

Environmental Tax Shifting in Canada: Theory and Application

March 2003

Prepared by: Amy Taylor with assistance from Robert Hornung and Stephanie Cairns in collaboration with the Triple E Tax Shift Research Collaborative.



Table of Contents

Table of Contents	2
Preface	4
1. Introduction.....	5
2. What Is Environmental Tax Shifting?.....	6
3. The Triple-E Drivers for Environmental Tax Shifting	7
Environmental Protection	7
Economic Competitiveness and Innovation	10
Employment Opportunities	10
4. Environmental Tax Shifting as an Appropriate Policy Tool	11
5. Why Environmental Tax Shifting?	13
The Need for Innovation	13
Risks and Cost Reductions	14
Competitiveness	15
Human Health and Quality of Life	15
6. Concerns with Environmental Tax Shifting and Strategies to Address Them	17
Impacts on Competitiveness.....	17
Impacts on Low-Income Earners.....	18
Adjustment Costs.....	19
Skepticism About Tax and Revenue Recycling	19
Uncertainty About Tax Revenue	20
7. Designing a Tax Shifting Package for Canada.....	20
8. Priority Environmental Issues for Tax Shifting in Canada.....	21
9. Case Study	23
Incentives for Consumer Engagement.....	24
Incentives for Joint Ventures	25
Incentives for Reforestation	26
General Conclusions About Environmental Tax Shifting in Canada	26
10. Summary and Reflections	27
Appendix A: Generic Terms and Ground Rules for Effective Collaboration	28
Appendix B: Detailed Description of Revenue Recycling Policy Options for Reducing Greenhouse Gas Emissions in Canada.....	29
Incentives for Consumer Engagement	30
Revenue Recycling for Energy Efficient Vehicles	31
1. Description of the Revenue Recycling Measure	31
2. Rationale for Implementation.....	31
3. Potential GHG Emission Reduction Actions.....	31
4. Quantity of GHG Emission Reductions	32
5. Estimated Economic Cost of Measure.....	32
6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure	33
Revenue Recycling for Residential House Efficiency Improvements	34
1. Description of the Revenue Recycling Measure	34
2. Rationale for Implementation.....	34
3. Potential GHG Emission Reduction Actions.....	34
4. Quantity of GHG Emission Reductions	35

5. Estimated Economic Cost of Measure.....	35
6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure	36
Revenue Recycling for Renewable Energy Consumption	37
1. Description of the Revenue Recycling Measure	37
2. Rationale for Implementation.....	37
3. Potential GHG Emission Reduction Actions.....	37
4. Quantity of GHG Emission Reductions	38
5. Estimated Economic Cost of Measure.....	38
6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure	38
Revenue Recycling for Renewable Energy Production	39
1. Description of the Revenue Recycling Measure	39
2. Rationale for Implementation.....	39
3. Potential GHG Emission Reduction Actions.....	39
4. Quantity of GHG Emission Reductions	39
5. Estimated Economic Cost of Measure.....	39
6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure	40
Revenue Recycling for Biofuels.....	41
1. Description of the Revenue Recycling Measure	41
2. Rationale for Implementation.....	41
3. Potential GHG Emission Reduction Actions.....	41
4. Quantity of GHG Emission Reductions	41
5. Estimated Economic Cost of Measure.....	41
6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure	41
Revenue Recycling for Reducing the Costs of Energy Efficiency Equipment and Products	43
1. Description of the Revenue Recycling Measure	43
2. Rationale for Implementation.....	43
3. Potential GHG Emission Reduction Actions.....	43
4. Quantity of GHG Emission Reductions	43
5. Estimated Economic Cost of Measure.....	44
6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure	44
Incentives to Invest in Development and Commercialization of Technologies.....	45
Revenue Recycling for Climate Change Joint Ventures (CCJVs).....	46
1. Description of the Revenue Recycling Measure	46
2. Rationale for Implementation.....	46
3. Potential GHG Emission Reduction Actions.....	46
4. Quantity of GHG Emission Reductions	47
5. Estimated Economic Cost of Measure.....	47
6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure	47
Incentives for Reducing the Ecological Footprint of Resource Industry Activities	48
Revenue Recycling for Limiting Ecological Impacts on Canadian Forests	49
1. Description of the Revenue Recycling Measure	49
2. Rationale for Implementation.....	49
3. Potential GHG Emission Reduction Actions.....	49
4. Quantity of GHG Emission Reductions	49
5. Estimated Economic Cost of Measure.....	50
6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure	50

Preface

The Triple E Tax Shift Research Collaborative comprises leading energy and resource companies and the Pembina Institute for Appropriate Development, an environmental non-government organization.

Since May 2001, the collaborative has been exploring the application of environmental tax shifting in Canada. Our objective has been to establish a common understanding of the concept, promote the concept to interested stakeholders, and propose an agenda for future research on environmental tax shifting in Canada.

Ultimately, the collaborative aims to design, evaluate and advance federal and provincial environmental tax shifts that will influence individual behaviour and business decisions and result in:

- *Improved Ecological Integrity* — through measurable reductions in materials and energy throughput;
- *Maintained or Increased Economic Competitiveness* — through the creation of a tax framework that, in conjunction with other policy tools, regulatory and market-based, gives incentives for individuals and businesses to improve their energy and materials productivity (eco-efficiency), while decoupling their environmental impact from economic growth and sustaining Canada's international competitiveness; and
- *Increased Employment and Social Benefits* — through additional employment opportunities, improved quality of life and growth of knowledge in Canadian communities.

This report represents a culmination of our exploration to date, and is the first product of the collaborative. The Pembina Institute prepared the report.

Alberta-Pacific Forest Industries Inc. has played a key role in the collaborative, and in the creation of this report. Other members of the collaborative felt they could not support in full the contents of this report and so are not formally recognized.

1. Introduction

There is a growing global acceptance of the need for environmental tax shifting — shifting a portion of a government’s tax base onto goods, services and activities associated with harmful environmental impacts that impose costs on society. Such shifts, also referred to as ecological tax reform, are well under way in numerous countries in Europe. The Organization for Economic Cooperation and Development (OECD) has been encouraging member countries to implement such policies for more than two decades.

Canada lags behind other industrialized countries in implementing environmental tax shifting. According to the United Nations Environment Program (UNEP), “Canada emphasizes regulatory reform, federal/provincial policy harmonization and voluntary initiatives” rather than fiscal measures. In its August 2000 Economic Survey of Canada, the OECD criticized this emphasis, reproaching Canada’s continued preferential tax treatment for non-renewable resources, and underlining the need to increase Canada’s use of economic instruments to correct for the external costs of pollution.

Within this context, the purpose of this report is to contribute to the public dialogue on the applicability of environmental tax shifting in Canada. This report provides substantial background information on environmental tax shifting and identifies potential areas for implementing environmental tax shifting in Canada. The report is organized in the following way:

- Part 2 offers a definition of environmental tax shifting.
- Part 3 describes the three drivers for environmental tax shifting.
- Part 4 outlines environmental tax shifting as an appropriate tool to address environmental issues.
- Part 5 offers a rationale for implementing environmental tax shifting.
- Part 6 gives an overview of concerns with environmental tax shifting and offers strategies to address them.
- Part 7 presents key principles for environmental tax shifting in Canada.
- Part 8 identifies priority areas for using environmental tax shifting in Canada.
- Part 9 is a case study of one potential application of environmental tax shifting in Canada.
- Part 10 concludes with a summary and reflects on opportunities for future implementation of this tool.

2. What Is Environmental Tax Shifting?

Environmental tax shifting is defined as shifting a portion of a government's tax base onto goods, services and activities associated with harmful environmental impacts that impose costs on society and recycling the revenue generated from those taxes in a transparent manner.

Environmental tax shifting can be implemented in several ways:

- Taxes and rebates to the consumers of environmentally significant goods (e.g., a deposit and refund system).
- Adjustments to existing taxes such that environmentally sensitive goods, services and activities are taxed at a lower rate than environmentally harmful goods, services and activities (e.g., taxing less harmful fuels such as ethanol at a lower rate than more harmful fuels such as gasoline).
- Reductions in existing taxes and charges and implementation of new environmental taxes (e.g., reducing income taxes and introducing a carbon dioxide emissions tax).
- Environmental taxes on the production or consumption of environmentally damaging activities or goods, combined with offsetting incentives for environmental improvements. Such incentives can come in the form of tax credits, tax rebates or tax exemptions (e.g., implementing a carbon tax and a tax credit for adopting environmentally beneficial technologies).

Environmental tax shifting is often described as revenue neutral. If, however, the link between the tax revenue and the expenditure is not clear, the tax shift is not revenue neutral. Increased revenues from environmental taxes can be

- Used to finance rebates for the purchase of environmentally sensitive goods, services or activities
- Offset by equivalent decreases in other taxes
- Tied to specific government expenditures (e.g., incentives or support for low-income earners).

Environmental tax shifting can also occur on various levels, from a broad restructuring of tax policies to more micro-level adjustments that occur at sector specific or individual levels.

A broad restructuring occurs when a portion of the tax burden is shifted off the current tax base and onto an activity or good whose consumption results in negative ecological impacts. This might entail, for example, reducing taxes on income and increasing them on solid waste generation. Or it could involve reducing corporate capital taxes and increasing automobile use taxes.

Environmental tax shifting can also be implemented at a sector specific level. A sector specific tax shift might, for example, involve levying an emissions tax on a particular industry and returning the revenue from the tax back to the same industry in the form of a subsidy for investment in pollution reduction/prevention technologies.

At an even more micro-level, environmental tax shifting can take place at the individual level. This might involve, for example, levying a tax on the purchase of a particular good and using the revenue generated to finance refunds to individuals in return for certain behaviour (e.g., participation in recycling programs). A common example of this kind of reform is a deposit-refund system for beverage containers. Here, the same person pays the charge associated with the purchase of a beverage container and receives the rebate upon recycling the container. A similar policy could be applied to other products including automobiles, household appliances, small engines and computer hardware.

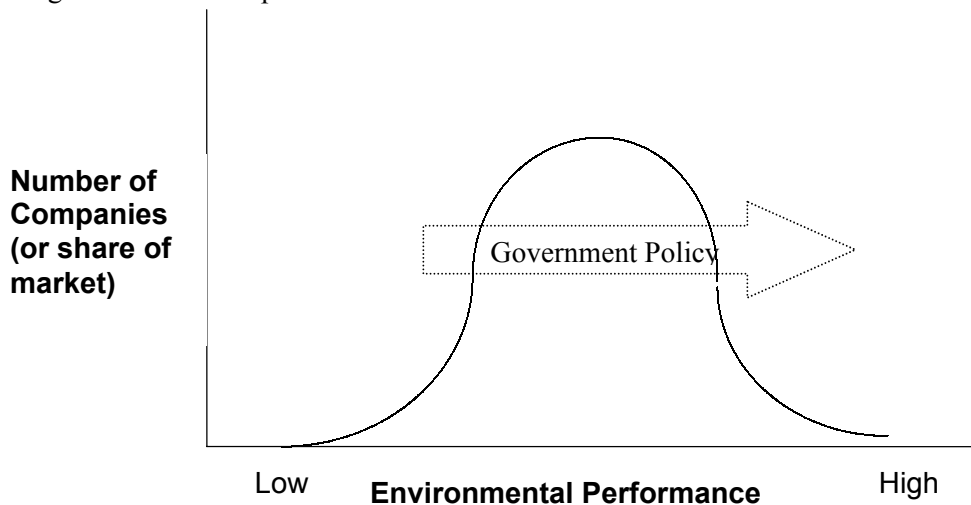
3. The Triple-E Drivers for Environmental Tax Shifting

Interest in environmental tax shifting has arisen largely from its potential to yield a so-called “triple dividend” of benefits: environmental protection, increased economic competitiveness, and employment opportunities.

Environmental Protection

By making the cost of goods and services associated with higher environmental impacts more expensive, environmental tax shifting provides incentives for producers and consumers to invest in more environmentally sustainable goods and services. The series of graphs below demonstrate the role of environmental tax shifting in increasing the environmental performance of companies. First, assume that the distribution of companies over a gradient of environmental performance follows a standard bell curve distribution (see the first graph).

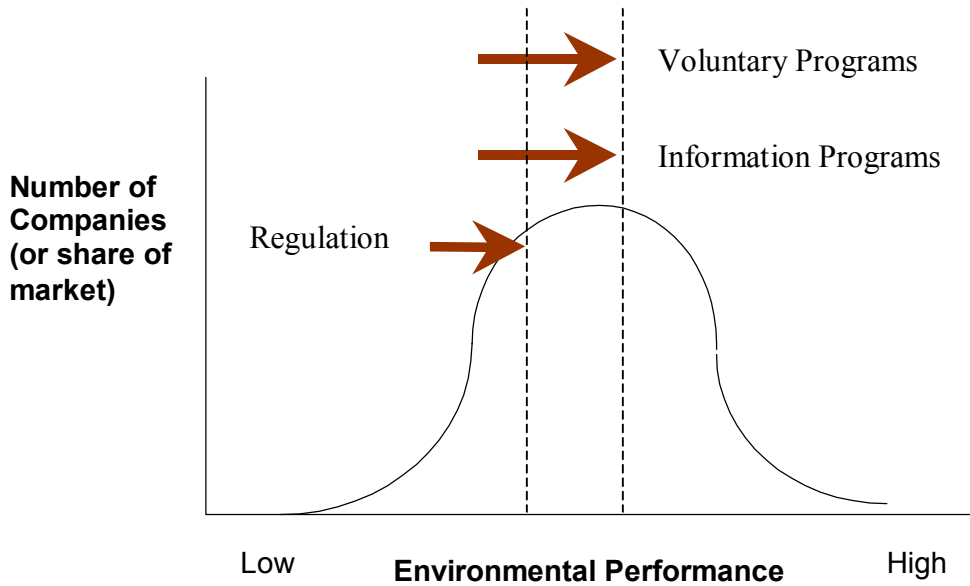
The distribution curve shows that there are currently few companies operating under high environmental performance, few companies operating under low environmental performance and many companies operating at an average level of environmental performance. From a sustainability point of view, the objective of government policies is to shift the distribution weight to the right so that the bulk of companies are no longer operating under average environmental performance but instead are operating under high environmental performance.



Currently, government policy in Canada focuses on three main policy tools for moving companies towards sustainability, i.e., for shifting the weight of distribution to the right: voluntary programs; information programs; and regulations (see the next graph, below). While all these policy tools will serve to shift the distribution to the right, there are limits as to what each can achieve.

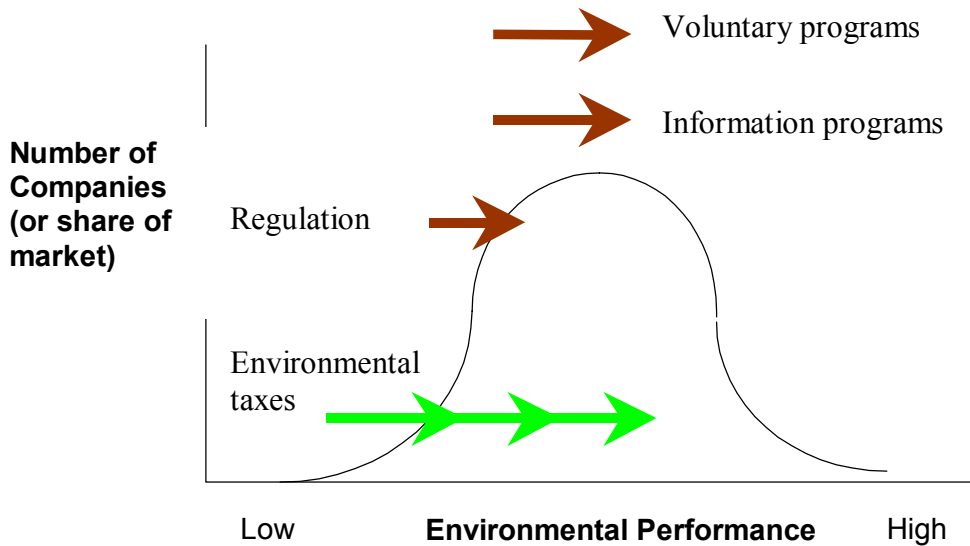
Voluntary and information programs are only effective to the point that they are economically viable. When price signals in the market do not incorporate environmental considerations, at some point it becomes too expensive to do more, and investment by governments in voluntary and information programs is no longer rewarded by improved environmental performance.

Regulations are generally designed to be sector specific. Environmental improvement associated with their use is limited to the sector in which the regulation is targeted.



Given the limits to environmental improvements that can be achieved by these conventional policy tools, the question becomes: What additional options are available for shifting the distribution curve to the right? One answer is the direct internalization of environmental costs — adjusting the prices of goods and services so that, at least to a certain extent, they are made to reflect the environmental costs associated with their production, consumption and disposal. One way to achieve the internalization of environmental costs is to implement environmental taxes.

Environmental taxes are placed on goods and services in proportion to the relative amount of environmental damage they impose. They have the effect of shifting the distribution curve to the right as they incent companies operating under low and mediocre environmental performance that are liable for the taxes to reduce their tax payments by improving their environmental performance.¹

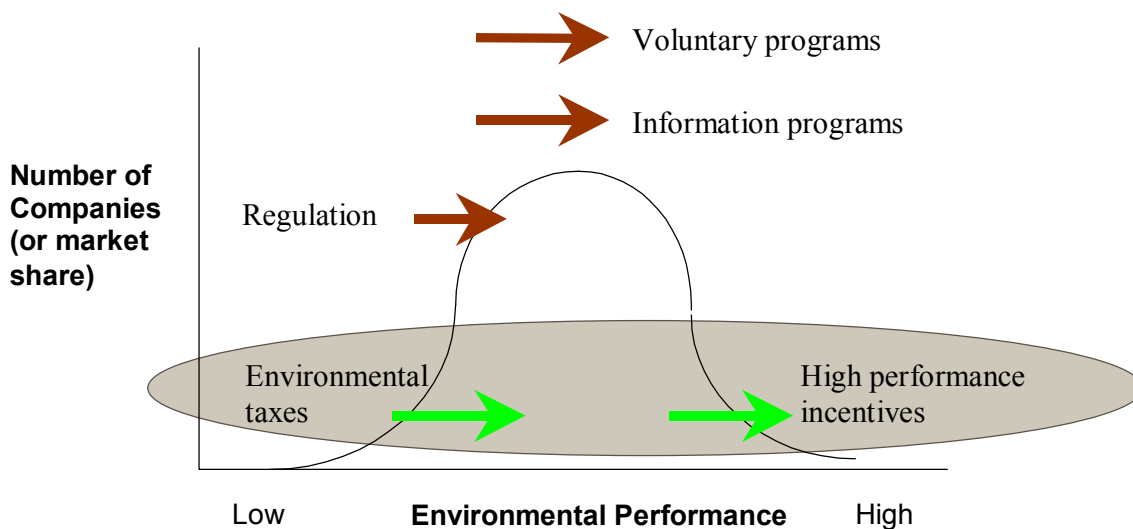


¹ Note that no matter what the actual distribution of companies is along an environmental gradient, the premise of this argument will hold. In other words, environmental taxes will still have the effect of encouraging increased environmental performance at the low end of the gradient.

The environmental improvements from emissions reductions and more effective use of natural resources and energy that can ensue from environmental taxes lead to improved environmental and health conditions in the communities in which Canadians live and work. Indeed, environmental taxes and environmental tax shifting have been implemented in various European countries to address a host of environmental issues including carbon dioxide emissions, sulphur dioxide emissions, nitrogen oxide emissions, solid waste generation and water consumption.

Environmental taxes and tax shifting can be used with other environmental management tools, such as regulation, other market-based tools or voluntary agreements, to achieve environmental objectives. Furthermore, in the context of environmental tax shifting, environmental taxes generate revenue that can be used to reduce already existing taxes and/or provide additional incentives for environmental improvements. Such incentives could include tax breaks for investments in certain activities, technologies or processes. The provision of such incentives could be targeted at high environmental performers.

This environmental tax shift policy, comprised of environmental taxes and high performance incentives, provides a comprehensive means of pursuing sustainability. The environmental taxes are targeted at the low and mediocre environmental performers, while the high performance incentives reward the high environmental performers.² In the figure below, the shaded area (made up of environmental taxes and high performance incentives) represents an environmental tax shift policy.



² Note that over time, as environmental improvements occur, the distribution curve shown in the figure above will shift to the right and the environmental objective of the environmental tax shift policy will be realized. As this shift up the environmental performance gradient occurs, revenue from the environmental taxes will decline. In this case, tax rates can be increased to offer additional incentive and to compensate for the declining tax base, the high performance incentives can be financed by general government revenues (and not by environmental taxes), or the high performance incentives can be phased out because they are no longer needed (i.e., the environmental objective has been achieved). It is common for incentives for the purchase of particular technologies to be phased out once a specified level of market share has been realized.

Economic Competitiveness and Innovation

The second driver for environmental tax shifting is increased economic competitiveness and technology and product innovation. By internalizing environmental costs, environmental tax shifting makes activities and products that cause environmental damage more expensive than those that have less environmental impact. In doing so, environmental tax shifting is intended to provide businesses with ongoing incentives to make environmental improvements and to give those that are environmentally mindful an economic advantage.

By adjusting market signals to reflect environmental costs, environmental tax shifting creates markets for new, innovative and increasingly “green” businesses, technologies and consumer products. Within the energy and resource sectors, it creates a competitive advantage for the more eco-efficient producers of energy and materials. At the individual level, it encourages consumption of more environmentally responsible goods and services by reducing the cost of green products and increasing the cost of goods with a negative environmental impact.

Employment Opportunities

Environmental tax shifting has the potential to bring about a double dividend of environmental performance and increased employment. Numerous European countries have implemented broad-based environmental tax shift policies that involve revenue recycling in the form of reductions of pre-existing taxes. Most commonly, revenue from environmental taxes has been used to finance reductions in social security contributions or payroll taxes. Part of the intention of such policies is to realize a double dividend of environmental performance and increased employment. Employers pay payroll taxes according to the number of employees they have. Thus, such taxes provide a disincentive to employers to create additional jobs. The rationale behind reducing these taxes as part of a revenue recycling policy is to remove a portion of the disincentive and, in doing so, increase employment. Similar rationales are presented for financing reductions in capital taxes. Here the argument is that such tax reductions remove a disincentive to increasing capital investment, which spurs consumption and subsequently increases Gross Domestic Product.

Substantial research has been conducted to test the double dividend hypothesis. Recent work by the Organization for Economic Development and Cooperation to evaluate and summarize double dividend research thus far concludes that positive employment effects can be expected if the revenues from environmental taxes are used to finance reductions in labour taxation in general and payroll or social security contributions in particular. Likewise, the OECD concluded that positive effects on GDP could be expected if the revenues are used to finance reductions in capital taxes (thus favouring investment).³

In addition to the potential to increase employment opportunities through reductions in existing payroll taxes, by driving innovation and market development, environmental tax shifting can also lead to additional employment opportunities in new and developing environmental sectors. In 1995, the total value of environmental goods and services produced in Canada was \$19.4 billion. The environment industry was the major provider, supplying \$10.2 billion of these goods and services.⁴ The environment industry is substantial and growing. Environmental tax shifting can help spur that growth. Experience with environmental tax shifting in various European countries demonstrates the power of environmental tax shifting in spurring market development. Since Sweden implemented its environmental tax shift policy, it has realized increased use of biofuels and combined heat and power units. The Netherlands has

³ OECD. “Environmentally Related Taxation in OECD Countries: Issues and Strategies.” 2001.

⁴ Government of Canada. “Human Activity and the Environment.” 2000.

experienced increases in renewable energy and energy conservation investments, as has Denmark, the third largest producer of wind turbines in the world.

4. Environmental Tax Shifting as an Appropriate Policy Tool

Environmental issues can be addressed through various government policy interventions. Depending on the issue, policy makers choose between regulations, voluntary agreements, information and education programs, and fiscal policies to achieve environmental objectives. The use of a particular tool does not preclude the use of others; in many cases, a package of policies will be the best way to achieve environmental objectives. Regulations that ensure some level of minimum environmental protection can be combined with the use of taxes to offer an incentive to exceed that, which is guaranteed by the regulation. An environmental tax shift policy can also combine the use of taxes on certain goods and services with the use of subsidies or credits to offer substantial incentives to move towards sustainability. The OECD's March 2001 Environmental Outlook recognized the value of and need to employ a package of environmental policies:

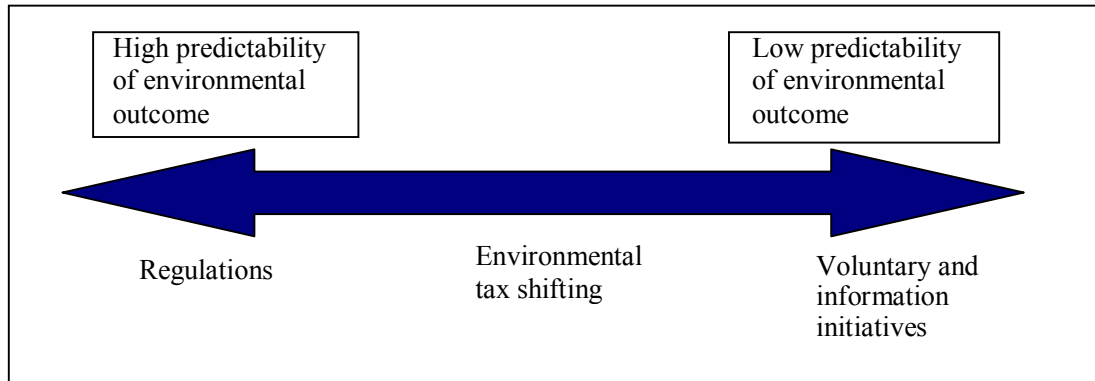
It is often difficult to design a single policy instrument that will successfully provide the right incentives for a total reduction in resource use or in pollution and waste generation. Instead, it will generally be necessary to employ a mix of policy instruments . . . involv[ing] the combination of a robust regulatory framework with a variety of other instruments, including strong pricing mechanisms to influence the behaviour of consumers and producers. . . . [i]n particular, the removal of environmentally harmful subsidies and a more systematic use of environmental taxes, charges and other economic instruments to get the prices right.⁵

The figure below presents a range of policy tools available for addressing environmental issues. On the left side of the figure are regulations. Regulations, often associated with high direct government and private sector costs of implementation and administration, also have a high degree of predictability of environmental outcome. Such policies ensure a specified level of environmental protection or improvement by either prescribing environmental performance standards or by requiring the use of particular technologies or processes. Regulations are often applied uniformly within a sector so that, while the degree of protection is well known, it is often not as high as is technologically feasible.

On the right side of the figure are voluntary agreements. These policies tend to be associated with low direct government costs of implementation and administration but also low predictability of environmental protection/improvement.

On the spectrum below, government policies that are based on economic instruments, such as environmental tax shifting, fall in between regulations and voluntary agreements. They are not as formal as regulations in that they do not specify particular technologies, processes or performance levels, yet they are more formal than voluntary agreements. Environmental tax shifting adjusts the prices of goods, services, technologies or processes and allows businesses and households to respond to those price changes to the extent that the households and businesses deem economical.

⁵ Organization for Economic Co-operation and Development. "Environmental Outlook," p. 24. Paris: March 2001.



Source: Adapted from Conference Board of Canada presentation at the Making Dollars and Sense conference, Vancouver, British Columbia, December 11, 2000

While some environmental issues will be best addressed through regulations, others will be better suited to the use of economic instruments. In cases where the threat of harm from the environmental issue is severe, persistent, or bioaccumulative, and/or where impacts are primarily felt at the local level, a regulation that bans the use of the good or emission, requires the use of particular technologies or processes, or specifies minimum environmental performance standards is the most appropriate tool. In other cases, it will be appropriate to incent businesses and consumers to make decisions in favour of environmental improvements through adjustments in market prices, while not actually guaranteeing a specific level of environmental protection or improvement. As was stated earlier, in many cases, governments will need to use a combination of policies to comprehensively address a particular issue.

The table below presents a set of criteria that should be evaluated when considering the use of environmental tax shifting for addressing an environmental concern. Because the most appropriate environmental policy tool will vary not only by environmental issue, but also by sector or life cycle stage, the criteria described below should be applied on a sector-by-sector basis. As well, policies should be evaluated and adjusted over time to ensure that the environmental objective continues to be addressed through use of the most appropriate policy tools. Indeed, it may be the case that, over time, a different policy tool or set of tools will become more appropriate than that, which was originally implemented.

CRITERIA	RATIONALE
A minimum level of environmental protection is not needed immediately	Environmental taxes are associated with uncertain environmental outcomes. Thus, in cases where a minimum level of protection is needed immediately to protect human and ecosystem health (due to bioaccumulation, severity and persistence of toxins, for example), environmental tax shifting will not be an appropriate tool.
Activities that cause environmental harm are well monitored	An established and monitored tax base must be available on which to implement environmental taxes.
The environmental impact of the release of effluent or use of a good is relatively uniform over time and space	Environmental taxes, by nature, are designed to internalize environmental costs. If the environmental impact of a particular activity varies over time or space, to be legitimate, the environmental tax would have to vary to reflect the change in impact. It is not practical or administratively feasible to implement such a tax.
There is no threshold of behavioural change that must be met before environmental improvement is realized	If a threshold of change is required before environmental improvements are realized, environmental taxes, because they cannot guarantee a given level of change, will not be an appropriate policy tool for addressing the environmental issue.
There is no well defined environmental target that must be met in a short time frame	Because environmental taxes cannot guarantee a minimum level of environmental improvement, in cases where a target for environmental improvement must be met in a short time frame, environmental tax shifting will not be an appropriate policy tool.

5. Why Environmental Tax Shifting?

By adjusting the market prices of goods and services, environmental tax shifting provides better financial incentives for sustainable practices, something that is needed for both businesses and individuals. For the business sector, this need relates to innovation, risk management, competitiveness, and desire for growth. For the individual, this need lies in the tension between expressed personal concerns about the environment, human health, and quality of life, and the incremental cost often incurred when choosing more environmentally sustainable products, activities, or lifestyles.

The Need for Innovation

Meeting global sustainability challenges will require groundbreaking technological innovations over the next half-century. The scale of this challenge has been expressed by the fifty-year “Factor 10 vision,” described below, which requires continuous improvements to the efficiency of energy and materials consumption.

The Factor 10 vision states that to simply maintain our environmental impact at current levels will require a 10-fold improvement in technical efficiency — that is, a 90% reduction in energy and materials intensity for each unit of service provided. World population is expected to grow from today’s level of 5.9 to 8.9 billion by 2050, with growth largely in the developing world,⁶ and material consumption is expected to increase by five-fold to meet the basic needs of this population.⁷ Given this

⁶ United Nations medium variant projection for population growth. See <http://www.un.org/popin/wdtrends/longrange/tab1.htm>.

⁷ Environmental Impact (I) is a factor of population (P) times consumption per capita, or affluence (A) times materials intensity of consumption, or technology (T): $I = P \times A \times T$. If P doubles and A increases five-fold, T

challenge, environmental tax shifting should be used to encourage businesses and individuals to undertake those activities and practices at the very front of the environmental performance and efficiency curve. These activities and practices include implementation of renewable energy, production and consumption of ecologically certified forest and agricultural products, constructing R-2000 and C-2000 buildings, and the production and consumption of hybrid electric or hydrogen fuel cell vehicles.

The scale of improvement needed requires that no opportunity be missed to ensure that new capital stock, especially stock with long life such as buildings, industrial operations, and infrastructure, is in the highest efficiency bracket currently available. Furthermore, it is important that policies continually encourage the development of new and increasingly environmentally sensitive technologies. This will help ensure that Canada remains at the cutting edge of new technology development and reaps the full benefits of these technologies, both from an environmental and a competitiveness advantage point of view.

Risks and Cost Reductions

By providing ongoing incentives for businesses to invest in sustainable practices, environmental tax shifting will

- Make Canadian businesses less vulnerable to the increasing risks arising from growing environmental pressures
- Help Canadian businesses maintain their public licence to operate and grow
- Help to reduce the risks (including higher costs) inherent in the proactive and early adoption of new technologies and approaches.

Growing environmental pressures present very real financial risks for Canadian businesses. For example, carbon dioxide emissions represent future environmental liabilities that could be on the order of CDN \$5 to \$50/tonne CO₂. For a business with annual CO₂e emissions of 1 million tonnes, this represents a potential annual liability of CDN \$5 to \$50 million by 2010. An environmental tax shift policy that encourages expanded use of green power reduces this exposure. Similarly, incentives for energy efficient buildings, appliances and vehicles will shelter firms and individuals from fossil fuel prices that will increase once environmental costs from carbon dioxide emissions are internalized.

Businesses pursuing a business-as-usual development path are also increasingly finding that environmentally concerned citizens are challenging their public licence to operate. This challenge expresses itself in lengthy regulatory details and market uncertainty and vulnerability. Sustainability leaders in the business community have found that the best way to address these risks, and maintain their licence to operate, is through unimpeachable environmental performance improvements and implementation of leading sustainability practices. For example, forestry and agricultural companies face growing consumer pressure to demonstrate sustainability; the adoption of practices certified as sustainable, for example under the Forest Stewardship Council or by organic food associations, makes these industries less vulnerable to international consumer pressures, and protects their access to retailers that restrict the sale of goods produced in an unsustainable manner.⁸ Environmental tax shifting makes investments in performance improvements and sustainable practices more economical.

must be reduced to 1/10th to keep I at the same level. The concept of a Factor 10 efficiency improvement was first put forth in 1994 in the “Carnoules Declaration,” which called for a ten-fold increase in the efficiency with which energy, natural resources, and other materials are used, within one generation. Austria, Sweden, OECD Environment Ministers, the WBCSD, and UNEP have since supported these goals, and the governments of Austria, the Netherlands, and Norway have publicly committed to pursuing Factor Four (75% reduction) efficiencies. From Hawken, Lovins, and Lovins. “Natural Capitalism,” p. 11. Little, Brown and Company, 1999.

⁸ For example, the Home Depot has implemented a policy to restrict the sale of lumber generated from clear-cut forestry practices.

Firms are also being challenged on their licence to grow. Such growth will increasingly secure public acceptance only if it can be demonstrated that a company is pursuing a full suite of environmentally sound and sustainable practices.

Paradoxically, firms and individuals taking responsible actions to reduce these risks confront other risks: the risks of adopting new technologies and practices, many of which are currently not economical due to market failures when environmental costs are not internalized, and shareholder pressures to tread familiar paths. The former concern can be relieved to some extent by tax shifting policies that level the playing field for new technologies. In the case of the latter, tax policies that support new and emerging technologies can increase the confidence of manufacturers, shareholders and consumers in new technologies by demonstrating that the government supports them and that they are willing to assume a portion of the risk associated with increasing the market share of the technologies.

It serves the common good, therefore, to use environmental tax shifting to provide incentives and remove barriers for businesses to move in the direction of sustainability.

Competitiveness

Pressures to reduce taxes come in part from businesses seeking a level playing field with their competitors, both in their own taxation level and in the tax levels of their highly skilled workers.⁹ Environmental tax shifting can be used to achieve desired tax reductions while still providing incentive to move towards long-term sustainable practices.

This will create a more competitive climate for Canadian businesses seeking to be sustainability leaders. In Canada today, market signals and tax incentives for environmental actions lag far behind our OECD competitors,¹⁰ leading to a climate that does not stimulate sustainability investments and new sustainable businesses. Unless these signals are brought in line with other countries, we will lose our potential to compete in tomorrow's more environmentally constrained economy.

Improved environmental efficiency¹¹ is also one factor that will contribute to the productivity of the Canadian economy.¹²

Human Health and Quality of Life

Canadian citizens continue to experience tension between their expressed personal concerns for the environment and human health, and the incremental costs often incurred when choosing more environmentally sustainable products, activities and lifestyles. A survey conducted by the Canadian Policy Research Network (CPRN) in October of 2000 was designed to reveal those things that Canadians regard as the essentials of a high quality of life. The survey results (which show percent of

⁹ Crow, Robert. "Competition for Highly Skilled Workers: Canada's Position and Strategy." Remarks by Vice President – Policy, ITAC, to the Fifth International Metropolis Conference, November 17, 2000, Vancouver, B.C.
¹⁰ OECD. "Economic Survey of Canada." 2000. See also, for example, Pembina Institute. "Lost Opportunities: Canada and Renewable Energy." 1999.

¹¹ Also known as "eco-efficiency," and defined as providing more value to society (products, services, and jobs) for less use of limited resources and less environmental damage.

¹² For example, see Sulzenko, Andrei. "Productivity Through Eco-efficiency." Speech by Assistant Deputy Minister, Industry Canada, to the Leaders Roundtable on Sustainable Development, Ottawa, February 28, 2001. See also Industry Canada. "Sustainable Development Strategy 2000–2003," p. 16.

those surveyed that identified the particular factor) are presented in the table below.¹³ Canadians surveyed ranked health care, education, the environment and social programs as the top four priorities for high quality of life.

Priority Factors Contributing to Quality of Life in Canada

#	FACTOR	PERCENT
1	Health Care	73
2	Education	62
3	Environment	59
4	Social Programs	58
5	Economy	35
6	Government	26
7	Legal/Justice System	20
8	General Values	19
9	Personal Well-being	10
10	Work	9
11	Community/Religion	9
12	Seniors and Children	8
13	Family and Friends	5
14	Information/Media	5
15	Infrastructure/Transit	5
16	Cultural Pursuits	4
17	Diversity/Multicultural	3
18	Quality of Life Generally	1

While Canadians are seriously concerned about health care and the environment (as is evidenced by the survey results above), they are simultaneously deciding what to buy and what to do based on market prices that do not account for environmental costs. Thus, it is often the case that the product, activity or lifestyle with less environmental impact is also more costly than one with greater environmental impact.

When environmental costs are not accounted for in the market prices of goods and services, consumers make purchase decisions without taking into account all of the costs associated with those goods and services. To the extent that consumers make consumption decisions based on price, goods and services associated with high environmental impacts will be “over-consumed” relative to their consumption if environmental costs were included in market prices. At the same time, “green” products and services are often “under-consumed” because such products are expensive relative to goods and services that are undervalued in the market from an environmental point of view. Environmental tax shifting can be used to adjust the prices of goods and services so that, at least to a certain extent, the environmental costs associated with the production, consumption and disposal of goods and services are accounted for in market prices. In this way, environmental tax shifting can render goods, activities and lifestyle choices that are relatively more sustainable also relatively more affordable.

¹³ Michalski, Joseph H. “Asking Citizens What Matters for Quality of Life in Canada: Results of CPRN’s Public Dialogue Process.” Canadian Policy Research Network (CPRN), 2001.

6. Concerns with Environmental Tax Shifting and Strategies to Address Them

While the need for financial incentives to encourage sustainable practices is substantial, there are several concerns associated with the use of environmental tax shifting that must also be carefully considered. Concerns related to impacts on competitiveness, impacts on low-income earners, adjustment costs, skepticism about tax and revenue recycling, and uncertainty about tax revenue are presented below. In each case, strategies for addressing each concern are also offered.

Impacts on Competitiveness

As with almost any tax reform initiative, an environmental tax shift policy will alter the cost of doing business. Such changes can lead to negative impacts on the competitiveness of businesses. The ultimate impact on the competitiveness of a particular industry will depend on a host of considerations, including the environmental taxes implemented, the rate at which taxes are introduced, the availability of substitutes and technologies for reducing environmental impacts, and the way the revenue from new environmental taxes is recycled.

Pollution-intensive firms that do not take steps to reduce their pollution may see their costs of production increase as a result of environmental tax shifting, despite revenue recycling. The higher cost of production may result in lost sales and even closure of firms and industries or their migration to other jurisdictions.

While reductions in already existing taxes will mitigate some of the impact of any new environmental taxes, there are several additional ways to mitigate competitiveness impacts. One is to return the tax revenue to businesses in the form of a rebate. The value of the rebate could be equal to the amount of tax paid by the firm or determined by some other criteria. It is worth noting that setting the level of rebate equal to the amount of tax paid will essentially eliminate the incentive to invest in environmental improvements. To maintain the incentive effect of the tax payment, the rebate could alternatively be determined by some other criteria such as level of production, or rate of investment in efficiency improvements. The revenue from a nitrogen oxide emissions-based charge on large energy production plants in Sweden is rebated to the liable plants in proportion to their energy production, not in proportion to their tax payments. This creates a greater incentive to reduce emissions, thereby reducing tax payments while maintaining current energy production levels.

Border tax adjustments are often used to eliminate concerns of impacts on regional competitiveness.¹⁴ Border tax adjustments offer tax rebates on goods that are exported and apply taxes on goods that are imported, thus restricting the impact of the environmental tax to the jurisdiction in which the tax is implemented. The Ozone Depleting Chemicals tax in the United States includes border tax adjustments. A tax is levied on the import of ozone-depleting chemicals, as well as products that contain them, but is not applied to limited quantities of chemical exports.¹⁵

Tax exemptions are also used to mitigate impacts on competitiveness. Here, qualifying industries are awarded a partial or full exemption from the environmental taxes. In Denmark, Finland, the Netherlands, Norway and Sweden, the most energy-intensive industries are exempt or partially exempt from carbon taxes. In some cases, the exemption is conditional upon participation in a legally binding

¹⁴ Note that it is not clear that border tax adjustments will be allowed under the World Trade Organization.

¹⁵ Barthold, Thomas. "Issues in the Design of Environmental Excise Taxes." *Journal of Economic Perspectives*. Vol. 8(1): 133–152. Winter 1994.

voluntary agreement for emission reductions, as in the Danish CO₂ agreement scheme,¹⁶ or upon investment by the industry in clean technologies. Such exemptions can be phased out over time as technologies for reducing emissions become increasingly competitive and thereby reach a certain threshold of market penetration.

Finally, tax-free thresholds can also be used to minimize potential impacts on competitiveness. Tax-free thresholds require that, for the good or service to which the tax is applied, an initial level of consumption not be taxed. Sweden's nitrogen oxide environmental tax shift policy (referred to above) includes a tax-free threshold. Specifically, the tax on nitrogen oxide emissions from energy production plants is not levied on energy production plants that produce less than 25 GWh of energy per year.¹⁷

Impacts on Low-Income Earners

To the extent that an environmental tax shift policy includes the use of new environmental taxes, there may be disproportionate impacts on low-income earners; that is, they will spend proportionately more of their income on the environmental taxes. This effect is referred to as "regressivity." Regressivity may be compounded by the inability of low-income earners to invest in ways to decrease their tax rates — for example, by purchasing high-efficiency household appliances.

Environmental tax shift policies should include measures to protect low-income earners from regressivity. One of the best ways to do this is through environmental tax exemptions. Another option is to issue tax rebates to those most impacted by the policy. This involves returning the revenue from environmental taxes to those who paid them in proportion to their respective tax payments.

Instituting income tax relief and tax-free thresholds can also effectively reduce the impact of environmental taxes on low-income earners. Tax-free thresholds are particularly appropriate in the case of a water tax, for example, because a certain amount of water consumption is considered a necessity. Setubal, a city in Portugal, has a water tax with such a tax-free threshold.¹⁸ The Dutch Small Energy Users Tax is an example of a carbon tax that protects low-income earners.¹⁹ With this tax, revenue is returned to households according to their respective tax payments and a tax-free threshold of energy use has been established. In addition, households get income tax relief such that an average energy user in each of four income groups will be made no worse off from the tax (high users will pay more and low users will pay less). The German environmental tax shift (or, as they call it, ecological tax reform) policy also includes provisions for protecting low-income earners.²⁰ Specifically, the German policy includes increased children's allowances, an increased tax-free threshold, and a reduction of income tax rates for low-income earners.

Depending on the type of environmental taxes implemented, other options for protecting low-income earners include increasing social security and other transfer payments to low-income households; gradually and predictably phasing in new environmental taxes over a number of years; expanding public transportation; introducing programs for insulating low-income earners' homes; and instituting tax rebates for investments in high-efficiency household appliances.

¹⁶ Johannsen, Katja and Mikael Tøgeby. "Evaluations of the Danish CO₂ Agreement Scheme." CAVA Working Paper no. 98/11/7, 1999.

¹⁷ The Swedish EPA. "The Swedish Charge on Nitrogen Oxides." See <http://www.internat.environ.se/documents/pollutants/nox/nox.htm>.

¹⁸ Worldwatch Press Release. "Shifting Tax Burden to Polluters Could Cut Taxes on Wages and Profits by 15 Percent." May 10, 1997. See <http://www.worldwatch.org/alerts/pr970508.html>.

¹⁹ An Ecotax that works well in Holland. See <http://www.globalideasbank.org/crespec/CS-41.HTML>.

²⁰ UN-ECE/OECD Workshop on Enhancing the Environment by Reforming Energy Prices. "The Ecological Tax Reform in Germany." Czech Republic: June 2000. See www.env.cebin.cz/akce/pruhonice_e/germany.html.

Adjustment Costs

Individuals and business owners decide on technologies to invest in or goods to purchase based on current prices. If significant, unanticipated environmental taxes are levied, some investment or purchase decisions may become uneconomical. This can result in high adjustment costs as individuals and business owners struggle to adapt to the new policies.

There are several strategies for minimizing these adjustment costs. New environmental taxes implemented as part of an environmental tax shift policy should start at relatively low levels. Tax rates should then increase gradually over time. It is very important for individuals and business owners to know well in advance what the tax rates will be in the future. Denmark introduced its CO₂ tax in 1992. At that time, it was levied solely on households. In 1993 it was extended to the business sector, and in 1995 the CO₂ rates for all sectors were increased. By implementing and increasing the tax over several years, Denmark allowed individuals and business owners to adjust to the taxes gradually and plan future investments accordingly.²¹ Similarly, the United Kingdom landfill tax was introduced in 1996.²² At that time, it was publicized that the tax would increase by one pound per year to a maximum rate achieved in 2004. Again, knowing what the rate will be over time allows individuals and business owners to immediately incorporate future costs into management decisions. Another strategy that addresses the adjustment costs associated with environmental tax shifting is to use some of the revenue from the environmental taxes to help individuals and business owners adjust to the new tax regime – for example, through subsidies or credits for investment in particular technologies, or through technology outreach programs.

Skepticism About Tax and Revenue Recycling

At a time when many individuals and business owners are calling for tax reductions, the public as a whole is skeptical of any government policy that includes the implementation of new taxes. The public is also likely to be suspicious of promises of revenue recycling.

Although taxes will never be popular, and skepticism towards policies that involve implementing new taxes will probably remain, environmental taxes are more likely than many other taxes to earn public support. A direct link between the taxes and the environmental issue to which they are tied substantially increases public acceptance of environmental taxes. Acceptance increases further when the environmental issue is well understood and widespread. When it comes to environmental tax shifting, public acceptance may be even higher than for environmental taxes generally if taxes and charges on issues of social value, such as employment and domestic investment, are reduced as part of the policy.²³

Environmental tax shifting that is transparent, complete, and direct will mitigate skepticism about revenue recycling. As well, governments can pursue an environmental tax shift policy in concert with an overall tax reduction agenda, thus appeasing calls for total tax reductions. Implementing environmental tax shifting does not compromise the ability of governments to reduce existing taxes. Indeed, revenue from the environmental taxes can be recycled to finance reductions in existing taxes.

²¹ Johannsen, Katja and Mikael Togeby. "Evaluations of the Danish CO₂ Agreement Scheme." CAVA Working Paper no. 98/11/7, 1999.

²² Whittall, Robert. "Landfill Tax in the United Kingdom." Environmental Taxation Worldwide Web site. See <http://www.greentaxes.org/country/uk/land.asp>.

²³ Von Weizsacker, Ernst. *Ecological Tax Reform: A Policy Proposal for Sustainable Development*, p. 65. London: Zed Books, 1992.

Uncertainty About Tax Revenue

An environmental tax shift policy that recycles revenue by reducing existing taxes requires governments to predict the revenue from the environmental taxes, and thus the extent to which existing taxes need to be reduced. A level of uncertainty is associated with predicting the response to the environmental taxes. The ultimate response will depend on how much the prices of goods and services change as a result of the tax and, in turn, how sensitive producers and consumers are to price increases. In cases where the response to the environmental taxes is significant, tax revenues will decline over time at a rate that may be difficult to estimate. This will, in turn, make it difficult to determine how much existing taxes should be reduced to accomplish revenue neutrality. Continual adjustment of tax rates may then be necessary, and this might prove administratively costly.

Implementing environmental taxes gradually and predictably over time can reduce tax revenue uncertainty. If this strategy occurs in conjunction with small adjustments to the tax recycling measures, it should be manageable for governments to achieve revenue neutrality. Over time, as individuals and business owners respond to the environmental taxes and the tax base declines, increases in the tax rate can compensate for reductions in tax revenue.

As the use of environmental tax shifting grows, so, too, will the body of evidence from other jurisdictions that can be used to more accurately predict revenue generation associated with various taxes.

7. Designing a Tax Shifting Package for Canada

Despite the fact that Canada has lagged behind other jurisdictions in implementing EFR, Canadian decision-makers have begun to recognize the need for fiscally oriented policies for environmental protection in Canada:

- Over the past year, the House of Commons' Standing Committee on Finance has, as part of its pre-budget consultations, invited experts to testify on the role of fiscal policies for environmental protection in Canada.
- David Anderson, Canada's minister of the environment, has stated, "It is time to get serious about aligning economic signals and financial rewards with environmental goals. For starters, governments have to end regulations and subsidies that harm the environment... Next, we can link taxation to environmental performance. Many other countries are doing this now... we can and must get on with the business of redesigning our tax base to reflect environmental costs."
- The prime minister's advisory body on environmental and economic sustainability, the National Round Table on the Environment and the Economy (NRTEE), initiated an ecological fiscal reform (EFR)²⁴ program in June 2000. The NRTEE's EFR program has now concluded that "there is a role for EFR in Canada, and EFR can offer many benefits and new opportunities."

While the need for greater use of market signals for environmental protection is increasingly being recognized, substantial work on how such policies should be pursued in a Canadian context is lacking. To begin to fill this gap, and to provide substance to the dialogue on environmental tax shifting in

²⁴ The National Round Table on the Environment and the Economy's Multi-stakeholder EFR Expert Group has defined ecological fiscal reform broadly as "a strategy that redirects a government's taxation and expenditure programs to create an integrated set of incentives to support the shift to sustainable development."

Canada, the Triple E Tax Shift Research Collaborative has identified and described numerous principles for applying environmental tax shifting in Canada:

PRINCIPLE	DESCRIPTION
Subsidy removal	Where relevant, before implementing environmental tax shifting a thorough investigation of current government expenditure related to a particular issue should be conducted and areas for reform or redirection of expenditure identified, evaluated, and considered.
Revenue neutrality	Environmental tax shifting should be implemented in a revenue neutral manner, such that the implementation of any new environmental taxes does not result in an increase in overall government revenues. Furthermore, consideration should be given to pursuing environmental tax shifting in the context of overall tax reductions.
Transparency	Environmental tax shift policies must ensure transparency of both revenue collection and revenue recycling. Taxpayers should be made aware of the magnitude of revenues collected as part of a tax shift policy, and revenue recycling should be visible and direct.
Sector specific revenue recycling	It may be appropriate to recycle revenues from an environmental tax shift policy within the same sector(s) from which environmental taxes were collected, through the use of credits, tax reductions, or direct rebates.
Administrative efficiency	Environmental tax shift policies should be designed to minimize both government administrative costs and business/individual compliance costs.
Predictability	Environmental taxes that are implemented as part of an environmental tax shift policy should be phased in over time and taxpayers should know well in advance what future tax rates will be.
Exemptions	Any exemptions from environmental taxes should be conditional on specified and acceptable environmental performance achievements, investments or covenants.
Low-income earners	Impacts on low-income earners, especially impacts that result from the implementation of environmental taxes, should be identified and mitigated.
Focus on pollution prevention	High-performance incentives should be designed to encourage pollution prevention, rather than end-of-pipe pollution solutions.
Competitiveness	Impacts on domestic and international competitiveness should be taken into account in the design of environmental tax shift policies.
Measurability	It is important to be able to verify impacts, costs, and ultimate results of environmental tax shift policies, especially those designed as pilot projects.
Life cycle perspective	Analysis of policy options should be from a life cycle perspective so the environmental issue is addressed through the most appropriate policy option or combination of policy options.
Tax shifting as part of a policy package	In some cases, it may be more appropriate to pursue environmental tax shifting in combination with other environmental policies to best achieve environmental objectives.
Perverse effects	As with any environmental policy, an environmental tax shift policy should be designed to account for any perverse incentives that may result from the policy.

8. Priority Environmental Issues for Tax Shifting in Canada

Although the use of fiscal tools for environmental protection, including environmental tax shifting, is comparatively uncommon in Canada, there is no lack of environmental issues that need to be addressed through public policy intervention. A 2001 publication, “Canada vs. the OECD: An Environmental

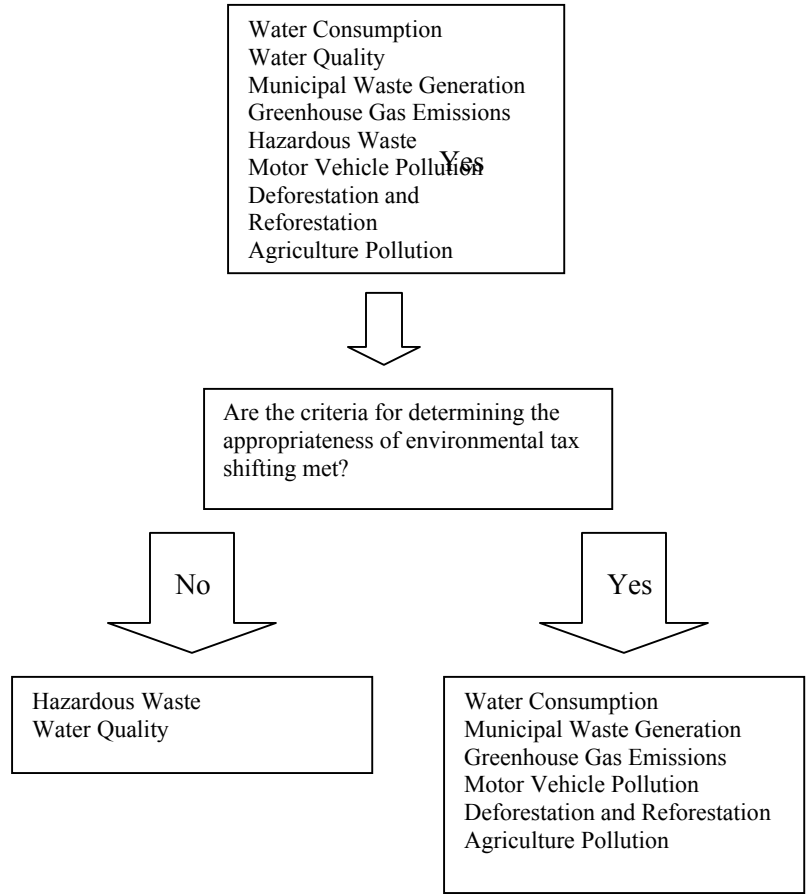
Comparison,” compared Canada’s environmental record to the 28 other nations in the Organization for Economic Cooperation and Development (OECD). The major finding of the study was that Canada’s overall ranking was 28th out of 29 based on the 25 environmental indicators in 10 categories that were examined. Issues on which Canada ranked among the top three worst countries included greenhouse gas emissions, water consumption, energy consumption, deforestation, and generation of nuclear waste.

A second study, also published in 2001, “OECD Environmental Outlook,” identified “red light” environmental issues for OECD countries as a whole. According to the OECD, issues are considered red light when recent trends have been negative and are expected to continue to be negative, or when recent trends have been stable, but are expected to worsen in the future, and, in either case, “need to be urgently addressed by OECD countries.” Among the red light issues identified were biodiversity loss, deforestation, climate change, emissions from transportation, groundwater pollution, and chemicals in the environment.

Because the list of environmental issues that are ripe for policy intervention in Canada is fairly extensive, the Triple E Tax Shift Research Collaborative used the above publications to develop a list of eight of the most important environmental issues facing Canada today. Included are water consumption, water quality, municipal waste generation, greenhouse gas emissions, motor vehicle pollution, hazardous waste, deforestation and reforestation, and agriculture pollution.

The Collaborative then used the criteria presented earlier in this report to identify the issues that can be appropriately addressed through environmental tax shifting (see page 13). Using this set of criteria, the eight issues were subsequently reduced to six: water consumption, municipal waste generation, greenhouse gas emissions, motor vehicle pollution, deforestation and reforestation, and agriculture pollution.²⁵ Water quality and hazardous waste were eliminated. In the case of water quality, regulations must ensure that minimum water quality standards are met to ensure safe drinking water for communities in Canada. Environmental tax shifting could be implemented in conjunction with such regulations to offer fiscal incentives to exceed the standards ensured by the regulation. Similarly, hazardous waste generation and disposal should be controlled by strict environmental regulations that ensure adequate environmental protection for humans and ecosystems. Environmental tax shifting can then be used as a secondary policy to offer an incentive to exceed the standards ensured by the regulation.

²⁵ This is not meant to suggest that environmental tax shifting be used as the primary tool for addressing all of these issues. Rather, we feel that some aspects of each of these issues could be addressed through environmental tax shifting. In all cases, a package of policy instruments that might include environmental tax shifting will be needed to deal with the issue comprehensively.



Additional research should be carried out on the application of environmental tax shifting to the priority areas identified here. Several factors should be investigated, including policy design, the environmental benefits of government intervention, the estimated cost of the policy, relevant experience in other jurisdictions, and other economic benefits associated with the policy. The Triple E Tax Shift Research Collaborative set out to evaluate these and other factors for one of the priority areas identified above: greenhouse gas emissions.

9. Case Study

The purpose of the case study was to design specific proposals for environmental tax shifting in Canada, and to conduct research on the potential impacts of such policies in a Canadian context. We have been able to demonstrate the applicability of environmental tax shifting in Canada, and provide specific environmental tax shift proposals for consideration by both provincial and federal governments.

The issue of greenhouse gas emissions was selected from the six priority areas identified above as a case study for further research and policy development. Our analysis addresses the following question:

How could government revenues generated through climate change mitigation policies (e.g., tax measures, but also auctioned emission permits or regulatory penalties) be recycled to provide incentives that would accelerate and enhance GHG emission reductions in Canada?

As described earlier, there are several key benefits to pursuing environmental tax shifting using a balanced approach that involves both revenue generation (through the use of environmental taxes) and government expenditure (in the form of tax credits, subsidies or rebates). Within this framework, an environmental tax shift policy for addressing greenhouse gas emissions would likely involve taxes on carbon dioxide emissions, with some form of revenue recycling. However, in Canada, rather than using taxes to mitigate greenhouse gas emissions, the federal government is considering a Domestic Emissions Permit Trading System. Under such a scheme, at least a portion of the total permits for greenhouse gas emissions could be auctioned to large carbon dioxide emitters in Canada. Such a policy would result in an increase in government revenue that could subsequently be recycled to provide incentives for accelerated and enhanced greenhouse gas emission reductions. Currently, substantial research is being carried out on the permit/revenue generation side of the equation, but there has been little research on ways to encourage accelerated and enhanced greenhouse gas emissions in the context of revenue recycling from an emissions trading system. The Triple E Tax Shift Research Collaborative therefore targeted this particular area as one that warranted additional research and consideration.

Specifically, we identified proposals for revenue recycling designed to encourage accelerated and enhanced greenhouse gas emission reductions in three general categories:

1. Incentives for consumers to purchase low-GHG intensity goods that are currently available, but expensive, and have limited market share;
2. Incentives for joint ventures to attract scarce capital in the development and commercialization of emission reduction technologies and activities; and
3. Incentives for reforestation of areas cleared for activities related to logging, oil and gas, and mining, to increase the sequestration potential of Canada's forests.

Each of the measures is described in more detail below (see Appendix B for a comprehensive description of each initiative).

Incentives for Consumer Engagement

Within this category of revenue recycling, we identified several measures that will encourage accelerated and enhanced greenhouse gas emission reductions. These measures are designed to provide consumers with incentives to purchase low-GHG intensity goods. Such goods are currently available for purchase, but generally have high upfront costs and low market share. In each case, the incentive would be time-limited until a broader market for these technologies brings down unit costs. The specific measures include the following:

1. Revenue Recycling for Energy Efficient Vehicles: Revenue would be recycled to finance a performance-based incentive for the purchase of the most energy efficient vehicles available on the market, regardless of the particular vehicle technology. The incentive would be based on a sliding scale of efficiency. The higher the efficiency of the vehicle (beyond a threshold level), the greater the financial incentive provided.
2. Revenue Recycling for Residential House Efficiency Improvements: This proposal calls for the government to offer a performance-based financial incentive to increase the energy efficiency of existing homes in Canada. Using Natural Resources Canada's EnerGuide for Houses (EGH)²⁶

²⁶ EnerGuide for Houses provides a reliable and objective tool for assessing the energy performance of a house. The EnerGuide for Houses evaluator provides the homeowner with a report outlining the energy consumption of

as a tool for identifying energy efficiency improvement opportunities, the government would offer financial incentives to homeowners to improve the energy efficiency of their homes. The incentive would be based on the actual performance improvements obtained using certified renovators, as measured by a second EGH audit, and would only apply to significant increases in energy efficiency.²⁷ The federal government would offer direct subsidies or tax credits to homeowners to cover a portion of the expenses incurred in a home retrofit where the EGH audit showed that energy efficiency improved significantly. The higher the EGH rating achieved, the greater the financial incentive provided.

3. **Revenue Recycling for Renewable Energy Consumption:** This proposal is designed to increase the demand for renewable energy by providing consumers with a green energy consumption credit. The credit would cover a portion of the premium cost associated with the purchase of renewable energy from electricity providers, and would complement the new federal production incentive for wind energy.
4. **Revenue Recycling for Renewable Energy Production:** This measure would use a portion of the revenue generated from a federal-level policy for reducing greenhouse gas emissions to finance a production incentive for on-grid facilities generating zero-emission power from renewable sources. This is an extension of the production incentive program recently implemented to encourage the production of wind power in Canada. The production incentive would improve the economics of facilities and allow more aggressive competition with hydrocarbon power sources.
5. **Revenue Recycling for Biofuels:** This proposal calls for an extension to the excise tax exemption for ethanol fuel to other non-hydrocarbon biofuels that can be produced in a sustainable manner and result in significant greenhouse gas emission reductions from a life cycle perspective. There is a great deal of potential to decrease greenhouse gas emissions through increased use of biofuels in, for example, the electricity generation and transportation sectors.
6. **Revenue Recycling for Reducing the Cost of Energy Efficient Equipment and Products:** Revenue would be used to finance an energy efficiency rebate for the purchase of energy efficient equipment and products. The rebate would be available to both individuals and companies who pay for highly energy efficient equipment and products.

Incentives for Joint Ventures

The third category of revenue recycling measures involves providing financial incentives for joint ventures to attract scarce capital in the development and commercialization of emission reduction technologies and activities (i.e., a “Climate Change Joint Venture” (CCJV), similar to a Labour-Sponsored Venture Capital Company (LSVCC) or other international funds). Under this measure, a company may make an investment in a registered CCJV, which must invest the funds in specified eligible GHG mitigation technologies or activities. The investment would be a deductible cost, with an incentive payment or tax credit that is time-limited due to the uncertainty of the ultimate realization of emission reductions.

the house, a list of potential energy efficiency improvements, and an energy efficiency rating between 1 and 100 before and after improvements.

²⁷ There would be a threshold level of improvement that would have to be met in order to qualify for the incentive.

This type of measure could create effective opportunities for industry, sectors, or groups of companies to disperse the risk of these activities and reduce the cost for each entity. Smaller companies, in particular, could benefit by developing the expertise required to manage and effectively reduce emissions. In addition, similar to some of the new funds associated with the Federation of Canadian Municipalities, a CCJV can be a concentrated vehicle that provides accountability and measurable emission reductions from eligible activities. There is a great deal of flexibility in designing eligibility criteria for the CCJV, depending on government policy choices, and these criteria can be modified as policies or new developments arise.

Incentives for Reforestation

A footprint has been made on Canadian forests through activities related to logging, oil and gas, and mining. Current legislation/regulation does not always require returning the forest to its natural state and, most assuredly, past legislation/regulation did not. This revenue recycling measure is designed to provide incentives to encourage the reforestation of forests previously cleared for activities related to logging, oil and gas, and mining, thereby increasing the sequestration capacity of Canada's forests. Logging, oil and gas, and mining activities occur mainly on Crown land, and are normally contracted to operators. These two factors combine to create little incentive, at present, for increasing sequestration through a reduced footprint. Past impacts could be countermanded by providing an incentive for reforestation of previously cleared areas.

General Conclusions About Environmental Tax Shifting in Canada

The Triple E Tax Shift Research Collaborative considered the question, “How could government revenues generated through climate change mitigation policies (e.g., tax measures, but also auctioned emission permits or regulatory penalties) be recycled to provide incentives that would accelerate and enhance GHG emission reductions in Canada?” We identified four categories of incentives that could be targeted through revenue recycling. For each of the categories, Collaborative members identified specific actions that could be encouraged, and evaluated the potential impact of those measures on greenhouse gas emissions (see Appendix B for details). Several conclusions can be drawn from this case study analysis:

- Environmental tax shifting could be used to help reduce greenhouse gas emissions in Canada.
- Revenue generated from a greenhouse gas mitigation policy in Canada can be recycled to encourage accelerated and enhanced greenhouse gas emission reductions from households, the transportation sector, the energy supply sector, and industry.
- Several technologies are already available for reducing emissions in Canada, but widespread adoption of these technologies is limited by their high upfront costs. Environmental tax shifting can be used to mitigate these upfront costs.
- The risk associated with adopting certain technologies for reducing greenhouse gas emissions precludes widespread adoption. Environmental tax shifting can be used to mitigate such risks by providing opportunities for joint ventures and sending a message to purchasers and manufacturers that government supports the particular technology and is willing to assume a portion of the risk associated with its implementation.
- Economic and environmental benefits beyond those strictly associated with reducing greenhouse gas emissions may ensue from revenue recycling designed to encourage the reduction of greenhouse gas emissions (e.g., improved habitat conditions from reforestation that increases sequestration, and reductions in emissions other than greenhouse gases).
- Revenue recycling policies that encourage the use of technologies that reduce greenhouse gas emissions will spur innovation, market creation, and new employment opportunities as demand for such technologies increases over time as a result of the tax shift policy.

10. Summary and Reflections

The Triple E Tax Shift Research Collaborative was established to design, evaluate, and advance federal and provincial environmental tax shifts intended to influence individual behaviour and business decisions. In May 2001, the Collaborative members began a dialogue on environmental tax shifting in Canada, developing a common understanding of the subject and setting the stage for future research in this important area of public policy. This report is the culmination of that ongoing dialogue. Its main purpose is to contribute to the public dialogue on the applicability of environmental tax shifting in Canada. Thus, the report is designed to provide both substantial background information on environmental tax shifting and a Canadian perspective on the topic. We have described environmental tax shifting, detailing how it relates to other government policies and when its use is appropriate. We have identified key areas for environmental tax shifting in Canada, and have presented the results of a case study analysis that involved identifying and designing revenue recycling options that would complement a policy for mitigating greenhouse gas emissions in Canada.

Several important observations emerged from the report:

- Environmental tax shifting has been implemented in numerous European countries.
- Canada lags behind other developed countries in its use of fiscal policies and environmental tax shifting for achieving environmental objectives.
- There is a growing recognition of the need for a comprehensive set of policies, including fiscal policies and environmental tax shifting, to address environmental issues.
- Environmental tax shifting can be pursued in the context of overall tax reductions.
- Environmental tax shifting presents a balanced approach to pursuing environmental objectives, both from a sustainability point of view and a fiscal point of view.
- The need for environmental tax shifting and other fiscal policies for environmental objectives exists for both businesses and individuals.
- Environmental tax shifting spurs innovation, provides competitive advantages to sustainability leaders, mitigates risks associated with new and cutting-edge technologies, and provides a framework in which companies can operate and grow.
- Environmental tax shifting adjusts prices so that individuals pursuing environmentally sensitive products, activities, and lifestyles are rewarded by more economical choices.
- Concerns associated with environmental tax shifting exist and can be addressed through creative and careful policy design. Experience in European countries provides examples of specific design features for addressing concerns.
- Pursuit of environmental tax shifting in Canada should consider the numerous principles that have been identified and described in this report.
- There are several environmental issues in Canada that are ripe for policy intervention. A number of these could be addressed through the use of environmental tax shifting or some other fiscally oriented public policy.

Future research in this area should explore options for pursuing environmental tax shifting for other environmental issues ripe for policy intervention. There is a substantial need for research on the application of environmental tax shifting in Canada. Specifically, research should identify, design, and estimate the effectiveness of environmental tax shift policies for addressing various environmental issues, including water consumption, municipal waste generation, motor vehicle pollution, deforestation and reforestation, and agriculture pollution. Policy design exercises should incorporate a range of policy objectives, including sustainability, competitiveness, employment, and consumer choice. Particular attention should be paid to the use of environmental tax shifting and other environmental fiscal policies for spurring innovation, creating new markets, and building the framework required to make Canada a global sustainability leader.

Appendix A: Generic Terms and Ground Rules for Effective Collaboration

The following terms and ground rules were agreed upon by members of the Triple E Tax Shift Research Collaborative as conditions that lead to effective collaboration:

- Clarity on shared purpose and common agenda.
- Agreement on process.
- Safe environment for speculation – confidentiality of internal discussions.
 - Nothing shared externally without consent of the group.
 - Nothing said attributed to individual companies.
 - All external products that identify the members have to be approved by members.
- Genuine commitment to innovation, particularly with respect to barriers in design and to implementation.
- Distinction between positions and fundamental interests.
- Adequate time to conduct analysis and create rigorous products.
- Adequate pressure (in the form of deadlines) to drive results.
- Commitment to deadlines.
- Decision making process is that of consensus seeking:
 - Understand and legitimize the various concerns.
 - Document various opinions and perspectives in the final product. Acknowledge where resolution was not achieved and where there is therefore a need for further research.
 - Some issues can be moved outside of the boundaries of the project.
- Think inclusively for those not at the table. This will help with general support of proposals once they are released to public.

Appendix B: Detailed Description of Revenue Recycling Policy Options for Reducing Greenhouse Gas Emissions in Canada

In the section that follows, we describe potential measures for revenue recycling that can accelerate and enhance greenhouse gas emission reductions. The measures fall into one of three categories, as described below:

1. Incentives for consumers to purchase low-GHG intensity goods that are currently available, but expensive and with limited market share. The incentive would be time-limited until a broader market for these technologies brings down unit costs (e.g., high-efficiency vehicles, residential house efficiency, renewable power, biofuels, and energy efficient equipment, products, and services);
2. Incentives for joint ventures to attract scarce capital in the development and commercialization of emission reduction technologies and activities that enhance, but do not duplicate, the initiatives described in this report; and
3. Incentives for the behavioural change required to reduce the footprint of past activities related to logging, oil and gas, and mining in Canada's forests, and thus increase sequestration. These activities are mainly on Crown land, and are normally contracted to operators. These two factors combine to create little incentive, at present, for increasing sequestration through a reduced footprint.

For each measure we include:

- A brief description of the measure
- The rationale for implementation
- The potential for greenhouse gas emission reduction actions
- A ballpark estimate of the quantity of greenhouse gas emissions that might be reduced as a result of the particular measure
- A brief discussion of the potential costs of the measure
- A discussion of other potential economic benefits associated with the measure.

In the case of the cost estimates, we have primarily presented either experience in other jurisdictions with similar measures or studies that have been conducted on similar measures. Thus, the cost estimates included are meant to provide an *idea* of the costs of similar measures, but are not meant to be conclusive. The final cost of the policy would depend on a host of factors, including timeline for implementation, value of incentive offered, participation in measure, and duration of policy.

It is important to note that the measures included in this policy brief are the results of a preliminary exercise for investigating the revenue recycling potential of greenhouse gas mitigation policies. The measures are not meant to be prescriptive, but are rather meant to start a dialogue on the various options for recycling revenue for enhanced and accelerated greenhouse gas emission reductions. Thus, the measures discussed are designed to be flexible with respect to design details and timeline for implementation. At the same time, the measures are designed to be robust, so they can be adapted to respond to opportunities and developments arising from Canadian and international greenhouse gas emission reduction policies.

Incentives for Consumer Engagement

The measures described in the following section are designed to provide incentives for consumers to purchase low-GHG intensity goods that are currently available, but expensive and with limited market share.

In each case, the incentive would be time-limited until a broader market for these technologies brings down unit costs.

Applications include the following:

- High-efficiency vehicles,
- Residential house efficiency,
- Renewable power,
- Biofuels, and
- Energy efficient equipment and products.

Revenue Recycling for Energy Efficient Vehicles

1. Description of the Revenue Recycling Measure

- Brief overview of revenue recycling measure: Revenue would be recycled to finance a performance-based incentive for the purchase of the most energy efficient vehicles available on the market, regardless of the particular vehicle technology. The incentive would be based on a sliding scale of efficiency. The higher the efficiency of the vehicle (beyond a threshold level), the greater the financial incentive provided.²⁸
- Appropriate level of government: This policy could be implemented by either the federal or provincial government(s).

2. Rationale for Implementation

- Barrier(s) removed: Transportation is the single largest source of greenhouse gas emissions in Canada, accounting for 25% of total emissions in 1997.²⁹ Passenger transportation accounts for 59% of total transportation energy use. According to figures from the United States Environmental Protection Agency, choosing a vehicle that gets 9.4 L/100 km, rather than 11.8 L/100 km prevents the release of over 13 tonnes of greenhouse gas pollution³⁰ over the lifetime of the vehicle. The difference in fuel efficiency between hybrid vehicles and conventional vehicles is substantial and growing. Fuel efficiency in the United States peaked in 1987 and 1988 at 10.64 L/100 km. Since then, it has declined by nearly 8% to 11.53 L/100 km. Average fuel efficiency in the U.S. for 2001 vehicles is lower than it has been at any time since 1980. In contrast to this, the fuel efficiency of the Honda Insight, an electric hybrid vehicle, is 4.13 L/100 km. The potential for reducing emissions and saving fuel costs through increased use of hybrid vehicles is clearly substantial. The savings associated with fuel cell vehicles can be even greater; depending on their fuel source, emissions can be nonexistent. Despite this, a number of barriers are currently restricting the widespread adoption of hybrid and fuel cell vehicles. These include higher upfront costs, market uncertainty, perceived vehicle unreliability, and lack of consumer awareness. Financial incentives that encourage investment in hybrid and fuel cell vehicles can offset the relatively high upfront costs for hybrid, fuel cell, and other super-efficient vehicles and increase consumer confidence in these new automobiles. Furthermore, government support for new, innovative, and emerging technologies reduces the costs and risks that manufacturers face when they consider introducing innovative technologies.

3. Potential GHG Emission Reduction Actions

- GHG emission reduction actions that might be encouraged: This measure will lead to increased purchases of hybrid, electric, fuel cell, and other highly efficient vehicles, such as some turbo-direct injection (TDI) diesels.
- Scope of measure: The measure could be targeted to individual car purchasers and businesses with company vehicles.

²⁸ This measure is distinct from a policy to increase the Corporate Average Fuel Efficiency (CAFÉ) standards for vehicles. The threshold would be set well above the average fuel efficiency of new vehicles and would be designed to include the top 5% to 10% of vehicles in terms of efficiency.

²⁹ Transportation in Canada. "1999 Annual Report."

³⁰ Thus, for each L/100 km difference, approximately 5.4 tonnes of greenhouse gas emissions are saved over the life of the vehicle.

- Relevant experience in other jurisdictions: The U.S. Energy Policy Act of 1992 included a federal tax credit of 10%, up to US\$4,000, on the purchase of an electric vehicle, thus setting an early precedent of support for new and emerging automotive technologies. As well, the U.S. National Energy Plan, recently released by President Bush, includes a plan to set aside US\$4.2 billion over 10 years to finance a temporary income tax credit for those who purchase hybrid and fuel cell vehicles. In late 1997, when Toyota's Prius was introduced in Japan, tax incentives and manufacturer subsidies helped to lower relatively high upfront costs by US\$2,000 to US\$3,000. The subsidies spurred Prius sales to about 1,500 models per month in Japan since 1997. The Dutch government also recently introduced a policy to encourage the purchase of less greenhouse gas intensive vehicles. Under the Dutch scheme, cars are rated from A to G, according to their associated greenhouse gas emissions,³¹ and are eligible for incentives on a sliding scale according to their rating.³²

4. Quantity of GHG Emission Reductions

- The American Council for an Energy Efficient Economy (ACEEE) has evaluated tax credits for the purchase of hybrid (US\$2,000), and fuel cell or electric (US\$5,000) cars. ACEEE estimates that between 2002 and 2006, with this incentive in place, 58,000 individuals will purchase electric/fuel cell vehicles and 380,000 individuals will purchase hybrid vehicles. The potential energy and greenhouse gas savings associated with such purchases would be substantial. Honda and Toyota are already selling hybrid gasoline-electric vehicles that are 50% to 75% more fuel efficient than typical new cars in the same size class. Assume that the 58,000 people predicted to buy electric/fuel cell cars and the 380,000 people predicted to buy hybrid vehicles between 2002 and 2006 would have bought new cars regardless of any fiscal incentive to do so. Then the fuel and emission savings associated with the purchase of hybrid and fuel cell or electric cars would be a function of the difference between the fuel efficiency of a new conventional car and the fuel efficiency of the fuel cell/electric or hybrid car. Thus, in the case of a hybrid car, the fuel savings would be no less than 50%, and up to 75%. Given that 2001 average fuel efficiency was 11.53 L/100 km, and assuming fuel savings of 50%, the purchase of the 380,000 hybrid vehicles alone would result in savings of 31.131 tonnes of greenhouse gas emissions per vehicle over the life of the automobile.³³ That is a total of almost 12 million tonnes of greenhouse gas emissions from the purchase of just 380,000 vehicles. The purchase of an estimated 58,000 fuel cell/electric vehicles would save an additional 62.262 tonnes of greenhouse gas emissions per vehicle over the life of the vehicle.³⁴ That amounts to a further reduction of 3.6 million tonnes of greenhouse gas emissions. Adjusting these estimates for population differences between the United States and Canada gives estimated reductions totalling 1.7 million tonnes of greenhouse gases in Canada over the life of the vehicles.³⁵

5. Estimated Economic Cost of Measure

- The American Council for an Energy Efficient Economy's evaluation of tax breaks for hybrid and fuel cell/electric vehicles provides rough estimates of what can be expected if a similar policy were implemented in Canada. ACEEE found that total U.S. federal costs associated with a tax break from 2002 to 2006 would be US\$760 million for hybrid vehicles and US\$290 million for fuel cell/electric vehicles. This assumes that between 2002 and 2006, 58,000 people purchase electric/fuel cell vehicles and 380,000 people purchase hybrid vehicles. Thus, the total cost to government in forgone

³¹ Under a 1999 EU directive, all EU member states are required to label their cars according to their fuel efficiency and carbon dioxide emissions.

³² *Tax News Update*. Vol. 21, no. 2.

³³ Based on emissions of 5.4 tonnes of greenhouse gases for each L/100 km difference over the life of the vehicle.

³⁴ Assuming these vehicles are associated with zero emissions.

³⁵ Canada's population is approximately 11% of the United States' population; the figure is adjusted accordingly.

tax revenue between 2002 and 2006 is US\$1,050 million. After correcting for population differences between Canada and the United States, the estimated cost of a similar policy in Canada is US\$115.5 million, or approximately CDN\$185 million.

6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure

- Providing an incentive to purchase hybrid and fuel cell vehicles sends a clear message that the Government of Canada supports a shift towards low and zero emission vehicles. Furthermore, it signals that the government is willing to assume a portion of the risk associated with switching to these relatively new and innovative technologies. The incentive will lead to increased demand that will spur investment and employment in fuel cell and hybrid vehicle manufacturing. Consumer confidence will increase, as will consumer choice and fuel savings. The money saved in fuel can be redirected towards other investments, which will subsequently lead to increased economic activity in Canada.

Revenue Recycling for Residential House Efficiency Improvements

1. Description of the Revenue Recycling Measure

- Brief overview of revenue recycling measure: This proposal calls for the federal government to offer a performance-based financial incentive to increase the energy efficiency of existing homes in Canada. Using Natural Resources Canada's EnerGuide for Houses (EGH)³⁶ as a tool for identifying energy efficiency improvement opportunities, the government would offer financial incentives to homeowners to improve the energy efficiency of their homes. The incentive would be based on the actual performance improvements obtained using certified renovators, as measured by a second EGH audit, and would only apply to significant increases in energy efficiency.³⁷ The federal government would offer direct subsidies or tax credits to homeowners to cover a portion of the expenses incurred in a home retrofit where the EGH audit showed that energy efficiency improved significantly. The higher the EGH rating achieved, the greater the financial incentive. This policy would require professional, third party energy audits, which are available as part of the EGH initiative already in place. It would also require qualified renovators certified to carry out effective retrofits, and designated retailers to supply high-efficiency equipment.
- Appropriate level of government: This measure would be best suited to joint implementation by the federal and provincial/territorial levels of government, with the federal government providing the EGH audits, financing, and certification of renovators, and provincial/territorial governments overseeing the quality of work and promoting the program.

2. Rationale for Implementation

- Barrier(s) removed: Energy used in dwellings for space heating and cooling, heating water, and operating appliances and lights accounts for 17.8% of secondary energy use in Canada. That corresponds to 16% of the nation's carbon dioxide emissions. Technologically feasible improvements in energy efficiency can cut energy use by 30% to 50%. However, there are several barriers to the implementation of energy efficient upgrades in homes. Such barriers include higher upfront costs, market uncertainty, lack of certified, experienced renovators, and lack of consumer awareness. Financial incentives for investing in energy efficient renovations for households can help offset the relatively high upfront costs of new technologies, while at the same time increasing consumer confidence in particular products.

3. Potential GHG Emission Reduction Actions

- Overview of type of GHG emission reduction actions that might be encouraged: Depending on the results of the EnerGuide for Houses evaluation, homeowners may choose to invest in increased insulation for outer walls, new, more efficient windows, energy efficient heating and cooling

³⁶ EnerGuide for Houses provides a reliable and objective tool for assessing the energy performance of a house. The EnerGuide for Houses evaluator provides the homeowner with a report outlining the energy consumption of the house, a list of potential energy efficiency improvements, and an energy efficiency rating between 1 and 100 before and after improvements.

³⁷ There would be a threshold level of improvement that would have to be met in order to qualify for the incentive.

equipment, and energy efficient furnaces to increase their energy efficiency rating and qualify for the financial incentive.³⁸

- Scope of measure: Current homeowners in Canada.
- Relevant experience in other jurisdictions: The Public Utilities and Technology Interim Committee of the Utah legislature approved a bill that would provide a tax credit worth up to US\$2,000 for installing energy efficient systems in homes.³⁹ In September 1999, the German government introduced assistance programs for energy conservation in existing buildings. Under the policy, grants and loans amounting to 20% of investment costs are available for various investments in energy conservation. Eligible investments include insulation of roofs and external walls, window refitting, heat recovery units, and heating modernization projects. The assistance program will be in place until 2003, and has an annual budget of CDN\$146 million.

4. Quantity of GHG Emission Reductions

- The Residential Buildings Issue Table of Canada's National Climate Change Process estimated greenhouse gas emission reductions resulting from a similar measure called the National Energy Efficient Housing Renovation and Retrofit Program. The program was designed to encourage consumers to upgrade the efficiency of existing homes, and included a tax incentive (the removal of GST, PST, or HST, and/or the accelerated depreciation of costs in rental housing) for retrofitting/renovating existing homes. The program also included home energy audits and labelling, renovator training/certification, and sales force training. With the exception of the tax incentive component, the policy investigated by the Residential Buildings Issue Table is similar to the EnerGuide for Houses program currently in place in Canada. The EnerGuide for Houses program has trained energy efficiency evaluators who conduct energy efficiency audits, assign an energy efficiency rating, and recommend household energy efficiency improvements. The Residential Buildings Issue Table estimated that the incentive portion of the National Energy Efficient Housing Renovation and Retrofit Program would result in 3,144 kilotonnes of greenhouse gas emission reductions in 2010.⁴⁰

5. Estimated Economic Cost of Measure

- The measure evaluated by the Residential Buildings Issue Table resulted in homeowner energy savings of CDN\$3,010.8 million (net present value) over the life of actions taken as part of the initiative (i.e., installation of highly efficient furnaces and boilers, use of integrated space heating, reduced hot water use, use of improved appliances, lighting, and motors, etc.). The cost of the incentive portion of the measure (net present value), cumulative to 2010, was estimated at CDN\$804.9 million.
- To the extent that an incentive program will lead to increased participation in the EnerGuide for Houses program, the cost of administering the program would be incrementally more than what is required to run the EnerGuide for Houses program as it currently exists. These figures provide only a rough estimate of the costs associated with the program proposed here.

³⁸ EnerGuide for Houses does not include household appliances. These are covered in the measure for encouraging energy efficient equipment, products, and services.

³⁹ *Tax News Update*. Vol. 18, no. 13.

⁴⁰ In 2000, greenhouse gas emissions from the residential and agriculture sector combined totaled 50 megatonnes; 3,144 kilotonnes is approximately 6.2% of 50 megatonnes.

6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure

- Increased energy efficiency saves homeowners money by cutting their energy bills, and improves home comfort. Money saved through a program such as the one described here can be reinvested in the economy. Increasing demand for energy efficient equipment will spur investment and increase employment in this new and growing industry. As well, encouraging the use of energy efficient equipment in Canada will promote the sale of energy efficient products manufactured in Canada. Finally, through this program, citizens are engaged in a process that discerns the energy efficiency of their homes and are empowered to make changes that help protect the environment and reduce smog (thus improving human health).

Revenue Recycling for Renewable Energy⁴¹ Consumption

1. Description of the Revenue Recycling Measure

- Brief overview of revenue recycling measure: This measure calls for revenue recycling to increase demand for renewable energy by providing consumers with a consumer green energy consumption credit. The credit will cover a portion of the premium cost associated with the purchase of renewable energy from electricity providers and will complement the new federal production incentive for renewable energy.
- Appropriate level of government: This federal- or provincial-level initiative could be designed in two ways. One option is for consumers to apply for the credit directly by filing their original utility bill with their tax return. A second option is for distributors or retailers to apply for the credit on behalf of consumers and credit consumers' electricity bill accordingly.

2. Rationale for Implementation

- Barrier(s) removed: Because of relatively higher generation costs, as well as higher administration costs, renewable energy producers in Canada have had a difficult time entering energy markets. In addition, consumers have little opportunity to purchase green power, and where opportunities do exist, cost premiums prevent widespread participation. In Alberta, for example, green power premiums are 6¢/kWh to 10¢/kWh. By providing a consumer green energy consumption credit for renewable energy consumption in Canada, the government will help stimulate public demand for such power and send a clear signal that will encourage electricity entrepreneurs and providers to increase the supply of renewable energy.

3. Potential GHG Emission Reduction Actions

- Overview of the type of actions that might be encouraged: This policy will lead to increased demand for renewable energy. Energy sources include wind, solar, biogas, biomass, and run-of-the-river hydro.
- Scope of measure: This policy is targeted at energy consumers in Canada and thus is broadly applicable.
- Relevant experience in other jurisdictions: Numerous countries, including Denmark, Germany, the United Kingdom, the Netherlands, Japan, and Australia, as well as several U.S. states, have taken action to support the demand for renewable energy through various policy mechanisms, including fiscal incentives. Germany increased its wind power capacity from negligible production in 1990 to over 6,100 MW in 2000 as a result of the Electricity Feed Law, consumer and producer credits and rebates, preferential pricing, and other fiscal incentive measures. Denmark's installed wind capacity rose to over 2,200 MW in 2000 as a consequence of supportive programs and fiscal measures, including mandated renewable purchases, premium payments to wind project developers, shared grid connection costs, favourable tax policies for income generated from the sale of wind electricity, and reimbursement to consumers of the general carbon tax.

⁴¹ As defined by the new Environmental Choice Program – Guideline on Renewable Low-impact Electricity.

4. Quantity of GHG Emission Reductions

- The Clean Air Renewable Energy Coalition investigated the impact on greenhouse gas emissions of a consumer credit for green power combined with a producer tax credit for supplying renewable energy (including solar, wind, small run-of-the-river hydro, biogas, and biomass). The Coalition estimated that the consumer incentive, along with the producer incentive, would lead to CO₂ emission reductions of 5,000,000 to 6,300,000 tonnes from 2008 to 2012. This is equivalent to 1,245,000 to 1,600,000 tonnes of CO₂ emission reductions per year.

5. Estimated Economic Cost of Measure

- The Clean Air Renewable Energy Coalition has investigated the impact of a credit of 2¢/kwh to 3¢/kwh per year for residential homes, and a credit of 2¢/kwh per year, up to a maximum of 2% conversion to green power eligible for the credit, for commercial, industrial, farming, and municipal green power purchases. The Coalition estimated that given a 2% household participation rate (based on experience with green power programs in Alberta), the tax credit would cost CDN\$28 million in 2002 and CDN\$42 million in 2003. In the case of the commercial, industrial, farming, and municipal credit, estimated costs were CDN\$76 million in 2002 and CDN\$92 million in 2003.

6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure

- Increased demand for renewable energy means larger economies of scale for renewable energy projects. Larger economies of scale mean reduced generating costs per unit.
- The measure would increase Canadian competitiveness in the rapidly expanding international marketplace for renewable energy technologies.
- Improved consumer information and education would lead to increased awareness of the environmental attributes of electricity supply.

Revenue Recycling for Renewable Energy⁴² Production

1. Description of the Revenue Recycling Measure

- Brief overview of revenue recycling measure: This measure involves using a portion of the revenue generated from a federal-level policy for reducing greenhouse gas emissions to finance a production incentive for on-grid facilities generating zero emission power from renewable sources. This is an extension of the production incentive program recently put in place for wind power in Canada. It would improve the economics of facilities and allow more aggressive competition with hydrocarbon power sources.
- Appropriate level of government: This measure could be implemented at either the federal or provincial level of government.

2. Rationale for Implementation

- Barrier(s) removed: Existing barriers include significant capital costs, low return on projects, and lack of interest from utilities in purchasing renewable energy. A production incentive would help address these barriers and develop the Canadian industry for renewables.

3. Potential GHG Emission Reduction Actions

- Overview of the type of actions that might be encouraged: Renewable energy projects, such as run-of-the-river hydro and solar applications with on-grid applications, reduce emission by offsetting energy projects that result in greenhouse gas emissions. This improves the quality of the overall pool of electricity by increasing production from emission free sources.

4. Quantity of GHG Emission Reductions

- Depending on the location of the renewable energy facilities, the offsets are based on the power displaced through on-grid emission free energy production.
- The Clean Air Renewable Energy Coalition investigated the impact on greenhouse gas emissions of a renewable energy production incentive combined with a consumer credit for green power purchases (including solar, wind, small run-of-the-river hydro, biogas, and biomass). The Coalition estimates that the consumer incentive, along with the producer incentive, would lead to CO₂ emission reductions of 5,000,000 to 6,300,000 tonnes from 2008 to 2012. This is equivalent to 1,245,000 to 1,600,000 tonnes of CO₂ emission reductions per year.

5. Estimated Economic Cost of Measure

- The Clean Air Renewable Energy Coalition tested the effect of a producer tax credit (or production rebate) for renewable energy (including solar, wind, run-of-the-river hydro, biogas, and biomass). Based on the anticipated response to a production tax credit of 2¢/kwh of annual production, the Coalition estimated that the initiative would cost the federal government CDN\$1 million the first year the program was in place, CDN\$9 million the second year the program was in place, and CDN\$25 million the third year the program was in place. Note that the estimated cost of the production tax credit evaluated by the Coalition includes a tax credit for wind power. After the Coalition completed its analysis, a production incentive for wind energy was implemented in

⁴² As defined by the new Environmental Choice Program – Guideline on Renewable Low-impact Electricity.

Canada. Eliminating the wind power component from the incentive as evaluated by the Coalition would lower the estimated total cost of the measure.

6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure

- Since most of these applications are distributed and small production facilities by nature, they reduce the requirement for expansion or upgrading of the main transmission system to provide energy to remote communities that are currently off-grid.
- Regional economic benefits will result from the construction, operation, and maintenance of facilities.

Revenue Recycling for Biofuels

1. Description of the Revenue Recycling Measure

- Brief overview of revenue recycling measure: This measure is an extension of the excise tax exemption for ethanol fuel to all non-hydrocarbon biofuels fuels that can be produced in a sustainable manner and result in significant greenhouse gas emission reductions from a life cycle perspective. There is great potential to decrease greenhouse gas emissions by increasing the use of biofuels in, for example, the electricity generation and transportation sectors.
- Appropriate level of government: This measure could be implemented at the provincial or federal level. With respect to biofuels generated from animal waste, the measure should be accompanied by a government mandate requiring the adequate disposal of animal waste, and government-sponsored collection and centralized handling facilities.

2. Rationale for Implementation

- Barrier(s) removed: Existing barriers include significant capital cost, low return on projects, and significant logistics costs for collecting the raw material. A consumer tax credit would address these barriers and help develop the biofuel industry.

3. Potential GHG Emission Reduction Actions

- Overview of the type of actions that might be encouraged: Biofuels generated from abattoir waste and manure solve an inherent social problem in the intensive livestock industry. This measure will reduce the likelihood of groundwater pollution and the contamination of water systems. Biofuels generated from other sources can help improve the economics of farming and forestry operations. Offsetting the use of hydrocarbon-based fuels generates emission reductions.

4. Quantity of GHG Emission Reductions

- Direct GHG emission reductions will be generated because the fuel source is part of a natural carbon cycle, although it is also essential to consider the emission impacts associated with production and transmission of the fuel.
- Offsets depend on the location of the renewable energy facilities and are based on the power displaced through on-grid emission free energy production.

5. Estimated Economic Cost of Measure

- The cost would be the value of the consumer tax credit or the value of reduced revenue from fuel taxes currently in place.

6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure

- Vehicles that use some biofuels produce a cleaner burn and fewer emissions, so the measure may result in the reduction of other air pollutants as well.
- Smells/odours from regions with intensive livestock can be reduced.
- Groundwater pollution from animal waste disposal can be reduced.

- Economic development and diversity of work in regions currently focused on agriculture/forestry can be encouraged.
- Lowering methane volumes released with any lagoon storage applications and lowering any excess N₂O volumes released after land spreading can reduce greenhouse gases.

Revenue Recycling for Reducing the Costs of Energy Efficiency Equipment and Products

1. Description of the Revenue Recycling Measure

- Brief overview of revenue recycling measure: Revenue would be used to finance an energy efficiency rebate for the purchase of energy efficiency equipment and products. The rebate would be available to both individuals and companies who pay for highly energy efficient equipment and high-efficiency products.
- Appropriate level of government: This measure can be implemented at the federal or provincial level of government.

2. Rationale for Implementation

- Barrier(s) removed: Energy efficient products and equipment are often associated with high upfront costs. Thus, the cost implications of choosing such products can be significant, for both customers and for utilities purchasing large quantities of equipment or products (e.g., light bulbs) to distribute to customers. A government-financed incentive to increase the sale of energy efficient equipment and products will help reduce these high upfront costs and the payback period for investing in such products.

3. Potential GHG Emission Reduction Actions

- Overview of the type of actions that might be encouraged: GHG emissions are reduced through lower electricity demand and/or avoiding new generation plants. Products could include high-efficiency light bulbs and appliances (clothes washers, dryers, and refrigerators), water-saving devices, and more efficient air conditioning and industrial equipment that run on electricity.
- Scope of measure: A direct incentive to purchase energy efficient equipment and products would apply to individuals, companies, and electric utility or generation sectors.
- Relevant experience in other jurisdictions: British Columbia has a sales tax exemption for the purchase of energy conservation equipment. In the state of Oregon, the Oregon Business Energy Tax Credit Program has been in place since 1980. Under this program, the government provides a 35% credit (spread over a five-year period) against approved energy efficiency investments. Eligible projects must produce “substantial” energy savings, defined as 50% of the energy used to heat water, 10% of the energy used to heat a building, 10% of a commercial or industrial process or load, or 30% of a waste heat stream for heat recovery projects. Applicants must certify that projects meet the substantial savings criteria and are subject to audits by the Oregon Department of Energy. A survey of the program by the Oregon State University Survey Research Center found that approximately half of the investment projects claimed under the tax credit would not have taken place without the credit or involved more extensive conservation measures than would have taken place without the credit.

4. Quantity of GHG Emission Reductions

- Demand side management (DSM) has reduced BC Hydro’s GHG emissions by just under 10 million tonnes since 1989.⁴³ There are very few active DSM programs currently under way in

⁴³ See www.vcr-mvr.ca.

Canada, which suggests that a tax incentive might be quite helpful for facilitating energy efficiency improvements.

5. Estimated Economic Cost of Measure

- The British Columbia sales tax exemption for energy conservation equipment cost the provincial government CDN\$10 million in 1999/2000. The Oregon Business Energy Tax Credit Program is authorized for up to US\$14 million in credits per year. These figures give an indication of the cost of similar policies in place in other jurisdictions.

6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure

- Greater energy savings would result in financial savings for Canadian individuals and businesses. In addition, along with lower GHG emissions there would be reductions in other pollutants, which would reduce associated health costs.

Incentives to Invest in Development and Commercialization of Technologies

These are incentives for joint ventures to attract scarce capital to the development and commercialization of emission reduction technologies and activities (i.e., Climate Change Joint Ventures (CCJVs), similar to Labour-sponsored Venture Capital Companies (LSVCCs) or other international funds) that would enhance, but not duplicate, the initiatives described in this report.

This type of vehicle could create effective opportunities for industries, sectors, or groups of companies to disperse the risk associated with these activities and reduce the cost for each entity, particularly smaller companies, in developing the expertise required to manage and effectively reduce emissions. In addition, like some of the new funds associated with the Federation of Canadian Municipalities, these can be concentrated vehicles that can provide accountability and measurable emission reductions from eligible activities. There is the opportunity for a great deal of flexibility in designing the eligibility criteria for the CCJV, depending on government policy choices, and criteria can be modified as new policies or developments arise.

Revenue Recycling for Climate Change Joint Ventures (CCJVs)

1. Description of the Revenue Recycling Measure

- Brief overview of revenue recycling measure: The basic model is a joint venture among several corporations, or industries or sectors. It could be in the form of a venture capital corporation. Under this measure, a company may make an investment in a registered CCJV, which must invest the funds in a specified eligible GHG mitigation technology or activity. This model will not duplicate or compete with the efforts of any government (federal or provincial) in this area, but it provides a vehicle for companies within an industry to coordinate their efforts with accountability and measurable results, creating the potential for GHG mitigation centres of excellence and broader-based participations. The investment cost would be treated as a deductible cost with a time-limited incentive payment or tax credit, due to the uncertainty of the ultimate recognition of emission reductions. Like reclamation costs or contributions to reclamation trusts, it would be appropriate to provide for 100% tax deductibility for contributions to a government-approved, registered CCJV, at least for the medium term to provide certainty of treatment and encourage expenditure on a broader scale. Any receipts of the CCJV, other than the participant's contributions, should be taxable to the participants as well.

2. Rationale for Implementation

- Barrier(s) removed: The joint venture fund will be used to invest in GHG mitigation and reduction activities, enhancing firm-specific reduction activities through joint participation in higher-risk technology deployment or commercialization of initiatives that could advance industry-wide emission reduction opportunities. Initial percentage incentive payments or investment tax credits would encourage emission reduction actions now, despite the uncertainty of the value of such reductions until domestic and international policies and market mechanisms are announced and implemented. This is particularly important because of the risks and timeframe required to effectively deploy technologies. The CCJV concept takes the favourable fiscal measures for research and development within Canada to the next step in order to encourage the commercialization of developments within Canada that reduce GHG emissions. The CCJV model addresses gaps in GHG knowledge, expertise, commercialization, and deployment for certain Canadian technologies, and reduces the risks surrounding international and domestic policies concerning early GHG reduction efforts.

3. Potential GHG Emission Reduction Actions

- Overview of the type of GHG emission reduction actions that might be encouraged: This model and concept is not finite. An estimation of potential emission reductions is open-ended and constrained only by investment criteria, capital available, and risk level. Eligible CCJV investments can include commercialization of GHG mitigation technologies or activities, except investments otherwise qualifying for investment tax credits (ITC)s or other government-sponsored initiatives. The government may wish to invest directly in certain initiatives and permit them to be part of eligible CCJV investments – it is up to the government and the gap/risks/priorities for GHG mitigation options. It would not be necessary to become too prescriptive in the legislation, since government approval or registration would require the CCJV to submit a plan and detail activities to mitigate GHG emissions. Furthermore, the measurement and verification of emission reductions would be subject to standards and fully transparent, with an annual reporting requirement, subject to audit.

- Scope of measure: This concept is neither firm nor sector specific. It is generic enough to be adopted at the federal and/or provincial level, by industry groups or associations.
- Relevant experience in other jurisdictions: Precedents have been set by similar activities – for example, labour funds in Canada. Also, this concept models the private sector fund administered by the Federation of Canadian Municipalities on behalf of the federal government. Additionally, there are several international funds of a similar nature that fall into three broad categories:
 1. Pure Carbon Funds: Prototype Carbon Fund (PCF)
 2. Private Equity Funds with “credits” to enhance IRR: Renewable Energy and Energy Efficiency Fund (REEF)
 3. Planned Private Equity Forestry Funds and Companies: Sustainable Asset Management Fund (SAM), the Dutch national afforestation program

4. Quantity of GHG Emission Reductions

- This model can be used in a “Kyoto” or carbon-constrained world. An estimation of potential emission reductions is open-ended and only constrained by investment criteria, capital available, and risk.

5. Estimated Economic Cost of Measure

- A total or annual cap for contributions to each CCJV or an aggregate national or provincial total amount for registered CCJVs could be established that closes entry or does not permit new CCJVs once it is reached. Alternatively, deductible contributions to registered CCJVs can be limited to investments made within certain time limits, which may be extended with different investment eligibility. A combination or permutation of the foregoing is also possible.

6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure

- This CCJV concept can operate effectively regardless of Kyoto Protocol ratification, and provide a net benefit irrespective of domestic emissions trading and climate change policy.
- Participants in the CCJV will be able to spread the transaction costs, diversify risk, and reduce general and administrative costs associated with building the expertise and systems to manage GHG emissions.
- Such a structure may encourage “small-cap” company involvement in response to shareholder concerns or to access international activities, lending strength to the “universality” of the CCJV concept.
- The CCJV can seed the creation of Canadian centres of excellence for expertise, mitigation management, and real GHG emission reductions.
- The CCJV may create a “local” vehicle that will encourage multinational corporations to look to Canada for international offset opportunities at least cost.
- This model may also increase the competitiveness of Canadian industry and fits nicely with Industry Canada’s innovation activities.

Incentives for Reducing the Ecological Footprint of Resource Industry Activities

The following measure is designed to provide incentives for the behavioural change required to reduce the footprint of activities related to logging, oil and gas, and mining in Canada's forests, and thus increase sequestration. These activities are mainly on Crown land, and are normally contracted to operators. These two factors combine to create little incentive, at present, for increasing sequestration through a reduced footprint.

Applications include:

- Reducing the width of seismic lines
- Reforestation of abandoned logging roads
- Reforestation of abandoned mining roads

Revenue Recycling for Limiting Ecological Impacts on Canadian Forests

1. Description of the Revenue Recycling Measure

- Brief overview of revenue recycling measure: A footprint has been made on Canadian forests through activities related to logging, oil and gas, and mining. Current legislation/regulation does not always require that the forest be returned to its natural state, and most assuredly past legislation/regulation did not. Past impacts could be countermanded by providing an incentive for the reforestation of areas previously cleared through activities related to logging, oil and gas, and mining⁴⁴.
- Appropriate level of government: This revenue recycling can be implemented at both the provincial and federal levels of government.

2. Rationale for Implementation

- Barrier(s) Removed: Much current legislation/regulation requires that affected areas be reclaimed through the planting of grasses and legumes (e.g., clover), which sequester considerably lower volumes of greenhouse gases than do trees and shrubs. There is currently little or no motivation for industry to do more than is required by legislation.

3. Potential GHG Emission Reduction Actions

- Overview of the type of GHG emission reduction actions that might be encouraged: Reforestation of areas previously cleared (as well as a reduction in the width of seismic lines) could be encouraged by government at both the federal and provincial levels through the implementation of Investment Tax Credits (ITCs) or through accelerated capital cost allowance (CCA), both of which are currently enacted in Canada.
- Scope of measure: This measure would be an incentive for any resource industry to reforest areas previously cleared due to activities associated with logging, oil and gas, and mining. As CO₂ credits become legislated/regulated, this measure, too, can be incorporated to encourage industry to be more ecologically responsible. Results would be quite easy to verify with GIS mapping, currently available throughout the country.
- Relevant experience in other jurisdictions: We are not aware of any legislation/regulation in the world that encourages this type of behaviour.

4. Quantity of GHG Emission Reductions

- Forests are a significant component of the Canadian landscape. Ballpark estimates indicate that reclaiming the forest to its natural state could significantly reduce greenhouse gas (GHG) emissions in Canada. The following chart shows the sequestration abilities of various plant species:

Hybrid Poplars	20–25 Tonnes CO ₂ Equivalent/Hectare/Year
Native Poplars	5–10 Tonnes CO ₂ Equivalent/Hectare/Year

⁴⁴ The Climate Change Plan for Canada refers to the forestry, agriculture and possibly landfill sectors being able to sell greenhouse gas emission offsets into a domestic emissions trading scheme. Should such a proposal be realized, the initiative described here should be modified to avoid redundancy with the national policy.

Native Coniferous	1–3 Tonnes CO ₂ Equivalent/Hectare/Year
Legume – Clover	1–3 Tonnes CO ₂ Equivalent/Hectare/Year
Grass	1–2 Tonnes CO ₂ Equivalent/Hectare/Year

5. Estimated Economic Cost of Measure

- There would be very little economic cost to administering this measure. As indicated above, the tax infrastructure that could be used to implement this measure currently exists. As well, the satellite technology data that is currently available is very auditable and could be used to ensure compliance. We do not have an estimate of the cost of the actual incentive.

6. Other Potential Economic Benefits Associated with the Revenue Recycling Measure

- Reducing the imprint on the land creates better habitat for animals (caribou, moose, deer, birds, etc.). Implementing this revenue recycling measure will create additional opportunities for hunting, fishing, recreational sports, and nature observation.