

GOOD PRACTICE IN POLICIES AND MEASURES FOR COMBATTING CLIMATE CHANGE IN THE CONTEXT OF NATIONAL CIRCUMSTANCES

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Abstract: *Good economic and environmental decision-making considers a variety of potential policies and measures (P&Ms), ranging from technology promotion and opportunities, flexibility mechanisms, regulatory and economic instruments, voluntary initiatives, to public education and outreach. In the context of the United Nations Framework Convention on Climate Change (UNFCCC), Canada supports opportunities for information exchange and learning among Parties. However the starting point for any discussion of P&Ms must be in the proper context of national circumstances. Since there are inherent difficulties in developing an internationally applicable concept of “best practices” for P&Ms - a conclusion supported by several international studies and UNFCCC Party submissions - Canada believes that there is no single and universal “best practice” formula for domestic policies to mitigate greenhouse gas (GHG) emissions.*

Parties to the UNFCCC include broad differences in their national circumstances relevant to P&Ms. In Canada’s case, a number of circumstances are paramount, including the following: geographical (e.g., size, regional weather patterns, etc.), economic (e.g., high percentage of natural resource and energy-intensive exports, etc.), demographic (e.g., population distribution, growth rate, etc.), jurisdictional (e.g., sharing of government powers at various levels, etc.) and environmental/health (potential for highly diverse climate change and mitigation impacts across different national regions and urban areas).

Canada’s relevant program experience is substantial. Federal, provincial, territorial and municipal governments’ investments in recent years have supported research, technology development and deployment, energy programs and public education. According to a recent International Energy Agency survey, Canada leads in the number of implemented energy-related P&Ms. This paper outlines a number of Canada’s P&Ms, underlining ways in which national circumstances have affected their design and implementation.

Inherent methodological hurdles also exist to identifying “best” practices. Where practices are identified, they are based on a country’s experience, circumstances, relevant data and analytical assumptions which are not necessarily applicable in other countries. For these reasons, Canada strongly believes that the concept of good practice for combatting climate change, determined by each sovereign country according to its own national circumstances, is the most useful approach to implementing appropriate P&Ms. Canada is also active internationally in efforts to share and learn from others’ experience. Within this context, Canada supports such activities as information exchange and sharing lessons learnt.

As Parties to the United Nations Framework Convention on Climate Change (UNFCCC) move forward on the implementation of their commitments under the Kyoto Protocol through domestic and international action, it is important that opportunities for each country to select, develop and improve upon its good practices to abate greenhouse gas (GHG) are optimized through information exchange and shared experiences. In this regard, good practices in policies and measures (P&Ms), based on each country's specific national circumstances, are increasingly important. Since P&Ms form an integral part of domestic implementation, it is desirable, from both a national and international perspective, that they be as effective and efficient as possible. However, it should be underlined from the outset that Canada refers to *good practices*, rather than "best practices", as explained below.

In order to facilitate good economic and environmental decision-making, a wide variety of potential P&Ms are available to choose from, ranging from technology promotion and opportunities, flexibility mechanisms (e.g., domestic emissions trading), regulatory and economic instruments, voluntary initiatives, and public education and outreach. However, the starting point for any discussion of P&Ms must consider the *context*, in order to clearly frame the objectives of the discussion. The FCCC secretariat's report on best practices for P&Ms (FCCC/SBSTA/1999/8) proceeds in this fashion and outlines several objectives for consideration at this workshop: 1) what is meant by "best practices" 2) how "best practices" can be assessed 3) how results can be shared between countries and 4) how analyses of "best practice" can be readily compared between countries. Canada believes that this is an appropriate opening for the discussion and the short paper that follows proceeds in this spirit.

1. What is Meant by "Best Practices"?

A survey of recent developments in OECD (1999) countries (which comprise the majority of UNFCCC Annex 1 Parties) concludes that there is no single formula for domestic policies to mitigate GHG emissions, and that each country needs to assess opportunities and constraints to develop a strategy adapted to their own national circumstances. In other words, what may be a "best practice" for one country, may not be so for another. The Intergovernmental Panel on Climate Change (IPCC)¹ concluded that: "A combination of measures adapted to national, regional and local conditions will be required. Appropriate measures, therefore, reflect the widely differing institutional, social, economic, technical and natural resource endowments in individual countries and regions". Moreover the IPCC notes that "in practice, economically efficient measures ... may be difficult to implement for technical and political reasons. Local circumstances demand local solutions, and the success of strategies may depend on their being designed with an understanding of the current system and its evolution"².

¹ IPCC. *Technical Paper on Technologies, Policies and Measures for Mitigating Climate Change*. 1996:1, p. 5.

² *Ibid.*, p. 23.

These views are echoed by several UNFCCC Parties in their September 1999 submissions (FCCC/SBSTA/1999/MISC.10) to the Subsidiary Body for Scientific and Technological Assessment (SBSTA), which note that because national circumstances differ widely between countries—and that these factors guide selection and implementation of P&Ms—there are inherent difficulties in developing an internationally applicable concept of best practice for P&Ms to abate GHG emissions, and that therefore there is little value in examining a given policy or measure in isolation from the totality of a country's national action plan to mitigate climate change. Canada has reached a similar conclusion and will therefore continue to take action that retains flexibility, such as “good practice” or “best-fit” suitable to its national circumstances. Canada supports sharing information on good practices among countries, regions and localities, so that P&Ms may be adapted and used if deemed suitable, given countries’ particular circumstances.

For the reasons discussed above, Canada believes that it is only useful to base discussions within the UNFCCC on the sharing of experience, and drawing of lessons, on the concept of *good practices*. Canada does not believe that there are “best practices” which are equally suited to all countries. We believe that this conclusion is supported by Article 2.1(a) of the Kyoto Protocol which requires each Annex I Party, *in accordance with its national circumstances*, to implement P&Ms in achieving its quantified emission limitation and reduction commitments under Article 3. We would also note that the FCCC national communications guidelines (FCCC/CP/1999/L.3/Add.1) adopted at CoP5, which should be used as the basis for the development of reporting guidelines under Article 7 of the Kyoto Protocol, places strong emphasis upon Parties reporting how national circumstances affect greenhouse gas emissions and removals.

Good climate change practices must also be considered in the context of a country’s other policy aims. It is important in considering whether a particular practice is a “good practice” to look at its ancillary benefits and aim to find “win-win” options. Although the choice of practices appropriate to each country will vary, many countries have found that in the process of developing and implementing climate change P&Ms, other secondary benefits may result. There is scope for possible improvements to local air quality and better health, reductions in traffic congestion, improvements in housing conditions, biodiversity, increased competitiveness for firms, new jobs and new or expanded business opportunities. Reciprocally, when implementing policies not directly related to climate change, valuable secondary benefits have resulted which did address climate change. While the key to identifying good practices lies in the amount of GHG emissions reductions, those reductions constitute only one part of the overall evaluation process.

Canada believes that information exchange and learning should be encouraged and facilitated under the FCCC so that good national practices can be usefully shared and lessons learnt within the context of various national circumstances. The examples that follow are presented in this light. Also in the paragraphs below, this paper addresses issues relating to assessment and comparative data analysis.

2. Variation of National Circumstances

A number of key circumstances need to be taken into consideration in decision-making with respect to P&Ms aimed at reducing GHG emissions. Each country needs to assess opportunities and constraints to develop a strategy adapted to its own national circumstances. Given that national circumstances tend to vary by country and region, so too will the national strategies developed.

The following is a list of key national circumstances that Canada believes are relevant to the design, elaboration and implementation of any action targeted to mitigate GHG emissions. This is by no means an exhaustive list and we look forward to discussing these and other national circumstances with Parties.

Geographic circumstances:

All national governments have to deal with their country's own physical characteristics such as location, climate, land mass, coastline, land use, etc. These characteristics are important in the development of a national strategy to address climate change.

Some countries have very similar climates while others are very different. Canada, for instance, experiences short, intense summers and long, cold winters. Its climate is also extremely diverse across the country, with fifteen terrestrial ecozones (arctic, boreal, temperate regions, etc.).

- Average annual heating degree-days³ (for a ten-year period) for Montreal, Toronto, Winnipeg and Vancouver, four major Canadian urban centres, are 4,540, 4,140, 5,923 and 3,030, respectively. By comparison, for Berlin, Paris, Washington and Tokyo, the figures are respectively 3,300, 2,720, 2,160 and 1,620.

Countries also vary considerably in size which can result in different demands for energy for freight and passenger transportation. Canada is the second largest country in the world. It extends 5,300 kilometres (km) from east to west, a distance equivalent to a flight from Paris to New York. Canada's transportation infrastructure extends over 9,000,000 km². This results in relatively high energy consumption and related GHG emissions.

- The average annual distance traveled by light vehicles in Canada was 19,765 km (1997 data), compared to an average of approximately 13,000 km per vehicle in European countries of the OECD (1992 data).
- Canada's long distances between points of export and urban centres, and its low population density contribute to high energy use in its transportation sector. Canada moves over three times as much freight (measured in tonnes-kilometre per capita) as

³ Calculated by multiplying the number of days the average temperature is less than 18° C by the number of degrees the average temperature is below 18° C over a year-long period.

Japan and each major country in Western Europe. During the period 1990-1997, road freight activity increased by 57% in Canada and 29% in the EU.

Economic circumstances:

The economic context also has to be taken into account when developing responses to climate change. A country's economic growth, natural resources, economic structure, and trade relations need to be considered.

Economic Growth

Sustained economic growth is usually a major contributor to increases in countries' GHG emissions. As economic growth rates tend to vary across countries so too will emissions growth rates. They may affect the type of effort undertaken by a country.

- During the period 1990-1998, various growth rates of the Gross Domestic Product (GDP) among industrialized countries ranging from 1.0% (Sweden) to 1.9% (Canada) have been experienced.

Economic Structure and Natural Resource Endowment

The economic structure of national economies also has a significant influence on domestic emissions. Some countries may have a high proportion of light industries, others may have more heavy industries (e.g., pulp and paper, iron and steel, smelting and refining, chemicals, petroleum refining and cement), which are more energy intensive as measured by the amount of energy used per unit of GDP.

- Canada's economy, for example, while increasingly knowledge-based, still has significant components based on natural resources and heavy industries (e.g., aluminum, mining and smelting, petrochemicals and forestry), which account for 60 percent of industrial energy demand. Moreover, the distances between centres of production and where the products are consumed tend to be large. As a result, the energy intensity of combined industry, residential/commercial and transport sectors of the Canadian economy in 1996 was approximately 0.29 (tonnes of oil equivalent per US\$ 1,000 at 1990 prices and exchange rates) compared to energy intensity for these sectors averaging from 0.11 to 0.15 for countries such as the U.K., Germany, France and Italy.

Trade Relations

Many countries depend on trade to different degrees. Those more dependent on trade need to pay special attention to both the competitiveness impacts of climate change policies and measures as well as the impacts on GHG inventories of energy intensive goods being exported.

- In 1997, exports represented 40% of the value of Canada's GDP, with 78% of exports destined for the USA. For the USA, exports represented 12% of its GDP, and for the G-7 as a whole, 18% of GDP. Thirty six percent of Canada's exports are energy-intensive, resource-based commodities.

- In 1997, more than 50% of Canada's oil and natural gas production was exported to the USA. Canada's exports of oil and gas, over the period 1990-1997, were responsible for about 26% of Canada's total GHG emissions growth. During the same period, the growth of greenhouse gas emissions due to oil and gas production for Canada's domestic consumption represented only 5% of total emissions growth.

Demographic circumstances:

Total population and population growth are factors that influence the levels of GHG emissions and the selection of mitigative policies and measures.

Population growth rates vary considerably across countries. High population growth raises the demand for goods and services, dwellings, commercial buildings, and transportation infrastructure, which contributes to increasing demands for energy which in turn increases GHG emissions. Good practices need to address such circumstances.

- From 1990 to 1998, the annual population growth rate of large OECD countries such as Canada, the USA, Germany, France, the U.K. and Japan in the same period was 1.4, 1.1, 0.5, 0.5, 0.4 and 0.3%, respectively. Canada's annual population growth rate is the highest among G-7 countries and second highest among countries that have emission reduction commitments under the Kyoto Protocol.

Jurisdictional circumstances:

Not all countries have the same system of government nor the same jurisdictional responsibilities for addressing climate change. These aspects can influence significantly the development of P&Ms and need to be carefully considered.

In Canada, for instance, jurisdictional responsibility for action on climate change is decentralized and shared amongst federal, provincial, territorial, and municipal governments. Therefore, the federal government does not have the necessary constitutional authority to fully implement all aspects of international environmental agreements, including the Kyoto Protocol.

Canada's ten provinces, three territories and thousands of municipalities experience very different economic, geographic and demographic circumstances that create different GHG emission profiles. They use their jurisdictional responsibility to design P&Ms that are cost-effective and environmentally sound for their circumstances.

- For example, in Alberta, the projected rate of emissions growth is largely due to continued oil and gas production for exports, including accelerated oil sands development. In Saskatchewan, it is due to recent fossil fuel developments. British Columbia's emissions are expected to grow due to anticipated population increases and related transportation emissions. In Ontario, the increase in projected emissions includes, in addition to economic growth, the projected closing of several nuclear power plants and

the subsequent increased reliance on fossil-fuel-fired electricity generation. In Canada, the types of electrical energy production range from up to 94% from fossil fuel sources in some provinces, to 99% from hydro-electricity sources in others.

Consultation with stakeholders is also of paramount importance in the development of a national strategy to address climate change challenges. In 1998, Canada initiated a comprehensive consultation process, which included over 450 participants from all around the country, representing various orders of government, the private sector, environmentalists, academia, etc. This consultation process was viewed by Canada as a pre-requisite to major governmental action, given the complexity of the issues and the diversity of the regional and sectoral views with respect to addressing climate change. The Canadian approach is that governments should involve key stakeholders early in order to help determine the most promising solutions. This approach should also encompass all orders of government and all sectors of the economy, be balanced and equitable and ensure that limiting emissions must be done in ways that carefully consider Canada's national circumstances (e.g., international competitiveness and trade balances) and that would not cause an unreasonable burden or prevent economic growth in any region of the country.

Environmental and health circumstances:

Environmental and/or health benefits (e.g., the reduction of smog precursors in some urban centres) represent potential ancillary benefits associated with GHG reductions. However, how these benefits are realized will depend on such factors as geography and population density.

Canada's vastness is matched by its climatic diversity and complexity. As a result, climate change impacts will be experienced differently in various regions of Canada necessitating the development of flexible and tailored responses that are specific to a range of possible environmental and health circumstances. Assessment of the costs and benefits related to mitigative and adaptative P&Ms includes ancillary benefits, and is part of the decision-making process.

Canada's vast northern regions and varied and diverse coastal regions will necessitate strong, site specific adaptation measures in response to climate change. Adaptation as well as mitigation is a necessary part of the policy planning process.

- Permafrost underlies approximately 50% of Canada's current land area. These areas are at risk of thawing due to warming temperature trends and consequently putting at risk buildings, utility systems, roads, railroads, long-distance oil pipelines, and wildlife.
- Canada has 243,790 km of coastline which is more than six times the total coastline for the United States of America (USA), France, Germany and the U.K. combined. An example of adaptation is the 13 km long Confederation Bridge between New Brunswick and Prince Edward Island that was built higher than originally planned in order to accommodate potential sea-level rise during its life span.

Cultural Circumstances:

All countries have different cultural circumstances. Differences in people's lifestyles and attitudes should not be underestimated. The recognition of cultural circumstances in the development of P&Ms is a pre-requisite for effective governmental intervention.

Ownership of single detached dwellings in suburbs has become a general cultural norm in some countries and this type of housing requires more energy because of size.

- In Canada, fifty-seven percent of households are single, detached units. The Canadian single detached house has an average area of 1,442 square feet or 134 square meters. Canadian houses are also getting bigger: since 1996, new single detached houses have an average area of 1,797 square feet. Canadians tend also to buy larger domestic appliances to suit their lifestyles. For instance, in 1997 the average size of a refrigerator was 20.4 cubic feet.

Automobile ownership is high in Canada largely for reasons of necessity (due to urban sprawl and long distances between city centers) but also for convenience and comfort.

- In 1994, 83% of Canadian households owned a least one vehicle (cars and light trucks) compared to 72% of households in the European Union. The 1994 Canadian National Private Vehicle Use survey shows an average of 1.4 vehicles per household. The average number of vehicles per household in France, Germany and particularly the U.K. is lower. Moreover, in 1994, 53% of Canadians owned at least one car (automobiles only) and 20% owned two cars or more.

The section above has demonstrated how national circumstances can vary considerably between countries and even within countries. As a result, in Canada's view, policies and measures

selected to address the climate change challenge should be equally varied, reflecting each country's own unique circumstances.

3. Canada's Program Experience

Canada's program experience is substantial. An annual federal government investment in recent years of \$200 million has supported research, technology development and deployment, energy programs and public education. The federal government also has a number of tax policies to encourage emission reductions, ranging from an exemption from the federal excise tax on lower carbon fuels such as ethanol and methanol, to allowing higher capital cost allowances under income tax regulations for the use of energy efficient and renewable energy technologies.

A recent survey by the International Energy Agency of its 25 member nations showed that Canada leads in the number of implemented energy-related P&Ms (fiscal, market, regulatory, research and development, and policy process) and in the number of implemented energy-related P&Ms to reduce emissions in sectors (buildings, transportation, energy, etc.).⁴ These activities are projected to reduce GHG emissions by approximately 60 megatonnes by 2010 (emissions would be about eight percent higher in 2010 without these initiatives).

This program experience was further strengthened on February 29, 2000, when the Federal Government announced in its budget, new funding and initiatives to address climate change, totaling more than \$600 million over the next five years. Announcements include: renewal of the Climate Change Action Fund (CCAF) and investment in proven energy efficiency initiatives; creation of the Sustainable Development Technology Fund; enhanced climate research capacity; establishment of two complementary funds to help municipalities to strengthen their sustainability, notably to assist municipalities with energy efficiency projects and green infrastructure projects; and funding for expanded federal government purchases of "green power".

Furthermore, after eighteen months of in-depth inter-governmental and stakeholder consultations and analyses, Canada is now entering a stage of confirming among governments the principal elements of its national implementation strategy on climate change and the strategy's first business plan, which should be ready by the end of the year 2000.

Both Canada's existing and future program experience on climate change is guided by consideration of our own national circumstances. In the paragraphs that follow, we offer a sampling of how national circumstances have influenced our program design so far.

Residential Programs:

As a consequence of high population growth rates from 1990 to 1997, the number of Canadian households increased by 13.4% (1.4 million units), and there has been also a trend to construct larger single detached houses. More than 80% of residential energy use is for space and water heating. Canadian governments, in their attempt to improve energy efficiency in space

⁴ **IEA Standing Group on Long-Term Cooperation, *Policies and Measures to Mitigate Climate Change: Update on the Development of the IEA Database, February 8, 2000***

conditioning and thus reduce GHG emissions, and energy utilities, in seeking to address peak demand, have implemented initiatives to improve the economics of higher energy efficiency and to draw consumers' attention to the value of investment in energy efficiency improvements⁵.

However, considerations such as average temperature and energy prices vary across the country. Regional circumstances and other considerations can be addressed through voluntary cooperation with local partners and delivery agents or through performance-based outcomes (i.e., based on local conditions), rather than uniform prescriptive regulations. For example, the federal government has programs (cited in parentheses):

- to increase the energy efficiency of new buildings by helping to develop model energy codes that specify minimum levels of thermal performance and compliance paths, but are sensitive to particular (i.e. regional) circumstances, and by encouraging provincial and municipal jurisdictions to incorporate these provisions into their building codes (the Model National Energy Codes for Buildings and Houses).
- to develop new home design standards that provide relatively high levels of energy efficiency and contribute to reducing GHG emissions (the R-2000 HOME Program);
- to encourage Canadians to consider energy efficiency when undertaking home renovations by providing targeted consumer information in cooperation with the retail, manufacturing and utility sectors (the RenoSense Program);
- to improve the energy efficiency and the environmental impact of Canadian low-rise housing by providing unbiased evaluations of house energy use and recommendations for improvement (the EnerGuide for Houses Program);
- to encourage consumers to purchase energy efficient household electrical equipment and appliances through a labeling program (Energuide for Equipment Program) and through minimum energy performance levels for products (Energy Efficiency Regulations). For example, the average energy consumption for new refrigerators has fallen from 1,018 kWh/year in 1990 to 661 kWh/year in 1997;
- to incorporate energy efficiency features into the design and retrofit of commercial, institutional and multi-unit residential buildings owned by the private sector, municipalities, provinces or federal institutions (the Commercial Building Incentive Program, the Energy Innovators Initiative and the Federal Buildings Initiative).

P&Ms like those outlined above have been identified as good practices because they have helped hold CO₂ increases over the period 1990-1997 to only 2.1% in the growing residential sector, while at the same time respecting regional and local circumstances.

⁵ **More information about Government of Canada's energy efficiency programs can be found on the Web at <http://oee.nrcan.gc.ca>**

Industry Programs:

Because of the high proportion of energy-intensive industries in the Canadian economy and the importance of international trade, Canadian industry requires ongoing technical advancement, institutional flexibility and training to remain competitive, particularly in the North American free trade arena, and to facilitate adherence to trade agreements.

Given this specific competitive context, Governments work toward an institutional environment (e.g., voluntary approaches, regulatory, market, and information support) that ensures transparency, fairness to all market participants and a stable basis to encourage investment. In this context, the federal government uses programs targeted to technical advancement and voluntary mitigative initiatives.

Technical advancement

The Industry Energy Research and Development initiative encourages and supports the development and application of energy-efficient and environmentally responsible processes, products, systems and equipment in all industrial sectors. It shares technology development costs with industry.

Canada is a world leader in fuel-cell technology. Companies like Ballard of Vancouver are working with major vehicle manufacturers to produce fuel-cell powered cars. The Government of Canada, in the collaboration with the private sector, has launched the \$30-million National Fuel Cell Research Innovation Initiative.

Voluntary initiatives

The Government of Canada has supported voluntary climate change initiatives to ensure that Canadian businesses and industries can adopt cost-effective mitigative actions in a competitive national and global market. It has programs:

- to help Canadian industry to remain competitive and at the same time limit its GHG emissions by improving energy efficiency. The Industrial Energy Efficiency Initiative, is a unique voluntary mechanism between the federal government and Canadian industry that is given effect largely through sector task forces representing almost 90% of secondary industrial energy demand in Canada. The program includes sector-specific targets for energy efficiency improvement and the development of action plans to achieve them. Since the beginning of the early 1990's, this program has contributed to significant energy improvements. For example, over the period 1990 to 1997, the 3,000 companies participating in the Canadian Industry Program for Energy Conservation (CIPEC) experienced an overall decrease in energy intensity of 0.9% per year, while their economic growth averaged 2.3% per year.
- to help organizations in the commercial and institutional sectors contribute to environmental objectives by voluntarily investing in energy efficiency improvement and by registering a commitment to improve their energy use (the Energy Innovators and

Energy Innovators Plus Initiatives). These programs employ partnerships with a range of important associations.

- to encourage Canadian companies and organisations to voluntarily commit to individual actions to limit GHG emissions through registration with the government-initiated, but private sector-led Voluntary Challenge and Registry Inc. (VCR Inc.). The VCR Inc. has over 650 participants with action plans, representing 78 percent of GHG emissions from all sectors. When registered under this program, companies and organizations gain greater public accountability for their GHG emissions while maintaining optimum economic performance, while respecting jurisdictional authority and regional differences.

Jurisdictional Cooperation:

As discussed in section 2 of this paper, Canada's constitutional separation of powers necessitates cooperation between federal, provincial, territorial and municipal orders of government (e.g., on regulatory initiatives). To facilitate cooperation, the federal government has employed such approaches as letters of cooperation, federal-provincial committees and the current national implementation strategy process related to the Kyoto Protocol. This pattern of cooperation has provided frameworks to encourage greater energy efficiency and to address Canada's goals related to climate change.

Transportation Programs:

Canada has a relatively high and growing demand for energy for freight and passenger transportation. This, combined with long distances for passenger and freight travel requires a number of policies and measures in the transportation sector. In designing program options, governments have to be cognizant of competitiveness in the freight transportation sector, of the different issues facing inter-urban and intra-urban transportation systems, and of the variances among urban communities in terms of physical and economic geography. The fact that jurisdiction for transportation in Canada is shared among the three orders of government also plays an important role in the design and selection of transportation-related policies and measures. For example, the federal government has programs (cited in parentheses):

- to inform consumers about the fuel efficiency of new cars, light trucks and vans and to encourage car manufacturers to make more fuel-efficient vehicles (the Vehicle Fuel Efficiency Program).
- to educate and bring about behavioural changes to improve energy efficiency and reduce carbon dioxide emissions from personal vehicle use (the AutoSmart Program).
- to encourage consumers to purchase models that consume less fuel (the EnerGuide for Vehicles Initiative).

- to lessen the environmental impact of public and private sector fleet operation and management practices (the FleetWise and FleetSmart Programs).
- to promote the development and use of alternative transportation fuels such as propane, natural gas, methanol, ethanol, electricity and hydrogen fuel cells (the Alternative Transportation Fuels Program).

Due to more drivers, more vehicles and shifts in modes of transport, energy use would have increased in the transportation sector by approximately 22% over the period 1990-1997, had it not been for energy efficiency improvements which held the actual increase to about 13%. CO₂ emissions increased 13% as well over this period.

Other Programs and Initiatives:

There are other federal information initiatives for the public to encourage Canadians to take action to address climate change, such as the \$30 million program on Public Education and Outreach under Canada's Climate Change Action Fund.

As well, there are numerous research, development and deployment initiatives to reduce emissions, ranging from solar and wind power to CO₂ capture and storage in coal mines and oil wells. Canada also employs a highly effective approach to public-private sector funding of initiatives. For example, the Technology Early Action Measures (TEAM), is a federally-led program designed to promote new technologies to reduce GHG emissions. To date, its \$60 million budget from the Climate Change Action Fund has levered funds from the private sector, provincial and municipal governments and other federal departments. Total project investment now exceeds \$600 million in funding for domestic and international technology projects.

Provincial, territorial and municipal governments, as well as the private sector and other entities have numerous mitigative initiatives in place. For a more complete listing of Canadian actions on climate change, readers should consult *Canada's Perspective on Climate Change: A Compendium of Canadian Initiatives*, also available on the Internet web site.⁶

4. Assessing Good Practices

When "best" or good practices are identified, they are done so largely based on limited or incomplete information and data on a specific sub-sector's base case and outcomes.

For example, in the residential sector, energy demand estimates for each end-use are derived through a calibration process that takes into account aggregate energy use and detailed data on the characteristics of buildings and household equipment. Assumptions and estimates have to be made about equipment and its use. Analysis includes determining the effects of space heating equipment (normal, mid and high-efficiency furnaces, electric baseboard heaters, heat pumps,

⁶ <http://www.ec.gc.ca/cc/cop5/comp/english/part1/part1.htm> (also see parts 2 and 3 on the same site).

coal, wood and propane furnaces and dual systems), of space cooling equipment (room and central air conditioners), of appliances (refrigerators, freezer, clothes washer, electric and gas dryers, electric and gas ranges, dishwasher, televisions, etc.), of water heating, and of lighting. Also added to the equation are the types of interaction among different equipment (e.g., a more efficient refrigerator produces less heat transfer into the room, and in Canada's case where there is particular concern with heating needs, this in turn means more heating demand on the household heating equipment). Also the nature of the usage of equipment by household occupants needs to be analyzed. To estimate the effects of P&Ms and hence good practices for particular sectors or sub-sectors, obtaining good quality data is essential. This is neither an easy nor inexpensive task.

In view of the interaction of measures and data constraints, rarely can a specific amount of emissions reduction be attributed to a specific individual measure. There is often more than one measure aimed at influencing the same outcome (e.g., multiple measures to reduce energy use and emissions from buildings), as well as other factors (e.g., income and commodity prices) affecting behavioural change. Also, there are often difficulties, especially in a federal state, in separating out the influence of individual P&Ms of other levels of government or agencies (e.g., electrical and natural gas utilities). The effect attributed to a particular policy or measure is inextricably linked to assumptions about program outcomes (change in behaviour of the target group) and market impacts (changes in energy use and emissions). As a result, it is rare that one can say unequivocally that measure "x" has resulted in "y" tonnes of greenhouse gas reduction.

In the international context, problems in assessing the impacts of measures are multiplied, as there are significant data gaps and/or data reliability problems in assessing the impacts of P&Ms. In addition, modelling assumptions to estimate results vary considerably. As a result, using a weakly founded information base as a norm for identifying the emissions reduction impact of a certain policy or measure in one country, will in many cases not be applicable or acceptable for the same purpose in another country.

Despite inherent difficulties, Canada is active both domestically and internationally in working to improve relevant data analysis and use. For example, to improve data reliability, the Government of Canada has established a National Energy Use Database to enable regular collecting of detailed data on energy use and the characteristics of energy-using equipment and buildings in all end-use sectors of the Canadian economy. Data collection through major energy end-use surveys, such as the Industrial Consumption of Energy Survey, the National Private Vehicle Survey, the Survey of Household Energy Use, and the Appliance Shipment Database enables Canada to conduct more thorough energy use analyses and emission estimates. At the international level, Canada is a leader and an active partner in the International Energy Agency (IEA) in analyzing factors such as sectoral activity, structure, weather, energy intensity and the interaction among these factors, which influence the growth in secondary energy use and GHG emissions.

5. Conclusions

Canada strongly believes that the concept of *good practice* for combatting climate change, determined by each sovereign country according to its own national circumstances, is the most useful approach to implementing appropriate P&Ms. Each country will have unique circumstances which in turn dictate a unique set of P&Ms.

To the extent possible, existing mechanisms and current work should be fully utilized to move forward activities on P&Ms relating to the Kyoto Protocol. Organizations such as the International Energy Agency are already carrying out analytical work for exchange of information in this area.⁷ Additional work may be required. For example, there is little experience on estimating the effects of P&Ms on GHG emissions outside the energy sector.

Assessing good practices requires reliable and sufficient data, and good analytical and modelling capabilities. Analytical methods and results are country-specific and not necessarily applicable or acceptable to all countries, given their different circumstances and capabilities. Developing common criteria for assessment of “best practices” to be applied to all countries, would not be a fruitful exercise.

Within the UNFCCC meanwhile, it is Canada’s view that our efforts would be best spent on sharing lessons learned from P&Ms based on experience in the context of particular national circumstances. Such an information flow would allow countries themselves to determine if practices elsewhere are applicable, and modify them in order to have some chance of success within their own jurisdictions.

⁷For example, the International Energy Agency’s *Domestic Policies and Measures to Meet Kyoto Targets Project* (to be conducted from 1999-2001).

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For further information and links to other Canadian climate change Internet sites, please visit the Government of Canada's web site at: <http://www.climatechange.gc.ca>.