Alberta Solutions

Practical and Effective Alberta Actions to Address Climate Change

Prepared by the
Pembina Institute
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About the Pembina Institute

The Pembina Institute is an independent, citizen-based organization involved in environmental education, research, public policy development and corporate environmental management services. Its mandate is to research, develop, and promote policies and programs that lead to environmental protection, resource conservation, and environmentally sound and sustainable resource management. Incorporated in 1985, the Institute's main office is based in Drayton Valley, Alberta with another office in Ottawa, and research associates in Edmonton, Calgary, and other locations across Canada.

The main focus of the Institute's work is energy/environment and economy/environment issues and solutions. A dedicated Climate Change Program has been established to address the long-term policy and education needs associated with this unique issue. Activities include the creation of educational materials on climate change, the design and review of municipal and corporate greenhouse gas emission reduction strategies, and the development of appropriate public policy tools for addressing the issue. The Institute advocates a balanced approach to greenhouse gas emissions reductions that relies on a mix of voluntary initiatives, regulations and economic instruments.

This report was prepared to assist participants in Alberta's Climate Change Round Table in their deliberations. Copies of this report can be downloaded from the Institute's website at: **www.pembina.org.** For more information on the Pembina Institute's Climate Change Program, please contact:

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Contents

A. Introduction

Alberta produced 160 million tonnes of greenhouse gas (GHG) emissions in 1990, 28% of the Canadian total. Between 1990 and 1995, GHG emissions in Alberta grew by 18%, reaching 189 million tonnes. Clearly, Alberta has a significant impact on Canada's total GHG emissions profile. According to Natural Resources Canada, Canada's GHG emissions are projected to be 19% above 1990 levels in the year 2010. A recent "events-based" update to that projection concluded that new developments in Alberta's oil sands alone could increase emissions by another 27 million tonnes, leaving Canada's projected 2010 emissions 23% above 1990 levels.

Alberta must play a proactive leadership role in the development and implementation of actions to reduce GHG emissions in Canada. Prior to October 1998, however, political direction on the issue was dominated by general denial of the legitimacy of the danger of climate change, as well as unrealistic fear-mongering about an economic Armageddon associated with action to reduce greenhouse gas emissions. Instead of proactively implementing significant actions to reduce GHG emissions, the Alberta Government has (often in concert with the federal government) substituted a series of consultative processes, strategic frameworks and analytical exercises around the climate change issue. For example:

- A Discussion Paper on the Potential for Reducing CO2 Emissions in Alberta: 1988-2005 (1990)
- National Action Strategy on Global Warming (1990)
- National Climate Change Task Group Consultations (1993-1994)
- The Alberta Climate Change Action Plan (1994)
- National Action Program on Climate Change (1995)
- National Climate Change Consultation Process (1998-1999)
- Alberta's Strategy for Action on Climate Change (1998)

Meanwhile it has been business-as-usual for carbon pollution, and provincial emissions grew even faster than the economy in the 1990-1995 period. Governments have placed all their eggs in the "voluntary action" basket, and the only prominent new initiative that has been launched in Canada in the last five years to address climate change is the National Climate Change Voluntary Challenge and Registry Program (VCR). A small number of Alberta companies have taken the climate change issue seriously by initiating incremental action to reduce or offset their emissions. It is clear, however, that most of Alberta's VCR participants have not yet taken any significant new actions to reduce GHG emissions as a result of the program. In fact, several Alberta companies, most notably Imperial Oil and Fording Coal, have been at the forefront of national efforts to lobby the public and the politicians to prevent any Canadian action on climate change.

To its credit, the Alberta Government has actively participated in the VCR, developing and implementing one of the most effective government action plans to reduce GHG emissions from its own facilities (although it must be noted that these facilities accounted for only 0.3% of Alberta's total GHG emissions in 1990). Serious efforts to encourage and facilitate broad greenhouse gas emission reductions across the Alberta economy, however, have been completely absent from a broader provincial action plan.

In October 1998, the Government released a revised strategy and position on the issue that acknowledged the serious risks from climate change, and the importance of taking action to reduce GHG emissions. It committed the government to science and technology research, encouraging voluntary action in energy efficiency, more economic analysis, communications of best practice, and

public discussion and education. The rhetoric shift was significant, and hopefully signals a willingness to commit to action that delivers reductions, but it has not yet been matched by actual programs or investments to reduce Alberta's GHG emissions. In the meantime, transportation and municipal infrastructure programs, energy mega-project development planning, and policies regarding commercial and residential housing stock continue to promote in-efficient and carbon-intensive approaches to economic development.

There are several reasons why the Alberta Government must now move from rhetoric on climate change to constructive engagement in the design and implementation of creative and effective solutions to reduce GHG emissions.

1. The Projected Impacts of Climate Change on Alberta

Climate change threatens Alberta's ecosystems and the economic activities that depend upon them. Some of the major impacts of climate change projected for Alberta include:

- increases in the incidence and severity of forest fires and pest infestations in Alberta's valuable forests,
- more frequent and severe drought in the agricultural heartland of southern Alberta along with more frequent episodes of extreme or unseasonal weather, and
- continuing decreases in snow cover and glacial mass in Alberta's Rocky Mountains.

These potential changes have significant business implications for important Alberta industries like forestry, agriculture and tourism. While it may be possible over time for industry to adapt to some of these changes, adaptation will carry a substantial cost, and cannot compensate for fundamental losses of the natural resource base, or declining fibre production rates. Moreover, adaptation will not be an option for many plant and animal species unable to adjust quickly enough to a rapidly changing climate.

2. The Multiple Benefits of Action to Reduce Greenhouse Gas Emissions

More than 80% of Canada's greenhouse gas emissions are released from the combustion of fossil fuels (coal, oil and natural gas) to produce energy. Combustion of these energy sources also produces a broad range of other emissions that are problematic for Albertans. For example:

- the emission of sulphur and nitrogen compounds is raising concerns about acid deposition in some regions of the province,
- the emission of nitrogen oxides is raising concerns about urban air quality (smog) in Alberta's major urban centres of Edmonton and Calgary, and
- the emission of a wide range of toxic compounds is raising concerns about the extent to which the oil and gas industry can co-exist with livestock and agricultural operations in many regions of the province.

Action to reduce GHG emissions will in many cases also contribute to the resolution of these other important regional air-quality and health concerns.

3. The Competitiveness Implications of Failing to Act to Reduce Greenhouse Gas Emissions

The world faces a rapidly approaching carbon-constrained future. Initial emission reduction targets set out in the Kyoto Protocol represent only the tip of the iceberg. Global reductions in GHG emissions of more than 60% will ultimately be required if we are to avoid a doubling of the atmospheric concentration of carbon dioxide in the atmosphere.

This has significant implications for a major energy-producing province like Alberta. Maintaining market share will require Alberta's energy producers to become more eco-efficient – producing desired energy products and services with less resource use and less pollution (e.g., GHG emissions). If other energy producers move more quickly (and they are in most industrialized countries including the United States), they will gain a competitive advantage. The same arguments hold with respect to energy consumers competing internationally.

Fortunately, improving eco-efficiency makes economic sense. For example, investments in energy efficiency reduce energy bills, putting money back into the pockets of consumers and businesses. The spending of these savings in labour-intensive sectors of the economy (i.e., services), coupled with the labour-intensive nature of energy efficiency retrofits, means that investments in energy efficiency can also produce eight times as many jobs as equivalent investments in new energy supply.

In the longer-term, Alberta must move beyond eco-efficiency improvements and make the transition from being a fossil fuel producer to an energy service and technology provider. Actions are needed now to help prepare Alberta to compete in the international energy marketplace of the 21st century – a marketplace where energy efficiency and renewable sources of energy will be the major growth sectors. International energy consumers won't want polluting fuels when clean alternatives are available, and those alternatives are being developed and commercialized rapidly around the globe. Coal, the most polluting fossil fuel source, is already facing serious market problems that are increasingly linked to customers choosing cleaner alternatives.

The balance of this discussion paper outlines a package of actions that, if implemented, can provide a meaningful initial contribution to meeting Alberta's fair share of GHG emission reductions, and to positioning the Alberta economy to be efficient and technologically advanced enough to prosper in the 21st century global economy.

B. A Climate Change Action Plan For Alberta

The Pembina Institute hopes that the Climate Change Round Table represents a turning point in the Alberta government's response to climate change. If, however, the Climate Change Round Table is to succeed in "**Turning Strategy into Action,**" it must move beyond generalities and recommend specific programs and initiatives that the Alberta Government can take on climate change. In contrast, the Climate Change Round Table exercise must be considered a failure if it fails to identify and recommend an initial set of actions the Alberta Government should implement by the end of 1999 as a first step toward climate protection.

To assist the participants in the Climate Change Round Table in their deliberations, the Pembina Institute proposes in this document 18 actions that the Alberta Government can take immediately to reduce Alberta's GHG emissions. These actions represent a mix of regulatory, fiscal and voluntary measures and address GHG emissions from all major sectors. Most of them have already been implemented in other countries or in other regions of Canada. They are, we believe, entirely consistent with the seven principles tabled in last October's Strategy.

The 18 actions described below represent a solid foundation for a serious climate protection program in Alberta. It is our hope that participants in the Climate Change Round Table will agree to recommend that these measures should be implemented as a high priority by the Alberta Government.

1. Reducing GHG Emissions from Transportation

Transportation accounted for 13% of Alberta's greenhouse gas emissions in 1995. The five measures proposed below are designed to reduce GHG emissions from the transportation sector by:

- reducing demand for transportation fuels,
- increasing the demand for fuel-efficient vehicles,
- increasing the operating efficiency of vehicles, and
- supporting investments in infrastructure for alternative modes of transportation as well as the development of alternative transportation fuels.

1.1 Phased Increases in Provincial Gasoline and Diesel Taxes to Support Investments in Infrastructure for Alternative Modes of Transportation

Albertans have received little in the way of market signals to encourage decreased consumption of transportation fuels. When inflation is taken into account, Canadians paid the same price for gasoline in 1996 as they did in 1957. And transportation fuel prices are typically only 33%-50% of the level found in most European countries. Such low transportation fuel prices not only provide little incentive to reduce greenhouse gas emissions, they also unfairly subsidize automobile travel because car owners are not required to cover the full environmental, health and other costs associated with the development, maintenance, and use of transportation infrastructure.

Countries with much more expensive transportation fuels are nonetheless increasing taxes on these fuels as part of their strategy to address climate change, traffic congestion, full life-cycle costs of road infrastructure, and other pollution issues. For example, gasoline taxes in Norway increased by 70% between 1990 and 1997 and duties on transportation fuels in the United Kingdom increased by 10% in 1993 and have continued to increase by more than 5% above the rate of inflation in each subsequent year.

The Alberta Government should increase the provincial tax on gasoline and diesel fuels by 2 cents per litre in the 2000 budget, and commit to four further increases of 2 cents per litre beyond the rate of inflation by 2010. Funds generated by these increases should not simply go into general revenues but should instead be used to support investments in infrastructure for alternative modes of transportation such as carpools, public transit, cycling and transportation demand management.

While the magnitude of this increase is small (gasoline prices regularly fluctuate by several cents a litre, and recent increases of 6-8 cents include a big portion for enhanced returns to downstream producers), a signal sent by the Alberta Government that there will be a slow but steady increase in gasoline prices over time should encourage consumers to reduce GHG emissions through behavioural changes and choice of vehicles and fuels. At a national level, Natural Resources Canada has estimated that similar increases in federal excise taxes would reduce Canada's greenhouse gas emissions by 7.5 million tonnes from projected levels by 2010 (without counting additional reductions generated by investments in more efficient transportation infrastructure).

1.2 Stricter Speeding Enforcement and Reduced Speed Limits

The efficiency of fuel consumption by automobiles varies with speed, and decreases dramatically at speeds above 90 km/hour. For example, a car traveling at 120 km/hour requires approximately 20 percent more fuel than the same car traveling at 90 km/hour. The maximum legal highway speed in Alberta is 110 km/hour, 10 km/hour above the maximum speed limit in most areas of the country.

The Alberta Government should pass legislation reducing the speed limit by 10 km/hour on all highways where the speed limit is currently above 90 km/hour. This reduction in speed limits would be accompanied by an increase in speed limit enforcement capacity (either through automated or manual means) to ensure that the average speed did indeed fall. Fines for speeding would be increased to recover any additional enforcement costs.

It has been estimated by Natural Resources Canada that simply reducing the average speed on Canada's highways by 5 km/hour would reduce GHG emissions by 2.2 million tonnes relative to projected levels in 2010. In addition, lower highway speeds have also been shown to significantly reduce the frequency and severity of automobile accidents, reducing health care costs and car insurance premiums.

1.3 Revenue Neutral Vehicle Fuel Efficiency Feebate Program

Between 1982 and 1994, annual sales of sport utility vehicles (SUVs) and minivans in Canada increased from 9,000 to 190,000. These vehicles now account for about 30% of all new vehicles sold in Canada each year. This is extremely problematic from a climate change perspective because SUVs and minivans are much less fuel-efficient than regular cars. In fact, the overall efficiency of new vehicles (cars and trucks) sold in Canada has actually declined from 8.4L/100km in 1986 to 9.5L/100km in 1998.

While some countries are using regulations and voluntary agreements with auto manufacturers to improve vehicle fuel efficiency at the national level, it is also possible for provincial governments to use financial incentives to encourage the purchase of fuel-efficient vehicles. For example, the Ontario government has implemented a feebate program that taxes the purchase of inefficient vehicles and provides a rebate to consumers who purchase fuel-efficient vehicles.

The Alberta Government should implement a revenue-neutral point-of-purchase charge and rebate program (referred to as a feebate program) for new car purchases that offers the

consumer a clear financial benefit when purchasing a more fuel efficient vehicle. Buyers of less fuel efficient vehicles would pay an additional charge that varies in relation to the model and its relative fuel efficiency. Rebates would be provided to buyers of the most fuel efficient cars. To ensure that the system spurs continued improvement over time, the fuel economy levels at which various levels of fees and rebates apply would be changed over time.

Implementing a strong feebate program could achieve substantial reductions in greenhouse gas emissions. Currently, the fee and rebate levels established under the Ontario program do not provide a strong signal to consumers. Restructuring the Ontario program so that by 2005 it encouraged consumer choices that improved the fuel efficiency of new cars purchased in Ontario to 6.5 litres/100 km (9.5 litres/100 km for trucks) could reduce GHG emissions by an estimated 10 million tonnes relative to what they would otherwise have been in that year.

1.4 Mandatory Vehicle Inspection and Maintenance Program in Major Urban Centres

According to Natural Resources Canada, a poorly tuned vehicle can increase fuel consumption by 15% to 50%. Mandatory vehicle emission testing programs have been demonstrated to be one of the most cost-effective means to identify polluting vehicles and initiate repairs that allow drivers and the environment to reap the multiple benefits of improved fuel efficiency, reduced air pollution, and reduced GHG emissions. British Columbia and many states in the United States have implemented such programs and a similar program is now being initiated in Ontario.

The Alberta Government should require all personal and commercial vehicles in Edmonton and Calgary, as a condition of being licensed, to participate in regular vehicle emission testing and to undertake follow-up maintenance to correct any major problems detected.

Preliminary results of British Columbia's Air Care program indicate that vehicles required to fix problems identified by the program improved fuel efficiency by an average of 10%. For these drivers, the net costs of participating in the program are minimal as the dollar savings from improved fuel economy offset most of the costs for testing and maintenance.

1.5 Actions to Promote the Development of Transportation Biofuels in Alberta

Transportation fuels manufactured from biomass can produce significant reductions in GHG emissions if the biomass used is harvested in a sustainable manner. One example of such a fuel is ethanol. Ethanol can be blended with gasoline or used as a substitute fuel and it can be derived from various feedstocks, including corn, grain, forage grasses, wood fibre, and wood and agricultural wastes. The most technologically advanced and environmentally efficient processes use non-food feedstock's such as grasses, straw, or agricultural and wood wastes (called ligno-cellulose biomass), so as to reduce input costs, and avoid long term price rises for human food commodities.

Although Canada is one of the world's most important producers of agricultural and forest fibre, it is not one of the world's 10 leading producers of ethanol. The United States, France, Germany and the United Kingdom all produce much more ethanol than Canada and even many smaller countries like Sweden have aggressive ethanol development programs. While Canada does produce 212 million litres of ethanol each year, this falls far short of the estimated potential annual production of over 5 billion litres of ethanol from grain and ligno-cellulose feedstock's.

Most of Canada's ethanol production is concentrated in Ontario (70% of Canada's ethanol is produced at one corn-based facility) even though Alberta's forest and agricultural industries produce a tremendous amount of potential ethanol feedstock's.

The Alberta Government should implement a series of measures to support the development of a transportation biofuel industry in the province. These measures could include:

- **loans and/or loan guarantees for the construction of eco-efficient production facilities,**
- **substantial support for additional research and development and commercialization of eco-efficient biofuels, and**
- **a commitment to exempt biofuels from provincial excise taxes through 2010.**

It has been estimated that if all gasoline sold in Canada had a 5% renewable energy content (such as is already available at Mohawk gas stations), greenhouse gas emissions would be reduced by 3.1 million tonnes from projected levels in 2010.

2. Reducing GHG Emissions from Electricity Generation

The overwhelming majority (about 89%) of Alberta's electricity is produced from the combustion of coal. As a result, 26% of Alberta's GHG emissions in 1995 were a product of electricity generation. The four measures proposed below will reduce GHG emissions from electricity generation by leveling the playing field for tax treatment of different fuels as well as through a mix of regulatory and procurement policies that seek to increase both the supply and demand of 'green' power produced from renewable energy sources.

2.1 Increase Royalty Payments for Coal

Alberta royalty laws heavily subsidize coal by giving it an absurdly low royalty rate. Royalty rates paid to the Crown for use of this publicly owned non-renewable resource are set at 2% of net profits, less than 1% of the value of the coal. In contrast, natural gas royalties range from 15% to 30% with a significant base of royalty on the total gas value. This perverse economic signal makes the most polluting form of electricity the least costly by government design, when in fact sound economics and good environmental policy would make the most polluting energy the most expensive. Many other jurisdictions across North America are closing down coal plants because of the multiple environmental costs and emerging climate change liability. In its place they are switching to cleaner natural gas fired plants, often using Alberta natural gas.

The Alberta Government must dramatically increase the royalty rates paid to the Crown for the use of coal to ensure a level playing field for different fossil fuels in the area of electricity generation. Specifically, coal royalties should be increased to be in line with natural gas royalties on a per-useful-energy-potential basis.

Per unit of energy produced, natural gas emits only 50% of the GHG emissions produced by the combustion of coal. While government policy actively encourages the use of coal for electricity generation in Alberta through a huge effective coal subsidy that distorts fuel price signals, natural gas is being exported to consumers in Ontario and the United States. There it is being used to make cleaner electricity that will help reduce GHG emissions and address local and regional air pollution problems. More importantly these jurisdictions are locking in gas supplies to ensure low carbon liabilities and lower costs for electricity in the time period when international commitments to reduce GHG gas emissions are likely to enter into force (i.e., 2008).

2.2 Establish a 10% Renewable Energy Portfolio Standard

It is possible to generate electricity from renewable, non-GHG emitting, energy sources like wind, solar, biomass, geothermal and small-scale hydroelectric projects. The Alberta government can increase the portion of electricity produced from renewable energy sources in Alberta through the use of a renewable energy portfolio standard.

A renewable energy portfolio standard is a legislated requirement for all electricity retailers to ensure that a specific percentage of the electricity they sell is created from renewable energy sources. This tool has already been used in a number of states like Vermont, Maine, Nevada and Arizona and President Clinton has forwarded a bill to the U.S. Congress that includes the establishment of a 7.5% renewable portfolio standard (excluding hydro) in the period from 2010 to 2015. This is primarily an economic development measure which will ensure the development of a world class renewable energy industry in the US. It will serve as the basis for massive technology exports to the 3 billion plus potential electricity customers in the developing world for whom renewable electricity is often the most cost-effective supply option.

As part of electricity market restructuring, the Alberta Government should require electricity retailers to demonstrate that 10 percent of the electricity they are selling is produced by qualifying renewable energy resources by the year 2010. This requirement would be phased in with interim targets in preceding years.

Analysis by the Pembina Institute indicates that the implementation of a 10% renewable energy portfolio standard for all provinces and territories in Canada would reduce greenhouse gas emissions 7.8 million tonnes below projected levels in 2010. The cost of such a program on the average residential customer's electricity bill would climb to $1.30 a month, a cost that will be more than offset by the increased government revenues and lower taxes generated through the economic development of a robust domestic renewable energy industry.

2.3 Green Power Procurement by the Alberta Government

Many governments and corporations have established green procurement programs. As a major consumer of electricity in the province, the Alberta Government can influence electricity supply through its procurement programs. By making a commitment to purchase electricity from renewable energy sources, the Alberta Government can help create economies of scale for green power production, in the important early stages of development of these emerging industries.

Within Alberta, the Government of Canada, Suncor and the Municipal District of Pincher Creek have already established green power procurement programs. The Alberta Government is already behind on this issue, and needs to make a similar commitment as a component of both its Governmental Climate Change Action Plan, and its economic development programs.

The Alberta Government should make a commitment to meet 25% of its own electrical power needs for government operations with qualifying "green power" produced from low or no-carbon emitting renewable energy sources like wind and biomass. **The purchase must be made on the basis of a competitive bidding process and result in the construction of new facilities to produce renewable energy in the province. Any modest increases in electricity bills can be at least partially offset by re-directing savings from continuing work to decrease electricity demand through energy efficiency improvements in government facilities and fleets.**

A commitment by the Alberta Government will allow renewable technologies that produce electricity to be constructed at a scale that will significantly lower production costs – leveraging

additional purchases by other levels of government, the private sector and individual Albertans. As electricity use in provincial government buildings in Alberta generated 310,000 tonnes of carbon dioxide in 1995, converting 25 percent of this electricity demand to green power would reduce emissions by 77,500 tonnes.

2.4 Net Metering Legislation

There is substantial potential in Alberta to generate electricity on a decentralized basis at a micro-scale at the site of customer demand, through the use of renewable energy (e.g., wind, solar, biomass and environmentally-benign small hydro) and natural gas micro co-generation technologies. For various regulatory and financial reasons, the potential of these resources and technologies is virtually untapped in Canada. Instead, large-scale centralized power generation facilities and long-distance transmission of that power are the norm.

Net metering is a highly effective policy tool that can provide a strong incentive to generate electricity on a small scale at the site of customer demand. Under net metering, electricity consumers who generate electricity on-site using their own wind turbine, PV modules, or micro-gas turbine, can feed any electricity that exceeds their demand into the electricity grid – running their own meter backwards. When the customer cannot generate enough power for his or her own needs, an electric utility will meet the shortfall and the customer's meter runs forward. The customer is billed for the net amount, sometimes with compensation for net production over consumption.

Net metering has already been adopted in 24 U.S. states and is being piloted by two electric utilities in Canada.

The Alberta Government should introduce a legislated net-metering policy for the electricity sector. This legislation would require electricity service providers to accept net metering arrangements from interested customers as one of the power purchase options that they offer. All retail customers would be included, i.e. residential, commercial, industrial and agricultural.

Analysis by the Pembina Institute indicates that implementing such a measure across Canada would reduce GHG emissions by 1.1 million tonnes from projected levels in 2010, of which a disproportionately larger share would likely occur in Alberta. Although this will produce only modest GHG emission reductions, net metering builds on existing Alberta leadership in renewables and on our top-quality renewable energy resources, creates a strong market for renewable technology which further lowers installed costs, and engages many more Albertans in the creative development and use of clean energy sources.

3. Reducing GHG Emissions from Industry

Industry was responsible for 46% of Alberta's greenhouse gas emissions in 1995, but there is a great deal of diversity in GHG emission sources within the industrial sector and a wide range of technology and operational solutions available to achieve reductions. As a result, the most appropriate measures in this sector to protect the climate are broad based economic instruments that send clear market signals to reduce GHG emissions but also provide firms with the flexibility to determine the most cost-effective means of responding to those signals. Such broad-based instruments are likely to be implemented at the national, rather than the provincial, level.

Alberta has, and should continue to be fully engaged in the technical design of emission trading mechanisms to create clear incentives to reduce emissions and then unleash market forces and provide the flexibility to seek those reductions at the lowest cost. The Pembina Institute will continue to advocate a national system with immediate and meaningful incentives for early emission reductions by pro-active companies, and the follow-up implementation of an emissions cap and allowance trading system to ensure that all industry players contribute equitably to Canada's GHG emission reduction obligations.

Nonetheless, the Alberta Government can also take some specific actions to reduce GHG emissions from the industry sector. The four measures described here would:

- ensure that all industrial emitters are measuring and reporting their GHG emissions
- adjust market signals to encourage GHG emissions reduction in the area of energy production,
- provide incentives to bring energy efficient and renewable energy technologies into the marketplace, and
- require new energy developments to maximize GHG efficiency.

3.1 GHG Emission Measurement and Reporting

Neither companies nor governments can manage what they don't measure and report. Some companies participating in the VCR are doing an effective job of measuring their GHG emissions annually, some measure partial emissions, however many significant emitters do not measure (let alone measure and report) their GHG emissions. A critical first step to effective provincial tracking and management of the sector responsible for nearly half the province's current emissions and most of the next decade's emissions growth, is to require all emitters to measure and report their greenhouse gas emissions according to clear provincial guidelines, on an annual basis. A vast majority of industrial greenhouse gas emitters in Alberta are subject to formal regulatory licence or operating approvals. A mandatory reporting requirement (already in place for many other pollutants) is within the discretion of existing regulatory bodies and needs no formal regulatory amendment.

The Alberta Government should direct the Alberta Energy and Utilities Board, and Alberta Environmental Protection, to amend the appropriate operating licences and approvals under their jurisdiction to require all significant emitters of greenhouse gases to measure and/or calculate annual greenhouse gas emissions according to provincial guidelines, and report those emissions on an annul basis in a standardized format.

3.2 Revenue Neutral Amendments to Petroleum Royalty Structures

Provincial petroleum royalties are currently only applied on produced oil or gas at production and processing facilities. This significantly reduces the price of the energy used or dumped in the production of energy (e.g., fuel gas, flared gas) and reduces the incentive for energy conservation measures in the upstream energy industry. Treating gas used to process gas, or flared off to produce gas and oil, with the same royalty application as final product gas not only sends a stronger price signal to reduce waste, it is fairer to the public by acknowledging that gas is a valuable public resource not to be wasted.

The Alberta Government should adjust petroleum royalty structures in a revenue neutral manner to ensure that full royalties are paid on all currently exempted flared and fuel gas associated with the upstream production of oil and gas. This measure would be designed to be, on average, cost-neutral to the industry by reducing the total royalty collected from processed (plant outlet) gas by an equivalent amount.

3.3 Tax Incentives to Increase Market Penetration of Energy Efficient and Renewable Energy Technologies

A number of energy-efficient and renewable energy technologies are available but under-utilized in the commercial and industrial sectors. One of the major barriers preventing the widespread adoption of these cost-effective technologies in the marketplace is payback periods that extend beyond the standard periods accepted by industry and small business when making new investments.

In the United States, President Clinton has proposed $3.6 billion in tax incentives over the next five years for the purchase of cutting edge energy efficient and renewable energy technologies. The provincial tax system currently provides few, if any, incentives for the purchase of such energy-efficient and renewable energy technologies that could help them to gain a foothold in the marketplace.

The Alberta Government should provide incentives in the form of 50% tax credits for qualifying investments in commercialization and demonstration of new technologies that can verifiably reduce GHG emissions through significant improvements in energy efficiency, process efficiency, or greater adoption of renewable energy sources. This measure would also apply to research and development investments in commercializing emerging energy efficiency and/or renewable (non-electric) technologies.

3.4 Mandate the AEUB and AEP to Address GHG Emissions

The Alberta Energy and Utilities Board (AEUB) is mandated to review all new energy development and the renewal of existing licenses to ensure that Alberta's natural resources are conserved and used efficiently. In a carbon-constrained world, the right to emit carbon dioxide becomes a valuable resource. When the AEUB approves a license or project, it is granting the applicant a portion of this scarce resource and potentially limiting the amount of that resource that is available for others.

At this time, however, the AEUB does not systematically consider greenhouse gas emissions in conducting their reviews. This cannot be allowed to continue, if Alberta wants to effectively manage the risks and opportunities associated with a carbon-constrained future.

The Alberta Government should mandate the AEUB to consider the GHG efficiency of new and re-licenced projects and to ensure that projects are maximizing GHG efficiency before approval is granted. This means that applicants to the AEUB would be required to provide information on GHG emission intensities, best available technologies considered, as well as a plan to mitigate the GHG emission impacts of the project. The Alberta government should mandate Alberta Environmental Protection and the Natural Resources Conservation Board to pursue the same practices when reviewing non-energy projects requiring approvals under the Alberta Environmental Protection and Enhancement Act.

4. Reducing GHG Emissions from Residential and Commercial Buildings

The use of fossil fuels to provide heat and power in residential and commercial buildings accounted for 7% of Alberta's GHG emissions in 1995. It is possible, however, to significantly decrease these emissions through energy efficient building construction and retrofits as well as the use of energy efficient appliances and equipment. Existing technologies can provide the same heating and power services to Albertans with a much smaller environmental impact. The two measures listed below would:

- mandate more energy efficient building codes for new residential and commercial buildings and provide incentives for builders to go beyond these building codes, and
- use a range of policy tools to encourage energy efficient retrofits of existing buildings.

4.1 Mandate the National Energy Codes for Houses and Buildings and Provide Incentives for R-2000 Construction

The National Energy Code for Houses (NECH) and the National Energy Code for Buildings (NECB) were developed with extensive stakeholder input and contain a minimum energy code tailored to the different regions of Canada. A new home built to the NECH standard in 1994 would reduce energy use by 11.5% relative to the average home built in Canada in that year. Commercial buildings built to the NECB standard in 1994 would have used 15% less energy than the average commercial building constructed in Alberta in that year. Despite these clear environmental benefits, neither the NECH nor the NECB have yet been adopted by the Province of Alberta. This constitutes a basic cost-effective first step that should be implemented immediately.

The federal government's R-2000 program is a voluntary standard that uses proven and affordable building techniques and has existed since 1982. A new home built in 1994 to the R-2000 standard would reduce energy use by 26% from the average level of a new home built in that year. Despite the fact that these houses are of superior quality and can command an increased price, less than 2% of new homes each year are built to the R-2000 standard.

The Government of Alberta should improve the energy efficiency of new building construction by:

- **adopting the National Energy Codes for Houses and Buildings in the year 2000**
- **removing barriers to the construction of R-2000 homes in Alberta (For example, builders have little incentive to invest in the increased capital cost of an R-2000 home because it increases the permit fees and municipal taxes associated with construction of the home. The Alberta Government should address these barriers by sheltering the incremental capital cost of a qualifying R-2000 home from the municipal mill rate as well as providing a 50% rebate on municipal development permit fees for homes built to the R-2000 standard).**

More energy efficient buildings can have a significant impact on GHG emissions. The Pembina Institute, using data from Natural Resources Canada, has calculated that the adoption of an R-2000 standard for new residential construction Canada-wide would decrease GHG emissions by 3.7 million tonnes relative to projected levels for the year 2010.

4.2 Incentives to Undertake Energy Efficiency Retrofits in Buildings

One of the most cost-effective mechanisms to reduce GHG emissions is improving the energy efficiency of existing buildings. In the residential sector, simple cost-effective measures like weather stripping and caulking, installing storm windows and doors, and the use of setback thermostats can reduce the energy used for space heating from 5% to 25%. More substantial savings are practical and available from building shell upgrades and replacement of inefficient furnaces, and lighting equipment. In the commercial sector, cost-effective actions can be taken to reduce the energy used for lighting by 30% to 75% and the energy used for heating and cooling by 10% to 25%. Unfortunately, much of this potential is untapped as a result of barriers like:

- a lack of information on energy efficiency opportunities,
- a failure to pay attention to energy use because energy use is a small percentage of total costs,
- a lack of capital to make the initial investment in energy efficiency improvements,
- an unwillingness to consider an extended payback period for energy efficiency investments, and
- an unwillingness to invest in energy efficiency improvements if the building owner (e.g., a landlord) does not pay the energy bills.

The Alberta Government should establish a goal to improve the energy efficiency of half of the existing building stock by 25% by 2010. To meet this objective, the Alberta Government should implement the following measures:

- **provide increased support to programs that educate the public and identify energy efficiency opportunities for home and commercial building owners (e.g., Destination Conservation and the Eco-Efficient Communities Initiative),**
- **provide financial incentives for home and building owners to undertake qualifying energy efficiency retrofits when energy efficiency improvements can be clearly measured and demonstrated (e.g., low interest loans and business tax credits for commercial buildings),**
- **assist municipalities by establishing an interest-free revolving fund for energy conservation and other eco-efficiency initiatives to reduce emissions from municipal and local authority facilities (money borrowed from the fund is repaid from the energy bill savings), and**
- **work with post-secondary vocational institutions and colleges to strengthen training for building trades, contractors and other professionals in energy efficiency design, construction technique and retrofit.**

The Pembina Institute has calculated that improving the energy efficiency of 50% of existing homes in Canada by an average of 20% by 2010 would reduce GHG emissions by 7.2 million tonnes relative to projections for that year. Calculations also show that if 80% of existing commercial buildings improved their energy efficiency by 30% by 2010, GHG emissions would be further reduced by 4.4 million tonnes relative to projections for that year. It should be noted that this number is lower than the number for the residential sector because Natural Resources Canada already assumes there will be some significant improvement in the energy efficiency of commercial buildings by 2010.

5. Reducing GHG Emissions from Non-Energy Sources

Non-energy sources of GHG emissions are significant, but are often overlooked. They are termed non-energy because the emissions do not arise from the combustion of fossil fuels or other energy-related activities. For example, GHG emissions from livestock digestive processes and manure accounted for 3% of Alberta's GHG emissions in 1995. Methane emissions from landfills accounted for about 0.5% of Alberta's emissions in that same year. The two measures identified below would:

- require landfill gas recovery at large landfills in Alberta, and
- use information and pilot programs to promote methane capture and improved livestock manure management.

5.1 Mandate the Capture of Landfill Methane from Large Landfills

When organic waste (e.g., food and yard waste, paper products) decomposes anaerobically in a landfill it produces methane and contributes to Alberta's greenhouse gas emissions. It is possible to capture and combust this methane. While combustion produces carbon dioxide, the environment benefits because carbon dioxide is a significantly less potent greenhouse gas on a molecule by molecule basis than methane. Additional GHG emission reduction benefits are possible if the combusted methane is used directly as an energy source for heating, and/or to produce electricity. Several Canadian landfills (including the Cloverbar landfill in Edmonton) already use this technology.

The Alberta Government should establish regulations requiring all landfills with a capacity of 1 million tonnes or more to install systems to capture and combust methane gas. To complement this measure, and as part of electricity market restructuring, Alberta should take steps to ensure that facilities that recover landfill methane have fair access to the electricity grid, and that landfill methane from existing landfills is recognized as a source of 'green power'.

The United States has established a goal of recovering 60% of all methane generated at landfills. If a similar level of landfill gas capture and combustion were to occur in Canada, the Pembina Institute has calculated that GHG emissions would be reduced by 11 million tonnes from projected levels in 2010.

5.2 Policies to Improve Livestock Waste Management Systems

Alberta's livestock industry produces substantial amounts of manure and different manure management systems can have significantly different impacts on GHG emissions. In general, the liquid and slurry manure storage systems typically used in large swine and dairy farms produce far more greenhouse gas emissions than dry form manure management systems (e.g. spreading it on a field). It is also possible, however, to gather this waste, convert it to methane gas and inert, nutrient-rich sludge through anaerobic methane digesters, thereby also eliminating surface water contamination, and odour problems. The sludge is an effective replacement for energy-intensive fertilizers, and the biogas can be used as heating fuel, or converted to electricity in micro-turbines, further eliminating emissions. This technology has huge promise for solving multiple environmental problems associated with livestock waste management in a cost-effective manner. The United States has established the AgStar program to provide farmers with information on improved manure management techniques as well as with technical expertise to implement commercially available methane recovery on the farm.

The Government of Alberta should assist farmers to manage livestock manure with GHG emission considerations in mind by:

- **strengthening information and technical support programs for farmers on low-emission livestock manure management alternatives, as well as the potential to recover methane and use it as an energy source, and**
- **establishing a livestock waste-to-energy commercialization and demonstration program.**

The Pembina Institute has calculated that a 50% reduction of methane emissions from animal wastes on farms would reduce Canada's GHG emissions by 3 million tonnes relative to projected emission levels in 2010. A disproportionately large portion of this could occur in Alberta given the share of the industry located here, and the projected growth rates of livestock populations.

6. Reducing GHG Emissions through Revenue Neutral Ecological Tax Reform

Most Albertans will agree that our current tax system places a high tax burden on labour, on innovation and on valued-added services, and actively discourages employment and innovation. Meanwhile, we subsidize pollution and waste by allowing producers and consumers free access to very limited and valuable natural resources and environmental sinks for their wastes.

Revenue neutral ecological tax reform would reform the tax system by reducing taxation on personal and corporate income taxes, GST, and employer burden (CPP, EI, etc.) to encourage employment, efficiency and innovation. At the same time, public services would be maintained by raising an equivalent amount of revenues from charges on waste disposal, effluent pollution into our waterways, and air emissions, including greenhouse gas emissions.

Such ecological tax reform would allow market price signals to do a better job of discouraging pollution and environmental damage while improving business competitiveness internationally. It must be designed to:

- be revenue neutral and maintain adequate revenues for public services,
- encourage efficiency and innovation,
- protect low-income Albertans from higher unit costs of some energy supplies, and
- allow polluters the greatest amount of flexibility to implement least-cost solutions to reduce greenhouse gas emissions and other pollutants.

While the concept of ecological tax reform is still in its infancy in Canada, it is already being implemented in European countries like Germany, Denmark, Norway, Sweden and the Netherlands. It also has a number of high profile supporters that include the World Business Council for Sustainable Development and its more than 50 large corporate members. The concept of Ecological Tax Reform was raised by several participants and received with wide interest at the Alberta Growth Summit in 1998, however there has been no further analysis of the substantial benefits to the Alberta economy this measure can bring.

The Alberta Government should immediately begin to analyze specific ecological tax reform adjustments within its own provincial control, as well as understand options for national ecological tax reform which also will serve Alberta's overall interests.

The sooner such reforms are made the faster economic forces and competitive innovation capabilities of Alberta industries and entrepreneurs can be unleashed to help meet our GHG emission reduction targets while building a stronger, more competitive and more sustainable economic base.

C. Actions that Alberta Should Encourage the Federal Government to Take to Reduce Canada's GHG Emissions

While Alberta has a big stake in being a leader in Canada's efforts to reduce its GHG emissions, the federal government has an important role to play in areas of federal jurisdiction or when policies clearly need to be implemented at a national level. Taking action at home, however, will give the Alberta Government more credibility when urging other jurisdictions to do their share in the national effort to fight climate change.

The following list briefly describes five key measures the Alberta Government should urge the federal government to implement or commit to by the end of 1999 as an initial step in Canada's climate protection strategy.

Improved Mandatory Fuel Economy Standards for Vehicles

The federal government should use the 1981 Motor Vehicle Fuel Consumption Act to implement mandatory fuel economy standards for new automobile fuel efficiency. New standards for 2005 of 5L/100km for cars (including minivans and Sport Utility Vehicles) and 7L/100km for trucks would reduce Canada's GHG emissions by 26 million tonnes from projected levels in 2010. According to the American Council for an Energy Efficient Economy, an 80% improvement in automobile energy efficiency is achievable at a cost of less than $1,200 per vehicle. The increased cost to the consumer of vehicles meeting the more modest improvements proposed here would quickly be repaid to the consumer in lower fuel operating costs.

Credit for Early Action

It is important to take action now to reduce GHG emissions. Unfortunately, existing voluntary programs have failed to generate significant action because companies have been given no strong signals of intent to act, or any other meaningful incentives to take action now to reduce greenhouse gas emissions. In the Spring of 1998, federal and provincial Energy and Environment Ministers agreed that Canada should establish "…a system for crediting verifiable early actions to reduce GHG emissions against any future emissions obligations". Recently, a Collaborative of environmentalists and industry representatives proposed a Canadian Early Emission Reduction Program that would allow Ministers to meet this commitment and provide meaningful business value to those companies who choose to manage future business risks by acting now to reduce emissions. Real incentives for early action, no matter what form they take, are clearly needed before voluntary action will amount to anything other than re-packaging of business as usual.

Cap and Allowance Emissions Trading

Emission sources, and emission reduction opportunities and costs, vary widely from industry to industry and from company to company within an industry. The federal government should make a commitment to implement cap-and-allowance emissions trading system by no later than 2005. Under such a system, companies would be required to hold allowances equivalent to their actual emission levels. If a company does not have enough allowances, it is given some flexibility for maintaining compliance. It could reduce its own emissions or it could purchase surplus allowances from another company. While a signal is needed now that such a system will be established, more time is required to develop the detailed elements of system design.

Kyoto Mechanisms

The Kyoto Protocol includes three "flexibility" mechanisms that are designed to help industrialized countries meet their commitments under the Protocol. Detailed rules and procedures around the mechanisms (international emissions trading, joint implementation, and the Clean Development Mechanism) are still being negotiated internationally. The federal government should be encouraged to participate actively in these negotiations to ensure that they are environmentally effective and that the extent to which they can be used is limited to ensure that Canada generates the majority of GHG emission reductions at home.

Municipal Green Infrastructure Fund

Municipal governments have been leaders within Canada on GHG emissions reduction. Many have made quantified commitments to reduce GHG emissions through programs like the Eco-Efficient Communities Initiative and the Federation of Canadian Municipalities' Partners for Climate Protection Program. The federal government should implement, in cooperation with provincial and municipal governments, a fund to support investments in green infrastructure that promote energy efficiency improvements, reductions in energy intensity, and increased use of renewable energy sources.

Major Expansion of Federal R&D in Low GHG Emission Technologies

If Canada is to be a major player in the energy sector of a carbon-constrained world, it must become a world leader in the development of the extremely efficient low GHG emitting technologies required to address climate change and pressing regional air quality problems. Unfortunately, the federal government's total support for research and development in the areas of efficiency and alternative energy in 1997/98 was $27.9 million, a 25% reduction from 1990-91 levels, and a much more substantial reduction from funding levels in the early 1980s. This must be significantly increased if Canada is to remain competitive. After all, President Clinton has proposed that the United States spend $2.7 billion over five years on increased research, development and deployment of energy efficient and renewable energy technologies. Other countries like Japan and Germany are also using public funds to spur technology development and leverage additional private sector investment.