

CLIMATE CHANGE PLAN FOR CANADA: TAX POLICY AND THE REDUCTION OF  
GREENHOUSE GAS EMISSIONS

by

ERIN McEACHERN TULLY

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LL.B., Queen's University, 2000

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BRUN McEACHERN TULLY  
Name of Author (please print)

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Date (dd/mm/yyyy)

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## **Abstract**

Climate change is now recognized as a serious area of environmental concern for all nations. In 1997, the Kyoto Protocol was adopted. The Kyoto Protocol requires 37 industrialized nations to achieve GHG emissions reduction by 2012. The federal government created the *Climate Change Plan for Canada* in 2002 to establish parameters for fulfilling Canada's obligations to reduce GHG emissions pursuant to the Kyoto Protocol.

This thesis seeks to explore the effectiveness of the various environmental policy tools found in the *Climate Change Plan for Canada* in enabling Canada to meet its prescribed GHG emissions reduction targets. Through an examination of various environmental policy tools currently utilized in Canada and throughout the world, the effectiveness of the initiatives found in the *Climate Change Plan for Canada* can be predicted.

In this writer's opinion, the most effective policy tools for enabling Canada to fulfill its GHG emissions reduction targets are emissions trading and taxation. However, as the means in which emissions trading is to be implemented in Canada has yet to be determined, I argue that the most effective policy tool is environmental taxation.

There is a greater trend in Canada, and internationally, to make use of economic instruments, including environmental taxes, for environmental protection measures. From the standpoint of environmental policy, environmental or eco-taxes may be attractive for several reasons. Firstly, eco-taxes can promote efficiency gains through reallocation of pollution abatement costs and through performance incentives. Secondly, eco-taxes provide innovation incentives. Thirdly, eco-taxes should be less vulnerable to

regulatory capture compared to command-and-control regulations. Fourthly, eco-taxes can also generate substantial revenues that can be recycled for environmental improvement investments.

Beginning with a brief history of international environmental recognition in the area of GHG emissions, and utilizing a law and economics and taxation theory framework, an analysis is provided to demonstrate that environmental taxation is the most effective tool for enabling Canada to meet its GHG emissions reduction targets as outlined in the Kyoto Protocol.



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# **Climate Change Plan for Canada: Reducing Greenhouse Gas Emissions Through the Use of Economic Instruments**

## **CHAPTER I The Problem of Climate Change and of Implementing the Kyoto Protocol in Canada and the Purpose of this Thesis**

### **1.1 Introduction**

This thesis seeks to explore the role that tax policy can play in helping to meet Canada's international environmental obligations, more particularly Canada's commitment to reduce Greenhouse Gas (GHG) emissions. In this writer's opinion, the two economic instruments with the greatest chance of enabling Canada to meet its international environmental commitments, as set out in the Kyoto Protocol<sup>1</sup> and adopted in the *Climate Change Plan for Canada*,<sup>2</sup> are emissions trading and emissions taxation. However, in the area of emissions trading, many questions arise in Canada, including whether or not the federal government has the power to implement such a regime without the consent of the provinces.<sup>3</sup> Therefore, I will argue that emissions taxation is a more practical, easier to implement, and more effective means of fulfilling Canada's international environmental commitment to GHG emissions' reduction.

The remainder of this chapter will provide a brief overview of the growing awareness and recognition of environmental concerns throughout the world, and more specifically, awareness and recognition of the impact of climate change, and international and

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<sup>1</sup> Kyoto Protocol to the United Nations Framework Convention on Climate Change, U.N. Doc. FCCC/CP/1997/L.7/Add.1, 37 I.L.M. 32 ["Kyoto Protocol"].

<sup>2</sup> Government of Canada, *Climate Change Plan for Canada* (Ottawa: Government of Canada, 2002) ["*Climate Change Plan for Canada*"].

<sup>3</sup> See, for example, Philip Barton, "Economic Instruments and the Kyoto Protocol: Can Parliament Implement Emissions Trading Without Provincial Co-operation?" (2002) 40 Alta. L. Rev. (No. 2) 417.

domestic endeavours to address this concern. The chapter will conclude with a summary of Canada's climate change obligations pursuant to the Kyoto Protocol. In chapter two I will provide an overview of two theoretical approaches to implementing the Kyoto Protocol; law and economics theory and tax theory. Further, chapter two will identify and explain the main criteria that I have utilized in determining what policy initiatives would have the greatest chance of enabling Canada to meet its GHG emissions reduction targets as found in the Kyoto Protocol: cost-effectiveness, precaution and pollution prevention. Chapter three will provide an overview of various economic instruments and environmental initiatives and their potential effectiveness, taking into consideration my prescribed criteria. Chapter four will provide a specific analysis of environmental taxation and its current application in Canada and internationally. Chapter five will focus on the *Climate Change Plan for Canada*, which was recently developed by the federal government in consultation with provincial and territorial governments, municipalities, industry representatives, non-governmental organizations and individual Canadians.<sup>4</sup> More specifically, this chapter will provide an analysis of how the *Climate Change Plan for Canada* includes environmental policy measures, specifically environmental taxation measures, that adhere to my prescribed criteria, and enable Canada to meet its international environmental obligations pursuant to the Kyoto Protocol. Finally, chapter six will provide a summary of my analysis and my conclusions.

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<sup>4</sup> *Climate Change Plan for Canada*, *supra* note 2, Preface at III.

## 1.2 Historical Overview

It has long been recognized that the environment is an area of concern for all nations.<sup>5</sup>

One of the main areas of environmental concern that has emerged over the years throughout the world is pollution reduction. Pollution reduction is an expensive endeavour. In most industrialized countries, approximately 1.5% to 2% of gross domestic product (GDP) is spent on pollution reduction and nature conservation.<sup>6</sup>

Generally, the more a nation spends on environmental conservation and pollution reduction, the less damage that occurs.<sup>7</sup> However, the cost of reduction of certain pollutants increases with the reduction percentage.<sup>8</sup> Therefore, effective and efficient pollution control and environmental conservation require a careful balancing by all concerned: federal agencies, foreign countries, state agencies, corporations and individuals. It has become increasingly important for countries to adopt policies that will help protect the degradation of the environment. These policies have become more detailed and specific over time, as more scientific information has become available.

One of the greatest areas of concern in relation to pollution control is global warming, or the "greenhouse effect".<sup>9</sup> The greenhouse effect is a natural process by which some of the radiant heat from the sun is captured in the lower atmosphere of the Earth, thus

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<sup>5</sup> At the turn of the century, there were relatively few multilateral or bilateral international environmental agreements. International environmental law was based on the principles of exclusive and unfettered national sovereignty over natural resources. During the first half of the 1900s, various environmental agreements were created addressing a wide range of environmental issues. (Penny Wensley, "Global Trends: The Emergence of International Environmental Law" in Ben Boer et al., eds., *Environmental Outlook: Law and Policy* (New South Wales: The Federation Press, 1975)).

<sup>6</sup> Charles D. Patterson, III, "Environmental Taxes and Subsidies: What is the Appropriate Fiscal Policy for Dealing with Modern Environmental Problems?" (2000) 24 Wm. & Mary Env'tl. L. & Pol'y Rev. 121.

<sup>7</sup> Harmen Verbruggen and Huib M.A. Jansen, "International Coordination of Environmental Policies" in Henk Folmer et al. eds. *Principles of Environmental and Resource Economics: A Guide for Students and Decision-Makers* (Brookfield, U.S.: E.Elgar, 1995) at 241.

<sup>8</sup> *Ibid.*

<sup>9</sup> David G. Victor, *The Collapse of the Kyoto Protocol and the Struggle to Slow Global Warming* (Princeton: Princeton University Press, 2001).

maintaining the temperature of the Earth's surface.<sup>10</sup> The gases that help capture the heat, called "greenhouse gases", include water vapour, carbon dioxide, methane, nitrous oxide, and a variety of manufactured chemicals.<sup>11</sup> Some are emitted from natural sources, while others are anthropogenic, resulting from human activities.<sup>12</sup>

Among Organisation for Economic Co-operation and Development countries,<sup>13</sup> the main category of anthropogenic GHG emissions is carbon dioxide (CO<sub>2</sub>), the vast majority of which results from the combustion of fossil fuels for energy.<sup>14</sup> In addition to carbon dioxide, however, other anthropogenic GHGs include:

Methane (CH<sub>4</sub>), most of which results from the anaerobic decomposition of solid wastes in landfills, the production and distribution of oil and natural gas, enteric fermentation in ruminants, coal mining, and manure management;<sup>15</sup>

Nitrous oxide (N<sub>2</sub>O), most of which is attributable to agricultural soil management (including the application of synthetic and organic fertilizers),

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<sup>10</sup> Government of Canada, *Action Plan 2000 on Climate Change* (Ottawa: Government of Canada, 2000).

<sup>11</sup> See *ibid.* and *Climate Change Plan for Canada*.

<sup>12</sup> *Ibid.*

<sup>13</sup> Twenty countries originally signed the Convention on the Organisation for Economic Co-operation and Development ["OECD"] on December 14, 1960. Since then a further ten countries have become members of the organization. Canada deposited its instrument of ratification on April 10, 1961. In addition, the OECD has an active relationship with 70 other countries. (Organisation for Economic Co-operation and Development: *About OECD*, online: <<http://www.oecd.org/home>>).

<sup>14</sup> According to the OECD, carbon dioxide is responsible for over 60 percent of anthropogenic GHG emissions: See Organisation for Economic Co-operation and Development, *Environmentally Related Taxes in OECD Countries: Issues and Strategies* (Paris: OECD, 2001) at 117. In the United States, approximately 82 percent of estimated GHG emissions in 1999 were attributable to carbon dioxide, of which 98 percent resulted from the combustion of fossil fuels. U.S. Department of State, *U.S. Climate Action Report 2002* (Washington, D.C.: May 2002) at 37-42. Other sources of CO<sub>2</sub> emissions include the production of cement and lime, the combustion of solid wastes, and natural gas flaring.

<sup>15</sup> According to the OECD, methane is responsible for approximately 15 to 20 percent of the greenhouse effect. OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 117). In the United States, methane accounted for approximately 9 percent of CO<sub>2</sub> equivalent GHG emissions in 1999. Of these emissions, approximately 35 percent were attributable to landfills, 23 percent to the production of oil and natural gas, 20 percent to enteric fermentation in ruminants, 10 percent to coal mining, and 6 percent to manure management. U.S. Department of State, *U.S. Climate Action Report 2002*, *ibid* at 42-45. Other sources of CH<sub>4</sub> emissions include wastewater treatment, rice cultivation, and the combustion of automotive fuels.

the combustion of fossil fuels, the production of nitric acid for synthetic fertilizers, and manure management;<sup>16</sup>

Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>), one or more of which is either used as a substitute for ozone-depleting substances (ODS), attributable to the production of ODS substitutes, used in electrical transmission and distribution, or attributable to the production of aluminum, the manufacture of semiconductors, or the production of magnesium.<sup>17</sup>

The greenhouse effect is not a new concern. As early as 1827, the French scientist Fourier suggested that the earth's atmosphere warms the surface by letting through high energy solar radiation but trapping part of the longer wave heat radiation going back from the surface. Fourier indicated that this is caused by a number of greenhouse gases, notably carbon dioxide and water vapour.<sup>18</sup> At the end of the nineteenth century the Swedish scientist Arrhenius postulated that the growing volume of carbon dioxide emitted by factories of the Industrial Revolution was changing the composition of the atmosphere, increasing the proportion of greenhouse gases, and that this would cause the earth's surface temperature to rise.<sup>19</sup>

The subject attracted little interest until the late 1950s, but in 1957 the International Geophysical Year provided the foundations for a global scientific community dedicated to understanding planetary processes and human influence on them, and established a

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<sup>16</sup> In the United States, nitrous oxide accounted for approximately 6 percent of the total GHG emissions in 1999. Of these emissions, almost 70 percent were attributable to agricultural soil management, 18 percent to the combustion of fossil fuels, 5 percent to the production of nitric acid, and 4 percent to manure management. OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 45-46.

<sup>17</sup> In the United States, these gases accounted for approximately 2 percent of total GHG emissions in 1999. Of these emissions, over 40 percent were attributable to ODS substitutes, approximately 22 percent to the production of HCFC-22 (an ODS substitute), 19 percent to electrical transmission and distribution, 7.5 percent to the production of aluminum, 5 percent to the manufacture of semiconductors, and 4.5 percent to the production of magnesium. *Ibid.* at 46-47.

<sup>18</sup> Victor, *supra* note 9 at 25.

<sup>19</sup> *Ibid.*



network of monitoring stations.<sup>20</sup> Observations immediately began to trace a steady rise in the concentration of carbon dioxide. A decade later, a study by the Massachusetts Institute of Technology (MIT) documented concerns about possible climate change,<sup>21</sup> and by 1970 the Secretary General of the United Nations was sufficiently concerned to mention the possibility of a "catastrophic warming effect" in his report on the environment.<sup>22</sup>

Modern international environmental law dates to approximately 1972, when the United Nations Conference on the Human Environment was held in Stockholm from June 5 through 16th, and the United Nations Environment Program (UNEP) was established.<sup>23</sup> Representatives from throughout the world attended in order to develop a common outlook and establish common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment.<sup>24</sup>

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<sup>20</sup> *Ibid.*

<sup>21</sup> *Ibid.*

<sup>22</sup> *Ibid.*

<sup>23</sup> A. Kiss and D. Shelton, *Manual of European Environmental Law* (Cambridge: Grotius Publications Limited, 1993) at 11.

<sup>24</sup> Representatives of the following 113 States invited in accordance with General Assembly resolution 2850 (XXVI) took part in the Conference: Afghanistan, Algeria, Argentina, Australia, Austria, Bahrain, Bangladesh, Belgium, Bolivia, Botswana, Brazil, Burundi, Cameroon, Canada, Central African Republic, Ceylon, Chad, Chile, China, Colombia, Congo, Costa Rica, Cyprus, Dahomey, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Federal Republic of Germany, Fiji, Finland, France, Gabon, Ghana, Greece, Guatemala, Guinea, Guyana, Haiti, Holy See, Honduras, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Lebanon, Lesotho, Liberia, Libyan Arab Republic, Liechtenstein, Luxembourg, Madagascar, Malawi, Malaysia, Malta, Mauritania, Mauritius, Mexico, Monaco, Morocco, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Peru, Philippines, Portugal, Republic of Korea, Republic of Vietnam, Romania, San Marino, Senegal, Singapore, South Africa, Spain, Sudan, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Thailand, Togo, Trinidad and Tobago, Tunisia, Turkey, Uganda, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Uruguay, Venezuela, Yemen, Yugoslavia, Zaire Zambia. The Secretary-General of the United Nations was present at the Conference. The Conference was attended also by representatives of the Secretary-General from the Department of Economic and Social Affairs, the regional economic commissions, the United Nations Economic and Social Office in Beirut, the United Nations Conference on Trade and Development, the United Nations Industrial Development Organization and the United Nations Development Programme. A representative of the United Nations Institute for Training and Research was

It was not until 1979, at the First World Climate Conference, that the World Climate Research Programme was created, helping to simulate and focus research specifically in the area of climate change. During the 1980s, UNEP and the World Meteorological Organization (WMO) convened a series of international scientific workshops around which coalesced a tentative scientific consensus on the nature of the problem. Driven also by rising popular concern about environmental issues, during 1988, a series of international meetings culminated in the establishment of the Intergovernmental Panel on Climate Change (IPCC),<sup>25</sup> under the auspices of UNEP and the WMO. The purpose of the IPCC is to provide authoritative assessments to governments of the state of knowledge concerning climate change. The IPCC produced its first report in 1990. One of the key conclusions was that rising concentrations of carbon dioxide and other greenhouse gases in the atmosphere were caused by human activities and would cause global temperatures to rise, with accompanying climate changes.

The assessment and recommendations included in the first report were passed up to and accepted at the Second World Climate Conference in November 1990.<sup>26</sup> The ministerial segment of that conference accepted the report and called upon the United Nations (UN) to open negotiations on an international climate change agreement. The UN proceeded

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also present. The following specialized agencies were represented: International Labour Organisation, Food and Agriculture Organization of the United Nations, United Nations Educational, Scientific and Cultural Organization, International Civil Aviation Organization, World Health Organization, International Bank for Reconstruction and Development, International Monetary Fund, Universal Postal Union, International Telecommunication Union, World Meteorological Organization, and Intergovernmental Maritime Consultative Organization. The International Atomic Energy Agency and the General Agreement on Tariffs and Trade were also represented. Observers from a number of intergovernmental organizations participated in the Conference. Representatives of numerous international nongovernmental organizations invited to the Conference also participated (United Nations Declaration on the Human Environment (Stockholm, 16 June 1972); 11 I.L.M. 1972).

<sup>25</sup> Although led initially mostly by industrialized countries, all governments were invited to join and the IPCC has expanded over subsequent years to almost global participation.

<sup>26</sup> Austrian JI/CDM Programme, "IPCC Assessment Reports", online: [http://www.ji-cdm-austria.at/en/klima/ipcc\\_assessment.php](http://www.ji-cdm-austria.at/en/klima/ipcc_assessment.php).

with these negotiations and, in 1992, the United Nations Conference on Environment and Development was held in Rio de Janeiro.<sup>27</sup> Several international agreements were drafted at the Rio Conference, pertaining to international environmental obligations.<sup>28</sup> This thesis will focus on two: (i) the Rio Declaration;<sup>29</sup> and (ii) the Framework Convention on Climate Change,<sup>30</sup> which was based on the IPCC 1990 report, the Second World Climate Conference, and negotiation.

The objective of the FCCC was to "...achieve...stabilization of the greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."<sup>31</sup> The specific objective of the FCCC was to return GHG emissions to 1990 levels in order to prevent interference with the climate system.<sup>32</sup> The signatories agreed to formulate programs to mitigate climate change, and the developed country signatories agreed to adopt national policies to return anthropogenic emissions of greenhouse gases to their 1990 levels.<sup>33</sup>

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<sup>27</sup> United Nations Conference on Environment and Development, Rio de Janeiro, June 3-14, 1992 ["Rio Conference"].

<sup>28</sup> At the Rio Conference, 108 Governments, represented by heads of State or Government, adopted three major agreements aimed at changing the traditional approach to development: (i) Agenda 21 – a comprehensive programme of action for global action in all areas of sustainable development; (ii) the Rio Declaration on Environment and Development – a series of principles defining the rights and responsibilities of States; and (iii) the Statement of Forest Principles – a set of principles to underlie the sustainable management of forests worldwide. In addition, two legally binding Conventions aimed at preventing global climate change and the eradication of the diversity of biological species were opened for signature at the Summit, giving high profile to these efforts: (i) the United Nations Framework Convention on Climate Change; and (ii) the Convention on Biological Diversity.

<sup>29</sup> United Nations Conference on Environment and Development: The Rio Declaration on Environment and Development, 4 June 1992, 3 I.L.M. 874 ["Rio Declaration"].

<sup>30</sup> United Nations Conference on Environment and Development: Framework Convention on Climate Change, 9 May 1992, 31 I.L.M. 849 (entered into force March 1994) ["FCCC"]. The text of the FCCC was adopted at the United Nations on May 9, 1992, opened for signature at Rio de Janeiro on June 4, 1992, and entered into force on March 21, 1994 (FCCC, article 2).

<sup>31</sup> *Ibid.*, Article 2.

<sup>32</sup> *Ibid.*, Article 4.

<sup>33</sup> *Ibid.*

The FCCC defines "greenhouse gases" as "those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation".<sup>34</sup> Further, Article 3 of the FCCC provides the following principles in relation to climate change:

In their actions to achieve the objective of the Convention and to implement its provisions, the Parties shall be guided, *inter alia*, by the following:

The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.

The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.

The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested parties.

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<sup>34</sup> Radiation from the sun is absorbed by the earth as radiant visible light. Eventually, the heat from the earth is re-emitted into the atmosphere as infrared radiation (IR). Certain gases in the atmosphere have the property of absorbing infrared radiation. Oxygen and nitrogen the major gases in the atmosphere, do not have this property. The infrared radiation strikes a molecule such as carbon dioxide and causes the bonds to bend and vibrate - this is called the absorption of IR energy. The molecule gains kinetic energy by this absorption of IR radiation. This extra kinetic energy may then be transmitted to other molecules such as oxygen and nitrogen and causes a general heating of the atmosphere. Greenhouse Analogy: Energy from the sun in the form of some ultraviolet and visible light (short wavelength) passes through the glass of the greenhouse. As the light strikes various surfaces in the greenhouse and they are heated. These surfaces in turn re-radiate the heat in the form of infrared radiation (long wavelength). However, the IR radiation is blocked from escaping by the glass. IR is not able to pass through the glass, hence the greenhouse air heats up fairly dramatically (Virtual Chembook, "Greenhouse Gases Absorb Infrared Radiation", online at: <http://www.elmhurst.edu/~chm/vchembook/globalwarmA5.html>).

The Parties have a right to, and should, promote sustainable development. Policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures to address climate change.

The Parties should cooperate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all Parties, particularly developing country Parties, thus enabling them better to address the problems of climate change. Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

164 out of 193 UN signatory countries signed the FCCC.<sup>35</sup> Canada ratified the FCCC on December 4, 1992, and it came into force in Canada on March 21, 1994.<sup>36</sup>

The signatories to the FCCC agreed to meet in the future to continue to address climate change issues. At the first and second Conferences of the Parties to the FCCC, in 1995 and 1996 respectively, the signatories agreed to address the issue of GHG emissions for the period beyond 2000, and to negotiate quantified emission limitations and reductions at the third conference of the Parties, that was to be held in Kyoto, Japan.

The IPCC published its Second Assessment Report (SAR) in June 1996.<sup>37</sup> The SAR marked a crucial stage in the progress of global action to combat climate change. The SAR made several conclusions which were accepted by governments. First, the SAR concluded that greenhouse gas concentrations have continued to increase as a result of human activities around the world. Second, global average temperature and sea level

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<sup>35</sup> FCCC, *supra* note 30, Convention Ratification. As at May 24, 2004, only the following parties have not accepted or ratified the FCCC: Andorra, Brunei Darussalalm, Holy See, Iraq, and Somalia.

<sup>36</sup> *Ibid.*, Annex II.

<sup>37</sup> Intergovernmental Panel on Climate Change, *Second Assessment Report: Climate Change* (1995): online: <<http://www.ipcc.ch/pub/reports.htm> ["SAR"].

have risen, and recent years have been among the warmest since at least 1860. Third, the ability of climate models to stimulate observed events and trends has improved. Fourth, the balance of evidence suggests a discernible human influence on global climate. Fifth, on central emission projections, by the end of the twenty-first century, global mean surface temperature is likely to rise by about 2°C, with a range uncertainty of 1-3.5°C, and to continue rising for some decades thereafter, even if GHG concentrations are stabilized by then. Sixth, sea level will rise, with a mid-range estimate of 50 cm by 2100 (range 15-95cm), and will continue rising for centuries thereafter. Seventh, significant “no regrets” opportunities are available in most countries to limit emissions of GHGs below levels that would otherwise be achieved at no net cost. And, finally the potential risk of damage from climate change is enough to justify action beyond such “no regrets” measures.<sup>38</sup> The SAR set the context for the negotiation of the Kyoto Protocol.<sup>39</sup>

### 1.3 Kyoto Protocol

The third conference of the signatories to the FCCC was held in December 1997. At the third conference, representatives from more than 160 countries met in Kyoto, Japan, to negotiate binding limits on GHG emissions for developed nations. The result was the Kyoto Protocol.<sup>40</sup>

The Kyoto Protocol requires 37 industrialized nations to achieve specific GHG emissions reduction by 2012. Over 150 countries, including the OECD, signed the pact,<sup>41</sup> which

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<sup>38</sup> *Ibid.*

<sup>39</sup> The IPCC's Third Assessment Report was published in 2001, subsequent to the Kyoto Protocol, and the Fourth is scheduled to be completed in 2007.

<sup>40</sup> Kyoto Protocol, *supra* note 1.

<sup>41</sup> To date, 84 countries have signed the Kyoto Protocol. In addition, 60 countries have ratified the Kyoto Protocol, 45 countries have acceded the Kyoto Protocol, 5 countries have approved the Kyoto Protocol and 1 country has accepted the Kyoto Protocol. The countries which have not ratified, acceded, approved or

outlines various GHG reduction targets for the post 2000 period. If the Kyoto Protocol is successful, it will ultimately result in a 5.2% reduction in greenhouse gas emissions below 1990 levels by 2008 to 2012.<sup>42</sup>

The Kyoto Protocol was designed to stabilize and reduce emissions of GHGs that are predicted to increase the earth's surface temperature, affecting natural ecosystems and human health. The Kyoto Protocol establishes specific limitations on each signatory's annual carbon dioxide equivalent emissions during the period 2008 to 2012 relative to its emissions in 1990. According to Article 3 of the Kyoto Protocol, these limitations may be satisfied both by reductions in GHG emissions and enhancement of "sinks" which remove GHGs from the atmosphere.<sup>43</sup> Kyoto establishes mechanisms by which these reductions can be achieved: (i) emissions trading, (ii) joint implementation (JI) and (iii) the Clean Development Mechanism (CDM). The Kyoto Protocol allows signatories to meet their commitments by acquiring "emission reduction units" from other Parties, authorizing an international trading system for GHG emissions.<sup>44</sup> Further, commitments may also be satisfied through JI involving investments in emissions reductions or sinks in

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accepted the Kyoto Protocol are Australia, Croatia, Egypt, Indonesia, Israel, Kazakhstan, Liechtenstein, Marshall Islands, Monaco, Niger, Philippines, the Russian Federation, Saint Lucia, Saint Vincent and the Grenadines, the Ukraine, the United States and Zambia. Of these 17 countries, seven are parties which are found in Annex I to the United Nations FCCC (online at: <<http://unfccc.int/resource/conv/ratlist.pdf>>).

<sup>42</sup> Alexander J. Black, "Emission Trading and the Negotiation of Pollution Credits" 225 *Energy Economist* (Financial Times) (July 2000) 14 at 58.

<sup>43</sup> Article 1 of the FCCC defines a "sink" as "any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere". Trees, plants, and soils act as carbon sinks since trees and plants absorb carbon dioxide from the atmosphere through the process of photosynthesis, and soils contain decomposed plant life that is transformed into soil organic matter.

<sup>44</sup> Article 17 provides:

The Conference of the Parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading. The Parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Article 3. Any such trading shall be supplemental to domestic actions for the purpose of meeting quantified emission limitation and reduction commitments under that Article (Kyoto Protocol).

other industrialized countries.<sup>45</sup> Finally, reductions in GHG emissions can be achieved through CDM involving investments in emissions reductions or sinks in developing countries that have ratified the Kyoto Protocol.<sup>46</sup>

The Canadian government announced its ratification of the Kyoto Protocol on December 17, 2002.<sup>47</sup> Under the Kyoto Protocol, Canada has agreed to lower annual GHG emissions during the 2008 to 2012 “commitment period” to six percent below 1990 levels. Assuming “business-as-usual” emissions of approximately 800 million tonnes or megatonnes (MT) of carbon dioxide equivalent emissions in 2010, this commitment requires a reduction of 240 MT annually by the end of this decade.<sup>48</sup> Although the achievement of this objective represents a significant challenge for Canadian individuals, businesses and governments, it also promises a more efficient and environmentally sustainable economy through which Canada will contribute to a concerted international effort to limit global warming.<sup>49</sup>

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<sup>45</sup> Kyoto Protocol, *supra* note 1, Article 3.

<sup>46</sup> *Ibid.*, Article 12.

<sup>47</sup> *Ibid.*, Ratification (online at: <<http://unfccc.int/resource/conv/ratlist.pdf>>).

<sup>48</sup> *Climate Change Plan for Canada*, at 13.

<sup>49</sup> To date, in Canada, reference to the Kyoto Protocol has only occurred in one judicial decision – *Environmental Resource Centre v. Canada (Minister of the Environment)* 2001 FCT 1423 [“*Environmental Resource Centre*”]. In *Environmental Resource Centre*, public interest groups applied for an order quashing authorizations issued by the Minister of Fisheries and Oceans to Suncor, owner of an oil sands project, to alter or destroy fish habitat, and for a declaration that a decision by the Minister of the Environment was made contrary to the *Canadian Environmental Assessment Act*, 1992 c. 37. The Applicants argued that the failure to provide an assessment of cumulative environmental effects was compounded by an erroneous interpretation of the requirements of that assessment. Specifically, the Applicants argued that “these effects include increased acid deposits in Saskatchewan and Northwest Territories, effects on water quality in Great Slave Lake and **effects on Canada’s ability to meet its international obligations to reduce greenhouse emissions under the Kyoto Protocol**” [emphasis added] (at para. 58). In reaching his decision to allow the applications in part, Heneghan, J. of the Federal Court of Canada-Trial Division did not make any reference to the Kyoto Protocol.



## **CHAPTER II      Theoretical Framework**

### **2.1 Introduction**

This chapter provides a theoretical framework for determining which environmental policy instruments have the greatest chance of enabling Canada to meet its international environmental obligations to reduce GHG emissions under the Kyoto Protocol. Section 2.2 will provide an explanation of two different theoretical approaches, and how these theories can be applied to environmental concerns, specifically the reduction of GHG emissions. In section 2.3, I will provide a brief overview of some of the criteria that is relevant in the development and implementation of any environmental policy initiative. Subsequently, I will provide an overview and explanation of three main criteria that are, in my opinion, fundamental to any environmental policy initiative aimed at reducing GHG emissions: (i) cost-effectiveness; (ii) precaution; and (iii) pollution prevention.

### **2.2 Theoretical Framework**

The following section provides an overview of two theories – law and economics theory and tax theory – and how each of these theories can be utilized in enabling Canada to meet its international environmental commitment to reduce GHG emissions. Subsequent to providing a theoretical framework for enabling Canada to fulfill its targeted GHG emissions reduction rates, I will identify several criteria relevant to reaching this objective, and more specifically, the criteria that I think are essential in order for Canada to adequately satisfy the goals and criteria outlined in the Kyoto Protocol.

### 2.2.1 Law and Economics Theory

The World Commission on Environment and Development emphasized the inter-relationship between the environment and economics:

These are not separate crises: an environmental crisis, a development crisis and an energy crisis. They are all one...We have in the past been concerned about the impacts of economic growth upon the environment. We are now forced to concern ourselves with the impacts of environmental stress – degradation of soils, water regimes, atmosphere, and forests – upon our economic prospects...Ecology and economy are become ever more interwoven – locally, regionally, nationally, and globally – into a seamless net of causes and effects.<sup>50</sup>

Despite the interdependence of ecology and economics, many environmentalists have resisted the application of economic analysis to environmental issues.<sup>51</sup>

Scarcity is fundamental to all economics analysis. If resources were not scarce, there would be no need for concern about their allocation. Economics attempt to allocate scarce resources in an efficient way so as to free people from undue governmental constraint, and provide people with choice.<sup>52</sup> When applied to environmental protection policies, economics helps define how society will tend its gardens, always assuming that nature's bounty exists to be consumed in some manner for human benefit. A society's economic structure will influence its notion of good governance, its ethical responsibilities toward nature, and its ethical responsibilities toward citizens.<sup>53</sup>

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<sup>50</sup> World Commission on Environment and Development, *Our Common Future* (Brundtland Report) (Oxford; NY: Oxford University Press, 1987) at 212.

<sup>51</sup> James L. Huffman, "Protecting the Environment from Orthodox Environmentalism" (1992) 15 *Harvard J.L. & Pub. Pol'y* 349.

<sup>52</sup> David Harvey, *Justice, Nature and the Geography of Difference* (Cambridge, Mass.: Blackwell Publishers, 1996).

<sup>53</sup> Verchik, Robert R.M., "Steinbeck's Holism: Science, Literature, and Environmental Law" (2003) 22 *Stan. Env'tl. L.J.* 3 at 98.

At its root, liberal economics promised to secure two main goals of the Enlightenment period: human emancipation and self-realization.<sup>54</sup> Emancipation meant freedom from material want, state oppression, dynastic and class privilege, and other vestiges of British feudalism.<sup>55</sup> Self-realization entailed nourishing one's creative and intellectual spirit.<sup>56</sup> Important to this concept was an emphasis on individual choice and expression.

Liberal economics aspires to a uniform landscape of production and consumption in which goods and services move freely. Because economic efficiency requires competition among sellers and among buyers, market economics requires a certain similarity of context for sellers and buyers throughout the world. For example, labour pools should be equally skilled across the country, or easily transported from one region to another. When differences among geographic regions intrude upon this ideal, law and technology intervenes to "even the playing field". In the example above, this would be the creation of worker-protection rules that are uniform across the country. This works on an international basis as well. In other words, worker-protection rules can be created uniformly on an international basis to ensure that workers receive the same rights, regardless of the country they are working in.

Liberal economics have influenced environmental policy in significant ways. Beginning with the idea that resource consumption begets self-realization, the liberal economist believes that the goal of environmental policy is to allocate natural resources efficiently, so as to optimize the aggregate benefits of resource use as measured against the aggregate cost of resource degradation. In this view, resource use should be allocated to the user

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<sup>54</sup> *Ibid.*, at 121-2.

<sup>55</sup> Harvey, *supra* note 52.

<sup>56</sup> *Ibid.*

who is willing to pay the most for the resource (here employing willingness to pay as a proxy for expected utility). In an ideal market, the purchase price of resource use reflects at least the total cost of making the resource available for such use, and therefore a user will purchase resources as long as her resulting benefits outweighs the aggregate costs associated with the use.<sup>57</sup> The liberal economist's dream is a world where users or consumers can squeeze the utility from nature's fruit, up to the very point where aggregate costs begin to overtake aggregate benefits.

In practice, many costs of exploitation (pollution, erosion, and loss of wildlife) are often externalized to third parties and, thus, excluded from a producer's or manufacturer's costs. For the liberal economist, the role of the government is to shore up market failure and contain externalities.<sup>58</sup> Government may pursue this goal through various interventionist means, including tort liability, command and control regulations, tax incentives and non-traditional markets in pollution and use credits.<sup>59</sup> The utility of these endeavours depends on economists' ability to measure the benefits of resource consumption and the costs of losing a sometimes irreplaceable natural resource. This is known as resource economics.

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<sup>57</sup> This view follows the conventional Kaldor-Hicks theory of efficiency. Kaldor-Hicks theory states that "a reallocation of resources is efficient if those who gain from it obtain enough to fully compensate those who lose from it, although there is no requirement that actual compensation occur." See Robin Paul Malloy, *Law and Economics: A Comparative Approach to Theory and Practice* (St. Paul, Minn.: West Pub. Co, 1990) at 40.

<sup>58</sup> See Zygmunt J.B. Plater, "Environmental Law as a Mirror of the Future: Civic Values Confronting Market Force Dynamics in a Time of Counter-Revolution" (1996) 23 B.C. Env'tl. Aff. L. Rev. 733 at 736-7.

<sup>59</sup> See Carol M. Rose, "Rethinking Environmental Controls: Management Strategies for Common Resources" (1991) Duke L.J. 1; Jonathon Baert Wiener, "Global Environmental Regulation: Instrument Choice in Legal Context" (1999) 108 Yale L.J. 677.

Resource economics was developed partly as a result of the unwillingness of traditional economic methods to recognize that environmental degradation causes harms in ways that cannot be measured directly in the market. Resource economics attempts to assign economic value to naturally produced goods and services.<sup>60</sup> Resource economics is increasingly recognizing natural services that lie outside the market. These services include “[a]ctual life support functions, such as cleansing, recycling, and renewal,” and “many intangible aesthetic and cultural benefits as well.”<sup>61</sup> Therefore, over the last quarter-century there has been a trend in economics that seeks to measure the utilitarian value of specific “non-market” resources, such as regional biodiversity, wilderness areas, or unique geological features. The valuation methods fall into three main categories: (1) valuation based on restoration and replacement costs, (2) behavioural use valuation, and (3) contingent valuation.<sup>62</sup> Non-market benefits, or benefits that are not measurable through a direct market transaction, can be divided into two categories: (1) use value – benefits that while not directly traded are actively used by human beings (such as a public beach), and (2) non-use value – passive benefits based on a human being’s mere knowledge of the resource’s existence, or on the supposed intrinsic value that a resource possesses.<sup>63</sup>

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<sup>60</sup> Natural services include “actual life support functions, such as cleansing, recycling, and renewal,” and “many intangible aesthetic and cultural benefits as well.” (Gretchen C. Daily, “Introduction: What Are Ecosystem Services?” in Gretchen C. Daily, ed., *Nature’s Services: Societal Dependence on Natural Ecosystems* (Washington, DC: Island Press, 1997), 1 at 3.

<sup>61</sup> *Ibid.*

<sup>62</sup> James Peck, “Measuring Justice for Nature: Issues in Evaluating and Litigating Natural Resource Damages” (1999) 14 J. Land Use & Envtl. L. 275, at 283-287.

<sup>63</sup> Lawrence H. Goulder & Donald Kennedy, “Valuing Ecosystem Services: Philosophical Bases and Empirical Methods” in Gretchen C. Daily, ed., *Nature’s Services: Societal Dependence on Natural Ecosystems* (Washington, DC: Island Press, 1997), at p. 23.

Under the valuation based on restoration and replacement costs method, an evaluator sets the value of a resource at what it would cost in dollar terms to restore the damaged resource or to replace it with a similar one somewhere else.<sup>64</sup> This technique partially accounts for the uniqueness of the resource and may also reflect existence and intrinsic values, in addition to more traditional use values.<sup>65</sup>

The application of this theory to Canada's ability to meet its environmental obligations to reduce GHG emissions has limits. Where the costs of restoration or replacement would exceed the value of the resource as measured in dollar terms, courts and policymakers almost always defer to the lesser value.<sup>66</sup> In many instances the replacement of resources is beyond our capability,<sup>67</sup> rendering the method meaningless in some situations.

Behavioural use valuation includes a variety of techniques designed to measure non-market use value through observation of behavioural patterns. One model in this category, known as the "hedonic model," considers the ways in which environmental benefits or burdens affect the value of marketed goods.<sup>68</sup> Under this model, a house located near a beach would have a higher market value than a house located in a more neutral environment. A house located near a contaminated site would have a lower market value. This diminution in value would reflect the behavioural use burden of the contaminated resource.

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<sup>64</sup> Peck, *supra* note 62, at 283.

<sup>65</sup> *Ibid.*, Appendix, Table 1.

<sup>66</sup> Frank B. Cross, "Natural Resource Damage Valuation" (1989) 42 Vand. L. Rev. 269, 335.

<sup>67</sup> Daily, *supra* note 60, at 9.

<sup>68</sup> Kenneth E. McConnell, "Indirect Methods for Assessing Natural Resource Damages under CERCLA" in Raymond J. Kopp & V. Kerry Smith eds., *Valuing Natural Assets, the Economics of Natural Resource Assessment* (Washington, D.C.: Resources for the Future, 1993), at 153, 163.

Another type of behavioural use valuation is travel cost valuation. This valuation model attempts to determine the use value of a natural resource such as a national park by determining how much travel and opportunity cost people are willing to incur in order to make use of that resource.<sup>69</sup>

In contingent valuation, economists attempt to assign surrogate or “shadow” prices to non-use, ecological values such as aesthetics, moral obligation, and philosophic engagement. This pricing method depends upon carefully administered surveys designed to find out what people would be willing to pay or give up to keep a given natural resource.<sup>70</sup> In some cases, subjects are asked about resources they may someday have the option to visit (called “option value”); in other cases, they are asked about resources they may never visit, but still have an interest in (called “existence value”).<sup>71</sup>

Contingent valuation has sparked significant controversy. For supporters, contingent valuation offers the best way to put intangible environmental benefits on the balance sheet. As survey techniques continue to improve, say supporters, so will the accuracy and precision of information about the public’s environmental preferences.<sup>72</sup> To some opponents, contingent valuation is both practically and logically impossible – as hopeless as quantifying the benefits of beauty or truth.<sup>73</sup> Despite this debate, contingent valuation continues to grow as a research discipline and is gradually sinking its roots into

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<sup>69</sup> Goulder & Kennedy, *supra* note 63, at 31.

<sup>70</sup> Peck, *supra* note 62, at 284. The term “contingent valuation” derives from the fact that subjects’ responses are contingent on a set of hypothetical events. See David S. Brookshire & Michael McKee, “Is the Glass Half Empty, is the Glass Half Full? Compensable Damages and the Contingent Valuation Method” (1994) 34 Nat. Resources J. 51 at 67.

<sup>71</sup> See Jan G. Laitos & Thomas A. Carr, “The Transformation on Public Lands” (1999) 26 Ecology L.J. 140, at 227-228.

<sup>72</sup> Peck, *supra* note 62 at 284-85.

<sup>73</sup> Mark Sagoff, *The Economy of Earth: Philosophy, Law and the Environment* (New York: Cambridge University Press, 1988), at 74-75.

environmental policy-making in two ways. First, contingent valuation has been used to assess damage that has already occurred.<sup>74</sup> Some U.S. statutes now allow contingent valuation methods to be used when determining damage awards for the destruction of natural resources.<sup>75</sup> At least some economists doubt the efficacy of this approach, partially out of concern that damage awards will be too high.<sup>76</sup>

Second, contingent valuation is also used as a part of a cost-benefit analysis to help analysts balance the benefits of a given environmental standard against the costs. While scepticism remains, many economists feel more at ease with this prospective approach to valuation than they do with the retrospective approach used in damage assessment.<sup>77</sup> Many environmentalists, however, disapprove of a prospective approach, apparently fearing that more cost-benefit analysis will mean more lax regulatory standards.<sup>78</sup>

The viability of any of the forms of resource economics is important to economic and ecological concerns. For economists, resource economics offers a potential way to block the flow of non-market externalities. Without a credible strategy for identifying and including such costs in numeric analysis, resource economics may lose support. For ecologists, resource economics offers at least some way to provide a numerical value for

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<sup>74</sup> For example, the *Exxon Valdez* case cited in Peck, *supra* note 62 at p. 275-77.

<sup>75</sup> Each statute authorizes regulations to establish methods of assessing resource damage and imbue such methods with a presumption of accuracy; *Comprehensive Environmental Response, Compensation and Liability Act of 1980*, 42 U.S.S. §§ 9601-9675 (1994)(c)(2) ("CERCLA") and *Oil Pollution Act of 1990*, 33 U.S.S. §§ 2701-2761 (1994)(e) ("OPA"). In separate rulings the Federal court of Appeals for the D.C. Circuit has upheld the use of contingent valuation as a means of pricing intangible benefits under CERCLA and OPA. See *Ohio v. U.S. Dep't of Interior*, 880 F. 2d 432, 464, 478 (D.C. Cir. 1989) (instructing the Department of Interior to give equal weight to use and non-use values in CERCLA claims and upholding contingent valuation as a means of calculating option and existence values); *Nat'l Ass'n of Mfrs. v. Dep't of Interior*, 134 F. 3d 1095, 1116 (D.C. Cir. 1998) (upholding the use of older contingent valuation studies in conjunction with travel cost studies to form computer valuation program).

<sup>76</sup> Paul R. Portney, "The Contingent Valuation Debate: Why Economists Should Care" (1994) 8 J. Econ. Persp. 3, at 8-9.

<sup>77</sup> *Ibid.*

<sup>78</sup> Sagoff, *supra* note 73 at 84.



non-market harms. Resource economics serves to attempt to reconcile the perspectives of economists, environmentalists and society as a whole.

In summary, economics as applied to environmental policy seeks to optimize the human use of resources to produce as much liberty and human growth as possible before the harms of consumption overtake the benefits. Second, resource economics attempts to monetize the considerable externalized harms that we know exist, but that do not appear on the balance sheet. Finally, economics assumes a uniformity of space that de-emphasizes distributional concerns in favour of collective benefit; it also assumes a bias in time that favours present demands over future ones.

A law and economics approach offers two advantages to the environmental cause. First, currency provides arguably the best universal translator of human preferences across time, space, idea, and culture.<sup>79</sup> Second, money is a source of great social power throughout the world. An individual able to use environmental laws to threaten polluting companies with exorbitant fines or damage awards can get the attention of multinational corporations and perhaps influence their conduct in ways that a purely political or value-based strategy could not.

### **2.2.2 Tax Theory**

Economic instruments are increasingly being seen as one of the methods by which sustainable development might be achieved. They are particularly attractive to governments as they have the potential to encourage behaviour that reduces pollution,

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<sup>79</sup> See Harvey, *supra* note 52, at 150-151

maintains resources and raises revenue. Among these economic instruments is the environmental or green tax, imposed under the polluter pays principle.<sup>80</sup>

An environmental tax sends a message about the goods or services charged with the tax, namely, to discourage their use in favour of other more environmentally sustainable goods or services. To make this message clear and for it to have an effect, the tax may have to be very high. The revenue generated from environmental taxes may be used for a variety of purposes.

Taxes are often regarded as unwelcome but necessary burdens that must be imposed in order to obtain revenues to finance essential public expenditures. From this perspective, it is generally suggested that taxes should affect market incomes as little as possible and should apply to broad-based measures of economic well-being such as income, consumption or wealth.<sup>81</sup> To the extent that market outcomes are regarded as presumptively efficient, moreover, tax incentives are often dismissed as questionable departures from tax neutrality, distorting market signals and reducing aggregate welfare.<sup>82</sup>

Notwithstanding these perspectives on taxation and tax incentives, a number of arguments can be advanced in favour of environmental taxes, also known as "ecotaxes" or "green taxes", and tax incentives to address environmental challenges. The following section reviews five arguments in favour of environmental taxes, as well as their

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<sup>80</sup> OECD (Organisation of Economic Cooperation and Development), *Environment and Economics: A Survey of OECD Work* (OECD: Paris, 1992).

<sup>81</sup> See e.g., Robin W. Boadway and Harry M. Kitchen, *Canadian Tax Policy*, 3<sup>rd</sup> ed. (Toronto: Canadian Tax Foundation, 1999) chapter 2.

<sup>82</sup> See, e.g. the discussion of the "universal market efficiency" approach in Edward A. Zelinsky, "Efficiency and Income Taxes: The Rehabilitation of Tax Incentives" (1986) 64 *Tex. L. Rev.* 973 at 980-86.

implications for the design of environmental taxes and tax incentives and the interaction of these measures with environmental policy instruments.

First, among economists, environmental taxation is typically justified as a way to internalize negative externalities – requiring economic actors to take the full costs of their behaviour into account when determining their actions.<sup>83</sup> Environmental taxes incorporate the costs of environmental services and damages directly into the price of goods, services or activities that give rise to them. This helps to implement the polluter pays principle, and to integrate economic, fiscal and environmental policies. To the extent that activities such as production, transportation, or consumption impose environmental costs that are not taken into account by those engaging in the activity, economic analysis suggests that economic actors will engage in too much of the activity – equating marginal benefits with marginal private costs while ignoring environmental costs. In these circumstances, environmental taxes may improve economic efficiency by requiring economic actors to confront the full costs of their actions.

Marshall was the first economist to introduce the concept of external economies.<sup>84</sup> But, it was Pigou who formulated the concept more precisely, as a divergence between private and social costs. Pigou was the first to observe that external effects could be positive as well as negative, and to propose a means to correct this divergence<sup>85</sup>. There is an externality when an action by an individual producer or consumer directly affects the

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<sup>83</sup> For a useful summary of this argument for environmental taxation, see OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 21-31. For a critical evaluation of this justification for environmental taxation, see J. Andrew Hoerner, *Harnessing the Tax Code for Environmental Protection: A Survey of State Initiatives*, (Washington, D.C.: Centre for Sustainable Economy, 1998) at 4-8.

<sup>84</sup> Whitaker, J.K., ed. *The Early Economic Writings of Alfred Marshall, 1867-1890* (London: MacMillan for the Royal Economic Society (Great Britain), 1975).

<sup>85</sup> A.C. Pigou, *The Economics of Welfare* (London, England: MacMillan, 1952).

satisfaction or the profit of other parties, without the market evaluating and charging or paying them for this interaction. It is the absence of payment that gives rise to an externality.

Environmental externalities are numerous. To a certain degree, they are present in all activities and all economic sectors. It is often challenging to quantify environmental damages. For example, a pulp and paper mill, in its production process, will emit a smell into the neighbourhood. Neighbours do not appreciate the smell emanating from the plant, but there is no real way to assess or quantify the cost to the neighbours of the smell. In addition, the smell coming from a pulp and paper mill will vary depending upon the direction of the wind, and the production schedule of the mill. There is, therefore, no means of assessing the overall impact on a neighbouring community.

There are three main ways of controlling external costs: regulating the activity that creates the external cost, taxing the activity that creates the external cost or subsidizing the polluter to stop or lessen their activity.<sup>86</sup>

Taxes, by making a free good no longer free, attempt to “internalize” externalities; that is to force the business or person who creates a negative externality to pay for it himself, or have the consumers pay for it, instead of foisting the charges upon the community. If the tax is appropriately figured it should raise the marginal private costs of carrying on the activity to equal the social costs that the activity imposes on the community.<sup>87</sup>

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<sup>86</sup> *Ibid*, at 372.

<sup>87</sup> Robert L. Heilbroner, “Understanding Microeconomics” in Elaine Hughes eds., *Environmental Law and Policy* (Toronto, ON: Emond Montgomery Publishing Limited, 1993) at 371.

Unlike permits, which serve to directly limit the quantity of pollution emitted, environmental taxes attempt to control emissions indirectly through related parameters, such as imposing a charge on the business or consumer engaging in a certain polluting activity, thereby essentially increasing the price of emissions. The theory behind this is that an increase in taxes will indirectly reduce the quantity emitted. The higher the tax on emissions, the smaller the polluting emissions. In essence, the government is estimating the level of the tax that will attain the desired emission reduction.

Environmental taxes have the potential to be cost-effective in achieving environmental objectives. With the implementation of an environmental tax, each polluter has to choose between reducing its polluting emissions or paying the tax. Therefore, businesses with the lowest abatement costs will take abatement measures, whereas others that have higher abatement costs will choose to pay the tax. In this way, the total abatement cost is minimized. Therefore, taxes force the individual or business to consider its actions before proceeding. The individual or business will ultimately “pay” for its actions, whether it is through abatement costs or through paying the tax.

Second, environmental taxes create incentives for producers and consumers to shift away from environmentally damaging behaviour by forcing them to pay for their actions, thus helping to reinforce controls or permits and other elements of a policy package. Individuals and businesses tend to produce, manufacture and distribute products that are cost-effective to produce and that generate revenue for them. If it costs an individual or business more money to produce, manufacture or distribute a product than the company can earn by selling the product, then it is not cost-effective and the individual or business will cease production. Environmental taxation forces businesses to consider the

economic consequences of polluting the environment. A business that has to expend financial resources because it is being forced to pay a higher rate of taxes due to their environmentally unfriendly production practices will likely pass this cost on to the consumer. The consumer may look for a cheaper alternative.

A business that has to implement procedures or new methods in order to adhere to a particular standard will assume the cost of compliance. However, an environmental tax is applied uniformly across an industry. Therefore, all businesses within a particular industry have to meet the same standards. In theory, the cost of meeting this standard should be consistent across the industry. Thus, it should be financially feasible for businesses to reduce their environmentally harmful output, thereby reducing their taxes, and still remain competitive.

Third, environmental taxes can be a more effective pollution control than regulations.<sup>88</sup> Regulations are costly and difficult to enforce, as they require regulators to monitor and enforce them. This enforcement cost is not paid for by the polluter. In addition, absent an economic penalty for not adhering to the regulation, businesses may choose not to comply with the regulation.<sup>89</sup> Today, regulations often include a permit or licensing fee and/or a fine for not adhering to the regulation. These new charges are not yet equivalent to the monitoring and compliance costs of the regulation. The regulation is, therefore, no longer a command and control regulation, but a mixed regulation which includes an economic instrument component. The employment of an economic instrument results in

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<sup>88</sup> Government of Canada, *Economic Instruments for Environmental Protection: Discussion Paper*, (Ottawa: Supply and Services Canada, 1992).

<sup>89</sup> Heilbroner, *supra* note 87 at 371

the generation of revenue. Further, there is less of an enforcement process as the tax is unilaterally applied to all processes or products affected by the tax.

Environmental taxes are also more effective than regulations as they allow for flexibility in application. Environmental taxes, unlike regulations, have the ability to recognize and respond to the fact that pollution abatement costs differ among sources of the same contaminant, by charging different sources varying amounts. Economic instruments permit a specified level of environmental protection to be attained at lower cost than uniform emission standards applied under regulatory supervision, as the cost of supervision is borne by the regulator, while the cost of an environmental tax is borne by the polluter.

As governments and industry become more comfortable with these new mixed regulations, government can alter them to more accurately reflect economic reality. The fines charged will likely change to reflect the monitoring and compliance costs associated with mixed regulations. This will ensure that governments can continue to impose regulations, and businesses will adhere to them. For a system to work, governments need to ensure that the fines charged for non-compliance are greater than the abatement costs. If it is more economical to pay a fine, then the polluters will likely choose to do so. From an environmental perspective, the government must ensure that businesses are forced to comply with the regulations from an economic perspective. Forcing businesses to think environmentally from an economic perspective is an effective means of achieving compliance and meeting environmental objectives. In other words, if a polluter has to pay the cost of meeting a standard, rather than the regulators, the polluter is more likely to adhere to the prescribed standard.

Fourth, for producers, environmental taxes may encourage innovation. When current methods of production become too heavily taxed, taxpayers will develop new modes of production, transportation, housing, energy use and general consumption to reduce tax liability. These new methods help to achieve better “eco-efficiency”.

Finally, environmental taxes may also potentially raise revenues for the government, which can be a significant advantage over the other economic instruments. These revenues can be used in several ways. First, they can be used directly to improve the environment. Second, environmental taxes can be used as incentives to others to behave in a more environmentally friendly manner. Knowing that a tax will be imposed for certain behaviour may encourage others to find alternative means of production, means that would not result in the imposition of a tax. Third, environmental taxes may be used to reduce other, more costly taxes. For example, environmental taxes may be used to reduce labour taxes, with the objective of increasing employment and overall welfare. Environmental taxes raise revenues and, at the same time, correct the economic distortions that arise from not taking the environmental costs into account. On the contrary, ordinary taxes (such as the personal income tax) raise revenues but, by doing so, they generate distortions in the economy. Therefore environmental taxes have the potential to improve the environment and the tax system at the same time.

In addition to the five advantages discussed above, I have chosen to discuss the potential “double dividend” effect of environmental taxation as an advantage because, in theory, it should be. Whether or not it is an advantage depends on whether or not the double dividend effect truly exists. This is a much discussed topic, and there are divergent



opinions.<sup>90</sup> The double dividend is based on the theory that environmental taxes create the double benefit of removing pre-existing tax distortions by creating new and more environmentally targeted price signals, and of improving environmental quality. The ideal combination should generate the kinds of conditions suitable for sustainable development.<sup>91</sup> The theory can be illustrated in the following quotation:

While most taxes distort incentives, an environment tax [such as a carbon tax] corrects a distortion, namely the externalities arising from the excessive use of environmental services...Governments may...adopt a fiscally neutral stance on the carbon tax, using revenues to finance reductions in incentive-distorting taxes such as income tax, or corporation tax. This 'double dividend' feature of pollution tax is of critical importance [from the point of view of] corporate and public acceptability of such a tax...From a *social* standpoint the double dividend feature is also important. Estimates suggest that every £1 of tax raised by taxes on effort and enterprise gives rise to deadweight losses of 20-50 pence (Ballard *et al*, 1985). Thus a fiscally neutral £1 carbon tax would amount to an effective tax of 50-80 pence.<sup>92</sup>

The main argument against the double dividend theory appears to be that the revenue generating capacity of environmental taxes is small.<sup>93</sup> If this is true, then the double dividend effect would be substantially reduced. The theory is that environmental taxes should generate less revenue over time, as the pollution is being reduced, and thus, there is less to tax. However, there are some areas of environmental concern where the

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<sup>90</sup> See for example, David Gee, "Economic Tax Reform in Europe: Opportunities and Obstacles" in O'Riordan, Timothy, ed., *Ecotaxation* (UK: Earthscan Publications Limited, 1997); Peter Bohm, "Environmental Taxation and the Double Dividend: Fact or Fallacy?" in *ibid*; Paul Ekins, "On the Dividends from Environmental Taxation" in *ibid*; Terry Barker, "Taxing Pollution Instead of Jobs" in *ibid*; Daniel McCoy, "Reflections on the Double Dividend Debate" in *ibid*; Lawrence H. Goulder, "Environmental Taxation and the 'Double Dividend': A Reader's Guide" *Public Economics and the Environment in an Imperfect World* (Boston, MA: Kluwer Academic Publishers, 1995).

<sup>91</sup> Timothy O'Riordan, "Editorial Introduction to the Double Dividend Debate" in *ibid*.

<sup>92</sup> D. Pearce, "The role of carbon taxes in adjusting to global warming" *Economic Journal*, 101, at 938-48.

<sup>93</sup> Bohm, *supra* note 90, at 107.

revenue generating component would not be reduced. Fossil fuels, for example, will continue to generate significant tax revenues,<sup>94</sup> for as long as fossil fuels are in use.

If a government drafts and implements taxes properly, that is, if the tax actually charges a polluter for his environmental harms and generates revenue, environmental taxes should result in a double dividend. This effect may not be permanent, but it exists nonetheless. If environmental taxes continue to evolve and change, then they will continue to generate revenue. The only time when there will be no revenue, is when there is no pollution.

Environmental taxes, therefore adhere to all three of the prescribed criteria: they are cost effective, they are precautionary, and they assist in pollution prevention. The implementation of environmental taxes encourages government, corporations and individuals to consider environmental concerns, while still allowing them to take into account the cost-effectiveness of implementing a measure or practice. Further, the implementation of environmental taxes clearly includes a precautionary element, as it allows for the implementation of a tax or tax incentive, even absent scientific certainty. Finally, environmental taxation encourages pollution prevention, and adheres to the polluter pays principle, by forcing corporations and individuals to pay for their potentially environmentally damaging behaviour.

While there are numerous advantages to the implementation of environmental taxation, as discussed above, it is important to note that there are several problems that may result from the creation of environmental taxes. However, proper drafting of these taxes should help eliminate most of the problems.

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<sup>94</sup> Carbon taxes have and will likely continue to be revenue generating due to the issue of global warming (*Ibid.*).

Some of the problems that have been raised are: a potentially negative impact on competitiveness; a resulting impact on low income groups; perceived conflicts between national taxes and world trade rules; a perception that taxes need to be high in order to work; existing subsidies and regulations may be impacted; and existing policies may negate the impact of environmental taxes.

If competing countries do not implement similar tax policies, then what may result is an advantage to one country over another in the world trade market. If, for example, it is substantially cheaper to produce an item in one country than in another due to the imposition of an environmental tax, then the country who levies the tax may be at a distinct disadvantage. This is especially important in the Canadian context, with the United States as a neighbour. The country paying the tax would need to sell their product at a higher rate than the country not paying the tax. This would result in an advantage to the country not paying the tax.

In order for Canada to effectively utilize environmental taxation to reduce GHG emissions, Canada will need to get rid of any subsidies and regulations that are ineffective, carefully design and implement new environmental taxes, use environmental taxes and revenue as part of policy packages and environmental tax reforms, consult with the public and industry, and provide information regarding environmental taxation to all concerned parties.

As the double dividend theory espouses, environmental taxes can result in optimal environmental protection, and as well generate revenue. However, these revenues are generally a problem for governments, because they raise multiple questions. First,

should the money generated be used to improve the protection of the environment? Second, should the revenue generated be used to compensate the losers? Third, should the government add the revenues to the general budget of the government, or should these revenues be assigned to a specific fund?<sup>95</sup> There are many ways to utilize the revenue obtained from taxation.

One option that the government may choose is to retain the new tax revenues.<sup>96</sup> The environmental tax revenues may be added to the other revenues of the government. This will decrease the public deficit<sup>97</sup> or potentially allow a budget surplus. If the environmental tax revenue does not pay for some other spending, such as towards environmental protection methods, or reduce other taxes, such as labour taxes, introducing an environmental tax is nothing but a tax increase.

Therefore, if the government retains the money generated from environmental taxes, then it will need to determine whether to use the money towards the deficit or to assign it to a specific program. In theory, one would think that the government would want to apply the revenue to existing debt. However, that is not always the case. In addition, debt does not always have to be repaid. In times of economic growth, debt decreases automatically compared to the size of the economy.<sup>98</sup>

Alternatively, the new revenues may be used to pay for additional public spending.<sup>99</sup> This additional spending can be a financial transfer. This financial transfer could

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<sup>95</sup> Nicolas Wallart, *The Political Economy of Environmental Taxes* (Northampton, MA: Edward Elger Publishing Limited, 1999), at 137.

<sup>96</sup> *Ibid.*, at 137.

<sup>97</sup> In Canada, Ontario has a tax for fuel conservation, which is levied on the least fuel-efficient new vehicles. The revenues from this tax reduce the public deficit of Ontario (*Ibid.*, at 140).

<sup>98</sup> *Ibid.*

<sup>99</sup> *Ibid.*

compensate for the distributive impact of the environmental tax, or environmental policy measure. This would ultimately serve to increase the environmental impact of the tax. In this case, the revenues could be simply added to the other revenues of the government. The government may then use a portion of the collected revenues to finance supplementary spending, which can be used for further environmental protection measures.

Or, the revenues could be paid into a special fund, separate from the government's main budget. This separate fund could be utilized strictly for supplementary spending, which again can be used for further environmental protection measures.

Governments may also choose to assign the environmental taxes to a particular agency or category of expenditure. In this situation, the environmental tax is pre-assigned to a particular agency or category of expenditure. Therefore, the revenues cannot be used for another purpose. Specifically, the government can assign the revenues to a special environmental fund, thereby increasing the environmental effectiveness of the tax.

Revenues from environmental taxes may also be used to reduce other taxes. When tax revenues from environmental taxes reduce other taxes, what results is referred to as an "ecological tax reform".<sup>100</sup> Some of the other taxes that may be reduced are indirect taxes,<sup>101</sup> personal income tax,<sup>102</sup> business income, or social security contributions.<sup>103</sup>

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<sup>100</sup> Tax Reform is defined as a modification of all or part of the tax system. In order to have a tax reform, a certain degree of change has to take place, and the reform must have a clearly defined objective. "Ecological" indicates the direction of change. See generally, J. Le Cacheux, "Les expériences de réforme fiscale dans les pays de l'OCEE", (1996) *Cahiers français*.

<sup>101</sup> Sweden and Norway recently reduced their energy taxes when they introduced a CO<sub>2</sub> tax, as part of a broader reform aimed at reducing the polluting emissions of the overall energy system (*Ibid*, at 149).

There are many options available, and governments can utilize any combination of them. The changing needs of the economy can be met by implementing a flexible process which allows the government the opportunity to change where the revenues generated from environmental taxation or portions of it are allocated.

### 2.3 Criteria

There are numerous criteria that may be relevant in assisting Canada to meet its prescribed GHG emissions reduction targets as outlined in the Kyoto Protocol and the *Climate Change Plan for Canada* including, *inter alia*, sustainability, conservation, efficiency, cost-effectiveness, precaution, and pollution prevention.

Sustainability, or “sustainable development” was first coined by the World Commission on Environment and Development in its 1987 Report (“Brundtland Report”), which is seen as a significant precursor to the Rio Conference. The definition of “sustainable development” set out in the Brundtland Report can be summed up as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. At the core of the concept of sustainable development is the requirement that current practices should not diminish the possibility of maintaining or improving living standards in the future. This means that our economic system should be managed to maintain or improve our resource and environmental base so that the generations that follow will be able to live equally or better. Sustainable economic development does not require the preservation of the current stock of natural resources or

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<sup>102</sup> When Sweden introduced its CO<sub>2</sub> tax, as part of a broad reform, the tax on labour income was reduced (*Ibid*).

<sup>103</sup> In the United Kingdom, the revenues of the landfill tax reduce the national insurance contributions paid by employers. This redistribution method has facilitated acceptance of the tax by manufacturers (*Ibid*, at p. 150).

any particular mix of human, physical and natural assets. Nor does it place artificial limits on economic growth, provided that such growth is both economically and environmentally sustainable.<sup>104</sup> The idea of economical sustainability is encompassed in the cost-effectiveness criteria, and the idea of environmental sustainability is encompassed in the criteria of precaution and pollution prevention, both of which are discussed later in this chapter. As such, I will not be focussing on the criteria of sustainability as one of my main criteria to assist Canada in its obligation to reduce GHG emissions.

For the purposes of this thesis, I have chosen to focus on three criteria which, in my opinion, are the most relevant, and encompass to a degree, all of the above-listed criteria: (i) cost-effectiveness; (ii) precaution; and (iii) pollution prevention. What follows is a brief explanation of these criteria and why they are beneficial in the implementation of any environmental endeavour, and more specifically, environmental endeavours aimed at reducing GHG emissions in Canada.

### **2.3.1 Cost-Effectiveness**

Whether or not an environmental endeavour should be cost-effective is open to debate. For the purpose of this thesis, and relying on law and economics theory and tax theory, I am assuming that cost-effectiveness is a necessary and positive criteria in any environmental endeavour. While it may be argued that select individuals may be morally persuaded to adopt environmental policies that are not cost-effective,<sup>105</sup> it is arguable that corporations are unlikely to adopt environmental policies that are not cost-effective.

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<sup>104</sup> National Task Force on Environment and Economy, "Report", Submitted to the Canadian Council of Resources and Environment Ministers (Downsview, ON: CCREM, 1987).

<sup>105</sup> This will be discussed further in section 3.5 of my thesis.

Most corporations, in my opinion, are focussed on profit, and an environmental endeavour that does not, at the least, result in no economic loss to the corporation, will likely not be adopted. A corporation, in most circumstances, is concerned with profitability, and an endeavour that ultimately costs a corporation more than it can obtain financially in return, is not one that can realistically be pursued. Further, in my opinion, it is unlikely that the Canadian government would implement any endeavour that is not cost-effective. The Canadian government attempts to be fiscally responsible, as any deficit incurred will ultimately have to be paid by the tax payer.

In determining whether or not an endeavour is "cost-effective", economists generally employ a cost-benefit analysis. A cost-benefit analysis uses economic criteria to consider "whether the change from a given state will be desirable".<sup>106</sup> A cost benefit analysis compares the increase in the social benefits that arise from implementing the new technology (marginal benefits), with its increased costs (marginal costs). When the marginal benefits of instituting new technology exceed the marginal costs, it is more efficient to implement the technology.<sup>107</sup> The underlying assumption of cost benefit analysis is that efficiency will be achieved when the marginal benefit realized from a new technology is just equal to the marginal cost incurred by implementing it.<sup>108</sup>

Benefits are defined as an individual's "willingness to pay" for the benefit in question. Willingness to pay is most easily identified when the benefit in question is traded on an open market. When there is no recognized market for a benefit, other methods such as

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<sup>106</sup> Thomas A Cinti, "The Regulator's Dilemma: Should Best Available Technology or Cost Benefit Analysis be Used to Determine the Applicable Hazardous Waste Treatment, Storage and Disposal Technology?", in E. Hughes and Tillenman eds., *Environmental Law and Policy* (Toronto, ON: Emond Montgomery Publications Limited, 1993 at 377.

<sup>107</sup> *Ibid.*

<sup>108</sup> *Ibid.*



contingent valuation, discussed previously in section 2.2, may be employed to estimate society's willingness to pay.<sup>109</sup> Theoretically, the costs to be measured in a cost benefit analysis are the opportunity costs of the resources allocated in the decision.<sup>110</sup> Therefore, the decision as to whether or not to implement a political economic instrument is dependant on the outcome of the cost benefit analysis. As indicated, if the marginal benefit realized from a new technology is equal to or greater than the marginal cost, it is likely that a government will see it as a worthwhile environmental policy initiative.

### **2.3.2 Precaution**

The second criteria I have chosen to rely on in my analysis is precaution. The following section focuses on two concepts, the precautionary approach and the precautionary principle, and explains how these two concepts are related and why it is important, in my opinion, that any environmental endeavour adheres to them.

#### **2.3.2.1 Precautionary Approach**

While there is plenty of debate about the precise definition of the "precautionary approach", one of the most classical formulations appears in Article 3 of the FCCC:<sup>111</sup>

The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive,

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<sup>109</sup> *Ibid*, at 378.

<sup>110</sup> *Ibid*.

<sup>111</sup> See also the Rio Declaration, *supra* note 29, Principle 15. For a helpful overview of many of the different strands within the concept, see Timothy O'Riordan and James Cameron, ed., *Interpreting the Precautionary Principle* (London, UK: Earthscan, 1994).

cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties.

In simple terms, this means that states should not use the fact that there is not scientific certainty regarding the adverse environmental effects of activities to postpone putting in place measures to prevent those effects. There is considerable controversy about the definition of the "precautionary approach" and the criteria to guide its implementation. It has been variously described as "fuzzy", "vague" and "too general" to be of practical use.<sup>112</sup> On the other hand, some commentators such as O'Riordan and Jordan have argued that the "precautionary approach" can be defined simply:

The intuitively simple idea that the decision-makers should act in advance of scientific certainty to protect the environment (and with it the well-being interests of future generations) from incurring harm...In essence it requires that risk avoidance becomes an established decision norm where there is reasonably uncertainty regarding possible environmental damage or social deprivation arising out of a proposed course of action.<sup>113</sup>

The "precautionary approach" recognizes that scientific uncertainty and risks of environmental harm are frequently inherent aspects of environmental management, and that a normative response is required. As environmental law evolves at both the

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<sup>112</sup> David Hughes, "The Status of the Precautionary Principle in Law: Secretary for Trade and Industry *ex parte* Duddridge" (1995) 7 J. Env'tl. L. 224, 238; Daniel Bodansky, "Scientific Uncertainty and the Precautionary Principle" (1991) 33 Env'tl. 4 at 5.

<sup>113</sup> Timothy O'Riordan and Andrew Jordan, "The Precautionary Principle in Contemporary Environmental Policies" (1995) 4 Env'tl. Values 191, 194.

international and federal level, the precautionary approach is rapidly becoming an accepted policy and legal tool.<sup>114</sup>

As the wording of Article 3 of the FCCC reveals, the obligation to take precautionary measures is qualified by concepts of “cost-effectiveness”<sup>115</sup> and “global benefits at the lowest possible cost” and is limited by thresholds of “serious or irreversible damage”. The FCCC need not have defined the “precautionary approach” in this way, but in doing so it has defined it in a manner consistent with the FCCC’s stated objective which includes enabling “economic development to proceed in a sustainable manner”.<sup>116</sup> This enables states to take a “business-as-usual” approach. As such, the criteria of precaution and cost-effectiveness can be seen as intrinsically linked in GHG emissions reduction. Therefore, arguably, any environmental policy instrument aimed at enabling Canada to meet its international environmental commitment to reduce GHG emissions should be both precautionary in nature and cost-effective.

Therefore, the FCCC clearly contemplates that environmental endeavours to reduce GHG emissions should be cost-effective and adhere to the precautionary approach. It is logical, therefore, that any measures used by Canada to satisfy its obligations pursuant to the Kyoto Protocol should also satisfy these criteria.

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<sup>114</sup> See, for example, the preamble to the *Oceans Act*, S.C. 1996, c. 31 [“Oceans Act”], which states: “Canada promotes the wide application of the **precautionary approach** to the conservation, management and exploitation of marine resources in order to protect these resources and preserve the marine environment” [emphasis added].

<sup>115</sup> It is interesting to note that in Australia, clause 3.5.1 of the Intergovernmental Agreement on the Environment, May 1992, expresses the precautionary principle as the following: “Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.” This interpretation does not include reference to the “cost-effectiveness” of the environmental protection measure. However, in the context of climate change, and more specifically the FCCC, which is the precursor to the Kyoto Protocol, cost-effectiveness is a component of the precautionary principle.

<sup>116</sup> FCCC, *supra* note 30, Art. 2.

### 2.3.2.2 Precautionary Principle

The precautionary approach has been internationally codified as the “precautionary principle”. The precautionary principle has been phrased in numerous ways in various agreements and commentaries. However, the phrasing in Principle 15 of the 1992 Rio Declaration on Environment and Development best reflects the international community’s views on the principle:

In order to protect the environment, the precautionary approach shall be widely applied by the states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.<sup>117</sup>

The Rio Declaration requires member states to adopt a “precautionary approach” towards environmental protection, such that where a risk exists of serious or irreversible damage, lack of full scientific certainty should not postpone “cost-effective” environmental protection measures. The precautionary principle affirms the importance of utilizing both cost-effective measures and the precautionary approach in any environmental endeavour. Since its inception, UN signatory countries have attempted to implement this principle through legislation, regulation, international treaties,<sup>118</sup> environmental policy initiatives<sup>119</sup> and through litigation.<sup>120</sup>

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<sup>117</sup> Rio Declaration, *supra* note 29, Principle 12.

<sup>118</sup> Examples of application of the precautionary principle include the decisions of the contracting parties to the London Dumping Convention, 26 U.S.T. 2403, 11 I.L.M. 1294 (1972), to phase out all dumping of industrial wastes; the protection of endangered species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 12 I.L.M. 1085 (1973); the Cancun Declaration on Responsible Fishing to establish general guidelines for a responsible fishing code, signed in May 1992; the Convention for the Protection of the Marine Environment of the North-East Atlantic to prohibit the dumping of unprocessed fish from fishing vessels, which includes the dumping of unwanted bycatch by driftnet vessels, signed in 1993; the Migratory Birds Convention to prohibit the taking of migratory birds in

In Canada, the federal government does not yet consider the precautionary principle to be a rule of customary international law "due to an absence of clear evidence of uniform

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the territories of Japan and the United States, signed in 1972, the Fur Seal Convention to prohibit the taking of fur seals in the North Pacific Ocean, signed in 1957; the International Whaling Convention (IWC 1946), which was reaffirmed in 1990 by the Indian Ocean Whale Sanctuary, to support the U.N. driftnet moratorium; the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) to protect populations of migratory wild animals that regularly cross national boundaries, signed in 1979, the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) to recognize "the essential role played by wild flora and fauna in maintaining biological balances", signed in 1979, and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. See also Freestone, David and Robin Churchill, eds., *The Precautionary Principle, in International Law and Global Climate Change* (Dordrecht: Kluwer Law International, 1991, at 35-36; Robert Jay Wilder, "The Precautionary Principle and the Law of the Sea Convention", in Myron H. Nordquist and John Norton Moore, eds. *Implications of Entry into Force of the Law of the Sea Convention* 50 (Ocean Governance Study Group, 1995).

<sup>119</sup> The 1982 decision of the International Whaling Commission to impose a moratorium on commercial whaling; the U.N. General Assembly's ban on driftnet fishing, Resolutions 44/225 (1989) and 45/197 (1990); and the World Charter for Nature and General Assembly, Resolution 37/7 (October 18, 1982) which mandates that "Ecosystems and organisms, as well as the land, marine and atmospheric resources that are utilized by man, shall be managed to achieve and maintain optimum sustainable productivity, but not in such a way as to endanger the integrity of those other ecosystems or species with which they coexist" and specifying that "natural resources shall not be wasted, but used with a restraint appropriate to the principles set forth in the present Charter, in accordance with the following rules: (a) Living resources shall not be utilized in excess of their natural capacity for regeneration";.

<sup>120</sup> Several states have relied on the Principle when stating their case before the International Court of Justice. Hungary has made use of the principle in a dispute with the former Czech and Slovak Republic over the Gabčíkovo-Nagymaros project (see the "Danube River case" mentioned in O. McIntyre & T. Mosedale, "The Precautionary Principle as a Norm of Customary International Law" (1997) 9:2 J. Enviro. L. 221 at 224). Representatives for the Hungarian state submitted that the Czech and Slovak Republic were bound by different sections of the Law of Non-Navigational Uses of International Watercourses, the Stockholm Declaration of 1972, and the Rio Declaration, which all mentioned the precautionary principle. New Zealand also relied on the principle in its application regarding French nuclear tests. New Zealand contended that France was under an obligation before carrying out its nuclear tests, "to provide evidence that they will not result in the introduction of such material to that environment, in accordance with the precautionary principle very widely accepted in international law" (*Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's judgment of 20 December 1974 in Nuclear Tests [New Zealand v. France]*, Order 22 IX 95, ICJ Rep [1995] 288 at 290. Mentioned in McIntyre, *Ibid* at 234). The precautionary principle was also referred to in the "NIREX case", in which Ireland questioned the possibility of radioactive material entering the marine environment from the United Kingdom. The Irish government argued that the burden of proof was on the U.K to prove absence of risk, while the Irish need only point out the "mere possibility of risk". (*In the Matter of the Public Inquiry concerning an Appeal by the United Kingdom NIREX Ltd. concerning the Construction of a Rock Characterisation Facility at Longlands Farm, Gosforth, Cumbria: Statement on Behalf of the Minister of State at the Department of Transport, Energy and Communications, Dublin, Ireland*, in McIntyre, *Ibid* at 234). Further, the policy has also been adopted by the U.S. courts. In *Cellular Telephone Co. v. Town of Oyster Bay* 166 F. 3d 490, (2d Cir. 1999), the court upheld the government's responsibility to base regulatory decisions on substantial evidence that is "less than a preponderance, but more than a scintilla" (K.R. Foster, et al., "Policy Forum: Risk Management Science and the Precautionary Principle" (2000) 288: 5468 Science 979 at 981).

state practice and *opinio juris*".<sup>121</sup> Nevertheless, the precautionary principle has been codified in some provincial<sup>122</sup> and federal<sup>123</sup> legislation. In addition, the Supreme Court of Canada provided the following commentary in relation to the precautionary principle in *Spraytech*, a recent landmark decision:<sup>124</sup>

The interpretation of By-law 270 contained in these reasons respects international law's "precautionary principle", which is defined as follows at para. 7 of the Bergen Ministerial Declaration on Sustainable Development (1990):

In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Canada "advocated inclusion of the precautionary principle" during the Bergen Conference Negotiations...

Scholars have documented the precautionary principle's inclusion "in virtually every recently adopted treaty and policy document related to the protection and preservation of the environment"...<sup>125</sup>

The above passage may be read in two ways. First, it may be seen as a codification and recognition of the precautionary principle as a principle of customary international law.

Alternatively, as the passage provided was not determinative of the issue on appeal, it

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<sup>121</sup> Government of Canada. "A Canadian Perspective on the Precautionary Approach/Principle: Discussion Document" (September 2001).

<sup>122</sup> *Endangered Species Act*, S.N.S. 1998, c.11, ss. 2(1)(h) and 11(1); *Water Resources Conservation and Protection Act*, C.C.S.M., c. W72, Preamble; *Water Resources Protector Act*, S.N.S. 2000, c. 10, Preamble. Other provincial legislation includes reference to precautionary measures: Bylaw respecting qualification for recreational underwater diving; *An Act Respecting Safety in Sports*, R.S.Q., c. S. 3.1, s. 46.15.

<sup>123</sup> *Canadian Environmental Protection Act 1999*, S.C. 1999, c. 33, s. 2(1)(a), 6(1.1), 76.1; *Pest Control Products Act*, R.S.C. 1985, C. P-9, s. 20(2); *Canada National Marine Conservation Areas Act*, 2002, c. 18, Preamble, 9(3). Other federal legislation includes reference to the precautionary approach: *Oceans Act*, S.C. 1996, c. 31, Preamble, 30(c); and precautionary manner: *Canadian Environmental Assessment Act*, R.S. 1992, c. 37, s. 4(1)(a)(2).

<sup>124</sup> 114957 *Canada Ltee. (Spraytech, Societe d'arrosage) v. Hudson (Town)* [2001] 2 S.C.R. 241; 2001 SCC 40 ["*Spraytech*"].

<sup>125</sup> *Ibid.*, at para. 31-32.

may be seen merely as an explanation of the precautionary principle, and not a codification of the precautionary principle in Canadian law. It is interesting that L'Heureux-Dubé, J. used the definition of precautionary principle from the Bergen Ministerial Declaration,<sup>126</sup> and not from the Rio Declaration. This definition does not include the cost effectiveness component found in the Rio Declaration. Does this imply that Canada should adopt the precautionary principle, but not focus on cost effectiveness? Is the protection of the environment a goal that is more important socially than economically in Canada?

The Supreme Court of Canada's reasoning in *Spraytech* was subsequently considered in several cases.<sup>127</sup> In *Wier*, the Appellant appealed the Decision of the Deputy Administrator, under the *Pesticide Control Act*,<sup>128</sup> to issue a pesticide permit, which authorized the use of monosodium methane arsenate (MSMA) to control spruce bark beetle and mountain pine beetle in the Morice Forest District and Tweedsmuir Provincial Park. In its Reasons for Judgment ("Reasons"), the British Columbia Environmental Appeal Board (the "Board") stated:

...The Appellant submits that *Spraytech* indicates that the administrator should apply the "precautionary principle" in deciding whether a proposed pesticide use will cause an unreasonably adverse effect. The precautionary principle had not yet emerged in international or domestic law when the B.C. cases were decided.<sup>129</sup>

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<sup>126</sup> Bergen Ministerial Declaration on Sustainable Development in the ECE Region, Joint Agenda for Action (Bergen, 16 May 1990); Ruster/Simpma, I/B1/16-15-90.

<sup>127</sup> See *Shuswap Thompson Organic Producers Assn. v. British Columbia (Ministry of Environment, Lands and Parks)*, (Appeal Nos. 97-PES-04/05 & 06) [1988] B.C.E.A. No. 24; *Resident Advisory Board et al. v. British Columbia (Ministry of Environment, Land and Parks)*, (Appeal No. 98-PES-03(b), [1998] B.C.E.A. No. 19; *Wier v. British Columbia (Ministry of Environment, Lands and Parks)*, (Appeal No. 2001-PES-003(a)), [2002] B.C.E.A. No. 43 ["Weir"].

<sup>128</sup> R.S.B.C. 1996, c. 360.

<sup>129</sup> *Wier*, at para. 52.

Based on the Appellant's argument, the Board considered whether the decision in *Spraytech* affected the two-step test on the basis that the administrator is obligated to apply the precautionary principle when deciding whether to issue a pesticide use permit. The Board applies a two-step legal test in appeals of pesticide use permits and pest management plans issued under the *Pesticide Control Act*. First, the Board determines whether the use of the pesticide in accordance with the permit or plan will cause an adverse effect on human health or the environment. If so, then the Board considers whether the adverse effect is unreasonable. The second step involves a risk-benefit analysis to determine whether the adverse effect is unreasonable, and includes consideration of alternative methods of pest control. The test is site specific.<sup>130</sup>

The Board, in its Reasons in *Wier*, provided a comprehensive overview of the decision and reasoning in *Spraytech*, as well as an analysis of Canadian legislation which incorporates the precautionary principle. The Board then concluded the following in relation to the precautionary principle:

...Consequently, even if it were clearly accepted as a principle of customary international law, it is uncertain what formulation of the principle would apply for the purpose of interpreting domestic environmental legislation that is silent concerning the precautionary principle. In the absence of clear statutory direction regarding the applicability and meaning of the precautionary principle, there is no guarantee that the principle would be applied consistently.

In summary, *Spraytech* does not impose an obligation to interpret Canadian environmental statutes, including the Act, consistently with the precautionary principle, as the Court did not find that the principle is clearly a principle of customary international law. Therefore, any obligation for Canadian statutory decision-makers to consider or apply the precautionary principle must currently be found in domestic legislation. In the present

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<sup>130</sup> *Wier*, para 49; see also *Canadian Earthcare Society v. British Columbia (Environmental Appeal Board)* (1987); 2 C.E.L.R. 254 ["Earthcare"].



appeal, any obligation on the part of the administrator and the Board to consider the precautionary principle as part of the two-step test must be clearly expressed in the language of the Act.<sup>131</sup>

At first glance, *Wier* appears to be a step back from *Spraytech*. The decision appears to state that the precautionary principle should only be applied if it is codified in domestic legislation.<sup>132</sup> However, the Board in *Wier* did not actually conclude its Reasons at this point. The Board went on to provide an analysis of the wording of the legislation in question; the *Pesticide Control Act* and the Pesticide Control Act Regulation.<sup>133</sup> The Board provided that in issuing a permit, the administrator had discretion to include the “precautionary measures” that he or she considered necessary.<sup>134</sup>

The Board stated that there was “no obligation for the administrator (or the Board on appeal) to impose precautionary measures”.<sup>135</sup> However, the Board also stated the following:

When all of those provisions are considered together, they could be interpreted as being consistent with the precautionary approach in certain respects... However, there is no mandatory obligation to impose such measures, or to consider or apply the “precautionary principle” when deciding whether to issue a permit or plan under the Act. Furthermore, in interpreting these provisions, it is important to note that section 17 of the Regulation came into force in 1981, well before the precautionary principle first emerged in international treaties. Therefore, the legislature could not

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<sup>131</sup> *Wier*, paras. 70-71.

<sup>132</sup> In fact, subsequent case law has relied on *Spraytech* and *Wier* as standing for this proposition. See, e.g., *Western Canadian Wilderness Committee v. British Columbia (Ministry of Forests, South Island Forest District)*, 2002 BCSC 1260, [2002] B.C.J. No. 2036 paras. 72, 77; *Lee v. British Columbia (Minister of Environment, Lands and Parks)*, (Appeal No. 2002-PES-003(b)), [2002] B.C.E.A. No. 27 at para. 20.

<sup>133</sup> B.C. Reg. 319/81.

<sup>134</sup> *Wier*, at para. 72. See also section 17(1) of the Pesticide Control Act Regulation, *ibid*, which states that “[a] permit shall specify, as may be appropriate and available,...(h) the precautionary measures or other terms that are considered necessary by the administrator under section 6 of the Act”.

<sup>135</sup> *Wier*, at para. 73.

have intended the words "precautionary measures" to have any connection to the "precautionary principle".

The Board has held that the two-step test that is based on these statutory provisions does, in some respects, take into account the "precautionary approach" as defined in the Rio Declaration.<sup>136</sup>

The Board then proceeded to identify several previous decisions in which the Appellants had specifically referred to the precautionary approach and the precautionary principle.<sup>137</sup>

Following this analysis, the Board concluded:

In summary, the majority decision in *Spraytech* does not indicate that there should be a presumption that the legislature intended the Act or the Regulation to reflect the precautionary principle, and there is no clear indication of such intention in the statutory provisions themselves. Therefore, there is no basis for concluding that the administrator and the Board are obligated to consider or apply the precautionary principle in the two-step test. However, **the two-step test does, in some respects, take into account the "precautionary approach" as defined in the Rio Declaration.**<sup>138</sup> [emphasis mine]

Therefore, I would argue that the final line of the above quotation indicates that while the Board was not willing to officially recognize the precautionary principle as customary international law, it did recognize the precautionary approach as forming part of the required test, notwithstanding that the legislation was created prior to the Rio Declaration. Ultimately, the Board confirmed the decision of the Deputy Administrator to issue the permit, but reduced the total volume of MSMA approved for use.

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<sup>136</sup> *Wier*, paras. 74 -75. It should also be noted that there are some scholars who have identified the precautionary principle as having German origins in relation to good household management, long before it was codified in the Rio Declaration (See, e.g., Jamie Benedickson, *Environmental Law*, 2<sup>nd</sup> ed. (2002) at Chapter 1, section G, at para. 1).

<sup>137</sup> *Wier* at paras. 75-78.

<sup>138</sup> *Wier*, at para. 78.

Josette Wier subsequently applied to the British Columbia Supreme Court ("BCSC") for a judicial review of the Board's decision.<sup>139</sup> Ross, J. of the BCSC allowed the application on the basis that "the Board excluded from its consideration evidence relevant to the question of whether the risk it had identified was reasonable or unreasonable",<sup>140</sup> and remitted the matter back to the Board to approach the question of "unreasonable adverse effects by considering viable alternatives disclosed by the evidence".<sup>141</sup> In reaching this conclusion, Ross, J. stated that "this interpretation of the test articulated in *Earthcare* is also consistent with the both the decision of the Supreme Court of Canada in *Spraytech*, *supra* and with the precautionary approach".<sup>142</sup> Ross, J. went on to state:

Thus, consistent with *Spraytech*, the precautionary principle, as stated in that decision should help to inform the process of statutory interpretation and judicial review. In the circumstances of the case at bar, application of the precautionary principle would favour an interpretation that permitted the Board to consider evidence of toxicity beyond that limited to site specific and application specific concerns. An interpretation that precluded the Board from considering such evidence in any circumstance does not reflect the precautionary principle.<sup>143</sup>

Thus, the BCSC has not only adopted the reasoning in *Spraytech*, but the inclusion of the words "should" and "would" arguably suggest that adhering to the precautionary principle is not merely discretionary but mandatory. Unfortunately, the reasoning in *Wier 2* has not been relied on or considered in any subsequent case law.

Subsequent to the decision in *Wier 2*, the Ontario Court of Appeal ("OCA") in *Fletcher v. Kingston (City)*<sup>144</sup> considered the application of the precautionary principle. More specifically, the intervenor, Pollution Probe, submitted that "s. 36(3) [of the *Fisheries*

<sup>139</sup> *Wier v. British Columbia (Environmental Appeal Board)* 2003 BCSC 1441 ["*Wier 2*"].

<sup>140</sup> *Ibid.*, headnote.

<sup>141</sup> *Ibid.*, headnote.

<sup>142</sup> *Ibid.*, at para. 33.

<sup>143</sup> *Ibid.*, at para. 38.

<sup>144</sup> [2004] O.J. No. 1940 ["*Fletcher*"].

*Act*<sup>145</sup>] must be interpreted in light of the ‘precautionary principle’.”<sup>146</sup> The OCA considered the reasoning in *Spraytech* and concluded:

114957 Canada [*Spraytech*] indicates that the values reflected by the “precautionary principle” may help inform the contextual approach to statutory interpretation. However, the meaning of s. 36(3) of the Fisheries Act is clear and unambiguous. As a consequence, there is no need to resort to the “precautionary principle” as an interpretive guide to the legislative text in question. I note merely that the interpretation of s. 36(3) contained in these reasons **is not inconsistent with the “precautionary principle” established under international law.**<sup>147</sup> [emphasis mine]

At first glance, this interpretation seems consistent with the reasoning in *Wier*. That is to say that, absent explicit statutory language, the precautionary principle does not need to be applied. However, the final line appears to go further and support the reasoning in *Wier* 2. The OCA, while indicating that the statutory language in s. 36(3) of the *Fisheries Act* does not support reference to the precautionary principle, also states that the Court’s decision is not “inconsistent” with the precautionary principle. I would argue that the OCA’s reasoning appears to support the idea that the application of the precautionary principle in certain situations is mandatory. More specifically, the OCA’s reasoning appears to indicate that where the language of a statute specifically provides for it, or where the language of a statute is ambiguous, the precautionary principle must be applied. In my view, the OCA is acknowledging that the precautionary principle is customary international law that should be applied in specific circumstances, such as when legislation specifically mandates, or alludes to, its inclusion. The final line of the

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<sup>145</sup> R.S.C. 1985, c. F-14.

<sup>146</sup> *Fletcher*, at para. 85.

<sup>147</sup> *Fletcher*, at para. 86.

above-quoted paragraph arguably goes so far as to indicate that even absent specific statutory language, the precautionary principle may be applied.

Therefore, the inclusion of the precautionary principle in recent provincial legislation, federal legislation, policies, and its adoption in Canadian case law, has confirmed that the precautionary principle has some relevance in Canada. While it has not been expressly recognized as customary international law in Canada, it is only a matter of time before it is universally accepted and included in further environmental legislation, policy and judicial decisions in Canada.

### **2.3.3 Pollution Prevention**

The final criteria I am relying on in my evaluation of approaches to GHG emissions reduction to determine whether or not an environmental endeavour is advantageous is pollution prevention. Pollution prevention is a reorientation of environmental protection efforts that is intended to reduce or avoid the creation of environmental contaminants in the first instance rather than trying to control and contain their impact later.<sup>148</sup> The federal government's working definition of pollution prevention is "the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste, and reduce the overall risk to the environment or human health."<sup>149</sup>

In my examination of the concept of pollution prevention, I am going to focus on the polluter pays principle as it is a normative doctrine of environmental law.<sup>150</sup> Further, it is

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<sup>148</sup> Canadian Council of Ministers of the Environment, National Commitment to Pollution Prevention (Canadian Council of Ministers of the Environment, 1993).

<sup>149</sup> *Canadian Environmental Protection Act, 1999*, S.C. 1999, c. 33, s.3(1)

<sup>150</sup> Jonathan Remy Nash, "Too Much Market? Conflict between Tradable Pollution Allowances and the "Polluter Pays" Principle" (2000) 24 Harv. Envtl. L. Rev. 465 at 2.

a means of attempting to define pollution prevention, in a method which can be identified. The core of this principle stems from the fundamental, logical, and fair proposition that those who generate the pollution, not the government, should bear pollution costs. This principle underlies much of modern environmental law, and in recent years, has become increasingly important in guiding environmental policy, especially at the international level.

The polluter pays principle first appeared in a legal context in a document prepared by the OECD.<sup>151</sup> This document contained the following recommendation:

The principle to be used for allocation costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment is the so-called "Polluter-Pays Principle." This principle means that the polluter should bear the expenses of carrying out the above mentioned measures decided by public authorities to ensure that the environment is in an acceptable state. In other words, the cost of these measures should be reflected in the cost of goods and services that cause pollution in production and/or consumption. Such measures should not be accompanied by subsidies that would create significant distortions in international trade and investment.<sup>152</sup>

The polluter pays principle was subsequently adopted and internationally codified in 1992 at the Rio Conference in Principle 16 of the Rio Declaration:

National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of

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<sup>151</sup> OECD, *Environment and Economics: Guiding Principles Concerning International Economic Aspects of Environmental Policies*, May 26, 1972, annex para. 1, Doc. No. C(72) 128, 1972 WL 24710. While this was the first legal memorialization of the principle, the economic theory underlying the principle had been recognized before that and had motivated environmental policies in various countries before 1972. See Ursula Kettlewell, "The Answer to Global Pollution? A Critical Examination of the Problems and Potential of the Polluter-Pays Principle" (1992) 3 Colo. J. Int'l Envtl. L. & Pol'y 429, 430 n.1; Gregory Westsone & Armin Rosencranz, "Transboundary Air Pollution: The Search for an International Response" (1984) 8 Harv. Envtly. L. Rev. 89, 96-97.

<sup>152</sup> OECD, *Environment and Economics: Guiding Principles Concerning International Economic Aspects of Environmental Policies*, *supra* note 151, annex para. 4.

pollution, with due regard to the public interest and without distorting international trade and investment.<sup>153</sup>

Principle 16 indicates that the underlying theme or goal of the polluter pays principle is that of internalizing external costs. This principle requires polluters to internalize abatement costs by forcing them to pay for their own pollution. This principle creates incentives for polluters to reduce their waste production or to reduce the harmful effects of the waste they do produce.

The polluter pays principle, when properly implemented, can have pedagogical effects too.<sup>154</sup> It instructs individual actors, even those not directly subject to regulation, to accept responsibility for their own pollution.<sup>155</sup> In theory, this should cause individuals and corporations to take responsibility for their own polluting actions, as failure to do so would result in a cost to them.

Therefore, the polluter pays principle emphasizes the responsibility of those who engage in environmentally harmful conduct, either as producers or consumers, for the costs associated with their activity. These actors should not be subsidized financially by direct public expenditures for environmental harm, nor should they enjoy indirect advantages from damaging the environment in ways that are not attributed back to them but are instead borne by others. This concept enjoys constitutional status within the European Union<sup>156</sup> and has begun to influence penalty regimes, economic incentives, and the nature of environmental restoration programs in Canada. For example, recognition of the

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<sup>153</sup> *Rio Declaration*, supra note 29, Principle 16.

<sup>154</sup> See Carol M. Rose, "Rethinking Environmental Controls: Management Strategies for Common Resources" (1991) *Duke L.J.* 1 at 36 ("We need to pay attention to the lessons we provide for ourselves through our laws").

<sup>155</sup> See *ibid* at 31 ("Norms that induce [voluntary cooperative] behaviour can be of some considerable importance in our regimes for protecting the environment.")

<sup>156</sup> *Single European Act*, OJ L 169, 29. 6. 1987, Article 25.

polluter pays principle is one of the goals of Nova Scotia's *Environment Act* where this concept is explained as "confirming the responsibility of anyone who creates an adverse effect on the environment to take remedial action and pay for the costs of that action."<sup>157</sup>

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<sup>157</sup> *Environment Act*, S.N. 1995, c.E-13.1, s. 2(c).



## **CHAPTER III     Different Approaches to Environmental Regulation**

### **3.1 Introduction**

Environmental policy initiatives have increased in breadth and originality over time. The fundamental purpose of environmental policy initiatives is to protect the environment. Although some policy initiatives serve to effectively protect the environment, there are some drawbacks to their implementation. One drawback is that not all environmental policy initiatives are cost effective. In fact, many environmental policy initiatives result in financial deficits for the governments or organizations who implement them.<sup>158</sup> Further, environmental policy initiatives have varying degrees of success in reducing the impact of harmful activities on the environment.<sup>159</sup>

Environmental policy initiatives can be categorized as the following: (i) command and control regulations; (ii) negotiation; (iii) product information or ecological labelling; (iii)

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<sup>158</sup> For example, there are beverage container deposit laws in several U.S. states, several provinces in Canada and several European countries. These measures provide for deposits upon the purchase of beverages that are refundable upon the return of the empty containers. The benefits from this type of program are largely environmental in character: they reduce litter, conserve energy and natural resources, and reduce the quantities of solid waste going into landfills. This type of program, however, also entails costs. These include additional capital and operating costs to the beverage industry. In addition, there is some concern that deposit programs divert potential revenues away from curbside recycling programs, making the latter economically infeasible. There have been several studies of the costs and benefits of container deposit legislation but the studies produce conflicting results on the relative magnitude of benefits and costs. It is difficult, on purely economic grounds, to make an airtight case for deposit laws. (See OECD, *Environment and Taxation: The Cases of the Netherlands, Sweden and the United States* (Paris, France: 1994) at 119; Jean-Phillipe Barde, "Environmental Taxation: Experience in OECD Countries" *Ecotaxation*, (London, UK: Earthscan Publications Limited, 1997); Thomas C. Kinniman and Don Fullerton "How a Fee per-Unit Garbage Affects Aggregate Recycling in a Model with Heterogeneous Households" in Lans Bovenberg and Sijbren Cnossen, eds., *Public Economics and the Environment in an Imperfect World*, (Boston, MA: Kluwer Academic Publishers, 1995), at 135-160).

<sup>159</sup> The effect of a user fee on the disposal decisions of each household determines the communities' aggregate changes of garbage, recycling, and litter quantities that would result from the implementation of a user-fee program. These aggregate changes comprise important costs and benefits to a community attributable to the implementation of a user-fee program. It is suggested that aggregate garbage will decrease with the value of the user fee. Aggregate litter increases with the user fee, but perhaps surprisingly, aggregate recycling may decrease. The magnitude of each of these changes can vary across communities. (Kinniman & Fullerton, *ibid* at 136).

moral persuasion; and (iv) economic instruments. Environmental taxes, such as emission taxes or user fee charges, are economic instruments. This chapter provides an overview of these environmental policy instruments, and an analysis of their potential effectiveness in meeting my prescribed criteria of cost-effectiveness, precaution, and pollution prevention.

### 3.2 Command and Control Regulations

Even though there is a current trend towards greater use of economic instruments in environmental policy planning, the main environmental policy instrument in most countries is the use of command and control regulations.<sup>160</sup> Command and control regulations are a form of performance standards consisting either of emission limits for each source, or of concentration limits that require emissions-related measures if the concentration is too high.<sup>161</sup> Regulations may either limit the emission or concentration of a substance, or they may totally ban a product or activity.<sup>162</sup> Since the emission limitation is mandated by regulation, each polluter must achieve the environmental objectives codified in the regulation independent of the implied costs. The regulations do not provide any parameters in relation to the financial burden placed on the polluter. They merely restrict what a person or firm can or cannot do, but do not provide any direction as to how to meet these objectives. Therefore, a polluter may be required to expend a substantial amount of money in order to achieve the regulatory standard. As such, regulations are not the most cost-effective way to achieve a given environmental

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<sup>160</sup> OECD, *Economic Instruments for Environmental Protection*, (Paris: OECD, 1989).

<sup>161</sup> Wallart, *supra* note 95, at 137.

<sup>162</sup> *Ibid*, at 18. (See for example Agricultural Waste Control Regulation, B.C. Reg. 131/92; Land-based Fin Fish Waste Control Regulation, B.C. Reg. 68/94; Oil and Gas Waste Regulation, B.C. Reg. 208/96, all pursuant to the British Columbia *Waste Management*, R.S.B.C. 1996, c. 482.)

objective for either the potential polluter, or the government attempting to enforce the regulations.

Moreover, the command and control approach does not generate revenue that can be used to achieve further environmental objectives. With command and control regulations, the individual or business owner expends resources to ensure that they are in compliance with the regulations. However, the resources used to adhere to the regulations are not paid directly to governments or environmental organizations.

The monitoring costs of command models of regulation have proven to be substantial. As well, regulators have faced significant political and economic costs when forced, by the regulatory model they have chosen, to initiate Draconian enforcement powers including plant closures and production stoppages.<sup>163</sup>

In addition to the fact that the command and control approach is not necessarily cost-effective, the command and control approach has limited effectiveness in protecting the environment. First, there is a concern that industry may choose to ignore the regulations.<sup>164</sup> If there is no fine or penalty imposed, or if they are too low, industries may not feel a need to conform to the regulations. Second, once a polluter conforms to an existing standard, or limits their emissions or concentration of a regulated substance to the prescribed amount, there is no incentive to achieve a further reduction in emissions;<sup>165</sup> they have done all they have to do. Once a firm has achieved the mandated target, it is unlikely that the firm will expend further resources without the possibility of

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<sup>163</sup> David S. Cohen, "The Regulation of Green Advertising: The State, The Market and The Environmental Good" in Elaine Hughes... eds., *Environmental Law and Policy* (Toronto, ON: Emond Montgomery Publications Limited, 1993).

<sup>164</sup> *Ibid.*

<sup>165</sup> Wallart, *supra* note 95, at 18.

some form of an economic gain. To increase the utility of regulations, many governments have begun to implement staggered regulations, which contemplate a certain percentage reduction in emissions over a prescribed period, followed by a further reduction over a subsequent period.<sup>166</sup> The use of staggered legislation increases the utility of the command and control approach.

In summary, command and control regulations do not satisfy all of my prescribed criteria. First, as discussed, they are not cost-effective. Second, while they can be precautionary in nature, this will only occur if legislation is drafted to explicitly include precautionary measures. And, finally, while command and control regulations may be seen as attempts to reduce pollution, their overall effectiveness, as discussed above, varies depending on the regulation.

### 3.3 Negotiation

Negotiation is another environmental policy instrument. If there are few polluting businesses, or if they are well organized, governments may approach and seek to negotiate emission reduction guidelines.<sup>167</sup> This approach is not strictly considered as a command and control approach; it is a version of regulatory approach,<sup>168</sup> as it creates a pseudo-regulation to which the businesses must adhere. In other words, once a negotiation is entered into between government and a business, the business is required to conform to the agreed upon terms, much in the same manner as businesses would be

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<sup>166</sup> See for example Antisapstain Chemical Waste Control Regulation (B.C. Reg. 300/90); Asphalt Plant Regulation, B.C. Reg. 217/97; Cleaner Gasoline Regulation, B.C. Reg. 498/95; Ozone Depleting Substances and Other Halocarbons Regulation, B.C. Reg. 387/99; and Wood Residue Burner and Incinerator Regulation, B.C. Reg. 519/95, all under the British Columbia *Waste Management Act*, R.S.B.C. 1996, c. 482.

<sup>167</sup> Wallart, *supra* note 95, at 21.

<sup>168</sup> OECD, *Economic Instruments for Environmental Protection*, *supra*, note 160.

required to adhere to a regulation. The negotiation can take two forms.<sup>169</sup> First, it can be a preliminary step towards the elaboration of a regulation, in which case it improves its flexibility and possibilities of application. It can also take the form of a voluntary agreement between public authorities and polluters on a reduction of the pollution. In this case, negotiations are made official and can be assimilated to an environmental protection instrument. These voluntary agreements are referred to as "covenants".

Negotiation provides flexibility, in that governments may approach businesses that the government feels are more environmentally harmful than others. This results in the imposition of standards on selective businesses. However, as the term "negotiation" implies, there is the necessity that the government offer an incentive to the business to reduce its emissions. As a business will likely have to expend financial resources in order to comply with environmental standards, governments will need to provide incentives that contain a financial component or benefit for the business. In other words, an incentive offered to a business would have to be of a greater or equal value to the business than the cost of adhering to the standards outlined in the agreement. Due to the flexibility of this approach, many commentators have doubts about its effectiveness.<sup>170</sup>

There are several drawbacks to the negotiation approach. First of all, it may be seen as a form of favouritism. Governments may be seen to be favouring one business over another. Businesses who do not enter into negotiations are not expected to meet any guidelines and may continue their actions without government intervention. This may result in a change in the competitiveness of a particular business. For example, if there

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<sup>169</sup> Wallart, *supra* note 95, at p. 21.

<sup>170</sup> L. Solsbery and P. Wiederkehr, "Énergie: actions volontaires contre le CO<sub>2</sub>" (October – November 1996) *L'observateur de l'OCDE* at 4-45.

are two competing businesses and one enters into an agreement with the government to reduce emissions in exchange for a particular contract or government approval, that business may gain a competitive advantage in the marketplace. Further, governments are not in a position to negotiate with all businesses. Negotiation is not always cost-effective as there is always the hidden cost of brokering the negotiation.

### **3.4 Product Information or Ecological Labelling**

Governments may also improve the availability of product information, by forcing businesses to label their products. Ecological labelling is information on the ecological consequences of the consumption of a product.<sup>171</sup> The optimal functioning of a market requires the most complete information on all characteristics of the products exchanged.<sup>172</sup> For example, a government may force manufacturers and retailers to indicate the energy consumption of a product so that the consumer can make his or her choice with full knowledge of the future implications of his or her purchase.<sup>173</sup> This kind of government intervention in the marketplace recognizes that for consumers to make environmentally appropriate choices when canvassing the marketplace, they must have easy access to environmental impact information that is accurate, reliable and independently verifiable.<sup>174</sup>

As the environment is a public good,<sup>175</sup> the choice of more ecological products does not directly benefit the buyer. On the contrary, products with a favourable ecological impact

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<sup>171</sup> Wallart, *supra* note 95, at 22.

<sup>172</sup> *Ibid.*

<sup>173</sup> *Ibid.*, at 22.

<sup>174</sup> Cohen, *supra* note 163, at 403.

<sup>175</sup> P.A. Samuelson, "The Pure Theory of Public Expenditure", *Review of Economics and Statistics* 36 at 387-9; Lans Bovenberg and Sijbren Cnossen, eds., *Public Economics and the Imperfect World* (Boston, MA: Kluwer Academic Publishers, 1995) at 3.

are often more expensive than comparable, less clean products. This approach benefits business, and at the same time has a favourable impact on the environment. In theory, this approach is cost-effective as the only additional cost is the cost of displaying the product information. However, this policy instrument relies on the consumer or purchaser to make a moral choice to select the more environmentally sensitive product. For this reason, eco-labelling relies on strong environmental ethics. Eco-labelling entails a control cost, as well as complex analysis procedures, if the whole life cycle of a product has to be taken into account.<sup>176</sup>

There is no direct financial incentive for the manufacturer, retailer or consumer to use ecological labelling. In addition, this approach may affect the competitiveness of a product. There may, however, be an advantage if, for example, there are two products on the market that cost the same amount of money, but their product labels identify that one is more environmentally friendly than the other. In this case, one producer may gain a competitive advantage that was previously hidden.

Eco-labelling has been introduced in the European Union, West Germany, Japan, Norway and India.<sup>177</sup> Eco-labelling also exists in the Canadian marketplace.<sup>178</sup>

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<sup>176</sup> Wallart, *supra* note 95, at 22.

<sup>177</sup> Linda Spedding, "Trends in Transboundary Environmental Standards" (2001) 2:3 *Due Diligence and Risk Management*.

<sup>178</sup> The Canadian Environmental Choice Program, which is perhaps the most sophisticated and well developed of existing programs, includes four stages. First, the Environmental Choice Board selects and tentatively defines product category. Very early on in this process, a life-cycle biophysical-environmental impact review of the products constituting the proposed product category is prepared. The second stage involves further development, through the Canadian Standards Association (CSA) and the voluntary multi-sectoral task forces, of the environmental guidelines issued by the Minister of the Environment under the *Canadian Environmental Protection Act*. These guidelines, which are based on environmental impact assessments, are specific to each product category and address the performance and design specifications to which products must comply in order that they may be allowed to display the federally owned Ecologo. After the guidelines have been fully developed at the task-forces level, they are then made subject to

Therefore, product information or eco-labelling may be cost-effective, as the implementation of this program has little cost to the producer or manufacturer. Eco-labelling does not satisfy the precaution criteria as this endeavour is not anticipatory in nature. This initiative provides for the disclosure of information after manufacture, and after the environmental harm has occurred. It is an accounting of what has already occurred, rather than a measure implemented in an attempt to avoid future harm. In addition, this environmental policy tool has little impact on pollution prevention. I would argue, however, that it may assist with pollution prevention in the sense that eco-labelling provides consumers with full disclosure of the environmental consequences of the production of a product. This knowledge may persuade consumers to purchase alternative products, and therefore, encourage producers or manufacturers to utilize pollution prevention techniques when producing or manufacturing a product, thereby increasing their adherence to the polluter pays principle. This is, however, merely an incidental side effect.

### **3.6 Moral Persuasion**

Governments may attempt to influence public behaviour by persuading individuals to adopt a favourable attitude towards the environment, which is often referred to as "moral

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review by the independent, scientifically competent Co-ordinating Technical Committee and to a 60-day public-review process. The third stage follows the promulgation of the new environmental guidelines and involves the licensing, for a fee, of Ecologo use in the product marketing of individual manufacturers, importers and retailers that meet or exceed the guidelines. Important to the licensing program is product testing and confirmation undertaken by the CSA to ensure that a particular product or group of products complies with the environmental guideline requirements. This is the fourth and final stage, where all licensed users are continuously monitored to ensure compliance with the environmental guidelines and the terms of their licenses. The licensing period is three years, and the licensing agreement permits spot-auditing of manufacturing plants with immediate access to all relevant production and purchase records. Sanctions for non-compliance include contract termination, product recalls and even damage recovery by the government, but is not clear whether non-compliance lists will be made public under this program. (See Cohen, *supra* note 163, at 404)



suasion".<sup>179</sup> The point of this approach is to push individuals and businesses to think about the social aspect of their actions or activities rather than their own vested interest. Environmental education allows future adults to have a better knowledge and comprehension of the mechanisms according to which nature works. Education and persuasion are not without cost; it costs money to create educational materials. As to their effectiveness, it seems to depend on different factors, such as the environmental problem considered, the urgency of the situation, or social and cultural influences.<sup>180</sup> Overall, however, information and persuasion seem to be less efficient than regulations or economic instruments because consumers, similar to governments and businesses, are not always willing to change their daily patterns without some form of compensation or incentive.

Moral persuasion may, therefore, be seen to conform to at least one of the prescribed criteria. Moral persuasion is precautionary in nature as it involves the education of society on existing and potential environmental harms. I would argue, however, that it is neither cost-effective as it costs governments or interested parties money to advertise and provide information to consumers or the public, nor does it conform to the polluter pays principle as this has no direct actual impact on the behaviour of the manufacturer or producer. Arguably, if enough individuals develop a social conscience, producers or manufacturers may increase their efforts at pollution prevention. However, whether a

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<sup>179</sup> Wallart, *supra* note 95, at 23.

<sup>180</sup> Despite individual costs exceeding individual benefits, Danish people sort their waste because of a sense of moral duty (J. Thorgersen, "Recycling Consumer Waste: A Behavioural Science Approach to Environmental Protection Policy", in B. Burgenmeier, ed., *Economy, Environment and Technology: A Socio-Economic Approach* (New York, NY: M.E. Sharpe, 1994)).

sufficient number of individuals will be persuaded to change the products they use in order to reduce harm to the environment is questionable.

### **3.6 Economic Instruments**

In my opinion, the environmental policy tool that is potentially the most cost effective, adheres to the precautionary approach and the precautionary principle, and reduces pollution, is the economic instrument. Economic instruments have the potential to minimize the cost of achieving a particular environmental objective by charging an individual or business for the right to engage in an environmentally harmful activity. In other words, an economic instrument will often provide a financial benefit to an individual or business if that individual or business utilizes a more environmentally friendly approach in the manufacture, production or distribution of their product. Economic instruments include: (i) marketable emission permits; (ii) grants; (iii) subsidies or tax reduction incentives; (iv) regulations; and (v) the imposition of environmental fines, taxes, charges or fees.

#### **3.6.1 Marketable Emission Permits**

Under a marketable permit scheme, the appropriate level of environmental quality is defined in terms of allowable emissions.<sup>181</sup> Permits are allocated to businesses, generally on the basis of historic emissions. These permits enable the owner to emit a certain amount of pollution. Permits can be traded and sometimes banked.<sup>182</sup> A business that reduces its permit requirements will be able to sell its permit to another business or back

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<sup>181</sup> D.G. McFetridge, "The Economic Approach to Environmental Issues" in Elaine Hughes and ... eds.,] *Environmental Law and Policy* (Toronto, ON: Emond Montgomery Publications Limited, 1993) at 391.

<sup>182</sup> *Ibid*, at 391.

to the government who issued it. This approach has the potential to be environmentally effective, however, but has met with limited success to date.<sup>183</sup>

Marketable emission permits allow a government to determine the quantity of emissions for a country or region.<sup>184</sup> The government then distributes the corresponding number of permits to polluters. Each permit allows the permit holder to emit pollution in accordance with his or her permit.<sup>185</sup> In general, governments allow permits to be exchanged between different participants. These permits can serve as effective negotiating tools between different organizations within similar industries. Marketable emission permits have proven to be cost-effective in some circumstances.<sup>186</sup> The main advantage of a system of emission permits is that the regulatory authority can directly control the overall quantity of emissions.

Emissions trading on a global level will be made possible by public international law, through environmental policies, as well as the private law rules for negotiable instruments. Emission permits will become tools in negotiations throughout the world.

Tradable permit systems have only been implemented in a few countries. There are provisions for pollution trading in Australia, Canada and Germany, but with limited scope and application.<sup>187</sup> Tradable permits are applied on a large scale only in the United

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<sup>183</sup> A system of marketable effluent permits was introduced in 1981 at Fox River Wisconsin. The permits last for five years and allow the holder to discharge effluent with a specified biological oxygen demand (BOD). Permits were granted to pulp and paper mills and municipal waste treatment plants. However, in the first six years of its implementation, there was only one permit trade. (See, McFetridge *supra*, note 181, at 391).

<sup>184</sup> Barde, *supra* note 158, at 225.

<sup>185</sup> *Ibid.*

<sup>186</sup> Alexander J. Black, "Emissions Trading and the Negotiation of Pollution Credits", (July 2000) 225 *Energy Economists (Financial Times)* 14.

<sup>187</sup> Barde, *supra* note 158, at 226.

States, in the particular context of the acid rain program.<sup>188</sup> The template for emissions trading is the United States' Environmental Protection Agency's Acid Rain Program with a market based trading system for SO<sub>2</sub> and NO<sub>2</sub> emissions.<sup>189</sup> This regulatory reform measure has created a limited system of transferable pollution credits. Under the Environmental Protection Agency's rules, electricity generators must remove nearly one million tons of nitrogen oxide by the year 2003.<sup>190</sup> The goal of this initiative is to reduce lung-related health problems, water pollution and regional smog.

The potential of emissions trading has yet to be fully explored. The Kyoto Protocol specifically includes emissions trading as a tool to reduce GHG emissions. Emissions trading can potentially satisfy all of the prescribed criteria; it may be cost-effective, it may be precautionary in nature, and it may adhere to the polluter pays principle. However, until a recognized program of emissions trading is fully adopted in Canada, its utility and effectiveness cannot be determined.

### **3.6.2 Grants, Subsidies and Tax Reduction Incentives**

Another economic instrument utilized by governments in an attempt to achieve environmental objectives is the implementation of grants, subsidies or tax reduction incentives.

A subsidy is essentially a financial incentive offered by a government to an individual or business to encourage them to reduce polluting emissions or to encourage more

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<sup>188</sup> *Ibid.*

<sup>189</sup> *Ibid.*

<sup>190</sup> *Ibid.*

environmentally sensitive behaviour.<sup>191</sup> To many, subsidizing individuals or businesses who do not adopt environmentally sensitive behaviour is unfair. Essentially, the government is paying a bad individual or business to become good. Further, subsidies have to be financed. Governments need to generate revenue in order to provide subsidies. Often this revenue is generated through some form of taxation of the general public. This results in the public paying the polluter to stop its behaviour. Ultimately, subsidies can be seen as a means of bribing businesses to behave appropriately. As such, subsidies clearly do not adhere to the polluter pays principle.

An abatement subsidy works in a similar manner as taxation.<sup>192</sup> Essentially, the authorities would pay a fee to each business for every ton the business stopped emitting. Thus, the more a business reduced its emissions, the more subsidy it would receive.<sup>193</sup> The principle is that businesses would find it profitable to change the materials or processes they use. There are few examples of abatement subsidies in practice.

An abatement subsidy adheres to the precautionary principle of environmental management, because it encourages businesses to think about their actions before they proceed with them. This is a forward-thinking approach that encourages businesses to act proactively. Also, as there is no required target, businesses can continue to reduce their pollutants until they are no longer polluting.

However, as with traditional subsidies, businesses are being paid to behave. The money that forms the subsidy has to be raised by the government. This money is likely obtained

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<sup>191</sup> Anthony Scott, "Economic Incentives: The Problem of Getting Started" in Elaine Hughes, eds., *Environmental Law and Policy* (Toronto, ON: Emond Montgomery Publications Limited, 1993) at 388.

<sup>192</sup> *Ibid.*, at 390.

<sup>193</sup> *Ibid.*

through taxation. Thus, the public is ultimately paying the businesses for their compliance with existing standards.

Unlike other tax provisions, which define the amount or transaction subject to tax and the rate or rates at which the tax applies, tax incentives represent deliberate departures from otherwise applicable taxes in order to encourage the activity at which the incentive is directed. For this reason, these subsidies are accurately described as "tax expenditures" and properly evaluated like any other public spending program, by weighing the public goals pursued by the program against its cost and overall effectiveness in promoting these goals.<sup>194</sup> In order to justify a tax incentive for environmental purposes, therefore, it is necessary to defend both a public subsidy for the product or activity that the incentive is designed to encourage, and the delivery of this subsidy in the form of a tax incentive rather than direct government spending.

Beginning with the first of these issues, at least three reasons can be advanced to support public subsidies for environmentally-sensitive behaviour. First, to the extent that certain kinds of activities generate public benefits in addition to those enjoyed by the persons engaging in the activity, economic analysis suggests that a subsidy may be appropriate to encourage a socially efficient quantity of the activity by internalizing these positive externalities.<sup>195</sup> For this reason, for example, governments often subsidize the research and development of new products and processes, the benefits from which are typically enjoyed by third parties as well as those incurring the cost of the research and

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<sup>194</sup> See, e.g., Stanley S. Surrey, "Tax Incentives as a Device for Implementing Government Policy: A Comparison with Direct Government Expenditures" (1970), 83 Harv. L. Rev. 705; Stanley S. Surrey, *Pathways to Tax Reform: The Concept of Tax Expenditures* (Cambridge, MA: Harvard University Press, 1985).

<sup>195</sup> See, e.g., the discussion of positive externalities in Edward A. Zelinsky, "Efficiency and Income Taxes: The Rehabilitation of Tax Incentives" (1986) 64 Tex. L. Rev. 973, at 1005-8.

development. For this reason as well, it may be economically efficient to subsidize both research and development regarding environmentally-sensitive processes and technologies,<sup>196</sup> and environmentally-sensitive forms of consumption and production that yield public benefits in the form of reduced environmental harm.<sup>197</sup>

A second reason to subsidize environmentally-sensitive products and activities is to encourage dynamic efficiencies resulting from reductions in the cost of these products and activities over time. To the extent that subsidies increase the demand for new products and activities, output is likely to increase and costs can be expected to fall with increasing economies of scale. For this reason, subsidies for environmentally-sensitive products and activities may be supported on the grounds that they accelerate market penetration of new technologies, creating a more mature market for these technologies, and reducing the costs of environmental protection.<sup>198</sup> Where an expanding market causes the cost of an emerging clean technology to be lowered to a level that is comparable with that of environmentally-harmful technologies currently in use, moreover, subsidies and other environmental policies can “flip” the clean technology from the low-production, high-cost state to a stable high-production, low-cost state, with

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<sup>196</sup> See, e.g. Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 18 (explaining that “production of new environmental technologies yields a positive technological externality that provides a benefit to the public”).

<sup>197</sup> *Ibid.* Although environmental taxes represent a more efficient response to the negative externalities associated with environmental harms, the use of subsidies to reduce these harms may be efficiency enhancing where environmental taxes are levied at low rates or not at all.

<sup>198</sup> See, e.g. Energy Information Administration, *Analysis of The Climate Change Technology Initiative: Fiscal Year 2001*, (Washington, D.C.: EAI, 2000) at x (characterizing “the intended purpose” of the Clinton Administrations’ Climate Technology Initiative as “encouraging the penetration of [new and environmentally-sensitive] technologies, reducing costs, and creating a more mature market”). See also Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 18-19 (explaining that the goal of these incentives “is not to find the optimal balance between the cost of emissions reductions and the benefits of environmental improvements at a given level of technology, but rather to achieve a market transformation that makes clean production cheaper and relaxes the environment/economy tradeoff”).

corresponding benefit to the environment and the economy.<sup>199</sup> As the cost-effectiveness of subsidies for this purpose depends on the extent to which demand for the clean technology increases as a result of the subsidy, attention to price elasticities is crucial in this context.<sup>200</sup>

A third rationale for environmental subsidies emphasizes their educational and transformative function, conveying information about environmentally-preferred products and activities, fostering different attitudes toward environmentally-sensitive and harmful products and activities, and encouraging environmentally-sensitive behavioural changes. Where established practices cause environmental harms, for example, subsidies and other environmental policies can encourage environmentally-sensitive alternatives by increasing awareness and encouraging institutional changes and make these alternatives less costly and more feasible.<sup>201</sup>

Although one or more of these rationales might justify a subsidy for environmental purposes, it is not obvious why such a subsidy should be delivered in the form of a tax incentive rather than a direct grant. Indeed, tax incentives are often criticized on the grounds that they increase the complexity of tax legislation, establish open-ended budgetary commitments, lack effective accountability, by-pass traditional legislative controls on budgetary expenditures, and portray as tax reductions what are in effect spending programs.<sup>202</sup> Where tax incentives take the form of exemptions, deductions or deferrals from progressive income taxes, moreover, these measures are justifiably

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<sup>199</sup> *Ibid*, at 18.

<sup>200</sup> Where demand for the clean technology is price inelastic, the effect of a subsidy is to provide a windfall to those who would have acquired the technology in any event. In contrast, where demand is highly elastic, the subsidy can induce sufficient market penetration and cost reductions to justify its cost.

<sup>201</sup> See, e.g., Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 19-20.

<sup>202</sup> See, e.g., Surrey, *Pathways to Tax Reform*, *supra* note 194 at note 66 at 126-54.



regarded as “upside-down” subsidies that confer a greater benefit on taxpayers with high-incomes than those with low-incomes.<sup>203</sup>

While these concerns suggest that direct grants are preferable to tax incentives in many contexts, they do not rule out all tax incentives. Where an incentive is introduced and monitored in a manner similar to a spending program, for example, with its cost estimated in advance and reviewed regularly thereafter through annual tax expenditure budgets, concerns about accountability and transparency are greatly reduced.<sup>204</sup> Where the amount of the incentive does not depend on the taxpayer’s level of income, moreover, concerns about equitable distribution of the associated tax benefits are similarly allayed.<sup>205</sup> In these circumstances, in fact, tax incentives may be preferred to direct grants on the grounds that they facilitate more decentralized forms of decision-making and are less costly for governments to promote and administer.<sup>206</sup> Whether these advantages are actually satisfied in the context of a particular tax incentive, however, depends on the design of the incentive and the manner of its administration. As a result, these policy choices cannot be made in the abstract but only by considering the particular incentive in question.

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<sup>203</sup> See, e.g., Surrey, “Tax Incentives as a Device for Implementing Government Policy” *supra* note 194 at 720-25.

<sup>204</sup> Both Canada and the United States publish annual estimates of tax expenditures, measuring their cost in terms of forgone revenues. For a useful history of the origins of these tax expenditure budgets, see Jonathan Barry Forman, “Origins of the Tax Expenditure Budget” (1986), 30 *Tax Notes* 538. For a recent proposal to extend the concept to include the costs of regulatory measures, see Julie Roin, “Truth in Government: Beyond the Tax Expenditure Budget” (2003) *Hastings Law Journal*, online: [http://ssrn.com/abstract\\_id=350981](http://ssrn.com/abstract_id=350981).

<sup>205</sup> This is the case, for example where an incentive takes the form of a refundable tax credit in computing purposes. Exemptions or deductions in computing flat-rate sales or consumption taxes would also appear to satisfy this concern, though such measures would presumably have distributional implications.

<sup>206</sup> See, e.g., Zelinsky, *supra* note 195, at 1010-12.

One alternative to subsidies is product stewardship. In British Columbia, the provincial government has created stewardship programs for beverage containers, lead-acid batteries, medications, paint, scrap tires, solvents, flammable liquids, gas, pesticides and used oil.<sup>207</sup> Industry product stewardship is defined as "a management system based on industry and consumers taking life-cycle responsibility for the products they produce and use".<sup>208</sup> In British Columbia, the focus is on household hazardous waste. Producers and users of products that create household hazardous waste in British Columbia have now assumed the financial and management responsibilities for the residuals created. In addition, brand-owners of beverage containers are required to establish a province-wide return collection systems for used beverage containers under a deposit refund system.<sup>209</sup> The creation of stewardship programs enables the provincial government to move away from government managed and tax payer financed waste management programs. Stewardship programs, therefore, adhere to the "polluter pays" principle.

Prior to implementing the stewardship programs in British Columbia, the provincial government attempted to create a program to encourage individuals and businesses to recycle household hazardous waste.<sup>210</sup> This program was relatively unsuccessful. As a result, in 1991, the Ministry established the Financial Incentives to Recycle Scrap Tires ("FIRST") and Lead-Acid Battery Collection programs, the first of their kind in

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<sup>207</sup> See the Beverage Container Stewardship Program Regulation, B.C. Reg. 406/97; Post Consumer Paint Stewardship Program, B.C. Reg. 200/94; Post Consumer Residual Stewardship Program Regulation, B.C. Reg. 111/97.

<sup>208</sup> Ministry of Water, Land and Air Protection, "Overview of Industry Product Stewardship in British Columbia" (online: <http://wlapwww.gov.bc.ca/epd/epdpa/ips/>).

<sup>209</sup> Beverage Container Stewardship Regulation, *supra* note 207.

<sup>210</sup> The Ministry of Water, Land and Air Protection established eight pilot household hazardous waste depots in eight communities throughout the province in 1990. These depots were sited in areas where regional ministry offices were located. The depots cost taxpayers \$1.4 million per year, served less than 0.5 percent of all B.C. householders, and, consequently, were discontinued in 1994 (Ministry of Water, Land and Air Protection, *supra* note 208).

Canada.<sup>211</sup> These programs provided consumers with waste management options for scrap tires and used lead-acid batteries. These programs are government-operated and consumer funded, through government levies assessed on the sale of new tires and batteries. There is only minimal industry or producer responsibility.

The British Columbia stewardship program has evolved and changed. Now, the programs are industry operated and industry and/or consumer funded. Therefore, the government's involvement is reduced. This serves to place the cost of the program into the hands of the parties who are responsible for the pollution.

The British Columbia government has successfully created and implemented a stewardship program that significantly reduces the amount of waste entering British Columbia's landfills. Consumers pay a recycling fee when purchasing beverage containers. When the container is returned, the fee is returned to the consumer. If a consumer does not return the container, then they are not given the fee back. Effectively, the consumer has now paid a fee for the container. Even though the current \$0.05 fee is minimal, it encourages consumers to return their containers. This type of program encourages both producers and consumers to consider environmental ramifications in production and purchasing. In general, it is effective because not adhering to the program results in an incurred cost.

Like it or not, we live in a society that is driven predominantly by financial concerns. A program that does not confer a financial benefit or create a financial loss will not have the same effect as one that does. The key to successful environmental management is to find

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<sup>211</sup> *Ibid.*

a program that can balance environmental and economic concerns. In other words, the key to successful environmental management is to find a program that is cost-effective, is precautionary in nature, and helps prevent or reduce pollution.

### 3.6.3 Regulations

Regulations as an economic instrument are distinct from regulations which serve only to limit an activity or pollutant. A regulation that is an economic instrument is one that imposes a cost on an individual or business for carrying out a harmful activity. Generally this is done through the implementation of a permit or licensing fee system.<sup>212</sup> The implementation of permits and licenses in the existing regulatory framework is a result of the excessive cost associated with monitoring command and control regulations.<sup>213</sup> The use of regulations as economic instruments relies on the enforcement of rules or standards for pollution behaviour. The economic aspect of this approach is the cost to the business of complying with requirements imposed by the regulations. This approach, similar to the application of fines, embodies the principle that "the polluter should pay".

<sup>214</sup> The imposition of a cost encourages producers and manufacturers to engage in a cost-benefit analysis of their production or manufacturing process in order to determine if their processes are cost-effective.

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<sup>212</sup> In Canada, there is a permit and licensing system in the fishing industry. The federal government has implemented procedures and regulations governing these permits and licenses in the *Fisheries Act*, R.S.C. 1985, c. F-14, and related regulations.

<sup>213</sup> R. Coase, *The Firm, the Market and the Law* (Chicago, IL: The University of Chicago Press, 1988).

<sup>214</sup> Scott, *supra* note 191 at 388.

### 3.6.4 Environmental Fines, Taxes, Charges or Fees

There are three basic types of environmental taxes: measured emission taxes, the use of other taxes to approximate a tax on emissions, and non-incentive taxes.<sup>215</sup>

#### 3.6.4.1 Measured Emission Taxes

Emission taxes or charges are direct payments on the quantity and quality of the pollutant discharged.<sup>216</sup> They are applied in many environmental fields and in most countries, although with varying intensity.<sup>217</sup> In many cases, environmental taxes based on measured emissions will have higher administrative costs than taxes which are levied on some other base, but will be better linked to the amount of pollution caused, and will thus provide a more precisely targeted incentive to reduce pollution.

For a measured emission tax, the authorities would impose a tax, a fee or charge, on each ton each business was emitting. Thus, the more a business dumped into the water, the sewers or the air, the more it would have to pay. The principle is that the businesses would find it profitable to change the materials or fuels they use, the processes they follow, or the products they make, in such a way as to reduce their tax bill. If a business chooses not to implement an abatement policy, then they would be liable to pay more taxes. The goal of this policy is to reduce pollution, but it may also generate revenue, particularly if businesses choose not to implement the abatement measures.

In the case of measured emissions taxation, the only actions that the polluter can take to reduce its tax liability are actions that will also reduce emissions. The cost effectiveness

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<sup>215</sup> Steven Smith, "Environmental Tax Design" in O'Riordan, Timothy, ed., *Ecotaxation* (UK: Earthscan Publications Limited, 1997), at 23.

<sup>216</sup> *Ibid.*

<sup>217</sup> *Ibid.*

of this measure depends on the amount charged to the polluter. If the amount charged is equal to or greater than the cost of monitoring and enforcing the program, then it will be financially advantageous and the government will generate revenue. However, if the amount charged is less than the monitoring and enforcement costs, then more revenue will be generated. Governments have the ability to change these charges, and should do so to ensure that they are cost-effective. Implemented correctly, this approach will not only protect the environment, but may also generate additional revenue that can be used for other environmental protection measures.

#### **3.6.4.2 Other Taxes to Approximate a Tax on Emissions**

Changes in the rates of indirect taxes may be used as an alternative to the explicit taxation of measured emissions.<sup>218</sup> Product charges or taxes may be applied to products that create pollution either as they are manufactured, consumed or disposed of. Product charges or taxes are intended to modify the relative prices of products. If a product is seen as environmentally harmful, then a greater tax may be applied.

Examples of indirect taxes include alcohol, tobacco or gasoline.<sup>219</sup> Their objective is not only to raise revenue, but also to reduce consumption by internalizing the external costs to the public health or environment.

The restructuring of existing taxes will generally have less of an administrative cost than implementing new taxes. This is because a tax system is already in place. Although restructuring taxes may be administratively less expensive, the degree of success

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<sup>218</sup> Heilbroner, *supra* note 87 at 371.

<sup>219</sup> Wallart, *supra* note 95, at 148.

regarding abatement will depend on the degree to which the tax is linked to the pollution it aims to control.

#### **3.6.4.3 Non-Incentive Taxes**

In many cases, environmental taxes have been used principally for the purposes of revenue raising, rather than to provide incentives to reduce polluting emissions.<sup>220</sup>

Where environmental taxes have been employed in this way, it has generally been to raise earmarked revenues for particular public expenditures related to environmental protection<sup>221</sup>.

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<sup>220</sup> J.B. Opschoor and H.B. Vos, *Economic Instruments for Environmental Protection*, (Paris, France: OECD, 1989).

<sup>221</sup> For example, to recover the costs of administering a system of environmental monitoring or regulation, or to pay for public or private expenditures on pollution abatement (Smith, *supra* note 215).

## **CHAPTER IV Environmental Taxation in the Implementation of the Kyoto Protocol - A Comparative Study**

### **4.1 Introduction**

The economic instrument with arguably the most likely chance of helping Canada fulfill its obligations under the Kyoto Protocol and the *Climate Change Plan for Canada* is the use of taxes, charges or fees. The concept of taxation and taxation incentives as tools to help the environment is internationally codified in the Kyoto Protocol, and nationally codified in Canada's *Climate Change Plan for Canada*. Both of these endeavours provide guidelines specifically to stabilize and reduce emissions of GHGs. I will demonstrate in this chapter that the stabilization and reduction of GHG emissions through taxation is cost-effective, adheres to the precautionary approach and the precautionary principle, and adheres to the polluter pays principle.

### **4.2 Examples of Tax Measures to Reduce Global Warming**

The following sections review existing and potential tax measures designed to address global warming by reducing GHG emissions and enhancing carbon sinks, considering both taxes and tax incentives. Rather than examining each tax and incentive in detail, the purpose of this survey is to provide a general description of the most promising tax measures and their expected effectiveness in reducing global warming.

#### **4.2.1 Taxes**

As the combustion of fossil fuels for energy constitutes the leading source of anthropogenic GHG emissions in OECD countries, it is not surprising that fossil fuels and energy consumption are the main targets of environmental taxes to reduce global



warming. This section considers taxes on fossil fuels and energy consumption as well as taxes on other sources of GHG emissions.

Among OECD countries, the most significant taxes on fossil fuels and energy consumption apply to automotive fuels and motor vehicles.<sup>222</sup> Automotive fuel tax rates vary widely from one country to another and also among different fuels. In Europe, for example, tax rates for unleaded gasoline as of January 1, 2000, ranged from a low of approximately 56 cents Canadian per litre in Greece to almost \$1.25 Canadian per litre in the United Kingdom.<sup>223</sup> In Canada and the United States, rates are considerably lower at 10 cents Canadian per litre of unleaded gasoline at the federal level in Canada<sup>224</sup> and approximately 7 cents Canadian per litre at the federal level in the United States.<sup>225</sup> Although provincial and territorial governments in Canada and state governments in the U.S. also levy excise taxes on automotive fuels, rates for unleaded gasoline vary between 6.2 and 16.5 cents Canadian per litre in Canada,<sup>226</sup> and approximately 3 and 12 cents Canadian per litre in the United States,<sup>227</sup> meaning that combined automotive fuel taxes

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<sup>222</sup> See, e.g., OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 55 (reporting that taxes on automotive fuels and motor vehicles accounted for 90 percent of environmentally related tax revenues in OECD countries in 1995).

<sup>223</sup> See the database of environmentally-related taxes at <http://www.oecd.org/env/policies/taxes/index.htm>. Tax rates converted to Canadian currency based on exchange rate in April 2003 of 1 EUR = 1.58701 CAD.

<sup>224</sup> *Excise Tax Act* (Canada), R.S.C. 1985, E-15, subsection 23(1) and Schedule II, paragraph 9(a) [hereafter "ETA"].

<sup>225</sup> U.S. Motor Fuel Excise Tax Rates available at [http://www.taxadmin.org/fta/rate/motor\\_fl.html](http://www.taxadmin.org/fta/rate/motor_fl.html) (18.4 U.S. cents per gallon). Tax rate converted to litres and Canadian currency based on exchange rate in April 2003 of 1 USD = 1.447 CAD.

<sup>226</sup> The lowest rate for unleaded gasoline is in the Yukon Territory and the highest is in Newfoundland. In Ontario, unleaded gasoline is taxed at a rate of 14.7 percent. Although automobile fuels are not subject to separate retail sales taxes imposed in most Canadian province, they are subject to the federal Goods and Services Tax (GST), a 7 percent value-added tax which applies to the total consideration paid for the supply of fuel in Canada, including federal and provincial fuel taxes. In Quebec, which levies its own value-added tax, as well as New Brunswick, Newfoundland and Nova Scotia, which have harmonized their sales taxes with the federal GST, these taxes also apply to automobile fuel as well as federal and provincial fuel taxes.

<sup>227</sup> See [http://www.taxadmin.org/fta/rate/motor\\_fl.html](http://www.taxadmin.org/fta/rate/motor_fl.html). The lowest rate for unleaded gasoline (7.5 U.S. cents per gallon) is found in the state of Georgia and the highest (31 U.S. cents per gallon) in the state of

by both levels of government are significantly lower than applicable rates throughout Europe.

With respect to taxes on different fuels, leaded gasoline is uniformly subject to higher rates than unleaded gasoline,<sup>228</sup> while diesel fuel is generally taxed at lower rates than other fuels.<sup>229</sup> In recent years, moreover, governments have introduced reduced rates or exemptions for clean-burning and renewable fuels such as ethanol and methanol and bio-diesel fuels of non-fossil fuel origin. In Norway, Sweden and the U.K., for example, diesel fuel rates vary according to the sulphur content of the fuel.<sup>230</sup> In the U.S., automotive fuels that contain stipulated alcohol content requirements are subject to a reduced federal fuel tax rate of approximately 5 cents Canadian per litre.<sup>231</sup> In Canada, the portion of blended gasoline that is ethanol or methanol produced from biomass has

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Rhode Island. In key border states like Michigan, New York, and Ohio, state tax rates on unleaded fuel range from 7.2 cents Canadian per litre (19 U.S. cents per gallon in Michigan) to 8.7 Canadian cents per litre (22.6 U.S. cents per gallon in New York State). Tax rate converted to litres and Canadian currency based on exchange rate in April 2003 of 1 USD = 1.447 CAD.

<sup>228</sup> In the United Kingdom, for example, the tax rate for leaded gasoline as of January 1, 2000 was almost \$1.40 Canadian per litre, compared to \$1.24 Canadian per litre for unleaded gasoline. See the database of environmentally-related taxes at <http://www.oecd.org/env/policies/taxes/index.htm>. Tax rates converted to Canadian currency based on exchange rate in April 2003 of 1 EUR = 1.58701 CAD. Likewise in Canada, leaded gasoline is subject to a federal tax of 11 cents Canadian per liter compared to 10 cents Canadian per litre for unleaded gasoline. See ETA, *supra* note 224, subsection 23(1) and Schedule II, paragraphs 9(a) and (b). In Ontario, leaded gasoline is taxed at a rate of 17.7 Canadian cents per litre, compared to 14.7 Canadian cents per litre for unleaded gasoline. *Gasoline Tax Act* (Ontario), subsection 2(1).

<sup>229</sup> See, e.g., OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 57 (Figure 7). In Germany, for example, automotive fuel taxes in 2000 were approximately 60 cents Canadian per litre for diesel fuel and 89 cents per litre Canadian for unleaded gasoline. See the database of environmentally-related taxes at <http://www.oecd.org/env/policies/taxes/index.htm>. Tax rates converted to Canadian currency based on exchange rate in April 2003 of 1 EUR = 1.58701 CAD. In Canada, diesel fuel is subject to a federal tax of 4 cents Canadian per liter compared to 10 cents Canadian per litre for unleaded gasoline. See ETA, *supra* note 224, subsection 23(1) and Schedule II, paragraph 9(a) and section 9.1. In the United States, on the other hand, diesel fuel is taxed slightly more heavily than unleaded gasoline both at the federal level and in many states. See [http://www.taxadmin.org/fta/rate/motor\\_fl.html](http://www.taxadmin.org/fta/rate/motor_fl.html).

<sup>230</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 58.

<sup>231</sup> *Ibid.* (reporting a rate of 13.1 U.S. cents per gallon). For a brief explanation of the required alcohol content of these fuels, see Department of the Treasury, *Excise Taxes for 2003*, Internal Revenue Service Publication 510 (Revised February 2003) at 11-12.

been exempt from the federal fuel tax since 1992.<sup>232</sup> Consistent with this exemption, the 2003 Federal Budget proposed to remove the federal excise tax on diesel fuel from the biomass-produced ethanol or methanol portion of blended diesel fuel and to exempt bio-diesel fuel and the bio-diesel portion of blended diesel fuel, provided that the bio-diesel is of a biological non-fossil fuel origin (such as from vegetable oils and animal fats, including recycled cooking greases).<sup>233</sup> Similar exemptions or tax rebates for these clean burning and renewable fuels are also available in several provinces and territories.<sup>234</sup>

Until recently, these taxes have generally been regarded as administratively convenient sources of general revenue or as benefit taxes the payment of which helps finance the construction and maintenance of roads and highways.<sup>235</sup> Notwithstanding these origins, however, automotive fuel taxes have assumed an increasingly important environmental character as rates have distinguished between leaded and unleaded fuels, and reduced rates or exemptions have been introduced for clean-burning and renewable fuels. From an environmental perspective, however, lower rates for diesel fuel than gasoline are generally regarded as inappropriate, since diesel produces larger CO<sub>2</sub> emissions per terajoule of energy than gasoline<sup>236</sup> and much higher emissions of particulates and other pollutants such as ozone (NO<sub>x</sub>) and sulphur dioxide (SO<sub>2</sub>).<sup>237</sup>

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<sup>232</sup> ETA, section 23.4.

<sup>233</sup> Department of Finance, *2003 Federal Budget*, Annex 9 at 343.

<sup>234</sup> In Ontario, for example, biodiesel fuel is fully exempt from the province's fuel tax, regardless of whether it is mixed with ordinary diesel fuel. *Fuel Tax Act* (Ontario), subsection 2(3.1). In the Northwest Territories and Nunavut, moreover, all non-petroleum based automobile fuels are completely exempt from tax. See *Petroleum Products Tax Act*, R.S.N.W.T. 1988, c. P-51.

<sup>235</sup> See, e.g., the discussion in Technical Committee on Business Taxation, *Report of the Technical Committee on Business Taxation*, chapter 9 (Ottawa: Department of Finance, 1997) at 9.1-9.2.

<sup>236</sup> Arthur Donner and Fred Lazar, "The Economic Effects of an Environment Tax" in Allan M. Maslove, ed., *Taxes as Instruments of Public Policy*, (Toronto: Queen's Printer for Ontario, 1994) 93-166 at 97.

<sup>237</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 57 (adding that although diesel-powered vehicles cause lower CO<sub>2</sub> emissions per kilometer driven than vehicles powered by

Regarding the effectiveness of automotive fuel taxes in reducing GHG emissions, available evidence is inconclusive but suggestive. On the one hand, U.S. studies indicating a low price elasticity of demand for gasoline suggest that fuel taxes are less an effective way to change behaviour than an efficient way to raise revenues.<sup>238</sup> European studies, on the other hand, indicate that while the number of kilometers driven is generally unresponsive to fuel price increases, the demand for gasoline is relatively price elastic, suggesting that higher fuel taxes encourage more efficient fuel consumption rather than discouraging driving.<sup>239</sup> In the United Kingdom, for example, one study concluded that increases in fuel taxes in the 1990s contributed to a 13 percent increase in the average fuel efficiency of heavy trucks between 1993 and 1998.<sup>240</sup> Likewise, in the United States, a strong correlation exists between inflation-adjusted gasoline prices and trends in the fuel efficiency of new vehicles, with significant improvements in fuel efficiency as gasoline prices increased in the 1970s, followed by a sustained stagnation in fuel efficiency as real fuel prices fell in the 1980s and 1990s.<sup>241</sup> As a result, the U.K. Treasury Department projected that scheduled increases in automotive fuel taxes during

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gasoline, this is not an argument for preferential tax treatment for these fuels, since drivers benefit directly from this fuel consumption advantage).

<sup>238</sup> See, e.g., K.N. Snipes and R. Mendelsohn, "The Effectiveness of Gasoline Taxation to Manage Air Pollution" (2001) 36:2 *Ecological Economics*, cited in Jean-Philippe Barde and Nils Axel Braathen, "Environmentally Related Levies" Paper Prepared for the Conference on Excise Taxation, Ministry of Finance, The Hague, Netherlands (11-12 April 2002); Organisation for Economic Cooperation and Development, *Environmentally Related Taxes in OECD Countries: Issues and Strategies*, (Paris, OECD, 2001) at para. 65 (reporting short-term elasticities of -0.4 to -0.6 and long-term elasticities of -0.5 to -0.7).

<sup>239</sup> See the studies cited in European Environment Agency, *Environmental Issues Series No. 1, Environmental Taxes and Effectiveness 7*, online: <http://org.eea.eu.int:80/documents/Issuerep/EnvTaxes/default.htm>, at 45 (reporting elasticities in the range of -0.65 to -1.0). Other studies indicating that the number of kilometers driven is unresponsive to increases in the price of automotive fuel suggest that drivers are apt to respond to increased fuel taxes by obtaining more energy efficient vehicles rather than driving less.

<sup>240</sup> Department of the Environment, Transport and the Regions, *Climate Change – The UK Programme*, (London: DETR, 2000).

<sup>241</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 103-04 (Figure 13).

the period 1996 to 2002 would reduce annual carbon dioxide emissions from the transport sector by 4.6 to 11.5 percent by 2010.<sup>242</sup>

In addition to these effects, moreover, it is important to recognize the role that other policies can play to enhance the environmental effectiveness of increased taxes on automotive fuels. Where these taxes are accompanied by increased spending on public transportation, for example, improvements in service quality can further the environmental objectives of automotive fuels taxes by encouraging commuters to shift from private automobiles to public transit. Where spending programs or tax incentives support the production and consumption of fuel-efficient and clean energy vehicles, moreover, these efficiency improvements can make it easier for drivers to respond to automotive fuel taxes by reducing their consumption of GHG-producing automotive fuels. For these reasons, it is important to consider the environmental effectiveness of automotive fuel taxes not in isolation but as one of several possible measures to address global warming.

Among other environmental policies directed at reducing GHG emissions from the combustion of automotive fuels, an increasingly common measure involves taxes and registration fees on the sale or use of motor vehicles. In the United States, for example, the federal government levies a Gas Guzzler Tax (GGT) on the sale by the manufacturer of automobiles with a fuel economy standard as measured by the Environmental Protection Agency (EPA) of less than 22.5 miles per gallon (greater than approximately

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<sup>242</sup> Her Majesty's Treasury, *Economic and Fiscal Strategy Report* (London: Her Majesty's Treasury, 1999); and Her Majesty's Treasury, *Financial Statement and Budget Report* (London: Her Majesty's Treasury, 1999). The scheduled increases were abandoned in 2000.

10.5 litres per 100 kilometres).<sup>243</sup> Starting at \$1,000 for automobiles with a fuel economy of 21.5 to 22.5 miles per gallon (MPG), the tax increases as fuel economy falls, reaching a maximum of \$7,700 for automobiles with a fuel economy less than 12.5 MPG (greater than approximately 19 litres per 100 kilometres).<sup>244</sup> Similarly, in Canada, the Province of Ontario levies a Tax for Fuel Conservation (TFFC) on the sale or lease of new passenger vehicles and sports-utility vehicles (SUVs) with highway fuel use ratings exceeding 6 litres per 100 kilometres for passenger vehicles (less than approximately 39 MPG) and 8 litres per 100 kilometres for SUVs (less than approximately 29 MPG).<sup>245</sup> For passenger vehicles, the tax is \$75 for vehicles with a fuel use rating of 6 to 9 litres per 100 kilometres (approximately 26 to 39 MPG), rising to \$7,000 for vehicles with ratings over 18 litres per 100 kilometres (less than approximately 13 MPG). For sports utility vehicles the tax increases from \$75 on vehicles with a fuel use rating of 8 to 9 litres per 100 kilometres (approximately 26 to 29 MPG) to \$3,200 for vehicles with ratings over 18 litres per 100 kilometres (less than approximately 13 MPG). For passenger vehicles with a fuel use rating less than 6 litres per 100 kilometres (greater than approximately 39 MPG), moreover, Ontario provides a Tax Credit for Fuel Conservation (TCFFC) of \$100.<sup>246</sup> Other tax incentives for fuel-efficient and clean-fuel vehicles are discussed later in this paper.<sup>247</sup>

As an alternative to taxes on fuel inefficient automobiles, a number of European countries levy vehicle registration fees that vary with the fuel efficiency of the vehicle.

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<sup>243</sup> For a brief description of the tax, see Department of the Treasury, *Excise Taxes for 2003*, *supra* note 231 at 22-23.

<sup>244</sup> Internal Revenue Service Form 6197, "Gas Guzzler Tax" (Revised July 1998).

<sup>245</sup> *Retail Sales Tax Act*, R.S.O. 1990, c. R-31, subsections 4(5) and (6) [ "RSTA" ]. For a brief description of the tax, see Ontario Retail Sales Tax Guide No. 513 (June 2001).

<sup>246</sup> RSTA, *ibid*, section 4.1.

<sup>247</sup> *Infra*, section III.B.

In Austria, for example, the rate at which a vehicle registration tax is applied increases as fuel economy decreases.<sup>248</sup> Similarly in Denmark, Germany, Switzerland and Sweden, annual registration fees vary according to the vehicle's fuel consumption and environmental characteristics.<sup>249</sup> Beginning in March 2001, moreover, the United Kingdom introduced graduated rates for the annual vehicle excise duty (VED) on private vehicles based on CO<sub>2</sub> emissions per kilometer driven.<sup>250</sup>

Like automobile fuel taxes, motor vehicle taxes and registration fees have traditionally been viewed as benefit taxes or user fees for the public provision of roads and highways. For this reason, most European countries base motor vehicle registration fees on the weight of the vehicle, its engine size, or the number of axels.<sup>251</sup> For the same reason, revenues from the U.S. gas guzzler tax are dedicated to the Highway Trust Fund notwithstanding that the tax itself is designed to discourage purchases of fuel inefficient vehicles.<sup>252</sup> Where rates vary according to fuel efficiency and other environmental characteristics, however, these taxes and registration fees assume a clear environmental character.

With respect to the effect of these taxes and registration fees on GHG emissions, evidence is limited. In Sweden, which introduced differentiated registration fees for motor vehicles in 1993, reducing fees for cleaner class 1 vehicles and increasing them for

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<sup>248</sup> This tax is based on the net price of the vehicle, with rates calculated as follows: fuel consumption in litres per 100 kilometres less 3 (2 for diesel-powered vehicles) times 2 percent. See the OECD database of environmentally-related taxes at <http://www.oecd.org/env/policies/taxes/index.htm>.

<sup>249</sup> *Ibid.*

<sup>250</sup> The rates for this Graduated Vehicle Excise Duty (GVED) are available on the website of the U.K. Driver and Vehicle Licensing Agency at <http://www.dvla.gov.uk/vehicles/taxation.htm>.

<sup>251</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 61.

<sup>252</sup> National Center for Environmental Economics, *The United States Experience with Economic Incentives for Protecting the Environment* (Washington, D.C.: NCEE, 2001) at 49.

less fuel efficient class 3 vehicles, the percentage of class 1 and 2 vehicles increased from 16 to 73 percent between 1993 and 1996 – a result that the Swedish Environmental Protection Agency attributes more to so-called “soft effects” from advertising and consumer awareness than from the registration fees themselves.<sup>253</sup> Likewise in Germany, where differentiated registration fees were introduced in the mid-1990s, the number of high-emission vehicles fell from 6.9 million to 3 million between July 1997 and January 2000, while the number of vehicles meeting high-efficiency standards increased from 6.2 million to nearly 16 million during the same period.<sup>254</sup> In the United States and Ontario, however, the GGT and the TFFC do not appear to have had a significant impact on the fuel efficiency of new vehicles.<sup>255</sup> To the extent that these taxes fall mostly on a small percentage of fuel-inefficient vehicles, however, this outcome is not particularly surprising.<sup>256</sup> Indeed, Ontario’s TFFC has been criticized not only on the basis that the rate is essentially flat for most vehicles, but also for levying lower rates on fuel-inefficient SUVs than passenger vehicles and failing to include light trucks and vans which represent approximately 25 percent of vehicles sold in the province.<sup>257</sup>

Another reason that motor vehicle taxes and registration fees appear to have been more effective in Europe than North America may relate to the combined effect of these

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<sup>253</sup> Swedish Environmental Protection Agency, *Environmental Taxes in Sweden*, (Stockholm: EPA, 1997), cited in OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 104-05.

<sup>254</sup> H. Jatzke, “The Ecological Reform in Germany” (Conference on Green Tax Reforms in Europe, Paris: 10 October 2000), cited in OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 104.

<sup>255</sup> In the U.S., for example, the fuel efficiency of new vehicles has remained largely unchanged since the early-1980s, shortly after the GGT was introduced. OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 104 (Figure 13).

<sup>256</sup> In Ontario, for example, approximately 90 percent of passenger vehicles fall in the fuel efficiency range that attracts the minimum TFFC of \$75. Ontario Fair Tax Commission, *Fair Taxation in a Changing World*, chapter 25 (Toronto: Queen’s Printer for Ontario, 1993) at 567.

<sup>257</sup> *Ibid.* at 566.



measures and higher automotive fuel taxes, which together discourage purchases of fuel-inefficient vehicles. Here too, therefore, it is important to consider the environmental effectiveness of motor vehicle taxes not in isolation but together with other measures to address global warming. Among these other measures, one of the most promising could be the use of revenues from environmentally differentiated motor vehicle taxes or registration fees to finance tax incentives or other subsidies to encourage drivers to retire older fuel-inefficient vehicles and to purchase fuel-efficient and clean-energy vehicles.<sup>258</sup>

Although the combustion of automotive fuels constitutes a major source of CO<sub>2</sub> emissions in developed countries, a much larger share of these emissions result from the combustion of other fossil fuels for industrial, commercial and residential purposes. In the United States, for example, the transportation sector is estimated to have accounted for 31 percent of CO<sub>2</sub> emissions in 1999, while combustion of fossil fuels for industrial uses and electricity generation accounted for 35 percent of CO<sub>2</sub> emissions, and commercial and residential sectors accounted for 16 and 19 percent of CO<sub>2</sub> emissions respectively.<sup>259</sup> Similarly, in Canada, transportation is estimated to account for approximately 25 percent of the country's total GHG emissions.<sup>260</sup>

For this reason, in order to encourage energy-efficiency and reduce GHG emissions from the combustion of fossil fuels, several countries have introduced broader taxes on energy consumption and fossil fuels. In Denmark, for example, taxes on electricity (most of which is generated by burning coal) and non-automotive fuel oils were first introduced in

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<sup>258</sup> For Canadian proposals to this effect, see Ontario Fair Tax Commission Environment and Taxation Working Group, *Final Report*, (Toronto: Fair Tax Commission, 1992) at 10; and Canadian Centre for Policy Alternatives, *Alternative Federal Budget 2003*, Technical Paper #2: An Action Plan for Kyoto (January 27, 2003) at 6.

<sup>259</sup> U.S. Department of State, *U.S. Climate Action Report 2002*, *supra* note 14 at 39-41.

<sup>260</sup> Government of Canada, *Climate Change Plan for Canada*, *supra* note 2 at 20.

1978.<sup>261</sup> In 1988, the Netherlands introduced a general fuel charge, the revenues from which were earmarked for environmental expenditures administered by the Ministry of the Environment.<sup>262</sup> In the early 1990s, Finland, Norway and Sweden introduced broad-based fuel taxes specifically targeting CO<sub>2</sub> emissions,<sup>263</sup> and Denmark and the Netherlands restructured their fuel taxes to correspond more closely to the carbon content of different fuels.<sup>264</sup> More recently, Austria, Belgium, Germany, Italy and the United Kingdom have also introduced broad-based taxes on energy consumption and fossil fuels.<sup>265</sup> Although neither Canada nor the United States have introduced similar taxes, proposals for broad-based taxes on energy consumption and fossil fuels have been made in both countries.<sup>266</sup>

In theory, taxes on energy should help to reduce GHG emissions by decreasing energy consumption and encouraging greater energy efficiency. From an environmental

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<sup>261</sup> Hans Larsen, *Energy Taxes: The Danish Model*, (Copenhagen: Danish Ministry of Taxation, September 1998).

<sup>262</sup> Willem Vermeend and Jacob van der Vaart, *Greening Taxes: The Dutch Model*, (Deventer: Kluwer, 1998) at 17. See also Andrew Hoerner and Benoît Bosquet, *Environmental Tax Reform: The European Experience* (Washington, D.C.: Center for a Sustainable Economy, 2001) at 19.

<sup>263</sup> For general discussions of these tax reforms, see OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 51 and 55-56; and Hoerner and Bosquet, *Environmental Tax Reform*, *supra* note 262 at 15-17 (Finland), 22-23 (Norway), and 23-26 (Sweden).

<sup>264</sup> For an overview of these reforms in Denmark, see Jens Holger Helbo Hansen, "Green Tax Reform in Denmark" in Kai Schlegelmilch, ed., *Green Budget Reform in Europe: Countries at the Forefront* (Berlin: Springer, 1999) at 51-66. For a detailed explanation of environmental tax reform in the Netherlands, see Vermeend and van der Vaart, *Greening Taxes*, *supra* note 262. See also Hoerner and Bosquet, *Environmental Tax Reform*, *supra* note 262 at 11-15 (Denmark) and 19-21 (Netherlands).

<sup>265</sup> See, e.g., Barde and Braathen, *Environmentally Related Levies*, *supra* note 238 paras. 41, 42 and 44. See also Hoerner and Bosquet, *Environmental Tax Reform*, *supra* note 262 at 28-29 (Austria) 17-18 (Germany), 18-19 (Italy), 26-27 (United Kingdom).

<sup>266</sup> In the U.S., for example, the Clinton Administration proposed a broad-based energy tax in February 1993. Although a modified version of the tax was approved by the House of Representatives in June 1993, the proposal was narrowly defeated in the Senate, which opted to increase the federal gasoline tax instead. See J. Andrew Hoerner and Frank Muller, *Carbon Taxes for Climate Protection in a Competitive World*, Paper Presented for the Swiss Federal Office for Foreign Economic Affairs (June 1996) at 9-11. In Canada, both the Ontario Fair Tax Commission and the federal Technical Committee on Business Taxation recommended that existing automotive fuel taxes be extended to other fossil fuels, with rates based on the carbon content of these fuels. See Ontario Fair Tax Commission Environment and Taxation Working Group, *Final Report – Environment and Taxation*, (Toronto: Ontario Fair Tax Commission, 1992) at 562; and Technical Committee on Business Taxation, *supra* note 235 at 9.14.

perspective, however, taxes on fossil fuels are clearly preferable to energy taxes since they encourage not only increased energy efficiency but also a substitution away from fossil fuels toward clean and renewable sources of energy. Better still are taxes based on the carbon content of different fossil fuels, since carbon content is an excellent proxy for CO<sub>2</sub> emissions,<sup>267</sup> and such taxes can be expected to encourage both energy efficiency and the substitution of low-carbon fuels for high-carbon fuels.<sup>268</sup> Not surprisingly, therefore, the introduction of a taxes based on the carbon content of different fuels is generally regarded as one of the most cost-effective ways to stabilize and reduce GHG emissions.<sup>269</sup>

In general, taxes in Austria, Belgium, Germany, and the United Kingdom are based mainly on energy consumption, while Denmark, Finland, Italy, the Netherlands, Norway and Sweden have introduced carbon or CO<sub>2</sub> taxes.<sup>270</sup> In practice, however, the distinctions between these taxes are blurred by the fact that many countries tax both energy and carbon,<sup>271</sup> by the availability of energy tax exemptions and rebates for energy

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<sup>267</sup> See, e.g., Donner and Lazar, *supra* note 236 at 97-98 (Tables 2 and 3). Coal, for example, contains the highest amount of carbon and produces the largest CO<sub>2</sub> emissions per unit of energy produced. Petroleum has approximately 25 percent less carbon than coal, while natural gas has about 45% less carbon than coal. U.S. Department of State, *U.S. Climate Action Report 2002*, *supra* note 14 at 38. Although taxes based on the carbon content of different fuels create no incentive to develop "end-of-pipe" abatement technologies, technological limits on abatement opportunities make this deficiency more theoretical than real. Government of Canada, *Economic Instruments for Environmental Protection*, *supra* note 88 at 57. As technologies for the capture and storage of CO<sub>2</sub> become available, incentives to introduce these technologies could be created by allowing a deduction or credit against tax otherwise payable.

<sup>268</sup> See, e.g., Hoerner and Muller, *Carbon Taxes for Climate Protection in a Competitive World*, *supra* note 266 at 3.

<sup>269</sup> Government of Canada, *Economic Instruments for Environmental Protection*, *supra* note 88 at 58. See also Roger C. Dower and Mary Beth Zimmerman, *The Right Climate for Carbon Taxes: Creating Economic Incentives to Protect the Atmosphere* (Washington, D.C.: Word Resources Institute, 1992).

<sup>270</sup> See the brief descriptions of these taxes in OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 51-52.

<sup>271</sup> In Finland, for example, the original carbon tax was amended in the mid-1990s to apply partly to the energy content and partly to the carbon content of specific fuels. Similarly, Denmark, the Netherlands and Sweden levy taxes both on energy use and the carbon content of fuels. See the OECD's database of environmentally related taxes at <http://www.oecd.org/env/policies/taxes/index.htm>.

from clean and renewable sources,<sup>272</sup> and by the existence of substantial carbon tax rate reductions or rebates for energy-intensive industries such as manufacturing.<sup>273</sup> As a result, most energy taxes contain some differentiation according to CO<sub>2</sub> emissions from input fuels, while the effective rates of carbon or CO<sub>2</sub> taxes vary only "to some extent ... according to the carbon content of those fuels that are taxed".<sup>274</sup> As well, both energy and carbon taxes include various rate reductions, exemptions, ceilings and rebates designed to address competitiveness concerns and distributional effects (both regional and among different income groups).<sup>275</sup>

With respect to the effectiveness of carbon taxes in reducing GHG emissions, estimates vary but are generally positive. According to a study conducted by the International Energy Agency in 1989, a tax of US\$50 per tonne of carbon content on all fossil fuels was projected to cause coal consumption in OECD countries to decrease by 25 percent, thermal electricity generation to decrease by 19 percent, oil consumption to fall by 5 percent, and natural gas consumption to decrease by 4 percent, resulting in reductions of CO<sub>2</sub> emissions of 11.7 percent in the OECD as a whole and 14.3 percent in North America.<sup>276</sup> A subsequent study in Ontario concluded that a carbon tax of approximately \$25 Canadian per tonne of carbon would reduce CO<sub>2</sub> emissions in the province by 4 percent over a fifteen-year period, with much larger reductions realized by the industrial sector (8.5 percent) and lower reductions realized by the commercial, transportation and

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<sup>272</sup> See the brief summary of these environmentally-motivated exemptions and rebates in OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 64.

<sup>273</sup> See the brief summary of these special provisions, *ibid.* at 56.

<sup>274</sup> *Ibid.*

<sup>275</sup> See, e.g., *ibid.* at 56, 62-63 (Box 10), 78 and 89. For a useful overview of competitiveness considerations in the design of environmentally related taxes, see *Ibid.* at 71-85. For a brief discussion of the distributional impact of energy and carbon taxes, see *ibid.* at 87-89.

<sup>276</sup> International Energy Agency, *Policy Measures and Their Impact on CO<sub>2</sub> Emissions and Accumulations* (Paris, IEA, 1989).

residential sectors.<sup>277</sup> Studies of proposed energy and carbon taxes in Denmark, Germany and the Netherlands projected reductions in CO<sub>2</sub> emissions of 1.5 to 2 percent.<sup>278</sup>

Although some studies suggest that appreciable reductions in CO<sub>2</sub> emissions are likely only where energy or carbon taxes are levied at very high rates,<sup>279</sup> European experience is more encouraging. In Finland and Sweden, for example, studies conducted after relatively modest carbon taxes were introduced in the early 1990s concluded that these taxes resulted in reduced GHG emissions of 7 and 9 percent respectively.<sup>280</sup> Other studies estimating the effects of energy and carbon taxes in Norway and the Netherlands have also reported meaningful reductions in CO<sub>2</sub> emissions.<sup>281</sup>

As with automotive fuel and motor vehicle taxes, it is important to consider the effectiveness of energy or carbon taxes not in isolation, but together with other policies aimed at reducing GHG emissions. Where these taxes are combined with tax incentives or other subsidies for renewable energy sources and energy conservation, for example, the environmental effectiveness of the tax is likely to be greater and the cost of reducing GHG emissions correspondingly lower.<sup>282</sup> Where the revenues from these taxes are

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<sup>277</sup> Donner and Lazar, "The Economic Effects of an Environment Tax" *supra* note 236 at 128 (Table 21).

<sup>278</sup> See the discussion of the Danish and German studies in OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 105-06; and the discussion of the Dutch study in Vermeend and van der Vaart, *Greening Taxes*, *supra* note 262 at 45.

<sup>279</sup> See, e.g., Donner and Lazar, "The Economic Effects of an Environmental Tax" *supra* note 236.

<sup>280</sup> See the discussion of the Finnish study in OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 105; and the discussion of the Swedish study in EEA, *Environmental Taxes*, *supra* note 239 at 46.

<sup>281</sup> See the discussion of the Norwegian study in OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 105; and the summary of the Dutch results in Vermeend and van der Vaart, *Greening Taxes*, *supra* note 262 at 35.

<sup>282</sup> See, e.g., Report to the Study Group on Economic Instruments in Environmental Protection, *The Carbon Tax to Reduce GHG Emission*, (2000), cited in OECD, *Environmentally Related Taxes in OECD*

“recycled” in the form of reductions in other taxes, moreover, competitiveness concerns can be significantly reduced and economic advantages realized by substituting efficiency-enhancing environmental taxes for distortionary taxes on labour or capital.<sup>283</sup> For these reasons, European countries that have introduced energy or carbon taxes have generally used these revenues to reduce other taxes and to encourage clean energy sources and energy efficiency through tax incentives and other subsidies.<sup>284</sup> For the same reasons, Canadian studies advocating taxes on the carbon content of fuels have generally proposed that revenues be used to reduce other taxes and provide tax incentives or other subsidies for investments in energy efficient equipment and clean and renewable energy.<sup>285</sup> Another recommendation involves the use of tax revenues to offset undesirable distributional effects by region or income class.<sup>286</sup>

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*Countries*, *supra* note 14 at 44. See also Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 15-16.

<sup>283</sup> For useful discussions of this so-called “double dividend” hypothesis, see Ernest U. Von Weizsäcker and Jochen Jesinghaus, *Ecological Tax Reform* (London: Zed Books, 1992); Lawrence H. Goulder, “Environmental Taxation and the Double Dividend: A Reader’s Guide” (1995) 2 *Int. Tax & Pub. Fin.* 157; Organisation for Economic Cooperation and Development, *Environmental Taxes and Green Tax Reform*, (Paris, OECD, 1997) at 33- 36; EEA, *Environmental Taxes*, *supra* note 239 at 16-17; and OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 35-40. Although the magnitude of any “double dividend” depends on the amount of revenue raised from environmental taxes, the kinds of taxes subject to rate reductions, the incidence of environmental taxes, and general equilibrium effects, empirical evidence suggests that the introduction of a carbon-energy tax with cuts to labour taxes is likely to result in at least some double dividend in the form of environmental improvements and employment gains. See, e.g., A. Majocchi, “Green Fiscal Reform and Employment: A Survey” (1996) 8:4 *Environmental And Resource Economics*, and Benoît Bosquet, “Environmental Tax Reform: Does it Work? A Survey of the Empirical Evidence” (2000) 34 *Journal of Ecological Economics* 19-32. For this reason, as J. Andrew Hoerner and Benoît Bosquet conclude, comprehensive environmental tax reform, in which revenues from environmental taxes are used in part to finance reductions in distortionary taxes, “is better than environmental taxes alone.” Hoerner and Bosquet, *Environmental Tax Reform*, *supra* note 262 at 61.

<sup>284</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 27, 39, 61 and 78.

<sup>285</sup> See, e.g., Ontario Fair Tax Commission, *Fair Taxation in a Changing World*, *supra* note 256 at 562; and Ontario Fair Tax Commission Environment and Taxation Working Group, *Final Report*, *supra* note 266 at 35.

<sup>286</sup> See, e.g., Government of Canada, *Economic Instruments for Environmental Protection*, *supra* note 88 at 59; and Ontario Fair Tax Commission Environment and Taxation Working Group, *Final Report*, *supra* note 266 at 36.

Although carbon dioxide from the combustion of fossil fuels is the leading source of GHG emissions in OECD countries, other GHGs are significant contributors to global warming and considerably more potent per unit of emissions.<sup>287</sup> Nevertheless, OECD countries have very little experience with the taxation of non-CO<sub>2</sub> GHGs.<sup>288</sup>

One reason for this record is undoubtedly the variety of non-CO<sub>2</sub> GHGs and sources of these emissions, many of which are either unsuitable for taxation or effectively addressed through regulatory means or voluntary agreements.<sup>289</sup> Although it is technically feasible to substantially reduce methane emissions from the distribution of natural gas, for example, it would be difficult and expensive to measure emissions over long stretches of pipeline, making taxation impracticable.<sup>290</sup> Nor is it administratively convenient to monitor for tax purposes methane emissions from old landfills, surface coal mines, and rice cultivation, emissions of methane and nitrous oxide from manure management, or emissions of HFCs, PFCs and SF<sub>6</sub> in the manufacture of semiconductors.<sup>291</sup> Conversely, while taxation may be administratively feasible for methane emissions from oil and gas production, modern landfills with gas collection facilities, and underground coal mines, PFC emissions from the production of aluminum, and SF<sub>6</sub> emissions from the production of magnesium,<sup>292</sup> the limited number of stationary sites for these emissions may make

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<sup>287</sup> In terms of global warming potential (GWP), methane is 21 times more potent than carbon dioxide, nitrous oxide is 310 times more potent, hydrofluorocarbons range from 140 times more potent (HFC-152a) to 11,700 times more potent (HFC-23), perfluorocarbons range from 6,500 times more potent (CF<sub>4</sub>) to 9,200 times more potent (C<sub>2</sub>F<sub>6</sub>), and sulphur hexafluoride is 23,900 times more potent than carbon dioxide. *U.S. Climate Change Action Report 2002*, *supra* note 14 at 37.

<sup>288</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 121.

<sup>289</sup> For a detailed analysis of the potential for environmental taxation to reduce non-CO<sub>2</sub> GHG emissions, see Organisation for Economic Co-operation and Development, *The Potential for Using Tax Instruments to Address Non-CO<sub>2</sub> Greenhouse Gases: CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs and SF<sub>6</sub>*, (Paris: OECD, 2000).

<sup>290</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 135.

<sup>291</sup> *Ibid* at 120 and 135.

<sup>292</sup> *Ibid* at 119 and 134.

regulatory measures and voluntary agreements effective alternatives to environmental taxation.<sup>293</sup> To the extent that environmental taxes create a dynamic incentive to go beyond regulatory requirements or voluntary agreements, however, taxes on these emissions or close proxies may be useful complements to other measures.

In practice, OECD countries appear to levy only two kinds of taxes related to non-CO<sub>2</sub> GHG emissions: taxes on synthetic fertilizers, the production and application of which release nitrous oxides; and taxes on packaging and solid wastes deposited at landfills, which are the most significant anthropogenic sources of methane. Although the former are generally regarded as user fees to finance fertilizer inspection and storage and other agricultural policy measures,<sup>294</sup> taxes on fertilizers also have the potential to reduce N<sub>2</sub>O emissions by decreasing fertilizer consumption and production.<sup>295</sup> In Austria, for example, a levy on synthetic fertilizers is estimated to have reduced the demand for nitrogen fertilizer by 2.5 percent.<sup>296</sup> In Sweden, fertilizer taxes are estimated to have reduced aggregate nitrogen dosages by approximately 10 percent.<sup>297</sup> Together with environmental regulations, therefore, taxes on synthetic fertilizers may help to reduce GHG emissions and global warming.

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<sup>293</sup> In many OECD countries, in fact, GHG emissions from these sources are subject to regulatory oversight and/or voluntary agreements. See OECD, *The Potential for Using Tax Instruments to Address Non-CO<sub>2</sub> Greenhouse Gases*, *supra* note 289.

<sup>294</sup> EEA, *Environmental Taxes*, *supra* note 239 at 48. See also National Center for Environmental Economics, *The United States Experience with Economic Incentives for Protecting the Environment*, (Washington, D.C.: NCEE, 2001) at 46.

<sup>295</sup> See the discussion in OECD, *The Potential for Using Tax Instruments to Address Non-CO<sub>2</sub> Greenhouse Gases*, *supra* note 289 at 22 (cautioning that taxes on synthetic fertilizers could cause farmers to increase the use of manure or sewage sludge from waste water treatment plants, which would increase emissions of N<sub>2</sub>O).

<sup>296</sup> M.F. Hofreither and F. Sinabell, "The Austrian Levy on Mineral Fertilizers: Selected Observations" in *Proceedings of Workshop on Economic Instruments for Nitrogen Control in European Agriculture*, (1999), cited in EEA, *Environmental Taxes*, *supra* note 239 at 48.

<sup>297</sup> Swedish Environmental Protection Agency, *Environmental Taxes in Sweden*, (Stockholm: EPA, 1997), cited in *ibid.* at 49.



In contrast to taxes on synthetic fertilizers, taxes on packaging and solid wastes deposited in landfills have an explicit environmental purpose – though this purpose is not primarily to reduce emissions of CH<sub>4</sub>, but to reduce unnecessary packaging and to encourage individuals and companies to recycle and produce less waste.<sup>298</sup> To the extent that these taxes reduce the volume of solid waste ending up in landfills, however, corresponding reductions in methane emissions are an inevitable consequence.<sup>299</sup> This secondary benefit is likely to be greater where, as in the United Kingdom, the tax applies at higher rates to methane-producing active wastes than to inactive wastes that do not result in GHG emissions.<sup>300</sup> In Austria, Denmark and Norway, moreover, waste taxes encourage reductions in methane emissions through lower rates for landfills with energy recovery systems.<sup>301</sup> In Norway, the combination of this waste tax and licencing requirements for is projected to reduce methane emissions from landfills by more than 10 percent per year.<sup>302</sup> Here too, therefore, environmental taxation may complement and enhance other environmental policies such as regulation and voluntary agreements.

#### 4.2.2 Tax Incentives

In addition to environmental taxes, environmental tax incentives may also reduce global warming by encouraging practices that decrease GHG emissions and enhance the scope and quality of carbon sinks. This section considers tax incentives aimed at reducing CO<sub>2</sub>

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<sup>298</sup> For a brief summary of these taxes in OECD countries, see OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 63-66.

<sup>299</sup> OECD, *The Potential for Using Tax Instruments to Address Non-CO<sub>2</sub> Greenhouse Gases*, *supra* note 289 at 12.

<sup>300</sup> For a description of the U.K. Landfill Tax, see, e.g., Robert E. Whittall, "Landfill Tax in the United Kingdom" at <http://www.greentaxes.org/country/uk/land.asp> (Environmental Taxation Worldwide Website).

<sup>301</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 65. See also Norwegian Ministry of the Environment, *Norway's Third National Communication Under the FCCC*, (June 2002) at 38.

<sup>302</sup> Calculated from figures presented in *ibid.* at 41 and 43.

emissions, tax incentives designed to reduce other GHG emissions, and tax incentives aimed at the preservation and enhancement of carbon sinks.

The vast majority of CO<sub>2</sub> emissions result from the combustion of fossil fuels for energy.<sup>303</sup> Since opportunities for “end-of-pipe” abatement of these emissions are limited,<sup>304</sup> the most effective ways to decrease these emissions involve the efficient use of energy and the substitution of clean and renewable energy sources for carbon-based fuels. Not surprisingly, therefore, tax incentives aimed at reducing CO<sub>2</sub> emissions tend to encourage energy efficiency in various activities, and the generation of energy from clean and renewable sources.

Among these incentives, some of the most obvious encourage purchases of fuel-efficient and clean-fuel vehicles. In the United States, for example, the federal government introduced a tax credit for “qualified electric vehicles” in 1992, computed at 10 percent of the cost of the vehicle up to a maximum amount of \$4,000 and deductible against income tax otherwise payable.<sup>305</sup> Another incentive allows a limited deduction for part of the cost of “clean-fuel vehicles” powered by natural gas, liquefied natural gas, liquefied petroleum gas, hydrogen, electricity and any other fuel at least 85 percent of which is methanol, ethanol, or any other alcohol or ether.<sup>306</sup> In addition to these

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<sup>303</sup> See *supra* note 14 and accompanying text.

<sup>304</sup> Government of Canada, *Economic Instruments for Environmental Protection*, *supra* note 88 at 57.

<sup>305</sup> Internal Revenue Code, s. 30. For this purpose, a qualified electric vehicle is defined as a motor vehicle that is powered primarily by an electric motor drawing current from rechargeable batteries, fuel cells, or other portable sources of electrical current.

<sup>306</sup> Internal Revenue Code, s. 179A. The deduction is limited to the portion of the vehicle’s cost that is attributable to the engine, the fuel tank, the system for delivering fuel to the engine, and the exhaust system, and is capped at \$50,000 for a truck or van with a gross vehicle weight over 26,000 pounds or a bus with a seating capacity of at least 20 adults, \$5,000 in the case of a truck or van with a gross vehicle weight between 10,000 and 26,000 pounds, and \$2,000 in the case of any other vehicle. Where the vehicle is used in a trade or business, the cost of the vehicle for purposes of depreciation is reduced by the amount of the deduction.

incentives, which are scheduled to decrease and disappear by 2006, recent proposals would introduce further tax credits for fuel-efficient hybrid vehicles, vehicles powered by fuel cells, and alternative and mixed-fuel vehicles.<sup>307</sup> As well, several U.S. states provide tax incentives for alternative-fueled vehicles in the form of credits against income taxes or exemptions from sales taxes.<sup>308</sup> In Ontario, rebates against provincial sales taxes are available for vehicles powered by electricity, propane, natural gas, or other clean-burning fuels.<sup>309</sup> In British Columbia, a partial refund of provincial sales tax is available for the purchase of an alternative fuel vehicle, computed at 30 percent of the tax paid up to \$1,000 for a passenger vehicle and \$10,000 for a passenger bus.<sup>310</sup>

In theory, these incentives should increase sales of fuel-efficient and clean-fuel vehicles by reducing their after-tax prices relative to those of conventional vehicles. Where increased sales facilitate reductions in production costs, moreover, the market for these vehicles might be expected to expand, resulting in a gradual replacement of conventional vehicles, and corresponding reductions in CO<sub>2</sub> emissions – provided that the incentives

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<sup>307</sup> As part of its Climate Change Technology Initiative (CCTI), for example, the Clinton Administration proposed a credit against federal income tax for hybrid vehicles purchased between 2003 and 2006, equal to \$1,000 for a vehicle that is one-third more fuel efficient than a comparable vehicle in its class, \$2,000 for a vehicle that is two-thirds more fuel efficient than a comparable vehicle in the class, \$3,000 for a vehicle that is twice as fuel efficient as a comparable vehicle in the class, and \$4,000 for a vehicle that is three times more fuel efficient than a comparable vehicle in its class. For a detailed discussion of this incentive, see J. Andrew Hoerner and Avery P. Gilbert, *Assessing Tax Incentives for Clean Energy Technologies: A Survey of Experts Approach*, (Washington, D.C.: Center for a Sustainable Economy, 2000) at 19-31. For more recent proposals, see Joint Committee on Taxation, *Description of s. Energy Tax Incentives Act of 2002*, (February 11, 2002) (online at: <<http://www.house.gov/jct/x-2-02.pdf>>).

<sup>308</sup> Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 38-39. In Oregon, for example, individuals who purchase an alternative fuel vehicle can obtain a credit against state income tax of up to \$1,500, while businesses can claim a credit against state business tax of 35 percent of the difference between the cost of a hybrid-electric or other dual fuel vehicle and the cost of a conventional vehicle of the same class and size. See Oregon Office of Energy, "Hybrid Electric and Dual-Fuel Vehicles" available on the web at <http://www.energy.state.or.us/trans/hybridcr.htm>.

<sup>309</sup> RSA, paragraphs 48(3)(g) and (h). The amount of the rebate is up to \$750 for vehicles powered by propane, and up to \$2,000 for vehicles powered by electricity, natural gas or other clean-burning fuels.

<sup>310</sup> British Columbia, *Consumer Taxation Branch Bulletin*, No. 085 (Issued August 200, Revised March 2002).

encourage mainly the substitution of fuel-efficient and clean-fuel vehicles for conventional vehicles, rather than an increase in total vehicle purchases, and that drivers do not significantly increase the number of kilometers driven in response to increases in the fuel efficiency of the vehicles they drive.

In practice, the effectiveness of tax incentives for fuel-efficient and clean-fuel vehicles is likely to depend on the commercial viability of the qualifying vehicles and the price differential between these vehicles and conventional vehicles, as well as the amount and form of the incentive. In the case of qualified electric vehicles, for example, the amount of the U.S. credit appears to have been insufficient to significantly increase sales of a commercially uncertain and expensive technology.<sup>311</sup> More promising are tax incentives for hybrid vehicles such as the Toyota Prius and Honda Insight, which are commercially available but 20 to 25 percent more expensive than conventional vehicles. Although this price differential suggests that tax incentives would have to be substantial to be effective,<sup>312</sup> the combination of a lesser incentive with increased automotive fuel taxes and taxes on fuel-inefficient vehicles might also prove effective.<sup>313</sup>

With respect to the form of the incentive, finally, an exemption from otherwise applicable sales or value-added taxes is likely more effective and more equitable than a deduction or non-refundable credit against income tax – which is realized some time after the vehicle is purchased, requires the consumer to maintain and file receipts, and depends

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<sup>311</sup> Notwithstanding the credit, sales of these vehicles in the U.S. were only 1,238 in 1998. Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 21.

<sup>312</sup> Energy Information Administration, *Analysis of The Climate Change Technology Initiative: Fiscal Year 2001*, (Washington, D.C.: U.S. Department of Energy, 2000) at 32 (concluding on this basis that the CCTI incentive would do little to encourage sales of vehicles that would not otherwise have occurred, producing windfalls for consumers who would have purchased the qualifying vehicles without the incentive).

<sup>313</sup> Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 29.

on the consumer's taxable income. In the U.S., however, the absence of a federal sales or value-added tax makes such an approach impossible at the federal level.

In addition to tax incentives for clean-fuel vehicles and fuel-efficient vehicles, several jurisdictions provide tax relief for ride-sharing or public transportation. In Minnesota, for example, employers may claim a 30 percent credit against state income tax for the cost of providing vanpools and transit passes to their employees.<sup>314</sup> Washington State provides a 50 percent income tax credit for costs incurred by employers to establish employee ride-sharing programs and a 30 percent credit for employer-provided bus passes.<sup>315</sup> In Wisconsin, employer-provided vanpooling and transit passes are exempt from tax as employment benefits.<sup>316</sup> Most recently, the Province of Quebec announced that it would also exempt employer-provided transit passes from tax and permit employees who do not receive these passes as employment benefits to deduct the cost of public transit in computing their incomes for provincial tax purposes.<sup>317</sup> Other jurisdictions exempt high-occupancy vehicles and public transportation from automotive fuel taxes.<sup>318</sup>

Current tax rules favour commuting by private vehicle because employer-provided parking is not included as a taxable employment benefit.<sup>319</sup> Consequently, measures may be necessary to prevent an existing tax bias in favour of single occupancy vehicles. More generally, these incentives can be expected to increase ride-sharing and public transit use

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<sup>314</sup> See <http://www.me3.org/projects/greentax> (Minnesotans for an Energy-Efficient Economy).

<sup>315</sup> Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 20.

<sup>316</sup> *Ibid.* at 39.

<sup>317</sup> Government of Quebec, *2003-2004 Budget: Additional Information on the Budgetary Measures*, (March 11, 2003) at 12-14.

<sup>318</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 64; and Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 39.

<sup>319</sup> The failure to include these benefits in computing an employee's income appears to be common to OECD countries. OECD, *Environmental Taxes and Green Tax Reform*, *supra* note 283 at 19.

by reducing the after-tax cost of these methods of transportation relative to alternatives. Since urban commuting is likely to be relatively price inelastic at least in the short run, moreover, one would expect the use of private vehicles to decrease as commuters shift to ride-sharing and public transit. In Washington State, for example, tax credits for ride-sharing and public transit have increased the use of these methods of transportation and decreased the number of single-occupancy vehicles on the road, leading the State Energy Office to conclude that the tax incentives are much more cost-effective than building more roads.<sup>320</sup> More importantly, perhaps, these incentives have the potential to change attitudes and habits, resulting in behavioural responses exceeding those predicted by economic analysis alone.<sup>321</sup>

With respect to the design of these incentives, it is unclear whether they are best directed at employers who determine compensation packages and are well-placed to establish institutional arrangements for ride-sharing programs, or at employees who make the ultimate decisions about methods of transportation to and from work. In either event, a tax incentive in the form of an exempt benefit or deduction, as the Government of Quebec proposed in its 2003-04 Budget, is open to the criticism that it is an “upside-down subsidy” worth more to high-income employees than those with lower incomes. Where commuting expenses are viewed as a cost of earning income, however, an exempt benefit or deduction may be defended as a necessary adjustment to compute taxable

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<sup>320</sup>Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 20.

<sup>321</sup>*Ibid.*

income. In practice, however, these expenses are typically characterized as discretionary personal expenses rather than costs of earning income.<sup>322</sup>

Although transportation accounts for a significant percentage of CO<sub>2</sub> emissions in OECD countries, a substantial share of these emissions is attributable to the heating and cooling of air and water and the operation of appliances and other equipment in commercial and residential buildings.<sup>323</sup> For this reason, incentives for energy-efficient buildings and equipment represent another important category of tax incentives to reduce global warming.

Like tax incentives for clean-fuel and fuel-efficient vehicles, these incentives tend to take one of two forms: tax credits in computing income tax payable, and sales tax exemptions or rebates. In the Netherlands, for example, a 40 percent tax credit for investments in energy-saving measures was introduced in 1997.<sup>324</sup> In Oregon, a Business Energy Tax Credit provides a 35 percent credit against state business taxes for investments in approved energy-efficiency investments.<sup>325</sup> Montana and Hawaii offer income tax credits for investments in residential energy conservation, while Connecticut provides an income tax credit up to 60 percent for investments in residential energy conservation in

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<sup>322</sup> See, e.g., the decision of the U.K. Court of Appeal in *Newsom v. Robertson* (1952), 33 T.C. 452 (C.A.).

<sup>323</sup> In the United States, for example, the commercial and residential sectors are estimated to have accounted for 35 percent of CO<sub>2</sub> emissions (28 percent of GHG emissions) in 1999, slightly more than the 31 percent attributable to transportation. U.S. Department of State, *U.S. Climate Change Action Report 2002*, *supra* note 14 at 41. In Canada, commercial and residential buildings are estimated to account for a smaller percentage of GHG emissions – closer to 10 percent. Government of Canada, *Climate Change Plan for Canada*, *supra* note 2 at 13.

<sup>324</sup> See Vermeend and van der Vaart, *Greening Taxes*, *supra* note 262 at 63-68.

<sup>325</sup> See Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 22. Eligible investments must produce “substantial” energy savings, defined as 50 percent of the energy used to heat water, 10 percent of the energy used to heat a building, 10 percent of commercial or industrial process load, or 30 percent of a waste heat stream for heat recovery projects. Applicants must certify that projects satisfy these criteria, which are subject to audit by the Oregon Department of Energy.

units with a high percentage of low-income households.<sup>326</sup> The Clinton Administration's Climate Change Technology Initiative (CCTI) would have introduced tax credits for purchases of energy-efficient building equipment and energy-efficient new homes,<sup>327</sup> but these have not been approved by Congress.<sup>328</sup> In British Columbia, materials used to improve the energy efficiency of residential and commercial buildings are exempt from provincial sales tax.<sup>329</sup> Similarly, the Ontario Government provides a rebate for provincial sales taxes on purchases of energy-efficient clothes washers, refrigerators and dishwashers purchased after November 25, 2002 and before November 26, 2003.<sup>330</sup> In addition, the United States allows taxpayers to exclude from income the value of any subsidy provided by a public utility for the purchase or installation of an energy conservation measure designed to reduce the consumption of electricity or natural gas or to improve the management of energy demand with respect to a dwelling unit.<sup>331</sup>

In principle, these tax incentives should increase investments in energy-efficient buildings and equipment, thereby reducing energy consumption and CO<sub>2</sub> emissions. To the extent that owners of buildings either undervalue or fail to fully capture the economic gains from energy-efficient investments, moreover, these incentives may address a

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<sup>326</sup> *Ibid.* at 36.

<sup>327</sup> For detailed descriptions and analyses of these proposed tax incentives, see Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 308 at 32-56; and EIA, *Analysis of the Climate Change Technology Initiative*, *supra* note 312 at 14-22.

<sup>328</sup> Some of these proposals appear to have been revived in more recent legislative proposals. See, e.g., Joint Committee on Taxation *Description of s. \_\_\_\_ "Energy Tax Incentives Act of 2002"*, *supra* note 307 at 13-17 (business tax credit for construction of new energy-efficient homes, and tax credit for energy-efficient appliances).

<sup>329</sup> See *Social Service Tax Act* (B.C.), R.S.B.C. 1996, c. 431, paragraph 74(a) and *Social Service Tax Act Regulations* B.C. Reg. 84/58, section 3.20, which exempt thermal insulation material, polystyrene forming blocks used as insulation, storm windows and doors, multiglazed windows, weather stripping and caulking materials, chemicals used to make spray polyurethane foam insulation, and specified window insulating systems.

<sup>330</sup> RSTA, *supra* note 245, section 9.1.

<sup>331</sup> Internal Revenue Code, s. 136(c)(1).



market failure that prevents an efficient level of investment. Such is often the case, for example, with rental buildings where neither the landlord nor the tenant obtains the full benefit from energy-efficient investments that one or the other might make.

In practice, however, the effectiveness of many of these incentives is highly uncertain.<sup>332</sup>

Incentives for energy efficient appliances, for example, may not only induce consumers to substitute energy-efficient appliances for less efficient appliances, but may also increase total appliance purchases and encourage owners to use these appliances more intensively (e.g., running air conditioners longer and at lower temperatures), leading to increased energy consumption and GHG emissions.<sup>333</sup> Where the elasticity of demand for appliances is low and more intensive use of energy-efficient appliance is unlikely, however, these incentives are likely to be more effective.

Incentives for energy-efficient new homes have a limited impact on global warming, due to the slow turnover of the housing stock, and are probably better directed at those who build new homes than at purchasers who have little involvement in the key decisions affecting the energy efficiency of new homes.<sup>334</sup> As the number of builders is much smaller than the number of purchasers, however, improved energy-efficiencies might be achieved more effectively through a combination of regulatory requirements, voluntary agreements, and direct subsidies.<sup>335</sup>

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<sup>332</sup> In the Netherlands, for example, the Bureau for Economic Policy Analysis concluded that the tax credit for investments in energy saving measures would generate little in the way of energy savings relative to its cost in terms of forgone revenues. Vermeend and van der Vaart, *Greening Taxes*, *supra* note 262 at 68.

<sup>333</sup> Bruce Yandle and Stuart Buck, "Bootleggers, Baptists, and the Global Warming Battle" (2002) 26 *Harv. Envtl. L. Rev.* 117 at 209.

<sup>334</sup> Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 40.

<sup>335</sup> In Canada, for example, a Commercial Building Incentive Program provides a direct subsidy of up to \$60,000 for buildings that are at least 25 percent more efficient than buildings satisfying the requirements

More promising, perhaps, are tax incentives for energy-efficient retrofits, which could affect a much larger percentage of the building stock,<sup>336</sup> and encourage innovative solutions by subsidizing certified efficiency improvements (subject to audit) without specifying particular methods or technologies.<sup>337</sup> Such is the case, for example, with Oregon's Business Energy Tax Credit, which is reported to have had a significant effect on energy conservation investments in the state.<sup>338</sup> In order to ensure that the credit is available irrespective of income, however, it should be refundable rather than non-refundable.<sup>339</sup> Special incentives might also be directed at improving energy efficiency in rental units and low-income households, where market failures and resource limitations make energy-efficient investments less likely.

A final category of tax incentives aimed at reducing CO<sub>2</sub> emissions involves incentives to encourage the generation of energy from clean and renewable sources. In countries with taxes on energy or electricity, for example, exemptions or rebates are generally available for energy from clean and renewable sources.<sup>340</sup> Likewise, the use of clean-burning and renewable automotive fuels is encouraged by reductions or exemptions from otherwise applicable taxes. In the United States, the use of alternative energy sources for motor

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of the Model National Energy Code for Buildings. For a brief description of this program, see <http://www.fiscallygreen.ca/fg/experience.html>.

<sup>336</sup> Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 40.

<sup>337</sup> For a brief description of an efficiency tax credit along these lines, see Hoerner and Muller, *Carbon Taxes for Climate Protection in a Competitive World*, *supra* note 266 at 23.

<sup>338</sup> See Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 22-23 (reporting on an Oregon Department of Energy study that concluded that half of the investment projects supported by the credit either would not have occurred without the credit or involved more extensive conservation measures that would have been taken without the credit).

<sup>339</sup> In Canada, energy-saving retrofits of commercial and institutional buildings are supported by a federal program (the Energy Innovators Initiative) that contributes up to 25 percent of the eligible costs of pilot projects to a maximum of \$250,000, provided that the recipient replicates the energy efficient measures in at least 25 percent of its remaining facilities. For a brief description of this program, see <http://www.fiscallygreen.ca/fg/experience.html>.

<sup>340</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 64.

vehicles is also encouraged by a tax credit for the sale or use of alcohol as a fuel,<sup>341</sup> and a current deduction for otherwise depreciable property used to refuel clean-fuel vehicles and recharge electric vehicles.<sup>342</sup>

In addition to these incentives, several countries also provide tax incentives for direct investments in equipment used to generate heat or power from clean and renewable sources. In the Netherlands, for example, investments in renewable energy are encouraged through tax-exempt green investment funds and accelerated depreciation for various kinds of environmental investments, including investments in renewable energy equipment.<sup>343</sup> In the United States, a federal income tax credit for purchases of solar and geothermal energy equipment was introduced in 1978.<sup>344</sup> Although the credit for residential uses expired in 1985, a credit for commercial uses remains,<sup>345</sup> and several legislative proposals would both restore a credit for residential purposes and make the credit available for investments in wind energy equipment as well as solar and geothermal energy equipment.<sup>346</sup> Another U.S. tax incentive encourages the generation

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<sup>341</sup> Internal Revenue Code, s. 40.

<sup>342</sup> Internal Revenue Code, s. 179A.

<sup>343</sup> See Vermeend and van der Vaart, *Greening Taxes*, *supra* note 262 at 60-63 (green investment funds) and 52-59 (accelerated depreciation). To qualify as a green investment fund, the fund must devote at least 70 percent of its assets to investments in qualifying green projects defined by legislation. Until 1998, these projects had to be in the Netherlands. Since then, however, qualifying projects may also be situated in Eastern Europe or developing countries.

<sup>344</sup> See the description of this credit in Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 72. As originally enacted, the tax incentive provided a credit of 30 percent of the first \$2,000 investment in qualifying property and a credit of 20 percent on the next \$8,000 spent. In 1980, the credit was increased to 40 percent on the first \$10,000 spent.

<sup>345</sup> Internal Revenue Code, s. 48. Although 15 percent in 1986, and 12 percent from 1987 to 1991, this credit was reduced to 10 percent in 1992, where it has remained. See Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 72-73.

<sup>346</sup> The Clinton Administration's Climate Change Technology Initiative, for example, would have introduced a credit for purchases of rooftop photovoltaic systems and solar water heating systems located on or adjacent to a building for uses other than heating swimming pools, equal to 15 percent of qualifying investments up to \$1,000 for solar water heating systems and \$2,000 for rooftop photovoltaic systems. For detailed descriptions and evaluations of this proposal, see *ibid.* at 72-86; and EIA, *Analysis of Climate Change Technology Initiative*, *supra* note 313 at 22-24. A more recent legislative proposal would provide

of electricity by wind or closed-loop biomass through a credit of 1.5 cents per kilowatt hour of electricity generated from these sources.<sup>347</sup> Other U.S. legislative proposals include a tax credit for investments in combined heat and power (CHP) systems,<sup>348</sup> and tax credits both for investments in clean coal technology facilities and for the generation of electricity from these facilities.<sup>349</sup> As well, several U.S. states provide tax incentives for solar power and electricity produced by wind or biomass, typically in the form of investment tax credits against state personal or corporate income taxes, but also in the form of sales tax exemptions and reduced property taxes.<sup>350</sup>

In Canada, tax incentives for clean and renewable energy take the form of accelerated capital cost allowance (depreciation) for qualifying investments, sales tax exemptions or rebates, and income and property tax holidays.<sup>351</sup> Since the 1970s, for example, the federal government has allowed investments in qualifying solar heating equipment,

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a 15 percent credit for purchases of rooftop photovoltaic systems and solar water heating systems and a 30 percent credit for purchases of wind energy equipment and qualified fuel cell power plants. See Joint Committee on Taxation *Description of s. \_\_\_\_ "Energy Tax Incentives Act of 2002"*, *supra* note 308 at 17-19.

<sup>347</sup> Internal Revenue Code, s. 45. This credit is indexed for inflation and was 1.7 cents per kWh in 2001. For the purpose of this credit, "closed-loop" biomass is defined as "any organic material from a plant which is planted exclusively for purposes of being used at a qualifying facility to produce electricity." For detailed discussions and evaluations of this credit and legislative proposals to extend it to electricity produced by non-closed-loop biomass and the use of biomass in coal-fired plants, see Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 86-102; and EIA, *Analysis of Climate Change Technology Initiative*, *supra* note 313 at 36-37, 38-46, and 54-55.

<sup>348</sup> The Clinton Administration's Climate Change Technology Initiative, for example, proposed an investment tax credit of 8 percent for purchases of qualifying combined heat and power (CHP) systems between 2000 and 2002. For a detailed description and evaluation of this proposal, see Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 57-71. A more recent legislative proposal would provide a 10 percent credit for investments in CHP systems. See Joint Committee on Taxation *Description of s. \_\_\_\_ "Energy Tax Incentives Act of 2002"*, *supra* note 308 at 23-24.

<sup>349</sup> *Ibid.* at 25-29.

<sup>350</sup> Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 35.

<sup>351</sup> In addition to these tax incentives, the Canadian government provides direct subsidies for clean and renewable energy through a production incentive of 1.2 cents per kWh (declining to 0.8 cents per kWh) for wind energy, and the Canadian Renewable Energy Deployment Initiative (REDI) which offers businesses and institutions a financial incentive of 25 percent of the purchase and installation costs of qualified renewable energy systems for space and water heating and cooling, up to a maximum of \$80,000. For brief descriptions of these programs, see <http://www.fiscallygreen.ca/fg/experience.html>.

small-scale hydro-electric generating equipment, and equipment to generate electricity from wind or biomass to be depreciated at accelerated rates for the purpose of computing business income.<sup>352</sup> More recent amendments also allow accelerated depreciation for investments in geothermal energy equipment, fuel cell generating equipment, and equipment used to convert biomass into bio-oil,<sup>353</sup> and permit the current deduction of expenses (such as the clearing of land) that are incurred in the development of clean and renewable energy projects.<sup>354</sup> In addition to these income tax incentives, British Columbia provides a sales tax exemption for purchases of wind, solar and small-scale hydro-electricity generating equipment,<sup>355</sup> while Ontario offers sales tax rebates for purchases of solar energy systems and building materials that are incorporated into clean, alternative or renewable electricity generation facilities.<sup>356</sup> In December 2002, moreover, the Ontario Government introduced a 10-year corporate income tax holiday for income

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<sup>352</sup> See the descriptions of class 34 and class 43.1 properties in Schedule II of the Income Tax Regulations, which provide for rates of 50 and 30 percent as opposed to the otherwise applicable class 1, 2 or 8 rates of 4 percent, 6 percent or 20 percent.

<sup>353</sup> See the description of class 43.1 property in Schedule II of the Income Tax Regulations.

<sup>354</sup> See the definition of "Canadian renewable and conservation expense" (CRCE) in section 1219 of the Income Tax Regulations, which is included in calculating the taxpayer's "Canadian Exploration Expense" (CEE) in paragraph 66.1(6)(g.1) of the federal *Income Tax Act*, R.S.C. 1985, c. 1 (as amended) {hereafter "ITA"}. CEE is fully deductible in computing income under ITA subsection 66(1) or (3). Unclaimed CRCE can be carried forward indefinitely for deduction in future taxation years. Alternatively, where a corporation incurring these expenses enters into a flow-through share agreement with shareholders, CRCE may be renounced in favour of the shareholders who may claim the deductions.

<sup>355</sup> *Social Service Tax Act* (B.C.), supra note 329, paragraph 74(a) and Social Service Tax Act Regulations, section 3.20 (exempting wind-powered generating equipment specifically designed to produce mechanical or electrical energy, solar photovoltaic collector panels, solar thermal collector panels, and micro-hydroelectric turbines).

<sup>356</sup> RSTA, supra note 245, paragraphs 48(3)(r) and (q). In the 2003 Ontario Budget, the government announced its intention to expand this sales tax rebate to include wind energy systems, micro-hydroelectric systems, and geothermal heating and cooling systems for residential purposes).

from the generation of electricity from clean, alternative or renewable sources,<sup>357</sup> and a 10-year property tax holiday for assets used to generate electricity from these sources.<sup>358</sup>

While reductions or exemptions from energy or automotive fuel taxes create indirect incentives for investments in clean and renewable sources of energy by increasing the demand for alternatives to fossil fuels, tax credits and accelerated depreciation and sales and property tax exemptions or rebates for clean and renewable energy equipment create direct incentives for these investments by lowering the after-tax cost of the property used to generate this energy. Production tax credits, tax-exempt investment funds, and income tax holidays encourage investments in clean and renewable energy by lowering the pre-tax rate of return necessary to invest in these projects, thereby increasing the supply of investment capital.

Evidence on the effectiveness of these incentives is limited and mixed. In the United States, tax credits for solar energy equipment helped to create a significant increase in the market for these systems in the late 1970s and early 1980s, though many turned out to be “poorly designed, poorly built and poorly installed” – resulting in high failure rates and a negative reputation.<sup>359</sup> With the expiration of credits for residential use in 1985 and decreases in fuel prices in the latter half of the 1980s, the U.S. market for these systems collapsed and has yet to recover.<sup>360</sup> Although the cost of solar photovoltaic systems has come down in the 1990s,<sup>361</sup> they remain significantly more costly than other forms of

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<sup>357</sup> *Corporations Tax Act*, R.S.O. 1990, c. C.40, section 13.6.

<sup>358</sup> *Assessment Act*, R.S.O. 1990, c. A.31, section 3.1. As property taxes fall within the jurisdiction of municipal governments, the Government indicated that it would compensate municipalities for lost property tax revenues.

<sup>359</sup> Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 73.

<sup>360</sup> EIA, *Analysis of the Climate Change Technology Initiative*, *supra* note 312 at 23.

<sup>361</sup> Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 76.

energy, making it unlikely that existing and proposed tax credits will have much impact on overall demand.<sup>362</sup> In contrast, solar water heating systems can be economically competitive with conventional alternatives over the life of the system, making tax incentives a useful way to offset the high initial cost of these systems and encourage lower costs through economies of scale.<sup>363</sup> Likewise, incentives for wind generation appear to have been relatively successful, encouraging substantial investments in wind turbines,<sup>364</sup> which have caused prices to fall as output has expanded.<sup>365</sup> Incentives for biomass energy and CHP systems, on the other hand, seem less promising, as the former is significantly more costly than conventional sources,<sup>366</sup> while the primary impediment to the latter appears to involve regulatory barriers to third party generation and sale of power.<sup>367</sup> At the same time, it is important to recognize that incentives for clean and

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<sup>362</sup> *Ibid* at 85. See also EIA, *Analysis of the Climate Change Technology Initiative*, *supra* note 312 at 24 (concluding that the proposed CCTI incentive would make solar technologies economically attractive only in "[n]iche markets with local incentives in place and electricity rates much higher than the national average").

<sup>363</sup> Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 74.

<sup>364</sup> In the Netherlands, for example, over 350 wind turbines were supported by green investment funds between 1995 and 1998. Vermeend and van der Vaart, *Greening Taxes*, *supra* note 262 at 62-63. In the United States, the production tax credit for wind energy is credited with the establishment of new wind generating facilities in Texas, Minnesota, Wyoming and Colorado. Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 89.

<sup>365</sup> See, e.g., Frank Muller, "Tax Credits and the Development of Renewable Energy in California" in Robert Gale and Stephen Barg, eds., *Green Budget Reform: An International Casebook of Leading Practices*, (London: Earthscan Publications, 1995). See also Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 88-90 (concluding that the combination of these price decreases and the U.S. production tax credit could make wind energy competitive with energy from fossil fuels by 2005).

<sup>366</sup> *Ibid* at 91 (adding that investments in biomass plants involve a greater commitment of capital, and therefore greater risk, than investments in solar or wind facilities, and that the expansion of biomass energy requires a reliable and economically viable source of biomass, which is unlikely to develop without established markets for this biomass). Where biomass is used in coal-fired plants, on the other hand, cost considerations suggest that tax incentives may be more effective. See *ibid.* at 93; and EIA, *Analysis of the Climate Change Technology Initiative*, *supra* note 312 at 44.

<sup>367</sup> Hoerner and Gilbert, *Assessing Tax Incentives for Clean Energy Technologies*, *supra* note 307 at 68-70.

renewable energy are likely to be most effective when combined with environmental taxes and other environmental measures that also encourage these alternatives.<sup>368</sup>

With respect to the form of these tax incentives, the optimal approach presumably depends on the kinds of activities intended to be encouraged. For residential purchasers of solar energy and heating equipment, sales and value-added tax exemptions are likely to be more effective and more equitable than income tax credits or deductions that do not reduce the immediate out-of-pocket cost of the equipment and (except for refundable tax credits) depend on the purchaser's level of income. For business investments in clean and renewable energy generation, tax credits and accelerated depreciation are likely to be more effective, though equity and administrative simplicity suggest that these incentives be delivered in the form of refundable tax credits – which do not vary with the investor's level of income and do not encourage elaborate ownership structures and transactions in order to ensure that non-refundable credits and deductions can be claimed in the taxation years in which they are available.<sup>369</sup> Similarly, financing incentives may be a useful way to encourage capital investments in clean and renewable energy, but are inequitable when delivered in the form of tax-exempt investments and income tax holidays which are worth more to high-income taxpayers than taxpayers with little or no income.<sup>370</sup> Somewhat more equitable is a recent Canadian proposal for tax-assisted Environmental Organization Capital Investment Funds (EOCIFs) which would be required to invest in

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<sup>368</sup> See, e.g., EIA, *Analysis of Climate Change Technology Initiative*, *supra* note 313 at 45 (noting that new wind plants appear to have been encouraged by the combination of federal tax incentives, state mandates, and other incentive programs).

<sup>369</sup> Government of Canada, *Economic Instruments for Environmental Protection*, *supra* note 88 at 60-63.

<sup>370</sup> *Ibid.* at 64-65.



qualifying environmental investments, though this proposal contemplates a non-refundable credit rather than a refundable credit.<sup>371</sup>

In addition to incentives to reduce CO<sub>2</sub> emissions, tax incentives can also be used to encourage reductions in non-CO<sub>2</sub> GHG emissions. In the United States, for example, the use of landfill methane to generate electricity is encouraged by a production tax credit of 1.0 cent per kWh.<sup>372</sup> In Canada, equipment used to collect landfill gas became eligible for accelerated depreciation in 1994.<sup>373</sup> The Clinton Administration's Climate Change Technology Initiative proposed to introduce a 10 percent tax credit for the installation of new power circuit breaker equipment to replace power circuit breakers that are prone to leak SF<sub>6</sub>, and a 10 percent tax credit for the installation of HFC and PFC recovery/recycling equipment in semiconductor manufacturing plants, though neither was enacted.<sup>374</sup> Other tax incentives might be imagined to encourage the capture of methane for storage or energy generation from oil and natural gas production and coal mining, reduced methane emissions from natural gas pipelines, reduced methane and nitrous oxide emissions from manure management, reduced PFC emissions from the production of aluminum, and reduced SF<sub>6</sub> emissions from the production of magnesium.

Although some of these tax incentives might encourage reductions in non-CO<sub>2</sub> GHG emissions, many of these emissions are either difficult to monitor or effectively

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<sup>371</sup> See <http://www.alkalizeforhealth.net/eocif/introduction.htm>.

<sup>372</sup> For a detailed description and analysis of this incentive, and the CCTI proposal to extend it to landfill gas-to-energy projects placed in service between January 1, 2001 and December 31, 2005, see EIA, *Analysis of the Climate Change Technology Initiative*, *supra* note 312 at 37-38 and 46-47.

<sup>373</sup> See the description of Class 43.1 property in Schedule II of the Income Tax Regulations.

<sup>374</sup> For brief descriptions of these proposed credits, see Chris Edwards, Ada Rousso, Peter Merrill and Elizabeth Wagner, "Cool Code: Federal Tax Incentives to Mitigate Global Warming" (1998) 51 *Nat. Tax J.* 465 at 474-75. In order to qualify for the first credit, the proposal stipulated that the replaced circuit breaker equipment would have to be destroyed to prevent further use. In order to qualify for the second credit, the proposal required the equipment to recover 99 percent of HFCs and PFCs.

addressed through regulatory approaches or voluntary agreements. In the United States, for example, increases in electricity generation from landfill gas are attributable primarily to state regulatory mandates, such that the majority of the tax benefits from the federal production tax incentives are expected to flow to landfills that would have installed energy generating systems even without the credit.<sup>375</sup> For this reason, the rationale for tax incentives in this context may be less to encourage environmentally sensitive behaviour than to share the cost of new emissions reduction measures established by regulation or voluntary agreement. Given the limited number of stationary sites for these emissions, however, direct subsidies may be a more transparent and effective method of cost-sharing in these settings than tax incentives.

A final strategy to reduce global warming involves the preservation and enhancement of carbon sinks, the most important of which are forests and agricultural soils. Together with tax incentives to reduce GHG emissions, therefore, many jurisdictions provide tax incentives to maintain or expand forests and agricultural soils. In the United States, for example, several states encourage the preservation of forest and agricultural property through property tax assessments based on current use rather than market value.<sup>376</sup> In Maine and the Canadian provinces of British Columbia, Ontario and Quebec, property tax reductions are available only for woodlots that are managed in accordance with environmental criteria.<sup>377</sup> The Canadian government also encourages the preservation of forests and agricultural land through special rules permitting tax-deferred transfers of

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<sup>375</sup> EIA, *Analysis of the Climate Change Technology Initiative*, *supra* note 312 at 46-47.

<sup>376</sup> Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 39.

<sup>377</sup> See, e.g., *ibid.* at 23 (Maine); and Nathalie Chalifour, "Ecological Fiscal Reform and the WTO – An Analysis of the Limitations of the Canadian Government to Implement EFR Relating to Forests" Presented at Third Annual Global Conference on Environmental Taxation: Issues, Experience and Potential" (Woodstock, Vermont, 12-13 April 2002) at 17-18 (British Columbia, Ontario, and Quebec).

farm property and commercial woodlots operated in accordance with a prescribed forest management plan.<sup>378</sup> In addition to these rules, the preservation of ecologically sensitive land is encouraged by a special tax incentive for charitable donations of this property.<sup>379</sup> Reforestation is also encouraged in the U.S. through tax credits,<sup>380</sup> and in Ontario through the exemption of tree seedlings from provincial sales tax.<sup>381</sup> Other proposals include income tax incentives for environmentally-sensitive forest harvesting equipment and practices,<sup>382</sup> reduced sales taxes on forest products certified to have come from a forest subject to a certified environmentally-sensitive forest management plan,<sup>383</sup> and a carbon sequestration tax credit based on the annual quantity of carbon sequestered by new projects.<sup>384</sup>

Evidence on the effectiveness of these tax incentives in reducing global warming is extremely limited. According to one study, however, incentives to encourage the preservation of forest and agricultural properties are unlikely to have much impact absent

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<sup>378</sup> ITA, subsections 70(9) (testamentary transfer) and 73(3) (*inter vivos* transfer). As a general rule, capital property transferred at death or by *inter vivos* gift is subject to a deemed disposition at fair market value. ITA, subsections 69(1) (*inter vivos* gift) and 70(5) (transfer at death).

<sup>379</sup> See ITA, *supra* note , paragraph 38(a.2), which reduces the taxable capital gain on gifts of ecologically sensitive land from the generally applicable inclusion rate of  $\frac{1}{2}$  to  $\frac{1}{4}$ . Although accrued capital gains on gifts of this property are partly taxable, the charitable contributions deduction (for corporations) or credit (for individuals) that may be claimed on the gift is based on the fair market value of the property.

<sup>380</sup> Internal Revenue Code, ss. 194 and 48(b). For a brief discussion of this tax incentive, See Roberta Mann, "Waiting to Exhale? Global Warming and Tax Policy" (2002) 51 *Am. U. L. Rev.* 1135 at 1193-94. In addition to this federal credit, the state of North Carolina also provides an income tax credit for reforestation. See Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 40.

<sup>381</sup> See RSTA, *supra* note 245, s. 7(1)13 and R.R.O. Regulations 1012 and 1013.

<sup>382</sup> See, e.g., Chalifour, "Ecological Fiscal Reform and the WTO" *supra* note 377 at 13-16 (proposing accelerated depreciation for environmentally-sensitive forest harvesting equipment, a tax credit for research and development carried out in order to modify forest management practices in order to satisfy environmental certification standards, and a tax credit for the cost of hiring new staff to use environmentally-sensitive forestry equipment).

<sup>383</sup> *Ibid.* at 18-19.

<sup>384</sup> See, e.g., Roberta Mann, "Waiting to Exhale?: Global Warming and Tax Policy" (2002) 51 *Am. U.L. Rev.* 1135 at 1214-15.

other measures such as zoning regulations.<sup>385</sup> Nor are these incentives likely to enhance the capacity of these carbon sinks unless they are contingent on owners employing environmentally-sound forest and soil management practices.<sup>386</sup> Provided that the satisfaction of environmental standards is a condition of the incentive, however, some of these measures may be useful ways to encourage and share the cost of carbon sequestration. Particularly promising are proposals for a carbon sequestration tax credit which could encourage innovative strategies to the preservation and enhancement of carbon sinks.

With respect to the form of these tax incentives, equity considerations suggest that refundable tax credits are preferable to exemptions, deductions, accelerated depreciation, tax deferrals, and non-refundable tax credits, the benefit from which can vary with the taxpayer's level of income. As with other environmental taxes and tax incentives, experience with property tax reductions suggests that these incentives should be considered together with other environmental policies such as zoning regulations, not in isolation.

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<sup>385</sup> Hoerner, *Harnessing the Tax Code for Environmental Protection*, *supra* note 83 at 40.

<sup>386</sup> *Ibid* at 23.

## **CHAPTER V      Application – Climate Change Plan for Canada**

### **5.1 Introduction**

In order to achieve the targets that Canada agreed to when it ratified the Kyoto Protocol, the Canadian Government has established specific reduction targets and proposed various policy instruments in its *Climate Change Plan for Canada*, released in November 2002. The *Climate Change Plan for Canada* proposes actions in various areas in order to achieve targeted reductions of 240 MT of CO<sub>2</sub> – equivalent emissions by the end of this decade. Pursuant to the *Climate Change Plan for Canada*, Canadian individuals, businesses and governments should achieve annual reductions of 80 MT from new actions announced in the Climate Change Plan for Canada, and a further 60 MT from other measures both underway and anticipated.<sup>387</sup> Proposed instruments for the reduction of GHGs include: (1) “innovation and technology investments” to increase energy efficiency (production, distribution and conservation) and develop cleaner sources of energy; (2) “infrastructure investments” including urban public transit, intermodal transportation of goods, and the capture and storage of GHGs; (3) the creation of a “Partnership Fund” to “co-invest and collaborate on emissions reductions projects”; (4) voluntary agreements and the establishment of a domestic emissions trading system linked to the international carbon market to be established under the Kyoto Protocol; and

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<sup>387</sup> *Action Plan 2000 on Climate Change*, *supra* note 10.

(5) “targeted measures” involving information (e.g. labelling), incentives, regulations and tax measures.<sup>388</sup>

Although the *Climate Change Plan for Canada* identifies tax measures as one of the policy instruments through which it plans to meet its reduction targets, these measures appear to be few in number and solely in the form of tax incentives for environmentally-preferred consumption or investment.<sup>389</sup> Indeed, aside from the proposed emissions trading system, the main instruments on which the Canadian Government intends to rely in order to meet its commitment under the Kyoto Protocol involve public spending,<sup>390</sup> voluntary agreements,<sup>391</sup> and public information programs.<sup>392</sup> Absent from the *Climate Change Plan for Canada* are various environmentally-related taxes that have been introduced or proposed in Canada or other developed countries.

The federal government’s strategy to implement the Kyoto Protocol favours an Adjusted Mixed Approach (“Option 4”), as laid out in the government’s *Discussion Paper on*

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<sup>388</sup> *Ibid* at 15-17.

<sup>389</sup> The only specific example provided in the document involves an existing exemption in the federal excise tax for ethanol in gasoline. *Ibid.* at 17. While the Plan also discusses the possibility of various financial incentives, it does not indicate whether these would be delivered in the form of tax incentives or direct grants. See, e.g. *ibid.* at 26 (discussing incentives for retrofits of residential housing); and at 35 (mentioning a “financial incentive program to sequester...CO<sub>2</sub> into long-term storage”).

<sup>390</sup> See *ibid* at 23 (infrastructure funding for public transit); and at 36 (explaining that the Canadian Government “is prepared to consider the participation in suitable clean coal demonstration projects, whether through the retrofit of an existing plant and/or the construction of a new generating station”).

<sup>391</sup> See *ibid* at 21 (stating that “the Government of Canada will negotiate targets for the introduction of more fuel-efficient vehicles into the Canadian market with automobile manufacturers”); at 23 (discussing “voluntary performance agreements” to promote more efficient transportation of goods); at 29 (discussing voluntary targets for energy efficiency improvements by large industrial emitters); at 30 (proposing that targets for emissions reductions by large industrial emitters be “established through covenants with a regulatory or financial backstop”); and 8 (discussing “voluntary energy efficiency targets” for small and medium-sized enterprises and “voluntary targets to reduce fugitive emissions” of waste gases during oil and gas production and exploration, as well as from small leaks in natural gas equipment, lines and storage tanks”).

<sup>392</sup> See, e.g., *ibid* (suggesting that the Canadian Government will work with other levels of government and the private sector “to provide better information” on the fuel economy of passenger vehicles).

*Canada's Contribution to Addressing Climate Change*.<sup>393</sup> This would involve a mix of three things. First, a domestic emissions trading (DET) system which would require companies to hold a permit for each tonne of GHGs emitted. Permits would be offered without charge. Firms that can reduce emissions could sell their excess permits to firms who face a higher cost of emissions reduction and who therefore require excess permits as an economic necessity. Secondly, there would be targeted measures including incentives, covenants, regulations, and fiscal measures. Finally, the government could purchase international emission permits through the Kyoto Protocol mechanisms, such as by investing in projects that reduce emissions and linked to trade promotion and innovation efforts. Under Option 4, the allocation of permits to business would be designed to ease competitiveness concerns for companies experiencing significant growth, with high emission intensity to their production, or facing high costs in reducing emissions. Additionally, sectors such as agriculture, forestry or municipalities would be able to sell emission reductions to DET companies through a system of offsets.

## **5.2 *Climate Change Plan for Canada: Specific Examples of Environmental Taxation***

The *Climate Change Plan for Canada* proposes actions to achieve targeted reductions of 240 MT of CO<sub>2</sub>-equivalent emissions in each of the following areas: (i) transportation; (ii) housing and commercial/institutional buildings; (iii) large industrial emitters (including renewable energy and cleaner fossil fuels); (iv) small and medium-sized enterprise with fugitive emissions; (v) agriculture, forestry and landfills; and (vi) international emissions reductions.

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<sup>393</sup> Government of Canada, *The Climate Change Discussion Paper*, (Ottawa: Government of Canada, May 15, 2002).

### 5.2.1 Transportation

Beginning with the transportation sector, which accounts for approximately 25 percent of Canada's GHG emissions,<sup>394</sup> the *Climate Change Plan for Canada* proposes to reduce emissions by 21 MT through: (1) increased use of ethanol-blended gasoline and biodiesel fuel; (2) negotiated improvements in new vehicle fuel efficiency and public information programs to promote fuel efficient vehicles; (3) research and development of fuel cell vehicles and other fuel cell and hydrogen technologies; (4) public information programs and voluntary agreements with manufacturers to reduce emissions from and improve the fuel efficiency of off-road diesel-fuelled commercial equipment such as construction and logging equipment, and gasoline-powered consumer products such as outboard motors and snowmobiles; (5) investments in public transportation; and (6) public-private collaboration to improve efficiencies in goods transportation.<sup>395</sup>

With respect to automotive fuels, the *Climate Change Plan for Canada* itself mentions the role that tax exemptions can play to encourage the use of clean and renewable fuels.<sup>396</sup> In addition, U.S. experience suggests that increased use of clean-burning fuels can also be encouraged by tax incentives directed at the production and distribution of these fuels. As well, higher automotive fuel taxes are apt to encourage increased use of clean and renewable fuels as the price differential between taxed and untaxed fuels increases. In practice, however, Canada's ability to increase automotive fuel taxes is significantly constrained by combined federal and state taxes in key border states in the U.S., which are currently about 40 percent less than Canadian rates.

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<sup>394</sup> *Climate Change Plan for Canada*, *supra* note 2 at 20.

<sup>395</sup> *Ibid* at 20-24.

<sup>396</sup> *Ibid* at 23 (mentioning the Ontario fuel tax exemption for biodiesel).



Regarding vehicle efficiency and alternative-fuel vehicles, the *Climate Change Plan for Canada* proposes negotiated agreements with manufacturers, public information programs, and federal funding for research and development.<sup>397</sup> In addition to these measures, as previously discussed, excise taxes and/or annual registration fees on fuel-inefficient vehicles, tax incentives or other subsidies for the retirement of older fuel-inefficient vehicles, and tax incentives for fuel-efficient and clean-fuel vehicles represent potentially effective market-based instruments to increase the demand for fuel-efficient and clean-fuel vehicles. While automobile registration fees fall within the scope of provincial jurisdiction, there is no constitutional impediment to federal taxes on fuel-inefficient vehicles,<sup>398</sup> or to federal tax incentives for fuel-efficient and clean-fuel vehicles. Nor do tax measures in this area raise the same cross-border problems as taxes on automotive fuels, since taxes can be imposed when automobiles are registered in the jurisdiction,<sup>399</sup> and incentives for fuel-efficient and clean-fuel vehicles can be limited to Canadian residents. In practice, the most effective incentives to purchase fuel-efficient and clean-fuel vehicles are likely to be exemptions from otherwise applicable sales or value-added taxes, which would require federal-provincial co-ordination in provinces that have not harmonized their sales taxes with the federal goods and services tax.

In addition to these tax measures, environmental taxes and tax incentives may also contribute to the *Climate Change Plan for Canada's* other proposals for the transportation sector. Where purchases of gasoline and diesel fuel for off-road uses are

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<sup>397</sup> *Climate Change Plan for Canada*, *supra* note 2 at 21-22.

<sup>398</sup> As provinces like Ontario have already imposed taxes on fuel-inefficient vehicles, federal action in this area could require negotiation and revenue-sharing with provinces.

<sup>399</sup> For a brief discussion of border tax adjustments for these taxes, see Government of Canada, *Economic Instruments for Environmental Protection*, *supra* note 88 at 56. To the extent that automobile registration is a provincial responsibility, however, the imposition of federal taxes on fuel-inefficient vehicles would require cooperation with provincial governments.

not subject to sales and excise taxes,<sup>400</sup> taxation of these fuels would contribute toward increased fuel efficiency and reduced emissions. As well, tax incentives to use public transportation can complement federal funding for basic infrastructure. So also can tax incentives help to improve efficiencies in goods transportation, at least where this requires investments in new equipment like anti-idling systems for rail and truck services, on-board tire inflation technologies and aerodynamic drag reducers.<sup>401</sup>

### 5.2.2 Housing and Commercial/Institutional Buildings

For residential and commercial/institutional buildings, which generated direct emissions of approximately 77 MT in 2000 and a further 57 MT from the consumption of electricity generated from coal, oil or natural gas,<sup>402</sup> the *Climate Change Plan for Canada* proposes to reduce GHG emissions by 8 MT through: (1) energy efficiency retrofits for 20 percent of Canada's residential and commercial/institutional building stock by 2010; (2) increased energy efficiency for all new housing and commercial/institutional buildings built by 2010; and (3) improved standards for equipment and appliances.<sup>403</sup> Although consultation with the building industry and building owners is mentioned as one way to achieve this target,<sup>404</sup> other measures include already existing financial incentives for commercial and institutional buildings,<sup>405</sup> unspecified "actions to promote wider penetration of energy efficient construction practices and products in the building

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<sup>400</sup> In Ontario, for example, gasoline that is used by persons engaged in the business of farming or fishing may be exempt from gasoline tax and retail sales tax. See, e.g., RSTA, s. 7(1)4.

<sup>401</sup> See *Climate Change Action Plan*, *supra* note ? at 24.

<sup>402</sup> *Ibid* at 25.

<sup>403</sup> *Ibid* at 25-27.

<sup>404</sup> *Ibid* at 26-27.

<sup>405</sup> *Ibid* See the brief discussions of the Commercial Building Incentive Program and the Energy Innovators Initiative at *supra* notes.

community and their adoption on the market",<sup>406</sup> and the possibility of financial incentives for residential retrofits.<sup>407</sup>

Given the slow turnover of the building stock, energy efficient retrofits are likely to have a greater impact on global warming than efficiency increases in new buildings. As the number of builders is much smaller than the number of purchasers, moreover, improvements in the energy efficiency of new buildings might be achieved more effectively through regulatory requirements, voluntary agreements, and direct subsidies, than by tax incentives.

Tax incentives for energy efficient retrofits, on the other hand, are considerably more promising, particularly where they encourage innovative energy efficiencies by supporting certified energy improvements rather than particular methods or technologies. At the federal level, for example, qualifying retrofits might be encouraged by refundable tax credits and/or exemption from Goods and Services Tax. Where administrative and compliance costs make outcome-based incentives impractical, however, incentives might apply to specific purchases such as energy efficient appliances or materials used to improve the energy efficiency of residential or commercial buildings. Solar and geothermal heating and cooling might also be encouraged by tax incentives in the form of exemptions from federal Goods and Services Tax and provincial sales taxes and/or refundable credits against income taxes otherwise payable.

In addition to these tax incentives, further encouragement for energy efficient buildings could be created by the adoption of a broad-based energy or carbon tax such as that

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<sup>406</sup> *Ibid* at 26.

<sup>407</sup> *Ibid*

introduced in many European countries. Although the prospect of these taxes can generate concerns about inter-jurisdictional competitiveness and the distributional effect on low-income households,<sup>408</sup> competitiveness is not a major concern for the construction and renovation industries, and unwelcome distributional impacts can be addressed through the recycling of revenues to tax reductions, tax incentives and other subsidies for energy-efficient retrofits, and support to low-income households in the form of social assistance and/or refundable tax credits.<sup>409</sup> As a final matter, the constitutional limitation on provincial taxing jurisdiction to “direct taxation within the province” suggests that a broad-based energy or carbon tax should be introduced at the federal level and not by provincial governments.<sup>410</sup>

### 5.2.3 Large Industrial Emitters

Large industrial emitters, comprising the electricity sector, the oil and gas industry, mining and manufacturing, are expected to account for approximately half of Canada’s GHG emissions by 2010.<sup>411</sup> In order to reduce these emissions by 96 MT, the *Climate Change Plan for Canada* contemplates: (1) “targets for emissions reductions established through covenants with a regulatory or financial backstop”; (2) an emissions-trading regime, with access to domestic offsets and international permits to provide flexibility; and (3) “complementary measures” including financial incentives and cost-shared investments in clean and renewable energy.<sup>412</sup> According to the *Climate Change Plan*

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<sup>408</sup> See the discussion of these issues in OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 71-85 (competitiveness) and 87-89 (distributional impact).

<sup>409</sup> At the federal level, for example, the Goods and Services Tax Credit could be increased to offset the increased burden of a tax on energy consumption or fossil fuels.

<sup>410</sup> See, e.g., Ontario Fair Tax Commission, *Fair Taxation in a Changing World*, *supra* note 256 at 557.

<sup>411</sup> *Climate Change Plan for Canada*, *supra* note 2 at 28.

<sup>412</sup> *Ibid* at 30.

for Canada, a "large proportion" of emissions permits "would be provided free to companies, based on their level of production and an emissions intensity factor."<sup>413</sup> The "complementary measures" identified by the Plan include an existing incentive for wind power production,<sup>414</sup> consumer information to encourage the consumption of "green power",<sup>415</sup> cooperation with provincial governments to reduce barriers to interprovincial trade and transmission of electricity,<sup>416</sup> and cost-shared investments in clean coal technology and other technologies to capture and store CO<sub>2</sub> emissions before they are released into the atmosphere.<sup>417</sup>

Although the *Climate Change Plan for Canada* does not identify the kind of "financial backstop" that might support voluntary agreements by large industrial emitters to reduce GHG emissions, a broad-based energy or carbon tax could serve this function well. Indeed, the United Kingdom and Denmark combine voluntary agreements with energy and carbon taxes by reducing taxes on energy-intensive businesses that have entered into negotiated agreements to reduce energy consumption or GHG emissions.<sup>418</sup> To the extent that emissions permits are distributed free of charge, moreover, a broad-based energy or carbon tax could, like the U.S. tax on ozone depleting substances, reduce the windfall gains of those receiving these permits. Alternatively, a carbon tax applied only to emissions that exceed levels that are authorized by permit could function as an effective ceiling on the domestic price of tradable permits. While competitiveness

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<sup>413</sup> *Ibid.* Although the document does not specify the manner in which an emissions intensity factor would be defined, it presents as possible options "actual performance in a defined period or a technical and economic assessment of emissions reductions possibilities for the sector." *Ibid.*

<sup>414</sup> *Ibid.* at 34. For a brief discussion of this incentive see *supra* note.

<sup>415</sup> Government of Canada, *Climate Change Action Plan*, *supra* note 2 at 34.

<sup>416</sup> *Ibid.* at 35.

<sup>417</sup> *Ibid.* at 35-36.

<sup>418</sup> OECD, *Environmentally Related Taxes in OECD Countries*, *supra* note 14 at 41.

concerns could be significant for some large emitters, these concerns could be addressed in part by border tax adjustments,<sup>419</sup> and also by revenue recycling in the form of reductions to other taxes, and tax incentives or other subsidies for efficiency improvements and clean and renewable energy.<sup>420</sup> Concerns about the regional distribution of such a tax could also be addressed by revenue recycling.

In addition to a broad-based tax on energy consumption or the carbon content of fossil fuels, tax incentives for energy efficiency and clean and renewable energy could also contribute to the *Climate Change Plan for Canada's* targeted emissions reductions for large industrial emitters. In the oil and gas, mining and manufacturing sectors, for example, refundable tax credits for demonstrated improvements in energy efficiency could help to encourage and offset the cost of targeted emissions reductions. In the electricity sector, generation from clean and renewable sources is currently encouraged by accelerated depreciation, sales tax exemptions and rebates, and income and property tax holidays, but might be done so more equitably and efficiently by refundable tax credits to reduce the cost of investments in qualifying equipment, and production tax credits to reduce the cost of the resulting "green power" relative to electricity generated by fossil fuels.

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<sup>419</sup> For an excellent discussion of the use of border tax adjustments in environmental taxation, see Hoerner and Muller, *Carbon Taxes for Climate Protection in a Competitive World*, *supra* note 266. See also J. Andrew Hoerner, "The Role of Border Tax Adjustments in Environmental Taxation: Theory and U.S. Experience" Presented at the International Workshop on Market Based Instruments and International Trade of the Institute for Environmental Studies, (Amsterdam, 19 March 1998).

<sup>420</sup> See, e.g., Ontario Fair Tax Commission Environment and Taxation Working Group, *Final Report*, *supra* note 266 at 35-36.

#### 5.2.4 Small and Medium Sized Enterprises

Small and medium-sized enterprises (SMEs) engaged in general manufacturing (e.g. textiles, wood products, food and beverage, and electronics) account for 2 to 3 percent of Canada's GHG emissions,<sup>421</sup> while fugitive emissions from the exploration and production of oil and natural gas, coal mining, and the distribution of natural gas are responsible for 7 percent of these emissions.<sup>422</sup> Although these emissions will not be subject to the emissions trading system contemplated for large industrial emitters,<sup>423</sup> the *Climate Change Plan for Canada* anticipates approximately 3MT of reductions by SMEs and 4MT of reductions in fugitive emissions.<sup>424</sup> Emissions reductions by SMEs are to be achieved by voluntary energy efficiency targets, cost-shared audits, and sectoral benchmarking and best practices under the Canadian Industry Program for Energy Conservation (CIPEC) as well as technical and financial assistance under the Industrial Research Assistance Program (IRAP),<sup>425</sup> the aims of which are to encourage "thousands of discrete investments in new capital, ... switching fuel, and programs of continuous improvement in their operations."<sup>426</sup> Reductions in fugitive emissions are to be achieved through "information, demonstrations, regulations and guidelines."<sup>427</sup>

In addition to these measures, environmental taxes and tax incentives could help to reduce GHG emissions. A broad-based energy or carbon tax, for example, would create

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<sup>421</sup> *Climate Change Plan for Canada*, *supra* note 2 at 37 (reporting that SMEs account for about 5 percent of industrial emissions, which are approximately 50 percent of all GHG emissions).

<sup>422</sup> *Ibid* at 38.

<sup>423</sup> According to the *Climate Change Plan for Canada*, emissions trading is inappropriate for SMEs "given the diverse nature and small size of firms" and impracticable for fugitive emissions "because of difficulties with precise measurement." *Ibid.* at 37.

<sup>424</sup> *Ibid* at 37-38.

<sup>425</sup> *Ibid* at 38.

<sup>426</sup> *Ibid* at 37.

<sup>427</sup> *Ibid* at 38.

an additional financial incentive for SMEs to conserve energy, the revenues from which could be recycled in the form of lower income or payroll taxes and tax incentives or other subsidies for energy-efficiency improvements. A carbon tax would create incentives both to conserve energy and to switch from fossil fuels to clean and renewable sources of energy. Fugitive emissions, on the other hand, are probably more amenable to regulatory and voluntary approaches than environmental taxation and tax incentives, though tax incentives might be used to share the cost of emissions reductions and/or to encourage the use of these emissions to generate electricity.

### 5.2.5 Agriculture, Forestry and Landfills

The final sources of GHG emissions in Canada are agriculture which generates roughly 60 MT of emissions (methane and nitrous oxide), and landfills which emit approximately 24 MT of emissions (primarily methane).<sup>428</sup> Forests and agricultural soils, on the other hand, are projected to provide a carbon sink of 30 MT under current management practices.<sup>429</sup> From actions already underway, the *Climate Change Plan for Canada* anticipates additional carbon sequestration of 5.8 MT, and GHG reductions of 2.2 MT from the capture and flaring or use of methane from landfills.<sup>430</sup> Further actions are expected to increase the volume of forest and agricultural sinks and reduce methane emissions from landfills by an additional 8 MT.<sup>431</sup> Existing and proposed measures to achieve these results include: (1) information programs to “encourage more planting of trees around farms to absorb carbon dioxide and reduce wind erosion of soil”, to “promote climate-friendly practices that improve soil nutrients, soil and livestock

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<sup>428</sup> *Climate Change Plan for Canada*, *supra* note 2 at 39.

<sup>429</sup> *Ibid.*

<sup>430</sup> *Ibid.*

<sup>431</sup> *Ibid* at 40-41.



management”, and to “promote sustainable land use and expand the area covered by perennial forage and trees”; (2) public investments in science and technology to develop lower emission technologies and strategies for enhancing carbon sinks; (3) a framework whereby carbon sinks can be sold as offsets within a domestic emissions trading system; and (4) public funding for municipal projects to capture and flare or use methane emissions from landfills.<sup>432</sup>

While informational programs, voluntary agreements and regulatory measures are probably the most effective way to reduce GHG emissions from agriculture and landfills, environmental taxes and tax incentives may help to reduce these emissions. Taxes on synthetic fertilizers, for example, may help to reduce emissions of nitrous oxide from the production and use of these fertilizers. Taxes on packaging and solid wastes are likely to reduce methane-generating solid wastes, particularly where they distinguish between active and inactive wastes that do not produce methane. At the same time, the capture and use of methane can be encouraged by reduced waste tax rates for landfills with energy recovery systems, and tax incentives like the U.S. production tax credit for electricity generated by landfill methane.

The preservation and enhancement of carbon sinks can also be encouraged by the use of environmental tax incentives, such as property tax reductions for forest and agricultural properties that are managed in accordance with environmental criteria. In addition to these and other tax incentives to preserve forest and agricultural properties, such as those for transfers and gifts of these properties under the federal *Income Tax Act*, tax incentives can also be used to encourage reforestation. Perhaps most interesting are U.S. proposals

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<sup>432</sup> *Ibid.* at 39-41.

for a carbon sequestration tax credit which, together with a system of tradable offsets in a domestic emissions trading system, could create a valuable set of financial incentives to preserve and enhance carbon sinks.

#### **5.2.6 International Emissions Reduction**

Under the Kyoto Protocol, Parties may satisfy their commitments not only by reducing domestic emissions and enhancing domestic carbon sinks, but also through investments in emissions reductions or sinks in developing countries that have ratified the Protocol (the Clean Development Mechanism), investments in emissions reductions or sinks in other industrialized countries (Joint Implementation), and the acquisition of "emissions reductions units" from other Parties through international emissions trading (IET). Although the *Climate Change Plan for Canada* expects to achieve most of Canada's emissions reduction target through domestic measures, it also anticipates credits of at least 2 MT through participation in international investments and the acquisition of at least 10 MT through IET.<sup>433</sup> For these purposes, the *Climate Change Plan for Canada* proposes to consult with the private sector on "the best approach to work together in support of their investments and purchases on the international market".<sup>434</sup>

The purchase and sale of emissions permits through IET has important tax implications that should be addressed as part of this consultation.<sup>435</sup> More importantly for this thesis, the availability of emissions credits through international investments suggests that tax incentives to reduce GHG emissions or enhance carbon sinks should be available not

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<sup>433</sup> *Climate Change Plan for Canada*, *supra* note 2 at 42.

<sup>434</sup> *Ibid.*

<sup>435</sup> Key questions involve the characterization of these permits for the purpose of determining allowable deductions and gains or losses on their disposition.

only for investments in Canada, but also for qualifying investments under the Clean Development Mechanism or Joint Implementation.

## **CHAPTER VI Conclusion**

The environment has long been considered an area of concern for all nations. Over the years, environmental concerns have been more specifically identified, and society has attempted to establish means of addressing these concerns. One area that has emerged as an area of concern is climate change. While the concept of climate change has been considered by scientists from as far back as 1827, it was not until 1957 that the global scientific community began to take serious notice of the issue and established monitoring stations in attempt to quantify the effect. Since 1957, there has been a strong international focus on climate change, and an international desire to address the problem.

The FCCC was the first comprehensive international convention to address climate change. The FCCC specifically sought to achieve a stabilization of greenhouse gas concentrations in the atmosphere to a level which would not create environmental harm. In order to do so, the signatories to the FCCC agreed to formulate programs to mitigate climate change, and the developed country signatories agreed to adopt national policies to return anthropogenic emissions of greenhouse gases to their 1990 levels.

In 1997, the signatories to the FCCC met in Kyoto, Japan to negotiate binding limits on GHG emissions for developed nations, in order to address the issue of climate change. The result of this meeting was the Kyoto Protocol. The Kyoto Protocol was designed to stabilize and reduce emissions of GHGs that are predicted to increase the earth's surface temperature, affecting natural ecosystems and human health. The Kyoto Protocol provides the following mechanisms for achieving prescribed GHG emissions reduction

targets by 2012: (i) emissions trading; (ii) joint implementation (JI); and (iii) the Clean Development Mechanism (CDM) which encourages industrial countries and companies to invest in greenhouse gas emission reductions in developing countries. By participating in measures that generate greenhouse gas reductions in developing countries, an industrialized country and its companies can earn carbon emission reduction credits to meet the country's Kyoto Protocol obligations. Some companies have even made such investments in anticipation of the adoption of rules. These trading measures promise the means by which developing countries can acquire needed resources to meet the upfront costs of renewable energy technologies to promote sustained carbon dioxide emission reductions. These measures also hopefully will assure that the developing countries can acquire the necessary capital, information, and training to permit them to participate fully in global warming solutions through the use of renewable and other clean energy resources.

Emerging from the Protocol's conference negotiations are a number of mechanisms to promote investment in carbon mitigation in developing countries. A Joint Implementation Program has been instituted by which developed and developing countries can collaborate on carbon mitigation projects including renewable projects.

The Clean Development Mechanism (CDM) is arguably the most promising means for non-target developing countries to acquire the resources and expertise necessary to promote renewable and other clean energy resources. The CDM provides target countries with carbon reduction credits for investment in carbon reduction measures, including renewable energy resources in non-target developing countries; thus it provides a substantial incentive for developed countries and their industries to invest in renewables

in developing countries. In advance of Protocol ratification and the adoption of the final Protocol rules for implementation of CDM measures, some developed countries and several of their industrial companies have already made CDM investments.

The Protocol also established international carbon emissions trading based on the United States' experience in reducing sulfur dioxide and NO<sub>x</sub> emissions costs through emission trading rights. Polluters may accumulate trading rights by reducing their emissions below adopted standards and then sell these rights to other polluters for whom pollution reduction is more expensive. International emission trading would provide another incentive for developed countries and their businesses to invest in renewable energy projects in developing countries.

While the Kyoto Protocol provides many environmental policy tools to enable countries to reach their mandated GHG emissions reduction targets, an analysis of these measures is premature. An examination of various environmental policy tools provides some assistance in predicting the effectiveness of the environmental policy tools found in the Kyoto Protocol. Further, as each country will likely pursue its own environmental policy initiatives, depending on that country's specific practices, objectives and means, it is necessary to focus on how Canada specifically intends to fulfill its international environmental commitment to reduce GHG emissions.

In November 2002, the Canadian Government released its *Climate Change Plan for Canada*, which proposes actions in various areas in order to achieve targeted reductions of GHG emissions. Pursuant to the *Climate Change Plan for Canada*, Canadian individuals, business and governments should achieve specified annual reductions of

GHG emissions from new actions announced in the *Climate Change Plan for Canada*, and a further specified reduction in GHG emissions from other measures both underway and anticipated. Proposed instruments for the reduction of GHG emissions include: (1) "innovation and technology investments" to increase energy efficiency; (2) "infrastructure investments" including urban public transit, intermodal transportation of goods, and the capture and storage of GHGs; (3) the creation of a "Partnership Fund" to "co-invest and collaborate on emissions reductions projects"; (4) voluntary agreements and the establishment of a domestic emissions trading system linked to the international carbon market to be established under the Kyoto Protocol; and (5) "targeted measures" involving information (e.g. labelling), incentives, regulations and tax measures.

Again, while the *Climate Change Plan for Canada*, like the Kyoto Protocol, provides many different environmental policy tools to enable Canada to reach its mandated GHG emissions reduction targets, an analysis of these measures is premature. Further, the *Climate Change Plan for Canada* does not provide significant information as to how these measures will be implemented. In the case of an emissions trading scheme, for example, it is questionable whether the federal government even has the power to implement such a regime without the consent of the provinces. An examination of various environmental policy tools, and their effectiveness in environmental protection measures to date in Canada and throughout the world, thus offers some assistance in predicting the effectiveness of the environmental policy tools found in the *Climate Change Plan for Canada*.

The fundamental purpose of environmental policy initiatives is to protect the environment. Environmental policy initiatives can be categorized as the following: (i)

command and control regulations; (ii) negotiation; (iii) product information or ecological labelling; (iii) moral persuasion; and (iv) economic instruments. There are examples of all of these initiatives in practice in Canada and throughout the world.

Command and control regulations are the most common environmental policy initiative in practice. They are a form of performance standards consisting of either emission limits for each source, or of concentration limits that require emissions-related measures if the concentration is too high. Since the emission limitation is mandated by regulation, each polluter must achieve the environmental objectives found in the regulation independent of implied costs. Enforcement of these regulations is expensive for regulatory authorities, and there are numerous examples where businesses will defy regulations as it is cheaper than adhering to the prescribed limits. Command and control regulations are not particularly cost-effective, or for that matter effective in pollution prevention. The *Climate Change Plan for Canada* does not appear to contemplate the use of command and control regulations.

Product information or ecological labelling is based on the theory that the optimal functioning of a market requires the most complete information on all characteristics of the products exchanged. Ecological labelling relies on the consumer's desire to make environmentally conscience choices in making any purchase, and as such it is difficult to quantify the effectiveness of this policy tool. The *Climate Change Plan for Canada* includes the use of ecological labelling in its "targeted measures".

Moral persuasion is an attempt by government to influence public behaviour by persuading individuals to adopt a favourable attitude towards the environment. This is



done through education and advertising. Use of this policy tool is found in *Climate Change Plan for Canada's* "targeted measures".

There is a greater trend in Canada, and internationally, to make use of economic instruments, including environmental taxes, for environmental protection measures. Fossil fuels and energy consumption are currently the main targets of environmental taxes to reduce global warming. Among OECD countries, the most significant taxes on fossil fuels and energy consumption apply to automotive fuels and motor vehicles. Automotive fuel tax rates vary widely from one country to another and also among different fuels. The effectiveness of automotive fuel taxes in reducing GHG emissions is inconclusive, but suggestive. These taxes can be seen to raise revenues, encourage more efficient fuel consumption, encourage innovation, encourage drivers to use public transportation (moral persuasion), and ultimately assist with the reduction of GHG emissions.

Another increasingly common measure involves taxes and registration fees on the sale or use of motor vehicles. These taxes are structured in different ways in different countries, in an effort to achieve the same result: the reduction of GHG emissions. Evidence on the effectiveness of these taxes and registration fees on GHG emissions is limited. These taxes can be seen as morally persuasive, encouraging drivers to choose more environmentally friendly vehicles. This ultimately leads to a reduction of GHG emissions.

Taxes have also been introduced on an international basis to encourage energy efficiency and reduce GHG emissions from the combustion of fossil fuels. Many European

countries have introduced broad-based taxes on energy consumption and fossil fuels, although neither Canada or the U.S. have done so (they have been suggested). In theory, taxes on energy should help reduce GHG emissions by decreasing energy consumption and encouraging greater energy efficiency. From an environmental perspective, however, taxes on fossil fuels are preferable to energy taxes since they encourage increased energy efficiency and substitution away from fossil fuels toward clean and renewable sources of energy. The introduction of taxes based on the carbon content of different fuels is generally regarded as one of the most cost-effective ways to stabilize and reduce GHG emissions. Opinions regarding the effectiveness of carbon taxes in reducing GHG emissions vary, but are generally positive. In general, these taxes are viewed as the most effective in reducing GHG emissions.

In addition to environmental taxes, environmental tax incentives have been utilized internationally in effort to reduce global warming by encouraging practices that decrease GHG emissions and enhance the scope and quality of carbon sinks. Tax incentives aimed at reducing CO<sub>2</sub> emissions tend to encourage energy efficiency in various activities, and the generation of energy for clean and renewable sources. These incentives include incentives to encourage the purchase of fuel-efficient and clean-fuel vehicles, incentives for energy-efficient buildings and equipment, incentives to encourage the generation of energy from clean and renewable resources, incentives for direct investments in equipment used to generate heat or power from clean and renewable sources, and incentives to encourage reduction in non-CO<sub>2</sub> GHG emissions. In practice, the effectiveness of many of these incentives is highly uncertain. However, utilized

properly, they can be seen to encourage innovation, promote energy efficiency, and reduce GHG emissions.

The *Climate Change Plan for Canada* proposes actions to achieve targeted reductions of GHG emissions in the areas of (i) transportation; (ii) housing and commercial/institutional buildings; (iii) large industrial emitters; (iv) small and medium-sized enterprise with fugitive emissions; (v) agriculture, forestry and landfills; and (vi) international emissions reductions.

In terms of transportation, the *Climate Change Plan for Canada* makes use of tax exemptions to encourage the use of clean and renewable fuels, higher automotive taxes, negotiated agreements with manufacturers, public information programs, and federal funding for research and development. In addition to these measures, excise taxes and/or annual registration fees on fuel-inefficient vehicles, and tax incentives for fuel-efficient and clean-fuel vehicles represent potentially effective market based instruments to increase the demand for fuel-efficient and clean-fuel vehicles.

For residential and commercial/institutional buildings, the *Climate Change Plan for Canada* proposes to reduce GHG emissions through energy efficiency retrofits, increased energy efficiency for all new housing and commercial/institutional buildings, and improved standards for equipment and appliances. Other measures include consultation with building industry and owners, already existing financial incentives for commercial and institutional buildings, unspecified actions to promote wider penetration of energy efficient construction practices and products in the building community and their adoption on the market, and the possibility of financial incentives for residential retrofits.

For large industrial emitters, the *Climate Change Plan for Canada* contemplates the use of covenants with a regulatory or financial backstop, an emissions trading regime, financial incentive, and cost-shared investments in clean and renewable energy.

The *Climate Change Plan for Canada* contemplates the reduction of GHG emissions for small and medium sized enterprises through voluntary energy efficiency targets, cost-shared audits, and technical and financial assistance.

The final sources of GHG emissions in Canada are agriculture. The *Climate Change Plan for Canada* proposes a reduction in GHG emission in the agriculture sector through information programs, public investments, a domestic emissions trading system, and public funding.

Finally, in terms of international emissions reduction, the *Climate Change Plan for Canada* proposes GHG emissions reduction through international emissions trading, the Clean Development Mechanism, and Joint Implementation.

From the standpoint of environmental policy, environmental or eco-taxes may be attractive for several reasons.. Firstly, eco-taxes can promote efficiency gains through reallocation of pollution (e.g. carbon) abatement costs and through performance incentives. The costs of pollution reduction typically vary among business (known as different 'marginal costs of abatement'), and efficient businesses should seek to lower their tax burden by investing in clean production technologies where this is most cost effective. Other policy instruments such as pollution licenses cannot be readily tailored to reflect each polluter's abatement or energy management costs. Secondly, eco-taxes provide innovation incentives; they can give polluters an ongoing incentive to seek more

efficient ways (e.g. technological innovations or recycling) to reduce emissions or save energy, whereas there is little financial incentive to do better once prescribed environmental standards are met. Thirdly, eco-taxes should be less vulnerable to regulatory capture compared to command regulation; where regulators attempt to set differentiated company-by-company targets they must acquire the necessary information about each business' abatement or technology characteristics, which creates a risk for regulators of getting drawn into negotiations and the making of concessions to industry as a price for their co-operation. Eco-taxes can take account of all businesses' differing pollution abatement costs without the need to consider the particular circumstances of individual firms. Fourthly, eco-taxes can also generate substantial revenues that can be recycled for environmental improvement investments. However, the revenue of an eco-tax is coincidental, and should decrease where a tax is 'ecologically optimal'.

Apart from the environmental benefits, eco-taxes may yield economic and political advantages. When eco-taxes are introduced as part of systematic revision of a nation's tax system, with corresponding reductions in income and employment taxes-known in the literature as 'ecological tax reform'-there may also arise the benefits of jobs growth and economic investment (the 'double dividend' hypothesis). Secondly, it has been argued that using taxes and other economic instruments has democratic benefits in that enables the public to focus on the fundamental questions of what level of pollution at what cost is socially desirable rather than obfuscate such issues when the public is expected to focus on the minutiae of pollution licensing.

Eco-taxes, along with other economic instruments, are not however without potentially significant limitations. Unlike quantitative pollution regulation (or tradeable emission

permits operating within a pollution cap), eco-taxes suffer from the drawback that they have uncertain environmental effects. The level of pollution reduction engendered flows from companies' responses to the financial incentive of the tax, and it is difficult to model in advance what level of taxation is necessary to provoke a particular environmental effect. Secondly, in large decentralised companies with specialised branches, decisions made by responsible units regarding desired pollution abatement or energy saving efforts in response to eco-taxes may not be effectively imparted to all arms of the business. Large firms may also be preoccupied with other priorities, causing them to disregard small environmental taxes as just another business cost. Thirdly, eco-taxes and other economic instruments usually require significant re-regulation to ensure their proper functioning and enforcement. Economic instruments do not necessarily mean cost-reducing market deregulation, and arrangements for monitoring and enforcing economic instruments can be complex and expensive. Fourthly, in the absence of international environmental tax harmonisation, eco-taxes levied on one country's industry may also damage that country competitively by making foreign imports relatively cheaper if competitor countries have no similar taxes. Fifthly, eco-taxes can collide with social policy concerns, primarily when the poor are disproportionately affected because a larger share of their income is spent on taxed items such as heating or lighting fuel. Compensatory payments can be made, although this increases administrative complexity. And finally, arguments have been made by Sagoff and others that using market-based policy mechanisms wrongly bases environmental decisions on people's 'consumer' preferences rather, as they assert should be the case, people's 'citizen' preferences given the political and ethical issues at stake.

On balance, there would appear to be a role for eco-taxes and other economic instruments as a means of environmental policy, but that the justification for using eco-taxes depends on the specific environmental problem and the prevailing market and institutional characteristics. Environmental policy-makers cannot rely on economic instruments to make fundamental judgements about environmental strategy: overall environmental quality objectives should be democratically determined by government. Successful applications of eco-taxes hinge on careful design and implementation-there is a considerable jump from theoretical principles to effective practical applications. Problems may arise if tax structures are too complex (hence costly to administer) or if tax incentives are insufficiently large to spur changes in firms' or individuals' behaviour.

In *Climate Change Plan for Canada*, it appears that the thrust of the government's plan is to change corporate and individual behaviour through economic instruments. Tax measures are only one of the policy instruments through which Canada plans to meet its reduction targets. The federal government's strategy for achieving the reduction of GHG emissions favours an "Adjusted Mixed Approach". This would involve a mix of three things: (i) a domestic emissions trading system; (ii) targeted measures including incentives, covenants, regulations and fiscal measures; and (iii) the government could purchase international emissions permits through the Kyoto Protocol mechanisms.

It is important to recognise that rarely is it a dichotomous choice between economic instruments and command regulation. Grabosky and Gunningham remind us that: 'single instrument ... approaches are misguided ... [and] that in the large majority of circumstances (though certainly not all), a mix of instruments is required, tailored to

specific policy goals'.<sup>436</sup> Solutions to climate change and sustainable energy use in particular entail numerous economic sectors and actors, each of which needs a combination of policy instruments.

Developed and developing countries provide abundant examples of successful adoption of cost-effective renewable energy measures to ameliorate pollution while aiding their economies. A wide variety of legislative and voluntary programs have been implemented, and the legal and financial mechanisms for doing so are many and varied. It is possible to meet the world's energy, development, and environmental needs, even on a basis of long-term profitability. But achieving these goals requires determined action and political will among all the world's governments and international institutions. For the developed countries and international institutions, success demands a vast increase in funding sustainable energy, technology transfer, and education and training in the developing countries. For developing countries, renewable energy goals require a commitment to eliminating the barriers to sustainable energy measures as well as creating a climate and laws to encourage private investment in those measures.

Through the implementation of the various environmental policy initiatives found in the *Climate Change Plan for Canada*, Canada will be able to satisfy its international environmental obligations to reduce GHG emissions, as prescribed in the FCCC and Kyoto Protocol. More specifically, Canada will utilize environmental taxation and taxation initiatives, as well as other environmental policy instruments, in an effort to protect the environment and to reduce GHG emissions. Canada's *Climate Change Plan for Canada* clearly envisages the utilization of environmental taxation, taxation

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<sup>436</sup> N. Gunningham and P. Grabosky, *Smart Regulation* (Oxford University Press, 1998) at 14-15.



initiatives, and other environmental policy instruments, in order to meet Canada's international obligations under the Kyoto Protocol. These measures will ensure that Canada not only meets its requirements under the Kyoto Protocol, but further adheres to its other international environmental obligations, including cost-effectiveness, pollution prevention and precaution.

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