to global warming. Therefore, there is still a rationale for a carbon tax to offset the social cost attributable to the carbon footprint of fossil energy production and consumption. And in terms of the Mintz-Olewiler proposal it would still be appropriate to level the playing field across all fossil fuels. However, one could imagine exceptions to this levelling-the-

playing-field argument. For example, if the purpose of the gasoline tax were to serve as a user fee for maintaining the highway system (as might be the case for the provincial taxes on gasoline), then equalizing across all fossil fuels would not be appropriate.

However, the political and policy implementation arguments would likely work in the opposite direction. The first reason for this is that the recent run-up in the price of oil has been very sizeable and very quick. Suppose for illustrative purposes that we take 90 cents per litre for gas as the benchmark price, with the current at the price per litre now at \$1.20, or 30 cents higher. Using the Mintz-Olewiler conversion rate (i.e., a ten cent tax per litre represents a \$42/tonne price for carbon) this 30-cent increase per litre is equivalent to a \$126/tonne for carbon. This is higher than most assumptions for the magnitude of the required carbon tax, at least for the medium term. Second, the implementation proposals that I have seen normally call for an initially low carbon tax that would be raised over time. Thirdly (and setting aside the implications of the revenue neutral aspects of a carbon tax) the increase in the price at the pump from the energy price increase is, from a consumer's vantage point, identical to an equivalent increase in a carbon tax. Therefore, to mount a carbon tax in this time frame on top of \$130 per barrel oil could be viewed as policy overkill (and probably political overkill as well).

This said, the rise to \$130 oil is most fortunate from a carbon-policy design and implementation perspective process. The response by consumers and producers to this price increase is creating a real-life laboratory that allows us to assess the implications of a carbon tax. We already know some broad response parameters: GM has put much of its Canadian assembly of SUVs on hold; Chrysler (highly inappropriately from a climate change perspective) has offered to guarantee a \$3.00 per gallon gasoline price to customers who purchase the (non-selling) gas guzzlers; importers are becoming concerned that they

have to rethink sourcing offshore because the shipping costs are too high, and so on. Presumably there will literally thousands of similar examples. These are exactly the types of responses that one would expect from a carbon tax. Even though the energy price rise is having a much narrower effect than would be the case from an equivalent carbon tax, the information that will be obtained will be vital to assessing the magnitude of the carbon tax required to achieve our climate exchange goals.

If energy prices remain at their current levels, and especially if they move toward the \$200 level that some are predicting, it may be that market forces alone will be sufficient to modify behaviour and to encourage low-carbon technologies to a degree that achieves the goals expected of a carbon tax. Hence, we may not need a carbon tax. However, if energy prices fall back, it would seem appropriate to have a policy in place that would gradually implement a carbon tax that would increase so as to partially offset the global energy price decline. The parameters of such a tax are obviously a political matter. However, the advantage of the current experience is that researchers and policy makers alike will be able to be more confident about what a carbon tax can achieve and, therefore, be better able to design the appropriate policy.

One might go even further here. Suppose, again only for illustrative purposes, that we somehow know that a price for carbon that would generate a price of \$1.10 per litre would achieve Canada's climate change goals. Suppose further that the existing price of energy generates a price at the pump of \$1.25 per litre. While policy fine tuning is admittedly not in vogue, a case could nonetheless be made for decreasing the existing the federal tax at the pump under the above assumptions, and for increasing it when the energy price yields a per-litre price for gas under 110 cents. But this presumes a degree of precision about agents' responses to prices that is difficult to attain.

Conclusion

Climate change is what Gilles Paquet would refer to as “wicked problem.” We are unsure about the underlying science; action now will make a difference only in the distant future; vested interest are everywhere and powerful, and they include private firms as well as governments; huge amounts of money are at stake (profits for corporations, revenues for governments); and perhaps most difficult of all, the politics are formidable and will take courage and fortitude for all the above reasons. In the above analysis, I have tried to spell out these challenges. My chosen solution is a VAT-style carbon tax that addresses climate change in a comprehensive way in terms of levelling the playing field across all products and integrating the tax regime across all jurisdictions. Thus far, it would appear that the cap-and-trade model appears to have the upper hand. This being the case, I have included (in Tableau 1) the features that ought to be included in a cap-and-trade system. One hopes that the reason why cap-and-trade is popular is not because its members assume that these features will not be part of the system. The other theme of the above analysis is that implementing climate-change policy in a decentralized federation such as ours is much more challenging than it is in a unitary state, or even in a centralized federation. Whether we like it or not, the phrase “environmental federalism” is about to enter our policy vocabulary.

Table 1**Comparison of Greenhouse Gas Emission Trends**

Country	<i>Emissions Growth (without LULUCF) 1990 to 2004</i>	<i>Population Growth 1990 to 2004</i>	<i>Increase in Emissions (without LULUCF) per capita, 1990to 2004</i>
Australia	+24.3%	+17.0%	+6.3%
Canada	+26.6%	+17.0%	+8.2%
Japan	+ 6.5%	+ 3.1%	+3.4%
Russia	-33.1%	- 3.0%	-31%
United States	+15.8%	+17.1%	-1.2%
EU 15	-1.0%	+ 4.5%	-5.3%
Germany	-17.4%	+ 3.8%	-20.3%
UK	-14.3%	+ 4.8%	-18.2%
Rest of EU	+12.8%	+ 4.7%	+ 7.8%

Sources: Emissions data from UN FCCC emissions profiles (http://unfccc.int/ghg_emissions_data/items/38954.php). Population data from US Census Bureau (<http://www.census.gov/ipc/www/idbrank.html>).

Note: LULUCF is *Land-Use, Land-Use Change and Forestry*.

Reproduced from Harrison and Sundstrom (2007, Table 4).

Tableau 1

Cap and Trade Basics

Under a cap-and-trade system the authorities will determine the limit (cap) on the pollution allowed, and will issue “pollution permits” for this amount. If a company wants to produce more than it has permits for, it has to acquire additional permits, either from the government, from other companies, or from approved “carbon offset” sources. This is the “trade” part of cap-and-trade and it will set the price of the permit.

Specific Features:

1. Cap-and-trade systems are usually limited to large emitters.
2. The cap should be set in line with overall climate change goals.
3. The allocated permits are almost always distributed free. Most environmental NGOs, among others, would recommend that the permits be auctioned. This will yield revenues that can be used for other purposes, e.g. provide low-income relief from rising energy prices, reduce other taxes, invest in low-carbon research,
4. The trading area should be reasonably broad in order to avoid price “spikes”.
5. Some systems include a “price cap”, i.e. a limit on how high the permit price can rise. This can undermine the integrity of the system. So can a guarantee that carbon offsets are available at a fixed price, since this is in effect a price cap. For example, in Alberta’s cap-and-trade system, there is a widely available offset set at \$15/tonne if the payment goes to a low-carbon-technology fund.

This table draws from Matt Horne’s “Cap-and-Trade” Fact Sheet (Pembina Institute, March 2008).

References

- Allan John R. and Thomas J. Courchene (2008) "Level the Greenhouse," *National Post* (May 15), FP15.
- Courchene, Thomas J. and John R. Allan (2008), "Climate Change: The Case for a Carbon Tariff Tax," *Policy Options* (March), 59-64.
- Harrison, Kathryn and Lisa McIntosh Sundstrum (2007) "The Comparative Politics of Climate Change," *Global Environmental Politics*, 7:4, (November), 1-18.
- Horne, Matt (2008) "Cap-and-Trade Fact Sheet," (March) (Pembina Institute).
- International Energy Outlook 2007* (Washington: Energy Information Administration)
- Mintz, Jack and Nancy Olewiler (2008) *A Simple Approach for Bettering the Environment and the Economy: Restructuring the Federal Fuel Excise Tax*, prepared for the Sustainable Prosperity Initiative (University of Ottawa: Institute of the Environment).
- Simpson, Jeffrey (2008) "The Bell Tolls for Alberta's Climate Change Policy," *Globe and Mail* (May 27), A17.
- Simpson, Jeffrey, Mark Jaccard and Nic Rivers (2007) *Hot Air: Meeting Canada's Climate Change Challenge* (Toronto: McClelland Stewart).