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Backgrounder

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The Kyoto Conundrum:

*Why Abandoning the Protocol's Targets
in Favour of a More Sustainable Plan
May Be Best for Canada and the World*

Joseph A. Doucet

The Backgrounder in Brief

Because Canada ratified the Kyoto Protocol and the United States did not, many Canadians worry that exports to the U.S. will become over-priced. While the structure of Canadian exports should ease some of those concerns, Ottawa's current plan for protecting Canadian companies and its lack of clarity about post-Kyoto requirements may compromise long-term emission reductions.

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The Government of Canada ratified the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) on Dec.17, 2002. By doing so, the federal government made a commitment to reduce Canada's greenhouse gas (GHG) emissions to 6 percent below 1990 levels, on average, during the 2008-to-2012 period.

Much of the debate leading up to ratification focused on the costs of emissions reductions and on the impact on competitiveness of the costs to the Canadian economy. Costs of emissions reductions were, and still are, largely unclear. The specific details of government policies will ultimately determine them and many of those policies have yet to be developed.¹ Analysts of any climate-change policy must recognize that it is impossible to eliminate all of the uncertainty surrounding costs. Indeed, many Kyoto costs depend on factors such as economic growth and technological progress, which are difficult to forecast accurately. That is small comfort to decision makers and investors facing significant public-policy shifts. As well, the issue of Kyoto costs is especially important to Canadian decision makers because of the structure of the Canadian economy.

For one thing, Canada's economy is relatively open. The nation's 2003 GDP was \$1,215 billion, while 2003 exports were \$460 billion, or 38 percent of GDP; imports were \$410 billion, 34 percent of GDP.² In short, international trade and competitiveness have a critical influence on the Canadian economy.

For another, the United States, Canada's largest trading partner by far, has unambiguously rejected ratification. Because approximately 85 percent of all Canadian exports of goods and services go to the U.S., competitiveness with respect to the U.S. market is an essential consideration.³

The federal government has released some details of its policy towards implementing the Kyoto requirements. On the competitiveness issue in general, the current policy proposal does, in fact, shield industry from some direct negative consequences. This is potentially good news. However, it does not mean that competitiveness effects will not arise more broadly in the economy. For instance, the February 2003 federal budget announced \$2 billion of new spending to be allocated to climate change over the next five years and the March 2004 budget committed another \$1 billion over 10 years for related environmental technologies. This is a significant cost to the economy. However, such spending might well be justified, both economically and environmentally, if it leads to genuine climate-change progress. This is where important questions arise. It is difficult to see how

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- 1 Interested readers should consult Weyant (2001) for a discussion of why cost estimates of climate change policies vary. Jaccard et al (2004) examines several technology-driven policy options in Canada, including the case for command-and-control implementation.
 - 2 Statistics Canada data from <http://www.statcan.ca/english/Pgdb/econ04.htm> and <http://www.statcan.ca/english/Pgdb/gblec02a.htm>.
 - 3 See <http://www.statcan.ca/english/Pgdb/gblec02a.htm>. Of course, competitiveness with the U.S. would matter whether or not the U.S. decided to ratify.
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a combination of shielding industry, striving to reach the relatively short-term Kyoto targets and an absence of clear long-term (post-2012) policy direction, both nationally and internationally, can lead to significant climate-change progress. This is not good news, especially for those who truly believe that long-term GHG emissions reductions are desirable.

Kyoto: Magnitude of the Challenge

It is essential to put Canada's Kyoto target in perspective. Because of the increases in Canada's emissions levels since 1990, and current estimates of emissions growth between now and 2010 (the mid-point in the Kyoto target range of 2008-to-2012), the Kyoto target of 6 percent below 1990 levels for 2008-to-2012 implies emission reductions of about 30 percent from business-as-usual levels in 2010.⁴ These requirements illustrate that the Kyoto emissions-reduction target is indeed ambitious, while the Kyoto window of 2008-to-2012 is tight.

Approximately 75 percent of Canadian GHG emissions are the result of energy consumption directly related to fossil fuel combustion (Government of Canada 2002a). Energy consumption, in turn, is directly related to and affected by capital-intensive activities and infrastructure (transportation, buildings, electricity generation, manufacturing and related factors). Capital stock turnover is a slow process — many industrial facilities and equipment last more than 40 years.⁵ Again, this highlights the fact that the Kyoto target dates of 2008-to-2012 are relatively narrow. Significantly, the Canadian economy is particularly energy intensive. According to data reported in Claussen and McNeilly (1998, Appendix I, p. 26), in 1995 Canada was the most energy-intensive industrialized economy, with a consumption-to-GDP ratio of 14.51. That is 12 percent higher than the second entry in the list, the United States, at 12.77, 25 percent greater than Australia at 11.61 percent and more than twice the intensity of Britain, at 6.16 percent. Neither the United States nor Australia intends to ratify; Russia, too, has declined ratification.

Although it is true that highly emission-intensive countries such as Canada are likely to have numerous opportunities for low-cost reductions, the level of effort required if Canada is to meet its Kyoto commitment will be relatively high and the potential for sharp cost shocks to Canadian companies and industries must be taken seriously.

Kyoto: Canadian Policy for Getting There

Canada's Kyoto target implies emissions reductions of about 30 percent from business-as-usual levels in 2010 and, in terms of actual emission numbers, this target is equivalent to 240 megatonnes (MT). In Canada (2002b) the 240 MT are broken down as follows:

- Step 1: Actions underway — 80 MT;

4 Government of Canada (2002b), pp. 11-13.

5 Jacques, Lafrance and Doucet (2001) discuss this issue with respect to the North American electricity industry and Kyoto.

- Step 2: New actions — 100 MT;
- Step 3: Potential actions for the remaining 60 MT.

Work on Step 1 is something of a measuring or accounting operation, looking at, or anticipating, the results of existing actions and policies. Step 3, on the other hand, constitutes a forward-looking exercise, focussing on possible actions in the future to address a gap in reductions. This step will likely include important emission credit purchases in the international market.⁶

Our focus is on Step 2, which involves new actions by government and industry to be put in place in order to achieve new reductions in 2008-to-2012. The policies of Step 2 will, arguably, have the greatest impact on company decisions and investments in the coming years.

The LIE Group

The Large Industrial Emitters (LIE) group includes companies in industries that together are expected to account for over 44 percent of total Canadian emissions.⁷ The industries in this group are energy intensive and have throughout the Kyoto process expressed concern about the negative competitiveness effects of emission-reduction constraints or policies. Ottawa's approach to this group is three-pronged:

- A quantity cap on total emissions for the group;
- Use of mechanisms, such as emissions trading, to achieve the quantity reductions at the lowest possible cost;
- A backstop price guarantee for emission reductions.

The federal government's approach is to implement the measures through negotiated covenants limiting the total emissions-reduction responsibilities of this group to 55 MT below currently expected business-as-usual levels by 2010.⁸ This translates to an average intensity reduction of about 15 percent across all companies in the LIE sectors. This quantity commitment provides these companies with a significant degree of certainty on the level of emissions reductions for which they will be held responsible, though many details remain to be ironed out.⁹

In order to achieve these emissions at the lowest possible cost, Ottawa intends to set up an emissions-trading system to provide added flexibility for companies to identify and act on the lowest-cost emissions-reduction opportunities within the LIE sectors as a whole. The government will also allow LIE companies to meet their responsibilities through a number of means other than reducing emissions

6 In this sense, Ottawa's plan explicitly recognizes that achieving the specified emissions reductions is not possible using only domestic actions.

7 The industries are: thermal electricity generation, oil and gas, transmission pipelines, distribution pipelines, petroleum refining, aluminum, mining, pulp and paper, chemicals, iron and steel, cement and lime production, fertilizer, glass and glass container production.

8 See Government of Canada (2002b) for more detail on the plan; 55 MT is 55 percent of the 100 MT objective of Step 2.

9 The allocation of the 55 MT within the LIE group is still unclear, and will no doubt be contentious. The Government has said that the allocation will be output-based in order to respect the targeted intensity reduction of 15 percent.

associated with their own sectors of operation. These additional flexibility opportunities include, for example, international permit acquisitions, offset purchases, and activities undertaken under the Kyoto Protocol's Clean Development Mechanism and Joint Implementation projects. All of these initiatives are designed to provide a wide range of opportunities for LIE companies to reduce the cost implications of climate policy.

Finally, the federal government has also provided a price ceiling on emission-reduction costs. "[D]uring the first commitment period, Canadian companies will be able to meet their emission reduction responsibilities at a price no greater than \$15 a tonne."¹⁰ This commitment implies that the maximum per-metric-ton cost that any LIE company will have to assume to meet its reduction responsibilities will not exceed \$15, whether the cost is incurred as a result of permit purchases, actions to reduce emissions from its own operations, or any of the other options mentioned. Of course, this price ceiling dulls, without completely removing, the

Table 1: *Illustrative Costs for Selected Industries at \$15/tonne CO₂*

| Sector | Cost as % of price |
|--|--------------------|
| Refined petroleum products | 0.05 |
| Conventional oil | 0.14 |
| Oil Sands — bitumen | 0.51 |
| Agricultural chemicals and fertilizers | 2.2 |
| Electricity generation (coal) | 2.9 |
| Lime | 3.8 |

Source: Government of Canada (2002b, p.31)

incentive that companies might have to introduce long-term changes. Further, the fact that the price ceiling ends (in theory) in 2013 and that the government has not introduced a post-2012 policy, creates a great deal of uncertainty for decision makers. This unpredictability might well dampen companies' incentives to undertake the type of long-term structural and capital changes necessary to bring about real climate-change progress.

There is limited publicly available information on the likely cost shock that the combination of these measures would impose on companies in the LIE sectors. However, Government of Canada (2002b, p. 31) presents a summary table of illustrative costs for a number of them, under the assumptions that only permit purchases are used to meet emissions-reduction responsibilities and that the permit price is \$10 per metric ton.¹¹ Table 1 adapts these cost numbers to a \$15 permit price by increasing them by 50 percent for a sample of the sectors, including the least affected (refined petroleum products) and the most affected (lime).

¹⁰ Statement by then-Natural Resources Minister Herb Dhaliwal, December 18, 2002.

¹¹ Note that Government of Canada (2002b) indicates that the \$10 permit price is for a tonne of carbon. My understanding, confirmed by NRCan sources, is that the illustrative calculations reported in that table are in fact based on a permit price of \$10 per tonne of CO₂.

As Table 1 shows, the forecast cost shocks associated with a \$15 permit price are less than 1 percent of the relevant output prices for certain LIE companies. In a few cases, however, the size of the expected cost shock falls in the 3 percent-to-4 percent range of output prices.¹²

As a result, even with the price and quantity assurances contained in federal policy, emissions reductions will lead to some level of cost shocks in the affected industries and will likely have an impact on competitiveness.

Secondly, the Canadian government and taxpayers will bear the risk of the price and quantity assurances offered to industry. Although CO₂ prices are currently below the \$15 price limit,¹³ CO₂ markets are nascent and very thin and current prices may not be reflective of true emissions reduction costs. Should prices increase dramatically, taxpayers would be on the hook for the increase, and companies would still not see a greater incentive for emissions reduction.

Finally, and most importantly, the combination of the protection afforded companies by the price and quantity assurances and the unpredictability surrounding the post-2012 requirements could leave companies facing limited incentives for real progress in long-term emissions reductions.¹⁴ Hence, Canadian taxpayers could absorb costs without making substantial emissions reduction progress. Short-term pain without any long-term gain is a true risk.

Other industrial sectors

Ottawa is much less clear in describing the proposed policy approach for the remainder of Canada's industrial sector in Government of Canada (2002b, pp. 37-38). However, commentators expect that relatively small emissions reductions would be made by the relevant sectors, and an important part of these would be achieved by curbing fugitive emissions in the oil and gas sector. From the perspective of competitiveness effects, the main point to emerge is that very little in the way of emissions reductions will likely be made by industrial sectors outside of the LIE group. In this sense, a first-order analysis suggests that little can be expected in the way of competitiveness effects in other industrial sectors.

As well, a first-order analysis of Canadian trade data with the United States suggests that its structure also dampens the competitiveness impact of Kyoto costs. As much as 87 percent of all Canadian exports of goods and services go to the U.S.

12 A more detailed analysis, including relative margins and competitive positions for specific industries would be required in order to comment further on the impact of these cost shocks. In some cases, 1 percent might be significant, depending on the competitive position in the industry. Also, it is important to keep in mind that what really counts in a competitive analysis is the change in costs at the margin, as opposed to average changes. This type of analysis is unfortunately beyond the scope of this paper.

13 U.K. prices are currently around £3.50/tonne CO₂, or \$C8.60, but this is with very little trading. See <http://Pointcarbon.com>, 30 April, 2004. pdf.

14 This is not to say that companies will do nothing. However, the combination of the price ceiling and policy uncertainty for the post - 2012 period may dull incentives quite a bit. Snoddon and Wigle (2003) provide an excellent analysis of the relative effectiveness of specific parts of federal policy, specifically commenting on likely emission reduction results.

market.¹⁵ Among the most important of these exports, in dollar value, are motor vehicles and parts (standard international trade classification (SITC) code 78), aircraft equipment (SITC code 792), telecommunications equipment (SITC code 764) and energy products (oil and natural gas). These categories make up close to 40 percent of exports to the U.S. For the first three, it is important to note that the sectors are not particularly energy intensive. Indeed, they fall within “other manufacturing industries”, responsible for less than 3 percent of total Canadian GHG emissions (Government of Canada 1999). Since they are not part of the LIE group, their specific emissions reductions responsibilities are not expected to be large.

At the same time, it is instructive to consider who Canada’s major competitors in the U.S. import market are (looking at the top 10 sources for U.S. imports).¹⁶ With respect to motor vehicles and parts, the main competitors are Japan and Germany — both of which have also ratified the Kyoto Protocol — and Mexico, which does not have an explicit emissions-reduction target. With respect to aircraft equipment, France, Germany and the United Kingdom, all ratifiers of the Protocol, are Canada’s main competitors. In the telecommunications-equipment area, Mexico, South Korea, China and Japan are the main competitors. Of these, only Japan has ratified the Protocol. However, telecommunications equipment makes up only 2.1 percent of Canada’s U.S. exports and is relatively non-energy intensive.

In short, the potential competitiveness effects of climate policy on Canadian manufacturers in these sectors are muted not only by the ratification of many trade competitors, but also by the fact that these sectors of manufacturing are not particularly intensive in GHG emissions.

Energy exports make up close to 12 percent of exports to the U.S. and are also exposed to international competition in varying degrees. Some sectors, particularly thermal electricity generation and oil sands, are much more GHG-intensive than manufacturing and thus more at risk from cost increases. In the case of crude oil (and refined products) it is relevant to note that most of the major foreign oil suppliers to the United States are not subject to GHG emission reductions targets. Because Canadian producers are price-takers in global markets, cost shocks will likely be absorbed by producers. The result will be reduced profitability. This could lead to a displacement of future investment in this sector. Within the electricity sector, a large proportion of Canadian exports are directly related to hydro production, and thus largely emissions-free.¹⁷ Further, a number of U.S. states are already acting to force electricity generators to reduce their GHG emissions, a trend that may actually favour Canadian exports.¹⁸ As for natural gas, Canada currently accounts for more than 98 percent of U.S. imports of that energy source

15 The data used in the next two paragraphs were taken from websites maintained by the U.S. International Trade Administration: www.ita.doc.gov/td/industry/otea/usfth.

16 A more complete analysis, beyond the scope of this paper, would also examine competitors within the U.S.

17 See Thurston (2003) for a description of the evolution of Canada-U.S. electricity trade.

18 Once again, it is important to focus on effects on the margin. In Ontario, for instance, a significant proportion of marginal production is coal-based thermal. This capacity could be displaced and lead to lower exports.

and the main competition for the foreseeable future will not be Mexico (which is currently a net importer from the U.S.), but far-away producers and shippers of costly liquefied natural gas.¹⁹

In summary, the structure of Canadian exports to the United States acts to limit the competitiveness cost of climate policy on Canadian companies and industries: Some important competitors are also subject to emissions reductions targets, some key exports are not very intensive in GHG emissions and there is limited international competition for some types of exports.

Kyoto: Are We There Yet?

There are at least two key reasons to believe that the federal government has not yet fully addressed the competitiveness consequences of GHG emissions abatement, which can be summarized as: Kyoto as a first step, and the sustainability of the current proposed policy approach.

First, much of the available scientific evidence indicates that reductions in GHG emissions much larger than those proscribed by the Kyoto Protocol will be necessary if concentrations of these gases in the atmosphere are to be maintained at levels considered non-threatening to the climate. While there is much debate around this question, it is clear that many view Kyoto as a first step in the process of limiting human influence on the Earth's climate. Hence, too narrow a focus on the Kyoto timeframe of 2008-to-2012 may be counterproductive if it detracts from choices that could lead to long-term benefits.

If larger GHG emissions reductions are effected, we can expect their marginal cost to rise, and thus the cost shock on emitting companies and industries will rise, as well. That would lead to increased competitiveness concerns as the potential emerges for a widening cost wedge among companies located in countries with explicit emissions-reduction targets and competitors in areas where no such targets exist. If participation in future international efforts to reduce GHG emissions is closely patterned on the Kyoto model, with only a limited number of countries having explicit targets, then the negative competitiveness effects on Canadian companies and industries could well increase significantly in importance. Therefore, as far as Canadian companies are concerned, a key objective of future international negotiations on climate change should be to increase the number of countries where emission-reduction targets would apply. If it were not possible to do so, it would become increasingly challenging — on competitiveness grounds alone — to justify Canada's continued participation in international emission-reduction efforts, especially if the United States and a number of key countries, such as China, Russia India, Brazil, and Mexico, were to continue to resist adopting explicit emissions-reductions targets.

A second cause for concern is the sustainability of the policy approach that the Government of Canada proposes. Current proposals would result in Ottawa

¹⁹ For a more detailed discussion of this issue, see Plourde (2002).

assuming a significant part of the emissions price and quantity risk.²⁰ While this clearly acts to limit the negative competitiveness effects on the companies and industries in these sectors, questions arise about the political acceptability of such an approach. Should the cost of emissions reductions turn out to be relatively high, then the proposed policy approach is likely to become much more controversial: Individual Canadians would much less readily accept a disproportionately large share of the burden of meeting Canada's Kyoto commitment, either in the form of emissions reductions, or — given the current structure of taxation — of higher taxes. This would be even more striking if voters think that the costs will not lead to long-term climate-change improvements. Thus, the proposed policy approach is likely to prove the least politically acceptable in the very situations where it would be most useful in protecting Canadian companies and industries from major competitiveness setbacks.

Conclusion

Canada's decision to ratify the Kyoto Protocol clearly gives rise to a situation in which Canadians must take competitiveness concerns seriously: Canada's most important trading partner, the United States, will not ratify Kyoto; our other NAFTA partner, Mexico, does not have to adopt explicit limits on GHG emissions to meet its climate-policy obligations. That is also the situation in a number of other rapidly industrializing countries, such as China and Brazil.

To some extent, the structure of Canadian exports to the United States eases competitiveness concerns; for example, some key Canadian exports are produced by industries that are not very intensive in GHG emissions, are not subject to dramatic constraints and many of their main competitors are located in countries also facing emissions-reduction obligations.

The federal government's approach to Kyoto implementation addresses competitiveness concerns by effectively re-distributing the responsibility for meeting the nation's commitments away from the corporate sector in general, and the LIE sector in particular, and toward individual Canadians, either as GHG emitters or as federal taxpayers. Still, it is clear that Canadian climate-policy actions will still lead to cost shocks on domestic companies and industries.

One dimension of the competitiveness effects remains very difficult to assess: the potential consequences on international investment flows and the location decisions of companies. Kyoto is just one potential factor in investment decisions. However, it will clearly carry more weight with decision makers in energy-intensive sectors, particularly with regard to long-lived, capital-intensive investments. Clearly, the unpredictability of the post-2012 period, both in Canada and globally, will have an impact on investment decisions.

²⁰ Obviously Step 3 of the plan, which involves 60MT and explicitly invokes the possibility of international permit purchases by the federal government, could also be quite expensive for Canadian taxpayers. For example, if international permit prices were \$15/tonne of CO₂ during 2008-to-2012, and the Canadian government purchased permits for its entire 60 MT Step 3, which could happen as a result of poor performance of measures in Steps 1 and 2, the cost for the Kyoto commitment period would be \$4.5 billion just for Step 3.

As to what the government should be doing at this point, I see a Kyoto Conundrum. The economic and political imperatives to shield Canadian companies cannot be ignored. In this sense, the federal plan is a reasonably good one. However, real progress regarding GHG emissions will require clear long-range policy signals that will enable companies to evaluate their costs and put in place effective strategies. In this sense, the federal plan is pretty bad. The combination of protection for Canadian companies and great uncertainty regarding the post-Kyoto requirements, both domestically and internationally, could mean that little in the way of long-term emissions gains will be realized. This suggests that the pain, ultimately for Canadian taxpayers, involved in shielding companies from the full costs of Kyoto might well lead to little long-term gain. That could well be the largest cost of the current policy.

It would be smarter for Canada to work toward long-term sustainable initiatives that fundamentally improve the energy and GHG intensity of the Canadian economy. This approach, with a focus on research and development, as well as long-term capital improvements, will not provide quick results in the 2008-to-2012 period. But, it just might be more effective, for Canada and the world, in the long-term. Choosing not to meet the Kyoto targets does have a cost. Climate change negotiations have been long and arduous. It could be argued that abandoning the Kyoto targets, even at the expense of more durable long-term gains, risks derailing the process permanently. Ultimately though, a clear and credible long-range plan may be what is best for Canada, and the world.

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