The Kyoto Protocol: Implications of a Flawed but Important Environmental Policy

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Le Protocole de Kyoto est une étape importante et nécessaire dans la protection de l'environnement global. Par contre, une analyse révèle des problèmes qui pourraient entraver l'efficacité de ce traité. Des déficiences techniques, des ambiguïtés et des contradictions existent dans le texte légal. De plus, d'une perspective canadienne, une distribution inéquitable des coûts liés à l'amélioration de l'environnement pourrait se produire malgré les efforts préparatoires visant à atteindre un traitement juste et équitable des nations participantes dans le contexte du programme international du commerce des émissions. Des solutions, comme la vente aux enchères des droits d'émission, sont proposées afin de remédier à ces inquiétudes.

The Kyoto Protocol is an important and necessary step toward protecting the global environment. However, analysis reveals problems that could hamper the effectiveness of this treaty. Technical deficiencies, ambiguities, and inconsistencies exist in the legal text. In addition, from the Canadian perspective, an inequitable distribution of the costs of environmental enhancement may occur despite design efforts that attempted to achieve fairness and equitable treatment for participating nations through the international emission trading program. Solutions for these concerns are proposed, including the auctioning of emission rights.

INTRODUCTION

While the *United Nations Framework Convention on Climate Change* (Framework Convention) and the associated protocol agreed to at the December 1997 meeting of the signatory countries in Kyoto Japan (Protocol) are positive, necessary environmental measures, it will be argued in this paper that one aspect of the Protocol — the proposed international emission trading program — is problematic from the Canadian perspective for two reasons. First, a number of technical issues, ambiguous phrases, and contradictory provisions have been found in the legal text of the Protocol. The second

reason the Protocol is problematic for Canada relates to the high level of foreign business ownership that exists in this country. Canada's efforts to meet its Protocol obligations could be frustrated if cross-border transfers of emission credits from Canadian subsidiaries to foreign head offices occur. GHG emission credits could be siphoned off to fulfil the Protocol obligations of other nations, leaving Canada in the position of having to make up for the transferred emission credits in addition to achieving its own Protocol limits. On the surface this would appear to be environmentally beneficial as Canada would be "doubling up" its reduction efforts, but the nation receiving the benefit of these Canadian credits could reduce its own environmental efforts accordingly.

Given these two potential problems, which will be discussed in greater detail throughout the paper, Canada's policy of supporting the Protocol in its current form should be tempered. It is vital that appropriate steps be taken to protect the country's interests before the Protocol is ratified.

Highlights of the Kyoto Protocol

Climate change is a hot topic. This issue has become one of concern on a global basis in a short period of time given that prior to the United Nations Conference on the Human Environment in Stockholm, Sweden in 1972, the matter was subject to only limited study (Environment Canada 1991). By 1992 when the conference was held in Rio de Janeiro, however, 154 countries were willing to sign the Framework Convention. This change in attitude was largely due to the environmental concerns being expressed by thousands of scientists, politicians, and individuals.[1] This convention had the objective of limiting the release of anthropogenic greenhouse gases (GHGs) to ensure that the global climate would not be changed to such an extent that ecosystems could collapse, food production be harmed, or sustainable development not proceed. All actions taken to limit emissions were voluntary, no goals were fixed, and no penalties were imposed.

In accordance with the Framework Convention, negotiations toward further commitments continued, culminating with the Protocol agreement in 1997. Emission-reduction targets were set for the first time, it was agreed that an emission trading program would be developed, and various methods for achieving targets were formulated. The industrialized nations accepted primary responsibility for making the initial reductions and agreed to cooperate with the less-developed countries in technological, financial, and developmental matters. Penalties for failure to meet targets, rules and regulations for the new emission trading program, and the structure for clean development projects (CDMs) were to be determined in a series of scheduled meetings. The first meeting occurred in Buenos Aires in 1998, the next in Bonn in 1999, and a third is scheduled for 2000 in The Hague, Netherlands (Climate Change Secretariat 1999).

Essentially, the Protocol represents a balance between countries intent on following scientific advice to impose significant emission reductions and those who are concerned with the economic and political consequences of attempting to achieve too much too quickly. The agreement reached provided for emission reductions averaging 7 percent below 1990 levels but individual targets were established for each participating country. Canada agreed to reduce emissions by 6 percent below its 1990 levels, the United States by 7 percent, and the European nations accepted an 8-percent reduction target. (For a complete listing of the participating industrialized countries and their reduction commitments, see the Appendix).

As a political compromise, the Protocol does not go as far in improving the global emission situation as some had hoped. However, the countries involved in the Protocol have established principles to encourage cooperation among nations, the sharing of information and the reduction of economic distortions that might be promoting emissions. All activities are to be undertaken in ways that minimize negative effects on trade and on social and economic conditions for developing nations. Joint effort is encouraged, each nation must ensure that

approved measuring systems are in place to track emissions and carbon sinks,[2] and annual reports on compliance efforts and emission levels are required (Protocol 1997, articles 2, 3, 4, 5 and 7).

In achieving their target during the 2008 to 2012 commitment period, countries must count increased emissions, the impact of human-induced deforestation and land-use changes since 1990, and transferred emission credits against their permitted emissions. Only human-induced reforestation, improvements in land use, source reductions, CDM credits, and purchased emission credits may be credited toward attaining their net yearly "carbon dioxide equivalent emissions" goal (Protocol 1997, article 3). This information, along with details on 1990 emissions, and forest and land-use policies must be provided to the Subsidiary Body for Scientific and Technological Advice, a subcommittee that issues scientific assessments of compliance efforts under the Protocol (Protocol 1997, articles 3(3) and 3(4)). It is up to the Conference of the Parties (COP)[3] to determine which activities are valid debits and credits in the process and to set future commitment levels (Protocol 1997, articles 3(4) and 3(9)).

For the most part, environmental goals, the interests of the nations committing to reductions, and the needs of less-developed countries are realistically balanced in the Protocol. Efforts are made to promote compliance, equity, disclosure, and trust among the signatories and the Protocol has been designed with sufficient flexibility to allow evolution to meet future conditions. However, analysis of the emission trading program reveals certain deficiencies that may limit the effectiveness of the Protocol in achieving its goals and create inequities despite efforts to balance competing interests.

The Emission Trading Program: Technical Problems and Concerns

Under the emission trading program, the Appendix 1 countries are empowered to enter into contracts among themselves for the purchase and sale of emission credits (referred to as emission reduction units [ERUs]) as one means of meeting their commitments. The provisions are deceptively simple in their wording but may, in practice, be a trap for the unwary.

Ignoring, for the moment, social, political, and economic considerations, the ambiguous and contradictory wording of the articles is problematic. For example, the issue of how much involvement private entities can have in trading ERUs is uncertain at this time. Article 6(1) indicates that the transfer of ERUs may only occur between Appendix 1 countries, implying that private firms will not be permitted to participate in the market, but article 6(3) grants private enterprise a larger stake in the matter. Countries are specifically authorized to include "legal entities" in the process of generating, transferring, and acquiring ERUs. However, the border between private profit and public good is not yet mapped and as such, countries or private enterprises that proceed with trades prior to these issues being resolved (and the Protocol ratified), act at their own risk.

Given that trading is to occur only between the Appendix 1 countries, uncertainty is also created by article 12 which deals with ERUs "earned" through the creation of CDMs. The uncertainty arises from the requirement that a non-Appendix 1 nation be involved in the CDM and that private entities are permitted to participate in the project. Article 12(9) specifically indicates that "[p]articipation under the clean development mechanism … and in the acquisition of certified emission reductions, may involve private and public entities." The CDM concept represents an excellent method of encouraging the distribution of advanced technology from industrialized to less-developed countries as both "sides" may "win" in such a transaction and clean sustainable development would be advanced on a global basis.

However, the ability to trade in ERUs creates a new form of asset and it is not difficult to envision

circumstances in which ERUs could be fraudulently or inappropriately generated or traded. Corporations located in non-Appendix 1 countries could establish shell companies in Appendix 1 states to claim ERUs from projects in their own nations. Allowing chains of both public and private entities to be involved in a single CDM could also result in ERUs passing through the ownership of parties not authorized to trade under article 6. This would further confuse an already complex situation and potentially affect the legitimacy of all trades subsequent to a non-authorized party coming into control of the asset. As such, determining which nation, transnational corporation, or combination of entities may validly create, receive, and trade credit for the emission reductions or sink enhancements generated by a CDM is vital but the Protocol does not provide clear guidance on this issue. Presumably the intent is not to discourage the use of CDMs by prohibiting the trade of earned ERUs, but the interrelationship between articles 6 and 12 must be made clear before ratification occurs. The system must guarantee certainty if trading is to become widespread.

Confusion is also generated by the lack of definitions or regulations specifying the types of projects that qualify as CDMs. Low emission industrial sites and resource extraction methods, for example, should qualify as CDMs but without a clear definition in the Protocol, projects may be held in abeyance and the environmental benefits delayed. Trading in ERUs earned through such projects by Appendix 1 nations would increase the likelihood of CDMs being used, thereby benefiting the global climate situation, but once again the lack of certainty restricts the value of these provisions. Problems are also created by articles 12(5) and 12(7). Article 12(5) calls for certification of ERUs by an as yet unappointed official, requires that benefits be "real" and "long-term," and that reductions be "additional to any that would occur in the absence of the certified project." Article 12(7) adds the further requirement that an audit and verification of results be conducted to ensure compliance and fair trading. These conditions are reasonable ones but the concepts are undefined and the standards necessary to pass this verification process have not been set. These omissions limit the efficacy of such projects and weaken the contribution that the trading system may make.

Additional uncertainty is created by article 6(1c). Under this article, a country that has not fulfilled its annual obligations to set up approved emission-measuring systems, report information, and explain its implementation actions under articles 5 and 7, is penalized by restricting its ability to acquire ERUs while in default. Given that these national reports and implementation actions are subject to review by expert teams and may be challenged pursuant to article 8, the value of ERUs may be affected. Article 6(4) partially addresses the issue of such challenges by indicating that ERUs may be acquired or transferred despite the questioning of commitment efforts. However, no purchased ERUs may be used to meet the nation's commitments until the challenge has been resolved. In other words, a country cannot be certain that acquiring ERUs will enable it to comply with its Protocol commitments as COP may restrict their use after the fact. While some form of penalty must exist to encourage countries to comply with their treaty obligations, using trade restrictions is short-sighted. Restrictions may have the effect of limiting market participation, reducing the value of ERUs and inhibiting the effectiveness of the program. Establishing fines payable to a climate change research fund or providing compliance assistance would be more productive and less harmful to Protocol goals.

All of this presupposes that the relevant nation entitled to credit for the tradable ERU can be identified. This is not an easy goal in a world where an American firm may be a general contractor on a CDM in India using German engineers to design an emission-reduction system. Add to this the possibility that construction may be subcontracted to a Canadian company using labour from Thailand (a non-Appendix 1 country) to install parts fabricated in Japan and the situation becomes even more

convoluted. Presumably, the incorporating jurisdictions for each entity would be involved in negotiating a contract for division of the anticipated ERUs as part of their involvement in "approving" the project (article 6(1a)). However, this multi-party example highlights the problems of the trading program in its current form. The complexity and uncertainty created by the Protocol wording may inhibit the achievement of the Protocol environmental goals, and amendments are necessary before ratification occurs.

Canada as a Special Case Under the Protocol

As a nation, Canada is in an unusual position compared to other industrially developed countries. Historically, Canadian wealth has been dependent upon international trade, whether in fish, timber, wheat, minerals, oil or manufactured goods. Unlike the situation in many other industrialized countries, the development which has occurred has been largely the result of foreign investment.[4] The issue is an important one given that as of 1996, foreign-controlled firms continued to dominate sectors of the Canadian economy involving the production of energy and the industries that are large energy consumers. More than 56 percent of the production of chemicals, chemical products, textiles, transportation equipment, and electrical and electronic devices is under foreign control. Substantial levels of investment also exist in wood, paper, energy, mining, machinery, and equipment manufacturing and the production of consumer goods (Statistics Canada 1998, p. 15). In a separate report, Statistics Canada (1997, p. 47) indicates that the overwhelming majority (94 percent) of such investments were held in the United States in 1996 and 1997.

The danger for Canada of combining international emission trading and foreign business ownership is made evident if one assumes that a strong demand for ERUs is created. If the ERU becomes a valuable enough commodity,[5] its value could outweigh that of simply upgrading operations and continuing in business. For foreign head offices debating the centralization of production in their home country or emitters seeking to maximize profits by relocating to countries without emission controls, closing plants would make 100 percent of the emission limit available for intercorporate transfer, or sale. A wide range of factors would play a role in any such decision. Relative productivity levels, wage rates, raw material location, transportation costs, government subsidies, labour availability, and shutdown or relocation expenses would all be relevant, as would the net cost of emission reduction in comparison to the value of ERUs. For some businesses, whether foreign-controlled or otherwise, meeting the environmental targets will be economically unfeasible and closure will be the only realistic option, but the issue here is not one of choosing between environmental responsibility and protecting every business and job. Some losses are inevitable. The issue is whether one deliberately enters into a situation that makes the double blow of business closures and loss of the associated ERUs to foreign markets possible, or takes steps to prevent or mitigate the harm for Canada.

The American experience with tradable emissions for sulfur dioxide and other pollutants under the *Clean Air Act* and California's South Coast Air Quality Management District regulations have shown that the majority of trades occur within corporations between production units (Dwyer 1992; Heggelund 1991). This suggests that under an international emission trading program, cross-border transfers between subsidiaries and parent corporations may become widespread as corporate decisions on production locations and volumes are made. Ceasing operation in Canada may enable production to continue elsewhere. While reducing emissions from any source improves the global climate position, the fact that only 39 nations have Protocol obligations makes the emission source a matter of vital concern for those countries. Presumably, each will attempt to encourage emission reductions within its respective borders so as to improve local conditions and obtain

ERUs to meet its commitments, but the loss of ERUs through the market could frustrate its efforts. Canada could, itself, become either a net purchaser or net vendor of ERUs depending on the relative cost of reducing emissions, creating sinks or buying ERUs. However, there is no guarantee that Protocol targets will be met if an uncontrolled international market is brought into existence with private party participation unless sales of ERUs are restricted to ensure treaty compliance.

A further source of concern lies in the fact that market freedom dictates that the highest bidder receives credit for the efforts of others. As such, if nations expend funds on domestic environmental and educational policies, economic subsidies or technological research, private business could potentially sell "their" ERUs to a foreign entity and profit from the cumulative results of their own efforts and those of the government that affected their operation. The impact of public policies on energy conservation and new emission-control systems would be lost to the nation and the Canadian taxpayer could, in effect, be subsidizing foreign emission reduction compliance.

Common use of business closures or relocations could thus cost Canada or other countries thousands of jobs, millions of dollars in lost tax revenues and the benefits of economic spin-offs from the lost operations. It may be argued that businesses are just as likely to expand to take advantage of new markets for environmental solutions, or that foreign head offices may retain Canadian production facilities. However, can any nation afford to gamble on the outcome of corporate decisions to maximize profits by relocating production and exporting ERUs? Implementing a "national" trading system instead of an international one would still provide some incentive to attract the participation of private parties in control efforts without endangering Canada's ability to comply with the Protocol. All costs and benefits would remain within the country and as such, ERUs would not be lost even in the event of shutdowns or relocations.

The Free Trade Complication

It may be argued that a national trading program is too restrictive and that Canada could proceed with the international trading system and resolve concerns over business closures and relocations by restricting the export of ERUs under such conditions. However, investment provisions of the North American Free Trade Agreement (NAFTA) add a further complication to an already twisted picture when ERU trade involving the United States or Mexico is involved. The investment protections in the NAFTA apply to investments in any tangible or intangible property used for business purposes (article 1139(g)). Investments would thus include "earned" ERUs and since American interests hold approximately 95 percent of foreign ownership in Canada, this represents a major impediment to considering trade restrictions as a solution to the ERU problem.

The ability of the Canadian government to intervene in the closing of a foreign-controlled business or the transfer of its assets out of the country, including ERUs, are severely restricted by various NAFTA provisions. Foreign investors are entitled to be treated as well as, or in some cases better than, Canadian investors pursuant to articles 1102-1109 that confer national status and favoured nation treatment on American and Mexican investors. In particular, no foreign investor may be forced to sell its assets in Canada and transfers that are voluntarily made are to proceed "freely and without delay" (articles 1102 (4) (b) and 1109 (1)). If the government attempts to expropriate assets (ERUs), it must do so for a public purpose, without discrimination against foreign investors, and must be prepared to pay the full market value of the asset immediately (article 1110).[6] As such, ERUs created through local plant closures could be quickly transferred and used to centralize production in the home jurisdiction. Alternatively, the funds obtained from the sale or expropriation of ERUs could be used to establish new plants in a non-Appendix 1 country that would produce the same product for the Canadian market.

The fact that the vast majority of nations are not obligated to reduce GHG emissions would provide a variety of lower cost locations for a new facility.[7] Most companies would not have to look any further than Mexico as a destination as that country is not bound by Protocol limits. Wages and other production costs are lower in Mexico, the NAFTA ensures easy access into the Canadian market for Mexican produced goods, and relocation would allow for the building of an operation as "dirty" as, or more "dirty" than, the plant sacrificed in one of the industrialized countries. This would clearly not be the intent of the Protocol as no net reduction of GHGs would be achieved, despite the benefits flowing to the emitter, under a free market international trading program.[8]

Finally, most Appendix 1 countries are involved in negotiations dealing with limiting restrictions on international investments through the World Trade Organization (WTO). While it is impossible to predict whether an agreement on cross-border investments will be achieved in the immediate future, the possibility raises the level of concern over the Protocol trading program to greater heights. At this point in time, most nation states not bound to a NAFTA-like arrangement have the authority to impose laws restricting activities by foreign investors and may control the transfer of assets, monies or other investments across their borders. As such, the potential negative impacts of the trade of ERUs can still be controlled in those states if the political will exists. However, little control would remain available if a "free investment" treaty is ever ratified. Such a treaty would be similar in effect to the NAFTA and would leave nations with few restrictions on the free transfer of investments or property across borders. In effect, global free trade in investments would destroy any leverage that countries now possess to limit the damage that private entities could do through the emission-trading scenario.

Negative Economic Implications of the Protocol Trading Provisions

Leaving aside issues respecting uncertainty and foreign ownership, the question of whether international emission trading is the best policy choice must still be raised. If trade reduces the costs of emission control, encourages compliance, limits the economic consequences for the global economy as a whole or distributes the costs of compliance more equitably, it may be worth pursuing despite the concerns specific to Canada. However, the benefits of international emission trading are less than clear.

With respect to the Canadian situation, a study funded by the federal government, and undertaken prior to the Kyoto meeting, found that every emission-reduction scenario imposed a variety of transition costs on the economy. This study analyzed the effect of several potential Protocol scenarios ranging from stabilizing emissions at 1990 levels by 2010, to reducing emissions by 10 percent under 1990 levels by that same year. The study also examined the effect of an international emission trading system but only for emission stabilization at 1990 levels, not emission reductions (Standard and Poor's DRI 1997, pp. A-14-16). It was recognized that "leakage" of business to non-regulated jurisdictions would likely occur, but the economic impact of such leakage on Canada was not specifically dealt with in the calculations.

Of the several scenarios researched, trade among Appendix 1 countries (the scenario accepted as part of the Protocol) was predicted to lead to a more "protracted decline in Canadian economic activity" as compared to a national trading or carbon tax system (Standard and Poor's DRI 1997, p. B-84). Assuming that action to reduce emissions commenced in 2000, international trade was estimated to produce unemployment rates up to 1.5 percent higher than would occur in a "business-as-usual" scenario. Consumer prices would be as much as 1.8 percent higher than otherwise expected for at least two decades while real wages and gross domestic

product (GDP) would drop by approximately 1.3 percent and 2.2 percent respectively by the year 2020.[9] Consumer spending would also be reduced throughout this period and the study found no indication that the situation would improve after 2020 (ibid., pp. B-63, B-65). These figures represent an estimate of the degree of the impact, but to put this in perspective, if 1999 figures were involved, an extra 20,000 people would be unemployed and GDP (measured on an income basis) would be reduced by $21 billion.[10] This does not account for future growth or change in non-emission-related factors. Regionally, the energy-producing provinces of Alberta and Saskatchewan would be most affected and sectorally most of the costs would fall on the energy industry, chemical producers, manufacturers of carbon-intensive products, and ultimately, consumers.

Every emission-reduction scenario examined was found to generate the same types of transition costs, but in all simulations that excluded international trading, the benefit of higher energy prices was absorbed by industry and stimulated recovery from the economic impacts of emission reduction by 2015. In the international trade scenario, the assumption was made that profits from the purchase and sale of emission permits would generate less economic activity and as such, the potential for economic recovery was reduced. Scenarios in which a carbon tax was imposed or emission permits were auctioned by the government were also considered. It was determined that economic recovery in Canada would be encouraged provided that the funds generated were utilized either to repay government indebtedness or were recycled by way of reductions in other taxes (ibid., pp. B-64, xiii, xiv). Thus, Canada and other countries that bear responsibility for this environmental problem must be prepared to accept that costs will be incurred in correcting the GHG imbalance, but deliberately choosing the option that generates more economic harm over a longer period of time would be negligent. Neither the Canadian government nor the government of any nation in similar circumstances could justify ratifying the Protocol while the risk of unnecessary harm exists.

From the American perspective, post-Protocol studies have indicated that trading among Appendix 1 countries is unlikely to reduce GHG emissions except in the short term (Nordhaus and Boyer 1999). Nordhaus and Boyer suggest that the global costs of any system other than an international carbon tax will far outweigh the benefits, but do indicate that emission trading among all nations of the world would be the least costly of the non-tax options considered. Trade between Appendix 1 nations would place much of the financial burden for emission reductions on the United States but Nordhaus and Boyer's worst-case scenario, from a global perspective, was a system with no trading between nations. Costs and benefits were predicted to fluctuate wildly depending on the particular emission-reduction program studied. A net global benefit of $10 billion (1990 US dollars) was predicted in a global carbon tax system but the next least-costly potential model, Appendix 1 nation trading, resulted in a net global cost of $716 billion. With no international trading, the net cost was estimated at $1.4 trillion. A trading scenario that included every nation ratifying the Protocol as a participant could operate at a net cost of only $59 billion, but that approach has been rejected in the Protocol.

However, from a long-term environmental perspective, Nordhaus and Boyer (1999) indicate that their proposed carbon tax would prove slightly less effective in reducing emissions than relying solely on the Protocol undertakings of each nation. In terms of options for a trading system, emissions and temperatures are predicted to be moderated equally as well with or without trading. As such, there is no environmental rationale to support international trading but global economic costs would be cut in half if Appendix 1 trading is pursued. As such, rejecting international trade completely would be globally irresponsible.

Conclusion

According to the head of the United Nations Conference on Trade and Development Greenhouse Gas Emissions Trading Project, a global GHG trading system can be built based on national emission limits for relevant commitment periods under the Protocol (Joshua 1998). The national reduction targets set out in Appendix 1 (see Appendix) and the estimated national inventories of carbon emissions in each nation as of 1990 would establish the "supply" of emissions for the "marketplace." International certification could provide a reasonable guarantee that the "product" does in fact exist for sale. Each nation would allocate the available emission limits internally and monitor, certify, and enforce any national exchanges between entities in addition to ensuring that their national goals are attained on a cumulative basis. Each could also choose its own preferred combination of measures for controlling emissions and would establish the national rules to be followed in generating and trading ERUs on the international market. This would arguably preserve a level of national sovereignty while at the same time allowing international trade to function.

Such a system theoretically encourages the use of the best technology and processes, reforestation and land-use policies that generate carbon sinks, and the creation of CDMs globally. Presumably, it would be cost effective for many emitters (and also provide indirect benefits by way of improved public relations) to invest in low-emission technology and carbon sinks, and sell ERUs in the marketplace to recover their expenses. The existence of potential profit would draw the attention of the private sector, competition would ensure efficiency, and thereby lead to the most cost-effective means of improving environmental conditions (Information Unit on Climate Change 1993). This utopian vision is attractive, but problems remain to be solved.

As suggested by Ortolano (1997), the success of trading programs is at least partially dependent upon emissions not being source dependent. In other words, a trading system cannot guarantee that reductions will occur at any particular location as that depends upon relative costs and benefits. Environmentally, global emissions are not source sensitive as GHGs may enter the atmosphere from any location and it does not matter where reductions occur. As such, an international trading program could be successful in the absence of "leakage" but as discussed, the transfer of "dirty" operations to non-Appendix 1 countries is a realistic possibility.

From the Canadian perspective, sources are important but in an imperfect world, what might realistically be done? It is unlikely that the non-Appendix 1 nations will accept emission limits, enter into the trading system, and thereby generate the cost savings envisioned by Nordhaus and Boyer (1999) at this time. Abandoning the Protocol trading system completely could be environmentally irresponsible and politically impractical. Reducing foreign ownership in Canada would not decrease the risks in a timely fashion, and given the governmental acceptance of the free trade ideology, NAFTA amendments to prevent ERU transfers by Canadian subsidiaries, or sales to foreign buyers are also unlikely to occur. The most practical solution to this problem is therefore to reduce the motivation to transfer ERUs, and adopt policies to limit the harm that may occur if a transfer is made. Auctioning emission rights for each commitment period would accomplish these goals and safeguard Canada's interests.

While the allocation of emission rights could be accomplished in a number of ways,[11] an auction would generate funds that could be utilized to compensate for economic losses resulting from emission restrictions, be recycled into the economy through tax reductions, or be used to finance environmental research into more effective methods of reducing climate impacts. The profit potential of emission transfers would be reduced by a realistic market price as opposed to a free allocation of rights

based on historical emissions. This would also reduce the incentive to cease operations merely to benefit from the value of ERUs, particularly in combination with the impact of existing capital gains taxes on the disposal of assets. The purchase price of emission rights, interest rates, currency values, and ongoing operating expenses might still lead particular emitters to decide that centralizing operations in their home country or relocating to a non-Appendix 1 nation is their most feasible option. Similarly, the cost itself may well result in the closure of businesses if the net cost of emission reduction is too high. This could reduce public support for the Protocol (see, e.g., Cramton and Kerr 1998, respecting the American experience with the auction process).

However, the auctioning of rights may be the best counter influence available to protect the Canadian economy while supporting the environment. Auctions would be relatively simple to impose as a Protocol amendment would not be required. Coordination with other nations would be necessary to avoid creating a global patchwork of auctioning and non-auctioning nations. Non-Appendix 1 countries would, of course, retain the advantage of having no Protocol-induced cost restrictions on investment but for all practical purposes, this problem is unavoidable in the absence of global-emission restrictions.

It is recognized that auctioning emission rights may reduce the effectiveness of the trading system by increasing the cost of transactions and that this may be seen as inconsistent with the argument that textual changes are required to increase its efficiency. However, a decision to impose costs and deliberately restrict the profit potential of ERUs must be weighed against the potential harm to Canadian interests of endorsing a process that may lead to inequitable results. No final position on technical issues or on details of the operation of the trading system has yet been taken. Thus, it is not too late to design a program based on the auctioning of emission rights that will provide the maximum environmental benefit while limiting the risk that an inequitable share of the cost of emission reduction will fall on Canada. A prudent trading system could assist in reducing the danger posed by climate change but in its current form, the system is neither efficient nor prudent from the Canadian perspective. Ratification of the Protocol should therefore be delayed until solutions to these issues are incorporated into the trading system and Canadian policy.

Notes

The authors would like to thank the editors and the referees. Their assistance was greatly appreciated. Any remaining errors are our own.

[1]For a comprehensive review of the meetings leading up to the signing of the Framework Convention, see Canadian Climate Program Board (1991); Jackson (1992); Meakin (1992); and Bodansky (1993).

[2]A "sink" is a natural storage reservoir for GHGs such as a forest. Carbon dioxide is removed from the atmosphere and stored in the form of plant material and as such, sinks contribute to the reduction of GHG atmospheric concentrations.

[3]Under the Framework Convention and Protocol, policy decisions are determined by majority agreement of the countries bound by the Framework Convention. Scheduled meetings of these countries are referred to as COP (Framework Convention 1992, Article 7; and Protocol 1997, Article 13).

[4]For a discussion of the control of industry by foreign investors, see Drache and Gertler (1993).

[5]Emission limits may become quite valuable as evidenced by a transaction between Suncor (a venture developing an oil sands extraction project in the province of Alberta) and Niagara Mohawk Power Corporation (an American company). Suncor paid $10 million to acquire "emission rights" to 100,000 tonnes of GHGs for use by 2000 and options for a further 1,000,000 tonnes per year for ten years commencing in 2001. This is not an insignificant sum, particularly given the risk of contracting before the trading rules have been announced. See Avery (1998); and Lambert (1998).

[6]For a discussion of the rules respecting freedom of investment and the prohibition of interference with cross-

border asset transfers under the NAFTA, see Camp and Kontrimas (1995).

[7]The possibility of "leakage" of industries to locations not subject to emission-reduction obligations has been reviewed in an Australian study. The distribution of reduction costs would be inequitable if leakage occurs and could discourage countries from actively pursuing their Protocol obligations (Australian Bureau of Agricultural and Resource Economics 1997).

[8]The minimally regulated, low-cost Maquiladoras production zone on Mexico's border with the United States has a history of factory relocations and is described by Pena (1997, p. 279) as an "environmental wasteland and industrial slum."

[9]Similar findings have been reported in a number of other studies compiled by Howatson and Campfens (1997). The degree of these consequences differed and the duration of the effects fluctuated, but the conclusions that uneven regional and sectoral effects would occur and that GDP would be lower than anticipated were consistent.

[10]Calculations based on average1999 unemployment figure and 1999 third-quarter GDP calculation (Statistics Canada 2000, pp. 3, 16).

[11]For a discussion of options for allocating emission rights (allowances) as considered by the National Roundtable on the Environment and the Economy, see Haites and Hornung 1999*a*, *b*. See also Nordhaus (1998) who indicates that government auctions are vital to balance the economic distortions that result from emission limitations.

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APPENDIX
Maximum Permissible Emission Levels in the 2008-2012 Commitment Period

Nation	*Permitted Emissions as a Percentage of 1990 Emissions*
Australia	108
Austria	92
Belgium	92
Bulgaria*	92
Canada	94
Croatia*	95
Czech Republic*	92
Denmark	92
Estonia*	92
European Community	92
Finland	92
France	92
Germany	92
Greece	92
Hungary*	94
Iceland	110
Ireland	92
Italy	92
Japan	94
Latvia*	92
Liechtenstein	92
Lithuania*	92
Luxembourg	92
Monaco	92
Netherlands	92
New Zealand	100
Norway	101
Poland*	94
Portugal	92
Romania*	92
Russian Federation*	100
Slovakia*	92
Slovenia*	92
Spain	92
Sweden	92
Switzerland	92
Ukraine*	100
United Kingdom of Great Britain and Northern Ireland	92
United States of America	93

Note: *Countries that are undergoing the process of transition to a market economy. (Given economic conditions, these countries are to be accorded flexibility in meeting their goals.)