

NEWFOUNDLAND AND LABRADOR

Climate Change

Discussion Paper

June 2003



Government of Newfoundland and Labrador
Department of Environment

Message from the Minister



Climate change is one of the major environmental issues of our time. It has the potential to impact many aspects of our natural environment and, in turn, our relationship with the environment. While this province contributes relatively little in the way of greenhouse gas emissions, we will nonetheless be impacted by changes in our climate resulting from the global accumulation of these gases. Sea level rise, an increase in extreme weather events, and changes to the health of our natural resources are impacts that we may have to consider in this province.

We must therefore be prepared to do our part towards reducing the level of greenhouse gases in the atmosphere and look for ways to mitigate the impacts of climate change. Like other industrialized areas, we must look for ways to reduce our energy consumption and burning of fossil fuels and we must take advantage of low emission resources such as hydroelectricity and wind which can be developed to the benefit of this province.

This discussion document is an important step in developing a provincial response to the issue of climate change. I invite all Newfoundlanders and Labradorians to consider the options presented herein and hereby participate in the development of a provincial climate change action plan. Climate change is an issue that will impact us all and together we must plan the way forward.

Sincerely,

*R.D. (Bob) Mercer
Minister of Environment*

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BACKGROUND: WHAT IS CLIMATE CHANGE

Climate change is, to a certain extent, a naturally occurring phenomenon. However, scientists have concluded that human activities have led to an increase in atmospheric greenhouse gases (GHG), which is impacting the global climate. Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and ozone (O₃) are “greenhouse gases” that help insulate the Earth and maintain a temperature that can sustain life. Activities such as the burning of fossil fuels and deforestation have led to 30 per cent rise in carbon dioxide levels since the Industrial Revolution.¹ This, in turn, is changing the composition of the earth’s atmosphere. The increasing concentration of atmospheric greenhouse gases is causing temperatures to rise and affect the global climate. Carbon dioxide, as a product of combustion, is by far the most abundant greenhouse gas and its release is attributable to human activity. Other gases, such as N₂O, have more heat-trapping potential and a longer life span in the atmosphere.

Although the greenhouse effect is natural, the current concentration of GHGs in the atmosphere is impacting global climate change at a much faster rate and higher magnitude than is thought to have previously occurred in history. Over the last century, Canada’s mean temperature increased by 1°C and the average global temperature increased by 0.6°C. Even with the international efforts to curb GHG emissions, the average global temperature is expected to continue to increase 0.3°C per decade over the next century. This is a significant increase, considering global temperature has risen only 5°C since the last Ice Age.²

Global warming has caused serious climate-related impacts in recent decades, including rising sea levels and coastal flooding, global changes to the hydrological cycle with widespread droughts and low water levels in reservoirs and rivers, and extreme weather events such as severe storms and heat waves. Warmer temperatures are causing glaciers to retreat and permafrost to melt, affecting communities in the north. Although not necessarily attributable to climate change, annual climate-related disaster losses increased from \$5 billion to \$55 billion worldwide between 1965 to 1995,³ indicating that these types of disasters are very costly.

Historical note:

Changes in global climate occur naturally, impacting both the natural environment and human interaction with the environment. Thousands of years ago, glaciers reached as far as the edge of the continental shelf. The Grand Banks were in fact an island. During the Medieval Warm Period (1000 AD - 1200 AD), the Vikings were able to navigate previously ice-clogged waters and reached Newfoundland and Labrador. Viking settlement in North America was short-lived but evidence suggests that trading continued between the Norse and Inuit for centuries. When the climate later cooled, the Vikings abandoned their colonies in Greenland and trade in the Canadian Arctic.

IMPACT OF CLIMATE CHANGE ON NEWFOUNDLAND AND LABRADOR

Scientists predict that the impacts of climate change will vary across the country and within regions. Changes on the Island of Newfoundland will be different from those predicted for Labrador. It is clear climate change could greatly impact regional economies and lifestyles. However, not enough is known about the potential local impacts and more research is needed. Significant impacts identified for coastal regions likely to be felt in Newfoundland and Labrador include:

Rising sea level and vanishing coasts: Sea level has been rising in most of Atlantic Canada for thousands of years due to slow warming trends, melting polar ice and thermal expansion. Rising sea level and increased wave-energy at the coast will intensify erosion and destruction of coastal structures. The Intergovernmental Panel on Climate Change predicts that global sea level may increase 50 cm by the year 2100.⁴

Changes to sea ice: Sea ice is expected to become thinner and less extensive. This could have positive impacts on marine transportation and the oil and gas industry. However, in other areas, such as the Gulf of St. Lawrence, the loss of protection provided by ice may make the coastal areas more vulnerable to erosion from wave action and storm surges.

Storm surges and coastal flooding: Climate change is expected to result in more extreme weather events, such as hurricanes. The increase in frequency and intensity of storms also increases the risk of flooding of coastal areas with major impacts on coastal infrastructures, including saltwater intrusion into coastal drinking water aquifers.

Fishing sector: Changes to ocean temperature and currents could influence distribution and migration patterns of important fish species. Growth rates and recruitment could also be affected.

Forestry and agriculture industries: These areas could be impacted by changes to air and soil temperatures that may positively influence growth rates of plants and trees, but may also lead to more severe insect outbreaks. Also, increased severity of storms may damage crops and forests through erosion, ice, blowdowns or fires.

CLIMATE CHANGE ON THE INTERNATIONAL AND NATIONAL AGENDAS

Global climate change became an international concern in the early 1990s. Since then, governments, including those in Canada, have been involved in initiatives both to better understand the science and to reduce GHG emissions. At the 1992 Earth Summit in Rio de Janeiro, Canada signed the United Nations Framework Convention on Climate Change (UNFCCC), the first major international agreement on climate change.

In 1997, Canada was involved in negotiating the Kyoto Protocol, an addendum to the UNFCCC that set binding reduction targets for industrialized countries. Canada's target was to reduce GHG emissions to six percent below 1990 levels between 2008-2012. Shortly thereafter, the Prime Minister and premiers directed federal, provincial and territorial Joint Ministers of Energy and Environment to initiate a process to examine the impact, costs and benefits of implementing the Kyoto Protocol. This National Climate Change Process led to the development of a National Implementation Strategy and the First National Business Plan to address climate change. These were adopted by the Joint Ministers of Energy and Environment in the year 2000.⁵

The federal government released its *Climate Change Action Plan for Canada* on November 21, 2002. Canada then formally ratified the Kyoto Protocol on December 17, 2002. Uncertainty remains around the implementation of the *Action Plan* and the impact of ratification on the various sectors and regions throughout the country. Some provincial governments have taken the initiative to develop climate change plans for action within their own jurisdictions. In the federal budget of February 18, 2003, the Government of Canada allocated \$2 billion to be spent over five years on the implementation of Canada's climate change plan. The federal government plans to increase support for technology and sciences and provide tax incentives for renewable energy. Some of this allocation will be used to build partnerships with the provinces. The extent to which Newfoundland and Labrador will be able to collaborate with the federal government on the implementation of the national plan remains to be seen. It is in the Province's interest, however, to examine and discuss the opportunities for partnerships with the Government of Canada. To do this, the Government of Newfoundland and Labrador must first have a clear idea of the priorities and goals of Newfoundlanders and Labradorians with respect to action on climate change. This document is intended to help engage citizens and stakeholders in the process.

THE PURPOSE OF A PROVINCIAL PLAN

The Government of Newfoundland and Labrador acknowledges climate change is a serious environmental issue and efforts are needed to stabilize, and even reduce, greenhouse gas emissions. At the national level, Canada has committed to lowering emissions in accordance with the Kyoto Protocol, which is expected to come into force when Russia has ratified. Although the federal commitment to the Protocol does not bind the Province to any specific course of action, some goals in the federal plan may coincide with those of the Province or there may be some jurisdictional overlap that would necessitate involvement at the provincial level. The Government of Canada has announced its intention to work with “partners” at the provincial, territorial and municipal levels to implement its plan. Where our provincial climate change objectives can be met, and where provincial interests can be promoted, the Province may be open to these partnerships.

Many of the environmental and development challenges facing the Province today are intertwined. A provincial climate change plan would thus complement many of Government’s policy objectives and existing strategies. For example, a plan could be supported by the recently released *Newfoundland and Labrador Waste Management Strategy*, which sets out a ten-year program to reduce the amount of waste sent to landfills by 50%. Better waste management, by reducing methane generation in landfills, can have the effect of reducing greenhouse gases as a co-benefit. The Department of Mines and Energy is currently undergoing a public review of the provincial *Electricity Policy*. Decisions made during this review will have implications for the options available for renewable energy and energy efficiency initiatives.

The Province has already committed to action on climate change through its participation in the Conference of the New England Governors / Eastern Canadian Premiers (NEG/ECP).⁶ The text of the NEG/ECP *Climate Change action Plan* can be viewed at <http://www.cmp.ca/negecp/en-ccap.pdf>. Commitments under this agreement will be incorporated into the province’s own climate change action plan. As part of this commitment, Government is currently developing a House-In-Order Strategy to address emissions reductions and the overall environmental sustainability of internal government operations.

A climate change plan would also assist Government in long-term planning to deal with the impacts of a changing climate. Even with large reductions in GHG emissions, climate change is expected to continue due to the concentration of gases already accumulated in the atmosphere and the dynamic nature of the global climate system. Adaptation measures will need to be developed to protect the natural environment and further growth and development of our provincial economy. Government would like to develop an adaptation strategy that minimizes negative impacts and maximizes opportunities. There is a cost for actions to cut emissions, but on the positive side, there are environmental and economic benefits, including: reduced air pollutants, health care savings, new investment and employment in the building and energy industries and energy cost savings. There is some indication that the associated benefits of climate change actions may even outweigh the costs of these actions.⁷

GUIDING PRINCIPLES

Government proposes the following principles to guide the development of an action plan on climate change. The public is invited to consider these principles and provide input on whether these are the most appropriate.

Showing Leadership

The Provincial Government, through the Minister of Environment, will spearhead the provincial response to climate change. While we expect any action plan to encourage broad-based actions through external initiatives and policies, Government will also continue to lead by example by improving energy efficiency and reducing waste from internal operations.

Raising Public Awareness

Through individual and collective action and appropriate consumer choices, the public can contribute to achieving our objectives. We can choose to use energy and resources more wisely and thereby reduce GHG emissions. Public education is essential to affect change in behaviour and lifestyle. In turn, public input is required to educate Government and other decision-makers about concerns, areas of interest and existing gaps in knowledge related to climate change.

Engaging Stakeholders

As local awareness grows on this subject, feedback from the public will help to inform Government's decisions on mitigation and adaptation activities. The success of a provincial action plan will depend on a co-operative effort in all sectors. Local organizations and industry will be engaged in the development and implementation of any plan. This will encourage support for the plan and identify economic opportunities for wide-ranging GHG reduction measures.

Promoting Investment

Targeted measures are policy instruments such as efficiency regulations; building and housing codes and standards; afforestation and reforestation; and incentives that encourage investments in increased efficiency in the utilization of energy and natural resources. The Province, in collaboration with stakeholders, aims to identify and promote economically viable ways to achieve GHG reductions. While many opportunities, such as retrofits of health care and other public sector facilities, have already been successfully acted upon, other opportunities for energy efficiency improvements remain untapped.

Promoting Strategic Opportunities

Government views climate change not only as a challenge, but also as an opportunity for developing areas where the Province has a strategic advantage. The development of clean energy sources, such as hydroelectricity, is one area that Government will promote.

Achieving Environmental Objectives

Government takes the view that many of the initiatives to address climate change can also act as mechanisms towards achieving results in other important policy areas, such as waste management, energy development, coastal zone management and air quality.

Reporting on Progress

As part of our ongoing dialogue with stakeholders and commitment to transparency, Government will report annually on local climate change initiatives and the progress made toward achieving emissions reductions.

CHALLENGES FOR NEWFOUNDLAND AND LABRADOR IN ADDRESSING CLIMATE CHANGE

Economic Development

Newfoundland and Labrador's climate change plan must be a balanced approach that reduces greenhouse gas emissions in the Province without impeding the continuing growth and competitiveness of the provincial economy. Government believes this can be achieved by first promoting voluntary, "no-regrets" measures that would pay for themselves or achieve other policy objectives not specifically related to climate change. The approach must take advantage of the Province's strategic resource interests, such as hydroelectricity, the development of which would result in lower emissions by displacing other energy sources. However, the Province must also develop a plan that treats our other industries, such as oil and gas, fairly and recognizes the contribution these industries make to the provincial economy.

Public Awareness and Interest

A provincial plan must highlight the relevance of climate change and engage the public in developing solutions to conserve energy and reduce GHG emissions. The process of climate change is complex and not fully understood, even by scientists. Nonetheless, climate change and subsequent policies related to mitigation and adaptation are expected to have significant long-term environmental and socioeconomic impacts. It is important to understand these impacts and to communicate the issues to the public at large. The success of a provincial plan will depend largely on stakeholder involvement and commitment.

Population and Geography

The overall GHG emissions in the Province account for less than 2 percent of Canada's total emissions. Per capita emissions for Newfoundland and Labrador in 2000 were 16.4 tonnes/person, well below the national average of 23.6 t/person.⁸ Lowering total emissions will be a challenge for the Province, given our harsh climate, large land area and low population density. Particularly challenging will be lowering emissions from the transportation sector, which contributes the largest percentage to provincial emissions. Despite these limitations, any provincial plan must promote energy conservation and reductions in GHG emissions wherever possible.

Long-term Planning

The issues around climate change are long-term in nature and go well beyond typical planning horizons. A climate change strategy includes decisions about the direction of the economy; the efficiencies we can achieve at all levels of society; and the development of new technologies and infrastructure. Policy-makers, industry sectors and the general public are challenged to respond to broad, long-term concepts and to integrate these concepts into local decisions and planning.

CONCEPTS FOR DISCUSSION

This section outlines priority areas where actions are already taking place in the Province and where more achievements can be made. The purpose is to inform Newfoundlanders and Labradorians of actions already underway in this Province and to solicit comments on whether these actions constitute an appropriate response to the challenge of climate change. The public is asked to consider the actions presented under each priority heading to determine whether these fit with the vision we all share for the future development of our Province.

A. Public Awareness and Education

Government would like to build an awareness and understanding about climate change among the people of Newfoundland and Labrador. As noted earlier, education around climate change is a challenge due to the complexity of the issue, yet must be a key component to the Province's response.

Unlike other parts of Canada, there are few non-governmental organizations in this Province involved in activities related to climate change on an ongoing basis. One exception is the Conservation Corps of Newfoundland and Labrador (CCNL), which currently is the host organization for the *Climate Change Education Centre*. This Centre is part of a national network of public education and outreach hubs. It is funded jointly by Environment Canada, the Department of Environment, Newfoundland and Labrador Hydro and private industry. The Centre has been involved in a number of valuable initiatives such as creation of a Climate Change Drama Team during the summer of 2002, production of a twelve-hour climate change radio show and involvement in a number of public presentations and information sessions.

The Department of Environment routinely responds to requests for information on climate change. Representatives of the Department have participated in presentations to groups such as the Homebuilders Association and the *Smart Taxis Encouraging Environmental Respect* (STEER) group. The Department also collaborated on the production of a children's book on climate change with the Newfoundland and Labrador Federation of Agriculture by providing funding and technical information.⁹ Further collaboration with other interest groups is envisioned and will be pursued in the future. For example, there may be opportunities for development of partnerships with municipalities to educate residents and homeowners about energy conservation and individual actions that reduce GHG emissions.

In order to be successful in educating the public and raising the profile of climate change issues in this province, some consideration will have to be given to long-term funding for educational activities as well as the appropriate roles for Government and non-governmental organizations (NGOs). The CCNL currently receives funding from Government on a year-by-year basis. This arrangement does not allow for any long-term development of effective public education programs nor retention of trained staff.

A. Public Awareness and Education (continued)

QUESTIONS FOR DISCUSSION

What does the public know about climate change science and impacts?

Is the public interested in knowing more about the topic of climate change?

Are there specific target groups that should be educated on this topic (e.g. youth, homeowners, small business owners, etc.)

Are homeowners sufficiently aware of ways in which they can reduce greenhouse gases?

What is the most effective way to inform the public?

What role should schools, provincial government, municipalities or local non-governmental associations take in climate change education? Who should take the lead?

How can climate change be addressed in post-secondary settings? What possibilities are available for partnership?

B. Technology Development and Innovation

Government would like to advance new and emerging climate change technologies by fostering collaborative research and development and exchange of information between governments and stakeholders. The energy sector is in the position to promote innovative technologies with low GHG emissions. Other opportunities may exist in the forestry and marine sectors. The business environment can certainly be enhanced through analysis, promotion and export of new technologies.

In the recent 2003 federal budget, The Government of Canada announced funding of \$250 million for Sustainable Development Technology Canada to encourage the development of greenhouse gas reducing technologies. Companies in this province will be encouraged to apply for this funding and the Province will facilitate project development where appropriate. Provincial funding for research, development and commercialization has not been determined.

QUESTIONS FOR DISCUSSION

How can Government promote technology development that will lead to reductions in greenhouse gas emissions?

Are there technologies that can help us to adapt to the challenges of climate change?

Are there opportunities for development of niche markets?

Do we have the capacity in this Province to develop the appropriate technologies?

To what extent should the provincial government be involved in the development of climate change technologies?

Is there potential for demonstration projects?

C. Understanding Climate Change Impacts and Adaptation Strategies

Government will develop a plan to improve our understanding of climate change science and its impacts as well as the effectiveness of mitigative actions. Research is needed to look at the environmental, economic and social implications of climate change and corresponding mitigative and adaptive actions. Since climate change is already occurring, the Province needs to pay particular attention to immediate impacts and to incorporate these impacts into long-term planning.

The Climate Change Impacts and Adaptation Program (C-CIARN) of Natural Resources Canada provides funding for research on climate change impacts and adaptations on a number of issues such as health, tourism and recreation, coastal zones, water resources and transportation.¹⁰ The Department of Environment is exploring opportunities to work with Memorial University to take advantage of this and any other funding sources. There is also a role for the private sector to explore opportunities in developing solutions to climate change impacts and problems.

In a province where the majority of the population resides near the coast, climate change impacts such as rising sea level, storm surges or flooding are of particular interest. A provincial coastal development plan may be one way to address vulnerabilities of coastal communities.

Climate change is expected to have impacts on human health. It is likely that Newfoundlanders and Labradorians will not be immune from these impacts. We are already seeing the introduction of new pathways for diseases not previously present in this province. Lyme disease, a tick-borne bacterial disease found sporadically in Canada is predicted to become endemic to more areas with increased temperature. The tick that acts as a host for this disease was identified for the first time on the Island of Newfoundland in the mid 1990s.¹¹ Research is being conducted on this issue but more linkages could be made between the research community and policy-makers in this province.

Projects may be developed with a special focus on Labrador or aboriginal issues. Initiatives are being developed in other jurisdictions to address unique northern climate change opportunities and challenges. The Province can encourage and facilitate the participation of Labradorians in research and other projects on climate change and ensure that these issues are considered in policy decisions affecting the region.

QUESTIONS FOR DISCUSSION

What are the most significant impacts of climate change for Newfoundlanders and Labradorians?

Is it better to adapt to climate change than to mitigate impacts?

What is needed to adapt to climate change?

What should be priority areas for research?

Should the Environmental Assessment process require consideration of climate change impacts?

D. Leadership by Government

The Province has already taken steps towards reducing GHG emissions from internal operations through actions on energy efficiency and waste reduction, however the linkages are not always made between such activities and emissions reductions. Through a climate change action plan, Government will encourage province-wide actions through appropriate policies, programs, and legislation. A variety of “no-regrets” options are available and should be promoted both in terms of internal operations and external policies.

Government has been involved in energy performance contracts (financed from energy cost savings) for government-funded facilities by the Department of Health & Community Services and the Department of Works, Services, and Transportation. Facilities completed to date are 80% of health care facilities, 50% of government buildings, and 30% of schools. Figures from the Department of Works, Services, and Transportation indicate that current or completed retrofit projects are resulting in an annual emission reduction of 1,965 t of CO₂ equivalent. Future projects in the Avalon region should result in approximately another 2,000 tonnes of emission reductions annually. Through its experience in past 20 years on energy retrofit/energy performance contracting, indoor air quality, cogeneration and demand side management, Government has gained knowledge that could benefit local industries as well. There may be opportunities for partnerships with private industry on the development of a technical advice program for the commercial sector.

Newfoundland and Labrador is an active member of the Conference of New England Governors/ Eastern Canadian Premiers (NEG/ECP). This group has developed a Climate Change Action Plan, which outlines activities in a number of areas, including government “leading by example” programs.

The Department of Environment is moving forward on a government-wide *House-in-Order Strategy* to reduce greenhouse gas emissions from Government operations. The initiative corresponds with elements of the NEG/ECP Climate Change Action Plan and includes activities such as the establishment and reporting of GHG reduction targets for government operations, energy efficiency improvements for buildings and vehicles, the development of a green procurement program, and employee education.

The success of the House-In-Order initiative and achievements of commitments under the Conference of New England Governors / Eastern Canadian Premiers may require consideration of a centralized coordinating body or clearinghouse for information within Government. Despite excellent efforts on the part of some departments toward achieving energy savings, there has been no lead provincial government agency for energy conservation since the mid 1990s. Additional resources for coordination, monitoring, and reporting of climate change actions may also be needed. Canada’s ratification of the Kyoto Protocol signals the federal government’s intention to meet its GHG reduction targets; the federal government may therefore be interested in partnering with the Province to provide funding for monitoring of local actions.

Other initiatives that may come out of the House-In-Order Strategy and relate to the monitoring and reporting process include re-submission of Government's GHG reductions actions to Canada's Voluntary Challenge and Registry Program. Government has not participated in this program since the mid 1990s. Climate change could also be integrated into operating practices through the development of Environmental Management Systems in one or more departments or agencies.

Government can also become a leader in educating employees actions they can take as individuals to reduce greenhouse gas emissions. Employers across the country are becoming increasingly aware of measures to promote employee wellness and some of the activities that promote physical activity also reduce individual GHG emissions. Installation of bike racks at government office sites, for example, is a relatively simple initiative that would help to achieve both objectives.

QUESTIONS FOR DISCUSSION

What are the key departments in the development of a provincial climate change strategy? What should be the role of each department?

On what areas should Government focus to reduce greenhouse gas emissions from its own operations? Fleet vehicles, buildings, green procurement, climate change impact statements, departmental greenhouse gas reduction action plans, etc.?

Does Government need to set a target for emission reductions?

Should Government dedicate specific resources for emissions reductions measures from internal operations?

How should Government's achievements be reported back to the public?

Are there partners available for Government emissions reductions.

Should Government create an office/secretariat/branch to co-ordinate climate change or energy efficiency initiatives?

E. Sectoral Issues

i) Agriculture

Agriculture represents a relatively small sector of the provincial economy but yet the industry employs over 4000 people and has combined sales of approximately \$500 million annually for the primary and value-added levels of production. The major components of the industry are dairy (33%), chicken production (30%), egg production (14%) and greenhouse products (11%), but primary production also includes red meats, vegetables, fruits and fur.¹²

Greenhouse gas emissions from farms are mainly nitrous oxides, methane and carbon dioxide from non-energy sources, including fertilizers, manure and livestock.¹³ There may be some potential to modify agricultural practices in the Province to reduce GHG emissions and increase the content of

organic matter in the soil. Emphasis should be placed on ways in which the industry can adapt to climate change. For example, some consideration could be given to developing awareness programs for the industry on anticipated changes in temperature, precipitation and flooding due to climate change and how to adapt to those changes. Research opportunities may exist in areas such as crop and livestock genetics, integrated pest management crops, best management practices, market research for “green” products and modelling.

In collaboration with Agriculture and Agri-foods Canada, the Department of Forest Resources and Agrifoods has expressed interest in the development of a “life science economy”, that is, an economy based on new and alternative products and services derived from renewable biological material. These products include medical, health and food products, as well as new energy sources. Work currently taking place in the Province include breeding and testing programs for improvements of native small fruits, such as partridge berries and blueberries, and an emerging nutraceutical industry. Climate change may impact this developing sector.

The Newfoundland Federation of Agriculture has shown some interest in the issue of climate change. The Federation produces a series of children’s books to educate schoolchildren about agriculture. The latest highlights environmental issues of agriculture, including the sector’s impact on climate change.

QUESTIONS FOR DISCUSSION

What research opportunities exist in this Province related to agriculture and climate change?

What do farmers and others involved in this sector need to know about climate change?

How can the local agricultural sector adapt to a changing climate?

Is there potential in the province for green house gas “offsets” through tree planting or similar activities?

ii) Buildings

Much has been done in Newfoundland and Labrador in recent years to improve the energy efficiency of the residential, commercial and institutional building stock. As noted earlier, the Government of Newfoundland and Labrador has been involved in retrofitting many of its buildings through energy performance contracts. These projects are financed by the savings of energy expenses from the retrofits over a specified period of time.

The Newfoundland and Labrador Home Builders Association administers the R2000 Program in partnership with Natural Resources Canada. This program promotes energy efficient house designs that meet stringent standards and provides training and support for builders.

One method for encouraging energy efficiency in the building sector could be the adoption of the model National Energy Codes for Houses and Buildings by the Province or individual municipalities. The National Energy Code has not yet been adopted in any jurisdictions and the home building industry is especially against implementation of the Code for fear that the added costs will slow down growth in the industry. More research on energy modelling is needed to determine potential and real energy savings resulting from renovation activity and to validate whether energy savings are actually achieved and worth the costs to implement them. Until recently, the Conservation Corps of Newfoundland and Labrador ran an EcoTeam Program that operated as the delivery agent for the EnerGuide for Houses in this province. This program of Natural Resources Canada offers homeowners advice on improving the energy performance of their homes. The EcoTeam's delivery of the EnerGuide for Houses was quite successful. It was ranked second overall across Canada in terms of energy evaluations completed per capita and the EcoTeam also conducted the highest proportion of rural community evaluations. The program was based on a cost sharing arrangement between the federal and provincial governments and the private sector. Lack of sustainable funding for the program has led to the termination of the program. The most appropriate mechanism for sustained funding for this type of program will have to be determined if such programs are to continue in the future.

With respect to the institutional buildings, the health care sector has made substantial investment in energy retrofit in the last eight years (primarily in the major facilities and new construction), there still remain a significant number of facilities that need investment in energy retrofit work. There are many lessons to be learned from the experience in this area:

- ▶ A comprehensive retrofit program for smaller sites (clinics, etc.) cannot be funded only through resultant energy savings. Improvements related to comfort and air quality, replacing aging heating, ventilation, and air conditioning systems, addressing environmental issues (e.g. asbestos, fuel storage etc.) will require additional financial resources.
- ▶ Many of the existing health care Energy Performance Contracts have required significant board operational savings commitments and cash down payments as a result of these environmental liabilities and the need for replacing aging equipment. This has resulted in longer term projects (10+ years payback).

- ▶ The biggest challenge under these projects are not the tried and true measures (energy efficient lighting, better controls and automation, building envelope, fuel conversions etc.) that have very consistent paybacks. Environmental liabilities and the need for a replacement program for major building systems are the biggest financial challenges.
- ▶ Any investment in energy efficiency and upgrades must consider future versus current services. Remaining life of facilities and changing health services are important factors in making energy efficiency investment decisions.

Communication to the public of government's achievements in the health sector and government buildings generally is essential if government is going to lead by example. The private sector (through Energy Service Companies for example) also have a role to play as do the utilities in promoting energy awareness and financing retrofits.

QUESTIONS FOR DISCUSSION

What measures are needed to encourage homeowners and others to invest in energy improvements?

How can homeowners be educated about climate change and energy efficiency?

Should energy/building codes be adopted by the Province and/or municipalities?

Should energy standards be introduced for equipment and appliances?

iii) Electricity

There are various issues for discussion around the development of the electricity sector and climate change. The Province would like to promote efficient electricity use in all sectors and the development of low-GHG technologies for electricity generation. Much of the Province's electricity is already generated from hydroelectric sources. As indicated in the 2003 *Speech from the Throne*¹⁴, the Province considers hydroelectricity in Labrador to have the potential to make a significant contribution to reducing national GHG emissions levels, an issue the Province intends to explore with the federal government in the coming months.

The undeveloped Lower Churchill hydro resource in Labrador includes two potential projects. A 2000 MW plant at Gull Island and an 824 MW plant at Muskrat Falls. Gull Island is the more economically attractive of the two potential developments. The Gull Island project could displace approximately 9.3 megatonnes per year of CO₂ emissions from an equivalent heavy oil thermal generation supply (11.4 megatonnes from coal generation). Muskrat Falls could displace an estimated 3.7 megatonnes of CO₂ from an equivalent heavy oil thermal generation supply (4.6 megatonnes from coal generation).

Other options with climate-change implications are contained in the consultation paper, *Electricity Policy Review*, and its companion document, *An Electricity Policy for the 21st Century, Options and Opportunities*, issued by the Department of Mines and Energy in March 2002.¹⁵ Among the options is the development of hydro sites on the Island. Recently completed projects include the 40 MW project at Granite Canal in the Bay d’Espoir system and the 32 MW Beaton Unit at Grand Falls combined with the upgrade at Bishop Falls in Grand Falls. Undeveloped potential include the 36 MW Island Pond project. There is little other large-scale hydro potential available on the Island that is environmentally acceptable today. Small hydro has some potential since it can be brought on in quantities that fit the Province’s projected electricity load growth. However, small hydro development, particularly on salmon rivers, is opposed by several environmental non-governmental organizations.

The *Electricity Policy Review* paper also discusses other sources of renewable energy generation, including industrial co-generation (power and useful heat fueled by wood waste and the pulp and paper mills or residual oil at the refinery), wind power, and solar energy. A 15 MW wood waste fired unit has recently been installed at the paper mill in Corner Brook. Newfoundland and Labrador has a strong wind regime and there may be potential for up to 200 MW of wind generation (approximately 10% of the total electricity generation capacity for the Island grid). However, the intermittent nature of wind generation often requires existing conventional capacity to be maintained as backup. While the cost per kilowatt hour from wind generation has fallen in recent years, it may still have problems competing with conventional sources. Currently a wind demonstration project is under development for St. Lawrence on the Burin Peninsula. There may also be some limited potential for solar energy that could be encouraged in any climate change plan, such as photovoltaic panels to generate electricity at remote sites such as lighthouses.

Changes to utility billing systems could remove disincentives to conservation through demand-side management programs. Under the present system, reduced electricity usage by a customer means reduced revenue for Newfoundland Power. This approach would also enable customers to opt to support “green” power sources (wind, biomass, solar) that may cost more.

Other options that could help to reduce GHG emissions from power generation on the Island, but are not cost effective at present are the construction of a power infeed line from Labrador and the development of offshore natural gas reserves. In the absence of significant industrial developments on the Island, an infeed line from Labrador would mean the shut-down of the thermal generating station at Holyrood, potentially saving as much as two million- tonnes of GHG emissions. However, this project is estimated to cost approximately \$2 billion and is not economically viable at this time. Natural gas development is not considered to be economically viable at this time either, given current technology. It may be a minimum of five and as much as 15 years before natural gas development becomes a viable option.

QUESTIONS FOR DISCUSSION

Should cost effective, environmentally appropriate small hydroelectric projects be considered as a means of reducing thermal generation?

What is the potential for wind energy, industrial co-generation (power and heat from industrial wastes), and solar energy?

Should the province invest in the development of alternative energies?

Is the public willing to pay more for electricity from 'green' power sources?

How do we balance local environmental impacts (e.g., from hydro development) with the global impact of GHG emissions?

iv) Forests

Forests play an important role in the global carbon cycle and are thought to influence levels of atmospheric CO₂. Throughout their lifecycles, forests can act as either *sinks*, reservoirs for carbon, or as *sources*, emitters of carbon. For example, when a forest grows it absorbs CO₂ and converts it into plant material, but when a forest is destroyed through activities such as land clearing or burning, it releases carbon into the atmosphere. Forest management practices can affect how much carbon can be stored, how long it is stored and how much will be released again.¹⁶

Newfoundland and Labrador will take part in evolving national initiatives on sinks as appropriate. The Department of Forest Resources and Agrifoods intends to work with Grenfell College to obtain Atlantic Innovation Funds to develop a carbon accounting model that is specifically designed for Newfoundland and Labrador forest conditions and will provide an accurate estimate of the potential for the Province's forests as sinks. If funding is provided, modelling is expected to begin in 2003.

The Newfoundland Forest Service is also partnering with the Western Newfoundland Model Forest and the Canadian Forest Service (Pacific Region) to develop a climate change model for provincial forests to accurately gauge a realistic value that the forests of the Island and Labrador can play as sinks.

Carbon sequestration has not to date been considered in the forest management planning processes or programs in the Province.

QUESTIONS FOR DISCUSSION

How can climate change issues be integrated in forest management practices in this province?

What research capabilities exist locally to assess the impacts of climate change on the forest ecosystem and the forestry sector?

How can this sector adapt to a changing climate?

v) Fisheries and Aquaculture

Fisheries was not developed as a discrete Issue Table of the National Climate Change Process (NCCP)¹⁷, but given the importance of this sector to our province, the issues are outlined separately here. The fisheries are intrinsically linked to environmental conditions although the exact linkage with climate change is difficult to ascertain. The Canadian fisheries sector tends to lag behind other sectors (e.g. forestry and agriculture) in terms of research on climate change impacts and potential adaptations. It is reasonable to assume that fisheries will be impacted by changes in fish productivity or distribution, predation, or extreme weather events resulting from global climate change.

Aquaculture can also be expected to be impacted by climate change. Aquaculture represents a rapidly growing sector of both the Canadian and Newfoundland and Labrador economies. The Newfoundland and Labrador aquaculture industry is primarily based on four key species: Atlantic Salmon, Steelhead Trout, Atlantic Cod, and Blue Mussels. The production value of industry in this Province in 2001 was approximately \$20 million and was estimated to top \$30 million in 2002.¹⁸ On the national scene, climate change has received little attention from the aquaculture industry. However, extreme weather, storm surges, coastal erosion, sea level rise are all likely impacts of climate change that can potentially impact this industry. Temperature changes may have both negative and positive impacts. Temperature affects sites and species suitable for farming as well as incidence of pests and disease.¹⁹ Long-term development of this sector will have to include strategies to deal with the potential impacts of climate change.

QUESTIONS FOR DISCUSSION

What are the vulnerabilities of the local fishery to climate change?

How can the local industry adapt to a changing climate?

What local research exists on climate change and this sector?

How does aquaculture fit with coastal zone management in light of impacts from climate change?

Are there opportunities for investment in biotechnology for species that can better withstand changes in environmental conditions?

Can climate change considerations be integrated into provincial policies (eg. additional controls or licensing on aquaculture?)

vi) Industry (Large Final Emitters)

This sector includes pulp and paper, mining, petroleum production and thermal electricity generation. These industries are among the major contributors to GHG emissions in this province. The federal climate change plan requires that the large final emitters as a group on a national basis reduce average emissions to 85% of business-as-usual projections. The federal plan calls for national level CO₂ emission targets to be set for industries under covenants to be negotiated between industries and government. It is thought that these covenants will be able to incorporate competitiveness issues and accommodate industry-specific circumstances better than an across-the-board approach. These covenants and associated targets have not yet been finalized, and may take up to two years to negotiate.

It is worth noting that local operations in the oil and gas and pulp and paper industries are owned by large national and multi-national companies. Since emissions reductions are not allocated by province, it is possible that these companies may choose to meet their GHG reduction targets at industrial sites outside the Province and local operations may not be affected to any great extent. Some local industries have been successful in making improvements in their energy use since 1990, which bodes well for local industry in terms of GHG intensity (GHG emissions per unit of output). The offshore oil industry, for example, has a good record in terms of GHG intensity as it uses relatively new, efficient technology. Also, during production, and as regulated by C-NOPB, much of the natural gas is reinjected into the reservoir rather than flared into the atmosphere.

Local industries are export-oriented and therefore compete on a world market. This means that the capability of local industries to make large investments to reduce their GHG emissions may be limited. Some industries have indicated that they are already committed to investments on other environmental issues and will need a clear picture of the priority areas.

The Province intends to continue dialogue with industry to be in a position to advocate climate change strategies that are in the interest of local industry.

QUESTIONS FOR DISCUSSION

Is emissions trading appropriate for the province's industries?

Should the province seek special arrangements for offshore oil and gas?

How can GHG emissions reductions be integrated with other environmental targets for large industry?

Are incentives needed for local industry to make investments in low GHG emission technologies? What form should such incentives take?

What should the role of the province be in negotiation of industry-federal government covenants?

vii) Municipalities

Municipalities can work to reduce GHG emissions from their own operations (buildings, vehicles, lighting and waste management) and through public education and outreach programs for residents. Municipalities in this province will also be key in development of any adaptation strategy. Coastal areas such as west coast south of the Port au Port Peninsula and the west coast of the Burin Peninsula may be impacted by climate change in terms of sea level rise and wave surges and awareness may have to be raised in these areas.

The federal climate change plan makes reference to a Partnership Fund to which municipalities will be able to submit proposals for funding. This fund has not yet been developed.

The Federation of Canadian Municipalities (FCM) administers a number of programs that can help individual municipalities take action on climate change.²⁰ The Municipal Building Retrofit Program offers education and training for municipal officials and energy audits of buildings. The Partners for Climate Change Protection (PCP) program helps municipalities develop local climate change action plans. The PCP sets out five milestones as a process for municipalities towards achieving emissions reductions. Four municipalities in this province have gotten involved in this program: St. John's, Gander, Conception Bay South and Marystown. The FCM also administers the Green Municipal Investment Fund which funds 50% for feasibility studies and 25% loans for projects in waste management, transportation and renewable energy.

QUESTIONS FOR DISCUSSION

How can more municipalities become involved in programs/strategies for reduction of greenhouse gas from municipal operations?

How can municipalities become involved in educating local residents about climate change?

What do municipalities need to do to adapt to climate change?

viii) Transportation

The transportation sector is responsible for approximately 40% of GHG emissions in this province and therefore deserves special consideration any climate change strategy. However, the long distances to be travelled, a small, dispersed population and the Province's lack of rail transport system will mean that it may be difficult to find realistic, cost-effective measures to reduce emissions in this sector. However, a climate change plan can encourage behavioural change in the transportation sector through increased public awareness and education, promotion of more fuel efficient cars and changes in driving behaviour, and voluntary commercial best practices. For vehicle fleets, fuel efficient vehicle replacements and improved maintenance can also be promoted. For example, the City of St. John's is involved in an environmental awareness program with a group of city taxi drivers. This group, Smart Taxis Encouraging Environmental Respect (STEER), has participated in a number of workshops with the goal of learning about climate change and discussing options for reducing GHG emissions and conserving energy.

There are other options that could also be considered. The Province does not currently have a motor vehicle inspection and maintenance program, but the new *Environmental Protection Act* includes provisions for such a program. Such programs have been implemented in other Canadian jurisdictions to address the issue of air quality and may have co-benefits for climate change. There may be opportunities to implement fiscal measures that encourage more energy efficient vehicle use, such as a climate change tax on the purchase of sport utility vehicles or discounts on the registration of hybrid vehicles or lightweight, fuel efficient vehicles. Environmentally friendly urban planning could be promoted more, such as bicycle paths in key commercial areas and new subdivisions or more compact urban planning.

QUESTIONS FOR DISCUSSION

What incentives are needed to encourage purchase of energy efficient vehicles?

How can climate change be better integrated into transportation planning?

Should vehicle inspection and maintenance programs be introduced?

What can be done to make public transit a more viable option in this province?

ix) Public Health Concerns

Canada and this province will be impacted by climate change. Potential health effects from climate change could be significant. Examples of health impacts would be increases in disease and death due to temperature extremes, water and food borne contamination and the emergence of new infectious diseases (e.g., vector borne disease).

Extreme weather patterns such as heat and cold waves, storms, droughts and floods can effect our health and well-being. “A warmer climate and its more extreme weather patterns can bring about an increase in illnesses such as asthma and allergies, respiratory and cardiovascular stress, especially in people who are not in good health, who work outdoors or in hot environments, in the elderly, and in the young. We, therefore, need to better understand how climate change can affect our health and well-being, and how we can best manage the risks which result from a changing climate.” (2002 National Climate Change Business Plan).

NEXT STEPS

This discussion paper represents a snapshot of climate change initiatives throughout the Province and offers some potential options for the way forward. It is not intended to be the definitive statement on the Province's position on climate change, nor does it represent the Province's response to the federal plan. Instead, the discussion document is intended to encourage dialogue on this issue among stakeholders in this province. Policy on climate change continues to be developed at the provincial, national and even international levels. Government is therefore interested in hearing from the public on what the priorities should be for actions on climate change in our continually developing and diversified economy.

Interested groups and individuals are encouraged to submit written comments up to September 2, 2003. Requests for additional information or clarification are also welcomed.

Please mail or fax to:

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ENDNOTES

1. See Government of Canada climate change website at <http://climatechange.gc.ca>
2. Natural Resources Canada
3. Insurance industry reports
4. IPCC THIRD ASSESSMENT REPORT
5. Except Ontario.
6. NEG/ECP RESOLUTION.
7. A recent report, *The Bottom Line on Kyoto: Economic Benefits of Canadian Action* (2002), by the Tellus Institute, on behalf of the Suzuki Foundation and the World Wildlife Fund, estimated the cost for Canada-wide GHG abatement measures to be \$4.0 billion and the associated benefits to be \$6.5 billion, a net savings of \$2.5 billion. The report is available at www.davidsuzuki.org.
8. Environment Canada. *Canada's Greenhouse Gas Inventory: GHG Trends Information from Environment Canada's Greenhouse Gas Division*. May 2002.
9. See D. Guillemette. *It's Up to Me: The Climate Change Challenge*. Newfoundland and Labrador Federation of Agriculture. 2002.
10. For more information, see http://www.c-ciarn.ca/index_e.asp.
11. Health Canada. *Identification of Ixodes Scapularis in Newfoundland, Canada*. Canada Communicable Disease Report. Vol. 26-16, 15 August 2000.
12. Department of Forest Resources and Agrifoods, Government of Newfoundland and Labrador
13. Agriculture and Agri-foods Canada. Environment Bureau. *Agricultural Greenhouse Gases*.
14. A copy of the Throne Speech is available at <http://www.gov.nf.ca/thronespeech/default.htm>
15. A copy of the document is available at <http://www.gov.nf.ca/mines&en/energy/policyreview/>
16. *Canada's Forests and the Global Carbon Cycle*, Canadian Forest Service, Natural Resources Canada.
17. Govt./Industry sector specific groups met and developed appropriate measures for each sector.

18. Department of Fisheries and Aquaculture, Government of Newfoundland and Labrador.
19. *Aquaculture and Climate Change: a discussion paper*, 2WE Associates Consulting Ltd. May 2000.
20. For more information, see www.fcm.ca



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