

From Crisis to Opportunity:
Climate Change,
Ecological Sustainability & Economic Security

David Suzuki Foundation

Finding solutions

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If we do nothing now, we could find that we have to take much more urgent and damaging action at some point in the future.

Sir John Browne, CEO of British Petroleum

Overview

Climate change threatens the long-term social security and economic well-being of Canada and Canadians. This global crisis, however, affords Canada the opportunity to transform energy use and production – ultimately, modernizing our economy with net commercial gains.

Efficient energy consumption combined with a growing reliance on the sustainable use of renewable resources can increase productivity, create high-tech jobs, and foster a knowledge-based economy. In pursuing a sustainable energy strategy, the multiple threats of climate change are reduced and our overall economy can be strengthened. There are also many co-benefits: less air pollution and acid rain, improved public health, the reduced consumption of precious water resources, and enhanced liveability in Canadian communities.

This transition is already underway in many of the most successful economies of the world: Germany, Japan, the Netherlands, and parts of Scandinavia. Even the U.S. and Great Britain are moving more rapidly than Canada. These countries are recognizing – to varying degrees – that both the costs of climate change and air pollution are too great, and the opportunities are too enormous to merely maintain the status quo.

A new approach for shaping our economy and society is needed for the 21st Century. Fundamentally, this is about protecting our interests today and our children's and grandchildren's opportunities tomorrow.

For the Government of Canada, this reorientation should be reflected in the millennium budget through a combination of measures: strengthening existing programs, establishing new ones, as well as shifting taxes to encourage clean, energy efficient practises and industries and discourage pollution and the waste of resources.

The Science of Climate Change

Carbon dioxide, and other greenhouse gases, help to keep the Earth's near surface environment at an average temperature of 15 degrees Celsius. Without these gases, the average temperature would be approximately -6 degrees. Prior to the widespread use of fossil fuels such as coal, oil and natural gas, the level of atmospheric carbon dioxide was 280 parts per million. Since the onset of the industrial age, around 1750, over 240 billion tonnes of carbon have been added to

the atmosphere. Current fossil fuel consumption is resulting in an additional 6.5 billion tonnes of carbon being added to the atmosphere every year.¹ As a result, the average level of carbon dioxide in the atmosphere has increased to 365 parts per million. Recent scientific analyses of ice cores from Antarctica have produced a history of atmospheric carbon dioxide levels covering 420,000 years. This analysis revealed that current levels of carbon dioxide are 22 percent higher than the highest reading for the entire period.²

The United Nations Framework Convention on Climate Change (UNFCCC), which was ratified by over 170 countries including Canada, states that its objective is:

“stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”

The Intergovernmental Panel on Climate Change (IPCC), an august body consisting of over 1,500 scientific experts who provide the scientific basis for decisions arising out of the UNFCCC, concluded that the:

“balance of evidence, from changes in global mean surface air temperature and from changes in geographical, seasonal and vertical patterns of atmospheric temperature, suggest a discernible human influence on global climate.”³

Scientists have agreed that in order to stabilize atmospheric carbon dioxide levels at a target concentration of 450 parts per million, an unprecedented level previously unseen in climate records, emissions of carbon into the atmosphere would have to be reduced by 50 percent. With these carbon dioxide concentrations it is predicted that the average temperature would increase by .7 to 1.4 degrees. Over the past 100 years, global temperature has increased by 0.6 degrees and global sea level has risen by between 10 and 25 centimetres. It must be emphasized that even the 50 percent reduction scenario offers no guarantee of climate stability, as greenhouse gas concentrations would still remain double pre-industrial levels.

Canada & Climate Change

Canadians' economic and social well being is intimately tied to our climate and weather systems which make up our environment. Weather dependent economic activity and sectors include, among others: hydro-electric power production, utilities, fisheries, agriculture, tourism, the construction industry and forestry. These industries annually account for \$130 billion worth of Canada's GDP.⁴ Although many economic analysts are aware of the contributions of these industries to our economy, many are unaware of the increasing risks to these sectors brought on by climate change resulting from increases in atmospheric greenhouse gases.

While weather systems and climate changes themselves may be hard to predict, long term strategic planning and investment decisions regarding these industries are constantly being made in response to government fiscal policy and budget measures arising out of that policy. By designing fiscal and budgetary policy that encourage reductions in energy consumption and

promote renewable energy, we can pursue a sustainable energy strategy which diversifies our economy and minimizes the economic risks of climate change. Such a strategy safeguards current and future generations.

Sustainable Energy & Economic & Social Security

In pursuing a sustainable energy strategy, the many threats of climate change are reduced and our economy is strengthened. For example, on average four times as many jobs are created from investments in energy efficiency as opposed to new energy supply and twice as many jobs are created from investments in renewable energy technologies compared to similar investments in conventional energy.⁵ There are also many co-benefits: for every tonne of carbon dioxide reduced from automobile use there is an additional reduction of 9 kilograms of NO_x and 0.5 kilograms of SO₂.⁶ Recent studies by Health Canada show that up to 16,000 Canadians die prematurely every year as a result of air pollution.⁷ Therefore a sustainable energy strategy results in less air pollution and acid rain and improved health and life expectancy for Canadians.

We are proposing that the government adopt a series of measures in five key areas as a first step towards implementing a sustainable energy strategy:

1. Federal Leadership in Sustainable Energy Development
2. Federal Sustainable Transportation Initiatives
3. Tax Shifts & Economic Incentives
4. Energy Efficiency Programs
5. Renewable Energy Initiatives

1. Federal Leadership on Sustainable Energy Development

By providing leadership through managing their own operations sustainably and through direct support for energy efficiency and renewables, the federal government can help develop infant Canadian industries, create meaningful, long term, high-tech jobs, increase productivity, and foster a knowledge-based economy.

1.1 Green Energy Procurement for Federal Operations

A federal green energy procurement program would see the federal government commit to purchasing 20% of its electricity by the year 2005 from low-impact renewable energy sources such as wind, solar and micro-hydro.⁸ The \$18 million annually required for such programs would cover the incremental costs incurred by substituting low-impact renewables for power currently obtained from existing conventional energy sources.

The green energy procurement program alone could reduce emissions by as much as 450,000 tonnes of carbon dioxide, if the displaced electricity was generated by coal fired power plants, and avoid the environmental impacts of other conventional energy sources. The increased expenditure to buy green energy would be offset by the already successful efforts under the Federal Buildings Initiative to improve energy efficiency. If 2/3 of green power purchased in this program was provided by wind energy, this would double wind energy capacity and start to place Canada closer to many OECD countries – still, however, far behind countries like Germany, Denmark, Spain and India.

1.2 Energy Efficiency Upgrades in Federal Buildings

Expanding energy efficiency investments in all federal buildings makes economic and environmental sense and should be part of this broader initiative. These actions have already reduced federal energy costs by \$22 million annually and are forecast to save \$160 million per year. New expanded efficiency projects could demonstrate leadership in on-site renewables, micro natural gas cogeneration and stationary fuel cells. Again, direct job creation in all regions will result.

2. Sustainable Transportation Initiatives

There is overwhelming agreement among the majority of urbanized industrial countries that alternatives to automobile transportation need national government incentives and that a national presence in this critical sector is pivotal to address climate change and air pollution – approximately 30% of Canada's carbon dioxide emissions come from transportation.

The federal government generates about \$3.8 billion from fuel taxes, while expenditures on transportation are less than \$400 million. Canada is the only OECD country that provides no federal support for public transit. There has been some discussion federally about investing \$3.5

billion in funding for a major highways program. This could further exacerbate human health problems, climate change and the decline in urban quality of life linked to our unsustainable automobile and freight systems.

Given the size of this proposed expenditure and the potential impact, a comprehensive sustainable transportation strategy should be developed with the goal of reducing all fossil fuel emissions. There are a number of key measures that should be part of this strategy.

2.1 Community Transportation Improvements

A community transportation improvement fund should be established by dedicating 25 percent (\$1.5 billion) of annual federal fuel tax revenue, to be matched by provincial governments, and collectively managed along with municipal and regional governments. The U.S. Transportation Equity Act for the 21st Century is based on this theory as well as broader pollution abatement strategies. The Canadian fund would be aimed at upgrading and expanding transit infrastructure. A portion of the fund should be allocated on a cost-shared basis for alternative transportation infrastructure such as intra-urban bicycle routes, commuter ride matching services, as well as encouraging the expansion of high-occupancy vehicle lanes for buses and car pools.

2.1 Automobile Efficiency Incentives

A federal automobile efficiency program should be designed to strengthen the market for fuel efficient vehicles and begin to internalize more of the costs of energy waste, thereby sending a message to Canadians about the importance of energy conservation. This revenue-neutral feebate program would provide rebates to Canadians for purchases of new vehicles with high fuel efficiency, most notably hybrids, and would be funded from fees levied on vehicles with poor fuel efficiency.

3. Tax Shifts & Economic Incentives

To reduce pollution and the wasteful use of resources while encouraging efficiency and clean industry, many industrialized countries are reflecting on some very basic economic principles: taxes will restrain certain facets of an economy while tax relief encourages the growth of others. Tax shifts can also correct market shortcomings. Despite the heavy cost to the public and long-term economic potential, pollution is not included in the price of goods. It is an external cost.

Following the lead of various European countries, Canada should apply an atmospheric user fee to the price of fossil fuels used directly by consumers or on inputs to the goods that they purchase. A commensurate reduction in taxes on other dimensions of the economy – sales taxes, income taxes, payroll taxes, or various clean, high-tech industries – would encourage employment, job creation, growth of a certain sector of the economy and/or increase personal incomes. The capital-intensive nature of the fossil fuel industry means the economic benefits would more than offset any economic costs.

There are, nevertheless, a variety of other mechanisms to internalize the costs of greenhouse gas emissions. Polluters, for example, could be required to purchase greenhouse gas, emission quotas equivalent to the amount of greenhouse gases that their sector would be allowed to emit under Canada's Kyoto commitment. This would force some of the cost of these emissions into the cost of production. Regulations could also be used to require producers to reduce emissions by changing their means of production.

All these mechanisms would result in a change in the cost of goods which may or may not lead to an increase in the price and the resultant price signal.

3.1 Carbon Emission Fee

A carbon fee, which is clearly revenue neutral, would be a very effective tool for reducing carbon dioxide emissions. It would send Canadians a message that Canada is serious about fighting climate change. A July 1999 poll by Environics shows that 77 per cent of Canadians support carbon charges as a means of tackling climate change.

The federal budget should commit to a biennial increase in fossil fuel taxes equivalent to a 2-cent/litre federal excise tax increase on gasoline and diesel, as well as a new equivalent tax on heating oil in each of the years 2000, 2002, 2004, 2006 and 2008. This would equate to a charge of \$30 per tonne of carbon increasing to \$150 by 2008. There should also be a corresponding biennial increase of 40 cents per gigajoule for natural gas and propane. This tax increase would be balanced by an equivalent decrease in other areas of taxation (e.g., payroll taxes, income taxes), and would be revenue neutral to government. At 1995 consumption levels a 2 cent increase in the federal excise tax on gasoline and diesel fuels would raise \$963 million in revenue, while a 40 cent per gigajoule charge on natural gas would bring in \$434 million in revenue and a charge on heating fuel would result in \$142 million. Over the eight-year period the total annual revenue would increase to \$7.5 billion if consumption remained at 1995 levels.

The federal government has not increased its excise taxes on diesel fuel (currently 4 cents a litre) since 1987. Federal excise taxes on gasoline (currently 10 cents a litre) have increased only once since 1990. Apart from the Goods and Services Tax, there are no fees collected on natural gas and heating oil. This stands in stark contrast to the position taken by a number of other major industrialized countries in the wake of international agreements to protect the global climate. For example:

In Norway, taxation is being used to limit carbon dioxide emissions from transportation, space heating and offshore oil extraction. As a result, the Norwegian government estimates that greenhouse gas emissions from these sources are 3-4 percent lower than they would otherwise have been.⁹ For example, between 1990 and 1995 the consumption of gasoline in the transportation sector alone fell by more than 8%.¹⁰

In Sweden, a carbon tax of approximately \$200 per tonne is generating \$1.6 billion per year in new revenue. The tax is applied to oil, coal, petroleum, natural gas, diesel and domestic aviation fuel and includes special rules for energy intensive industries, aviation and shipping. Revenues

are used to reduce personal income taxes and to increase environmental protection.¹¹ In 1993 carbon taxes accounted for approximately 2.5% of total government revenue.

In the Netherlands, an energy regulatory tax for small consumers and businesses has been implemented as a means of reducing carbon dioxide emissions. The tax applies to natural gas, electricity and home heating oil, with a tax-exempt portion for electricity (800 kWh) and gas (800 cubic metres) in order to reduce the financial impacts on low income groups. There is also an environmental tax on transportation fuels, uranium used in power generation and fuel oil used in industry. Revenues collected from the regulatory tax are recycled back to households through a decrease in the tax rate, a raise in the tax-free allowance and a raise in the standard deduction for seniors. Businesses receive a 0.19 percent decrease in their contributions to social security and a 3 percent reduction in their taxation rate.¹²

In Italy, as part of a plan to reduce greenhouse gas emissions, the government has begun to raise excise taxes on gasoline, diesel, coal and mineral oils every year for the next five years. The revenue will be used to fight unemployment in southern Italy and to fund environmental programs.¹³ Over half of the revenues - 1.13 billion Euros (over \$700 million) will be used to reduce employment charges. The remainder of the revenues will contribute to: financing welfare costs incurred by employers that hire workers in Italy's comparatively poor south; offsetting increases in diesel and heating oil prices for transport professionals and residents of remote mountain areas; and funding emission reduction programs. By the end of the five-year phase-in period, taxes on gasoline will increase by 7%, diesel by 12%, coal by 42%, and natural gas by 2%. The tax rate on heating oil will increase by 52% for residential users and 61% for industry.¹⁴

The German government recently passed an ecological tax reform bill, which will increase taxes on electricity, gasoline, fuel oil, and natural gas and provide revenues, which will be used to reduce social security taxes. As a result, taxes on gasoline increased by 4.5 cents per litre, on fuel oil by 3 cents, and on electricity by 1.5 cents/kWh. As part of the ecological tax reform law over the next four years, Germany will raise taxes on gas and electricity annually.¹⁵

3.2 Reduce Incentives for Fossil Fuel Exploration

Fossil fuel pollution incentives should be removed by eliminating subsidies and preferential tax treatment for exploration, development, production and distribution. The oil and gas industry currently enjoys the lowest effective rate of taxation on marginal investment: 5.5 per cent (compared to 37 per cent for the construction industry and 27.6 percent for the service industries).¹⁶ The mining industry, which includes coal, enjoys a marginal tax rate of 8.7 percent. In addition, there are considerable advantages for investors in fossil fuel exploration. With these incentives, capital investment shifts towards these environmentally damaging activities that generate few jobs per dollar of revenue invested. In order to rectify this bias, these incentives should be removed.

Because the government currently loses revenue by allowing shareholders in exploration companies to write off losses from this sector against revenues they may receive from other sectors, the net result of this measure would be a decrease in oil and gas exploration activity and

an increase in taxable revenue from gains in other sectors. Since the removal of the shareholder flow-through loss provisions increases the risk to investors, there would be a movement of capital into other areas of the Canadian economy. With properly designed new incentives, this capital can be mobilized in a manner which contributes to reducing greenhouse gas emissions.

4. Energy Efficiency Programs

Energy efficiency can increase industrial productivity and create jobs. Investments in energy efficiency create more jobs per dollar of investment than alternatives: 4 times higher than new energy supply.¹⁷ If just 25 per cent of Canadians' total annual energy expenditure were put back into consumers' pockets through energy efficiency and conservation, the re-spending effect would create 660,000 person years of employment.¹⁸

From a federal government perspective, the injection of public dollars to support energy efficiency are very small in relation to the amount of private spending which can be leveraged.

4.1 Residential & Small Business Retrofits

A residential/small business retrofit program should be designed as a multi-part program to provide tax credits and/or incentives for investments in home and small-business, energy-efficiency retrofits based on effectiveness criteria. The program would include a revolving fund for small and medium businesses, including commercial buildings, to invest in cost-effective energy efficiency retrofits. The fund would partner with other funding sources to provide low interest loans to businesses seeking to either design or implement an energy efficiency retrofit program. In addition to establishing the revolving fund for business, the federal government should buy down the interest rate for energy-saving retrofits in the residential sector. This would allow utilities and financial institutions to offer low interest loans to residential customers. Both the Toronto Atmosphere Fund and the Better Buildings Partnership have been very successful in reducing emissions and creating jobs. We estimate that the fund should be established with an initial sum of \$300 million.

4.2 District Energy Programs

District energy systems use one central energy source and a system of pipes to provide heating and cooling needs to a large number of buildings. These systems are much more energy efficient than conventional systems in which individual units are used to provide heating and cooling needs in each building. They distribute recovered thermal energy to buildings in the form of cold and hot water as well as steam. They also provide a highly efficient means of providing space heating, air conditioning, hot water or industrial process energy.

Major district energy systems currently operate in six Canadian municipalities. About 60 smaller district energy systems are owned and operated by the Department of National Defence. An additional 60 systems are in use in hospitals and universities. Even so, the use of district energy systems in Canada is minimal when compared to other countries with climate

similar to Canada. In Denmark, Sweden, and Finland, for example, district heating meets the needs of between 30% and 45% of the heating market, and up to 80% in major urban areas. The United States has approximately 5,800 district energy systems, mainly serving downtown areas, universities, military bases, hospital complexes and other groups of buildings.¹⁹

A district energy incentive should be created by expanding the existing accelerated capital cost allowance treatment in Section 43.1 of the Income Tax Act, which includes energy conservation initiatives and renewable energy projects. The tax treatment should be extended to district energy systems, in order to encourage investments in these systems. CCA Class 43.1 provides a 30% depreciation, and a declining balance which can be applied against, energy, mining, or manufacturing income. Additional funding should be allocated in the federal budget to allow special project cost sharing with provincial and municipal governments or the private sector, on select large district energy projects.

5. Renewable Energy Initiatives

Low-impact renewable energy is the fastest growing form of energy in the world. Canada's key trading partners and several of the world's largest multinationals are investing hundreds of millions of dollars to take advantage of the emerging new global energy market. Canada's current course would miss this opportunity and oblige us to import solutions at a much higher price in the future.

With new incentives, and by shifting support from conventional sources of energy to renewable energy, Canada can begin to invest in an ecologically sustainable 21st Century economy.

5.1 Renewable Energy Production Credits

A renewable energy production credit should be implemented which rewards low-impact renewable electricity generators in proportion to their output. It could be delivered as a tax credit or outside the tax system as a rebate, depending on the extent of the producers' taxability. Similar incentives have been successfully implemented in other countries. For example, in 1992 the U.S. implemented a 10-year 1.5 cent/kWh production tax credit implemented in 1992 to encourage wind energy development. This measure is administratively simple, effective and could be shared by provincial and federal governments. The federal government would have to contribute \$60 million per year to this program.

5.2 Agricultural Renewable Energy Generation

A consumer credit for agricultural renewable energy generation would help empower farmers to participate in solutions to climate change. It would take the form of a rebate or credit to agricultural energy consumers for their on-site renewable generation and cost approximately \$11 million per year for 10 years. This measure would involve co-operation with provincial governments and be combined with other incentives for on-site renewable energy technologies such as provincial net-metering policies.

5.3 Incentives for Space & Water Heating Renewables

Accelerated financing for space and water heating renewables would help Canadian consumers reduce the burden of capitalization when they choose to purchase a renewable technology for space or water heating purposes. The federal government would guarantee fixed financing rates for purchases of specified small-scale solar hot water and ground-source heat pump systems. The cost to government would be \$16 million per year for 10 years.

5.4 Biofuel Incentives Program

A biofuel incentive program would help Canadian ethanol and other biofuel industries mature. Despite being a world leader in the production of forest and agricultural fibre, Canada is not even among the world's top ten biofuel producers. To complement existing support, the federal government should commit funds for additional research, development and commercialization of transportation biofuel production technologies, including loan guarantees for the construction of biofuel production facilities that meet appropriate life-cycle environmental criteria. A federal mandate that all gasoline for transportation contained 5 per cent biofuel would further strengthen the market for biofuel. Brazil, which has created a favourable public policy environment for alcohol-based fuels, has displaced half of its transportation gasoline consumption and reduced national carbon emissions by 20%.

Conclusion

Climate change threatens the long-term social security and economic well-being of Canada and Canadians. This crisis, however, affords Canada with an opportunity to adopt a sustainable energy strategy as a cornerstone of our economy for the next millennium. Such a strategy takes advantage of already-available technologies to improve energy efficiency and move towards the sustainable use of renewable energy. This shift can increase productivity, create high-tech jobs, and foster a knowledge-based economy.

Not only does a sustainable energy strategy reduce the multiple threats of climate change, there are also many co-benefits: less air pollution and acid rain, improved public health, the conservation of precious water resources, and enhanced liveability in Canadian communities.

This transition is already underway in many of the most successful economies of the world. If Canada fails to make this transition, we risk forfeiting domestic and international market opportunities for these new technologies, and the likelihood that we become a market for these high-tech industries thriving in other parts of the world.

Government of Canada leadership is essential to maintain our international commitments and set an example for all dimensions of Canadian life: individual Canadians, the private sector and other levels of government. All of Canada has an important role to reducing the threat on climate change.

The David Suzuki Foundation is urging that the House of Commons Standing Committee on Finance recommend to the Government of Canada the following list of measures as a first step towards implementing a sustainable energy strategy:

- 1. Federal Leadership in Sustainable Energy Development**
 - 1.1 Green Energy Procurement for Federal Operations**
 - 1.2 Energy Efficiency Upgrades for Federal Buildings**

- 2. Federal Sustainable Transportation Initiatives**
 - 2.1 Community Transportation Improvement Fund**
 - 2.2 Automobile Efficiency Program**

- 3. Tax Shifts & Economic Incentives**
 - 3.1 Carbon Dioxide Emissions Fee**
 - 3.2 Reduced Incentives for Fossil Fuel Exploration**

- 4. Energy Efficiency Programs**
 - 4.1 Residential and Small Business Retrofit Program**
 - 4.2 District Energy Program**

- 5. Renewable Energy Initiatives**
 - 5.1 Renewable Energy Production Credits**
 - 5.2 Agricultural Renewable Energy Program**
 - 5.3 Incentives for Space and Water Heating from Renewable Energy**
 - 5.4 Biofuel Incentives Program**

 Endnotes

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- ⁶ Senes Consulting, Background Report on the Effects of Weather, Climate Variability and Climate Change on Air Issues, Great Lakes Basin - Toronto - Niagara Region, May, 1998, p. 5-15
- ⁷ Canada's Response to U.S. EPA Proposal on Transboundary Air Pollution, Government of Canada, March 16, 1998
- ⁸ Wind and solar have experienced 20% and 16% market growth internationally throughout the 90's, and there is growing domestic and international demand. Growth in wind energy over the last 30 years, for example, has allowed innovations enabling wind power prices to drop from 38 cents per kWh (U.S.) to between 3.5 and 5 cents per kWh (coal currently costs 3.5 cents per kWh).
- ⁹ Hanisch, Carola, Taking Stock of Green Tax Reform Initiatives, Environmental Science and Technology, Vol. 32, Issue 23, Dec. 1, 1998, pp.540A-544A
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- ¹¹ Olivecrona, Christina, The Carbon Dioxide Taxes in Scandinavia, Green Budget Reform, R. Gale, S. Barg and A. Gilles, eds; IISD, 1995 pp. 173-184
- ¹² Baron, Richard, Policies and Measures for Common Action, International Energy Agency, July, 1996 p30.
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- ¹⁴ Tax News Update, Center for a Sustainable Economy, Vol. 9 No. 2, January 29, 1999
- ¹⁵ *ibid.*, Vol. 11, No. 2, July 12, 1999
- ¹⁶ Report of the Technical Committee on Business Taxation, Department of Finance, Ottawa, Ontario, December, 1997 Table 3.10
- ¹⁷ Campbell *et al.*, *op.cit.*
- ¹⁸ Canadians currently spend about \$75 billion annually on energy in order to heat homes and offices, and operate cars, factories and appliances. This represents 10 percent of Canadian Gross Domestic Product (GDP). If 25 percent of this expenditure (\$18.75 billion) were put back into Canadians' pockets through energy efficiency and conservation, the re-spending effect would create 660,000 person years of employment. This is based on a job creation multiplier of 35 person years per \$1,000,000 invested in energy efficiency (see footnote 5). Improvements in energy efficiency in Canada between 1990 and 1996 resulted in a reduction of \$4 billion per year in energy costs for Canadian consumers
- ¹⁹ Hornung, Robert, *et al.*, Canadian Solutions, David Suzuki Foundation, Pembina Institute, October, 1998, p. 70