

# **Discussion Paper: New Brunswick and Climate Change**



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# Summary

## 1. Why should New Brunswickers be concerned about climate change?

The past decade was the warmest ever recorded. We have seen more extreme weather, like the drought most of Canada experienced in 2001 and 2002, winter storm surges that damaged homes and wharves on the coasts of New Brunswick, and the 1998 ice storm in Quebec and Ontario. People around the world are deciding that the risks of climate change are potentially high and that it is time to take action.

## 2. How could New Brunswick be affected by climate change?

The warming of the earth's climate is projected to cause changes in precipitation patterns, more frequent storms and sea levels to rise as glaciers and icecaps melt. New Brunswick's long coastline makes us particularly vulnerable to the impacts of climate change (Figure 1). Storms and rising seas would damage coastal bridges, wharves, roads, buildings and properties.

Long-lasting drought or intense flooding could affect our drinking water supplies, agriculture, and the health of our forests, natural resources on which we are economically dependent.

While the global patterns of climate change are becoming clearer, we don't know how quickly or to what extent climate change will occur in New Brunswick. Those uncertainties make it difficult to estimate what the costs or benefits might be.

## 3. What is causing global climate change?

A United Nations panel of scientists has stated that most of the changes in global climate are being caused by human activities. In the past 100 years, we have been burning more and more oil and coal while cutting more of the world's forests and using more land for agriculture. These activities lead to larger concentrations of carbon dioxide and other gases in the atmosphere each year. These "greenhouse gases" (GHG) trap heat and cause global temperatures to rise.

## 4. What can people do about climate change?

Responses to climate change fall into two broad categories: actions that can help reduce the amounts of GHG we are releasing and actions that can help us adapt to the effects of climate change. We can readily identify ways to reduce GHG emissions. It is more of a challenge to predict the ways we may eventually have to learn to adapt.

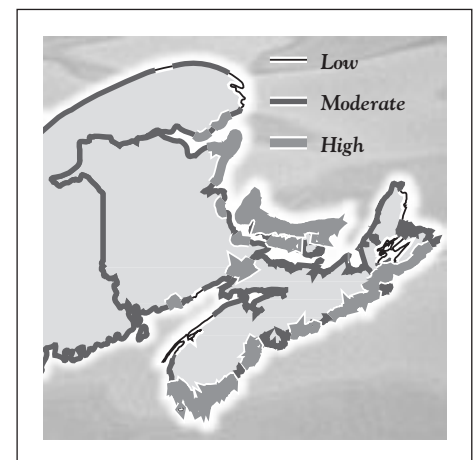


Figure 1. Coastline sensitivity to sea level rise.

### 5. What is the level of Greenhouse Gas emissions in New Brunswick now?

New Brunswick releases about 20 million tonnes of GHG each year. A small part comes from landfills and agriculture. Over 90% of the emissions are energy related from the burning of fossil fuels (Figure 2). Electricity generation and transportation account for three-quarters of the total energy-related emissions, with much of the remainder coming from energy used in industry and in commercial and residential buildings.

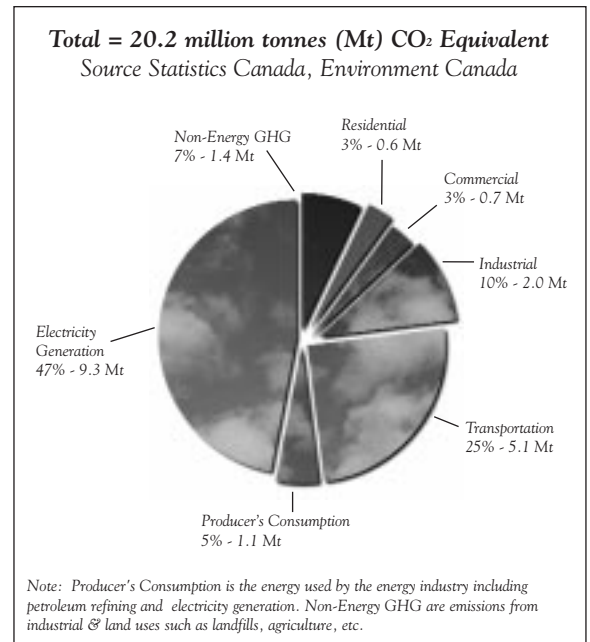


Figure 2. Greenhouse Gas Emissions in New Brunswick, 2000.

### 6. What can New Brunswick do to reduce its GHG emissions?

New Brunswick must identify options that can set the stage for significant long term emission reductions while producing some early results. We must give priority to the areas where we can make meaningful changes. New Brunswick is already working to reduce GHG emissions. Many successful energy efficiency programs are in place, and the Energy Policy, released in 2001, focuses on energy efficiency and emissions reduction.

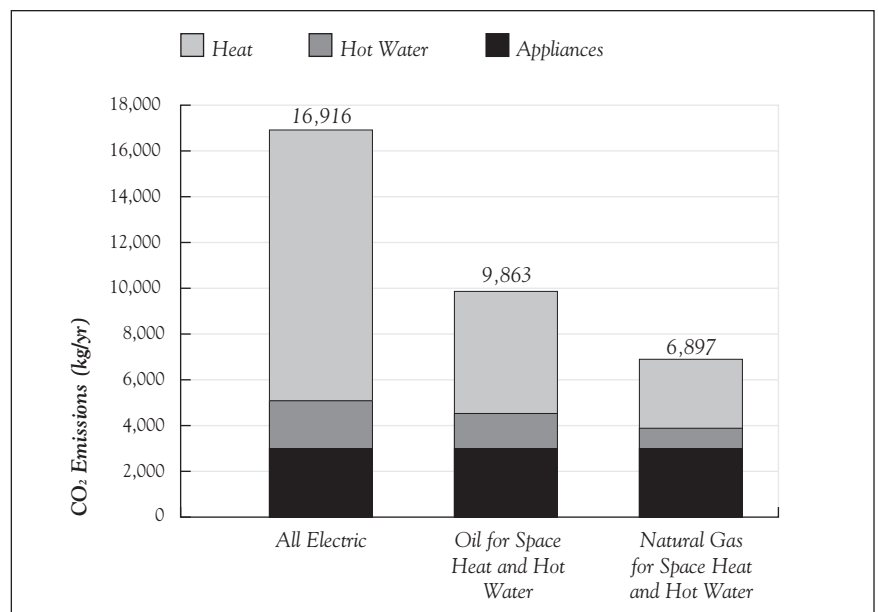


Figure 3: Energy Related CO<sub>2</sub> Emissions for a Typical NB Home

As most GHG emissions are energy related, we must become even more efficient in how we use energy in transportation and electricity generation, in large and small industries, and in our buildings and homes. We can insulate and switch to more efficient heating systems and to renewable energy sources like small hydro, fuel cells, wind power, biomass, and solar. Changing the fuel we use for space and water heating can make a big contribution (Figure 3). Over half of our buildings are dependent on electricity, for space and water heating, much of which is produced from fossil fuels.

Better information and more awareness can help us make better decisions, like choosing fuel-efficient vehicles, efficient appliances and heating systems, or choosing transit or carpooling. Shipping more freight by rail and improving road surfaces can reduce emissions from the transportation sector.

## 7. What about adaptations to climate change in New Brunswick?

Even if we could completely stop adding GHG to the atmosphere, global warming would continue until concentrations of GHG stabilize. That means we need to think about adaptation as well as about reducing our GHG emissions.

New Brunswick's environment and resource-based businesses, such as forestry, agriculture, tourism and fisheries, are very vulnerable to the impacts of climate change. All could be affected by changing temperatures and precipitation patterns, damage from storms, and new pests and diseases migrating into our area. Plants, animals and natural systems could be seriously affected. Research and monitoring of climate changes and the effects will help us take action to minimize costs and damage.

## 8. How will New Brunswick stimulate wide-spread action on climate change?

The Province will give priority to approaches that will help all New Brunswickers respond to climate change. It will continue enhancing the plan in years to come. These approaches for New Brunswick's first Climate Change Action Plan will include:

- **Government leadership** – practicing energy efficiency in our buildings, vehicles and equipment purchases, purchasing “green” products and services, and implementing appropriate incentives, regulations and tax treatments.
- **Enhancing awareness and understanding** – providing information about how climate change is affecting New Brunswick will encourage the involvement of all of our society, from businesses to individuals.
- **Technology research, development and innovation** – stimulating new and advanced technologies and innovative approaches.
- **Investing in knowledge** – analyzing the impacts, costs and effectiveness of different options, so we all make the best choices for New Brunswick.
- **Working with Partners** – developing approaches that are practical and effective by working with our partners: other governments, industry, communities, organizations and individuals.

New Brunswick will integrate GHG emissions reduction goals into existing programs to meet air quality objectives, programs that reduce levels of other pollutants and protect human health, and economic development and trade objectives. Cooperation among governments, with the private sector, and within research networks will help develop complementary approaches.

## 9. Have we already made commitments to reduce GHG emissions?

Canada contributes only a small portion of global GHG emissions, but Canadians are among the highest per capita emitters in the world. Canada acknowledges it must be a leader among developing nations and will continue to work towards meeting the Kyoto Protocol. Under this Protocol, Canada agreed to reduce its GHG emissions to 6% below 1990 levels by 2010.

The Governors and Premiers of the five eastern Canadian provinces and six New England states have adopted a Climate Change Action Plan that targets to reduce regional emissions to 1990 levels by 2010 and to 10% below 1990 by 2020 (Figure 4).

New Brunswick is committed to work toward these targets. We also believe that by acting responsibly and early, New Brunswickers can take advantage of opportunities to reduce emissions while preserving our economic stability.

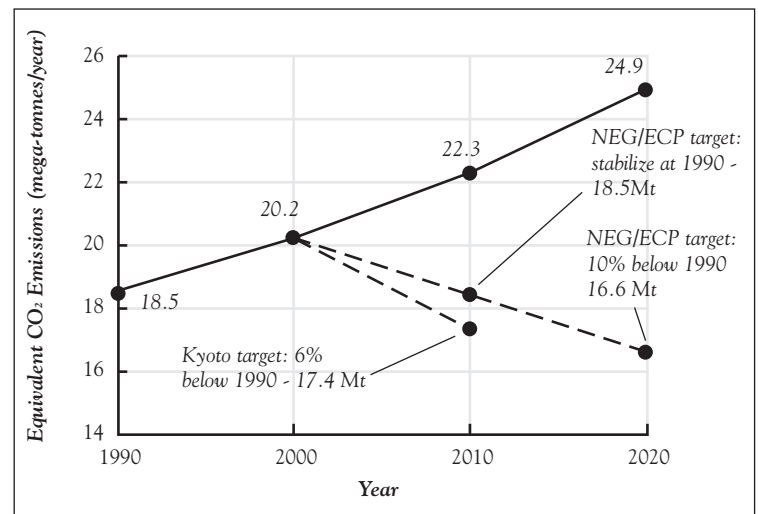


Figure 4. Projected Greenhouse Gas Emissions in New Brunswick - Business as Usual Case (Source: DNRE)

## 10. What are the key challenges for New Brunswick in reducing emissions and adapting to climate change?

If our emissions continue to grow at the current rate, they will be 23% higher by the year 2020 than they were in 1990 (Figure 4). The magnitude of the challenge for New Brunswick is illustrated by the approximated gap between the reduction targets of the Kyoto Protocol or the NEG/ECP Climate Change Action Plan, and our projected emissions.

The energy-intensive, resource-based nature of our economy presents a particular challenge for New Brunswick. We are also highly dependent on the export of goods that are subject to external market prices. The initiatives taken by New Brunswick and by other jurisdictions will affect the cost of doing business. At the same time, opportunities exist to reduce emissions while we become more economically competitive and efficient. The challenge is to make the choices that will ensure our economy is best able to adapt and grow.



## 11. What are the key public issues for developing a climate change strategy?

We need to be strategic to ensure that the objectives of our actions are balanced with the potential risks of climate change and other economic and social objectives for our province. Just as uncertainties remain about the scale and timing of climate change impacts on New Brunswick, there is also uncertainty about the effectiveness and the economic impact of each policy decision that might be taken to reduce emissions.

How far can we go in addressing climate change, given our small size and limited resources? What information do we need to choose the best options? What can individual New Brunswickers do? How can we ensure that the actions we take are comprehensive enough to make a real difference? How can decision-makers establish a level of confidence in the possible costs and benefits so we can start making good choices? These questions are complex. They will require ongoing attention and discussion among New Brunswickers as our Climate Change Action Plan evolves.

## 12. How can New Brunswickers be involved in planning for climate change actions?

The full discussion paper “New Brunswick and Climate Change” is part of a public consultation. The paper provides information on some of the options for action and on key policy issues.

The government wants to hear the opinions, concerns and ideas of all New Brunswickers about the issues addressed herein. It needs to gauge the level of concern, the level of understanding of the issues, the information that is required for good decision-making and the commitment to tackling the uncertainties of this issue. This will be important in developing our own New Brunswick Climate Change Action Plan.

The full discussion paper can be obtained by writing to:

*Climate Change Discussion  
Natural Resources and Energy  
PO Box 6000  
Fredericton, N.B. E3B 5H1*

Or by calling: 506-453-2206. The paper is also available on the Internet at:

<http://www.gnb.ca/0078/index-e.asp>. Individual comments and detailed submissions can be submitted to the above address or by e-mail to: [Climate.Change@gnb.ca](mailto:Climate.Change@gnb.ca)



# Introduction

This discussion paper is designed to help New Brunswickers gain a better understanding of the issues surrounding climate change and what it means to our Province. It sets out some of the projected impacts of climate change on New Brunswick. The paper lists some examples of actions that could be taken to adapt to a changing climate and to reduce emissions. These examples are simply that - examples. The Government has not considered, let alone endorsed or rejected, any of them. Many other examples of possible action are contained in the References listed at the end of this paper.

The paper begins with background information on global climate change and the events that have lead governments around the world to consider how they might respond. A discussion of overall public policy issues facing New Brunswickers follows. There is information about sectors of the economy that are most likely to be affected by climate change and an outline of some of the possible options and opportunities for each sector.

New Brunswick has taken the position that climate change is a serious problem that requires a thoughtful, comprehensive response. New Brunswick continues to evaluate the potential impacts of climate change, and of our response, on our environment and on our economy. However, we have made commitments and we are taking action. We have joined with eastern Canadian provinces and neighbouring New England states in committing to act at the regional level where we may experience similar impacts and can cooperate in developing responses. The Province is committed to doing its part to assist the federal government in its program to address the issue.

As part of our commitment to develop a New Brunswick Climate Change Action Plan, this Discussion Paper provides information on the issue and is designed to encourage public debate and response. The Action Plan will be developed in consultation with all stakeholders as part of a comprehensive and coordinated approach with our fellow provinces, the New England States and Canada.



# The Impacts of Climate Change

## What is Climate Change?

Climate change is being caused by an increasing concentration of greenhouse gases in the earth's atmosphere. The atmosphere creates a natural greenhouse effect that sustains life on this planet. Gases in the atmosphere, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), trap heat reflecting from the surface and radiate it back to the earth's surface. While volumes of methane and nitrous oxide are not large, these gases have a much greater warming potential than a similar volume of carbon dioxide. In the past 100 years, concentrations of these "greenhouse gases" (GHG) have been increasing in the atmosphere at rates unprecedented in the planet's history. Global temperatures have begun to increase as a consequence and the global climate trends are becoming more unpredictable (Figure 1).

An international body of atmospheric scientists, the United Nations Intergovernmental Panel on Climate Change (IPCC), states, very significantly, in its Third Assessment Report (2001) that:

***"There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."***

These human activities include the burning of fossil fuels, the use of nitrogen-based fertilizers on agricultural land, raising livestock, rice cultivation, and escalating global deforestation. Because the buildup of GHG is so much greater than the ability of the earth to reabsorb them, their influence on global climate will continue well into the 21st century even if all releases of GHG from human activities were to dramatically decrease. If no action is taken, the concentrations of GHG in the atmosphere could double and the overall temperature of the planet increase as much as 5°C by the end of this century.

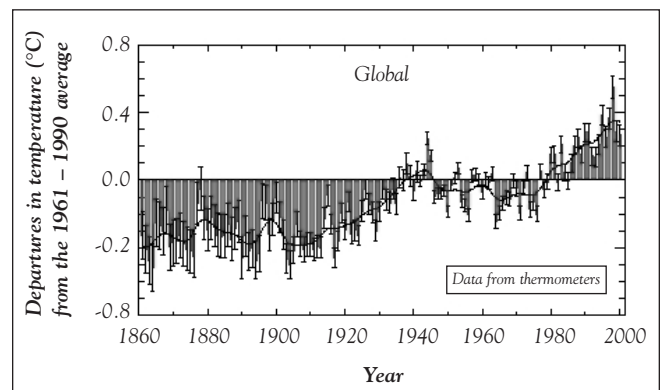


Figure 1. Global temperature change, 1860-present

## Possible Impacts of Climate Change on New Brunswick

A 2001 workshop on climate change in eastern Canada and the northeastern US (Reference 9), held in Fredericton, New Brunswick, concluded that climate change impacts in this region could cause sea level rise, weather extremes and changes in precipitation rates. Predictions of increasing temperatures of 4-5° C and a sea level rise of 50 centimeters per century would carry serious consequences for natural coastal features and habitats, biodiversity, forests and marine fish populations as well as on coastal infrastructure, agricultural systems, tourism and man-made structures. With a coastline over 2,000 km long (Reference 37), New Brunswick is particularly vulnerable (Figure 2).

Our economic dependence on natural resources adds to that vulnerability. For example, a warming climate could cause changes in the mix of tree species in our forests, with some being eliminated and other species gradually migrating into the area. New species are being introduced as part of silviculture programs. Infestations of pests and diseases could be more frequent and more severe, and new pests and diseases could arrive in our area. More severe storms may cause more blowdowns and increased soil erosion, while extended dry periods could increase the incidence of forest fires. Similar impacts might be expected in agriculture. There are many more concerns, not the least of which is the possible impact on the quality and availability of potable water, especially in conditions of drought and flood (Reference 9).

Specific projections about the exact impact of climate change in New Brunswick are hampered by uncertainty about the degree of change, how fast it will happen, and where it will occur. While there is some knowledge about what climate changes will occur in Canada, there is far less certainty about the impacts in local areas. However, the types of changes projected from global climate models are already occurring, and many governments around the world are agreeing that it is time to act.



Figure 2  
Coastline sensitivity to sea level rise

# International Developments

The issue of climate change received its first real international attention at the International Conference on the Changing Atmosphere convened by the Government of Canada in Toronto in 1988. Even with the rudimentary understanding of the issue in 1988, the Conference ended with a call for countries to look at cutting greenhouse gas emissions in the order of 25% as a first approach. Subsequent research has justified these early estimates. The responses to climate change have subsequently fallen into two broad categories: reducing emissions of greenhouse gases and adaptation to the impacts of climate change. International agreements have focused principally on emissions reductions as adaptations will have to be made at the local level. The IPCC continues to assess and report on scientific and monitoring issues.

## The Kyoto Protocol

International efforts continue in an attempt to find an approach that will stimulate global response to climate change. The first international agreement on climate change was the United Nations Framework Convention on Climate Change (UNFCCC) (Reference 35) concluded in Brazil in 1992. Today, most people would associate climate change with the Kyoto Protocol (Reference 35) developed at the 3rd Conference of the Parties to the UNFCCC in Kyoto, Japan in 1997. By ratifying the Protocol in December 2002, Canada is now committed to reduce its greenhouse gas emissions to 6% below 1990 levels by 2010. Only developed countries have agreed to the Protocol and to reducing emissions. However, since the signing in Kyoto, the United States and Australia, among others, have advised that they will not ratify their intentions to abide by the Protocol. Developing countries were not required to make emission reductions and are, thus, unaffected.

The Kyoto Protocol will come into effect when it is signed by at least 55 developed countries representing at least 55% of the total carbon dioxide emissions. Canada became the 100<sup>th</sup> country to ratify the Protocol on December 16, 2002. The anticipated ratification by Russia will mean more than 55% are represented and the Protocol will come into full effect. Although the US has declared it will not sign the Protocol, the Americans are continuing to work on reducing GHG emissions largely through their energy self-sufficiency programs, and are still a part of the UNFCCC of 1992. Most countries agree that the Kyoto Protocol is only a first step in global action. Much more substantial emissions reductions will be needed over the longer term.

## North American Action

Canada is part of the North American Free Trade Agreement (NAFTA) and thus also part of the Commission on Environmental Cooperation (CEC). The CEC has been effective in accomplishing coordinated North American approaches on environmental issues.

With the withdrawal of countries from the Kyoto Protocol, particularly the United States, it may be appropriate to approach the issue on a North American basis through the CEC. The success of such an approach, particularly as it would bring in a developing country, Mexico, could be an effective template for future global negotiations.



# Canadian Response

Canada's response to climate change began in earnest when First Ministers agreed, in 1997 during the lead up to the Kyoto Conference, to initiate a National Climate Change Process (NCCP) (Reference 6). Multi-stakeholder "Issue Tables" involving 450 experts from across the country were assembled to discuss sixteen key areas of concern. They developed an extensive list of response options for all sectors (Reference 5). They identified options for both reducing greenhouse gas emissions and making adaptations to the impacts of climate change.

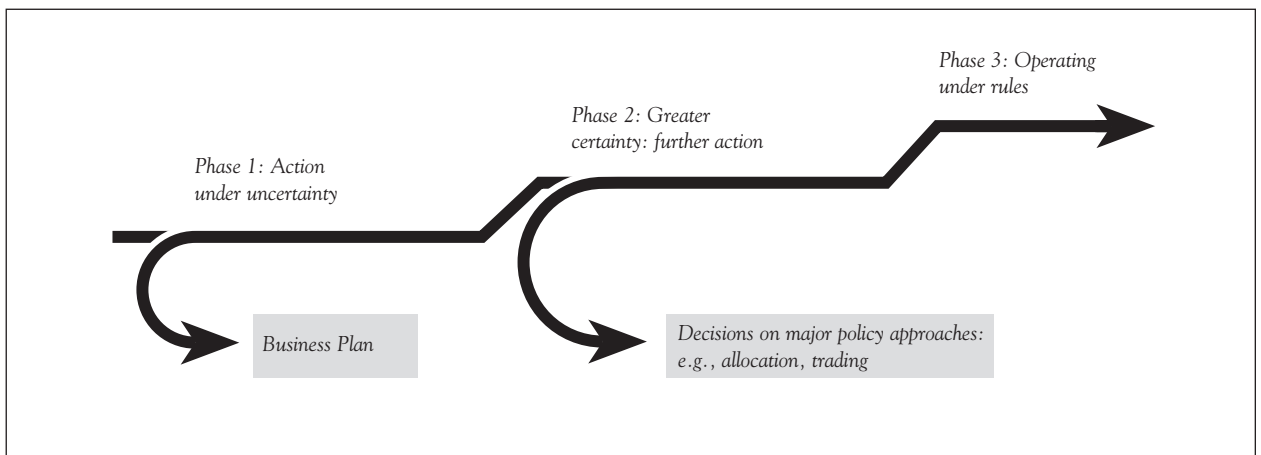


Figure 3: National Implementation Strategy

From this work, a National Implementation Strategy and a First National Climate Change Business Plan were developed in 2000 (References 2, 3 and 4). The Strategy acknowledges that while climate change poses significant environmental, economic, health and social risks for Canadians, many uncertainties remain. It uses a risk management approach to balance the uncertainty with action. It enables action to reduce emissions and promote adaptation, while continuing a major research and analysis program. The analysis ranges from economic modeling to forest impact research and further to a health impact initiative lead by Health Canada.

A Joint Meeting of Ministers of Energy and Environment (JMM) endorsed the National Implementation Strategy, the Business Plan and an Analytical Work Program in October 2000 (Reference 6). New Brunswick is thus committed to doing its part in support of Canada's undertakings. New Brunswick has made it clear, however, that it also supports the principles put forward by provincial Premiers to the federal government in February 2002. Key elements include the following Principles:

- 1. provinces should have an understanding of the costs of meeting Kyoto emissions targets;*
- 2. Canada should not be put at a competitive economic disadvantage; and*
- 3. no province should bear an unreasonable share of the burden.*

New Brunswick has also made it clear that its efforts to reduce emissions are in a large measure dependent upon support from the federal government.

More recently, at the JMM on October 28, 2002, New Brunswick and the other provinces and territories, in response to a draft climate change plan (Reference 39) proposed by the federal government, agreed to invite the federal government to work collaboratively with them to develop a truly Canadian Plan. The provinces and territories proposed 12 Principles for the development of such a national plan (Reference 6).

Provinces, territories and the federal government have worked together to analyze options and to project the impacts of implementation on the environment, on the national economy, and on the economy of individual provinces and territories. That work is ongoing. As more becomes known about the impacts of measures to reduce GHG emissions, more significant measures can be implemented.

Considerable national and regional uncertainty remains about Canada's implementation plans to meet the Kyoto Protocol targets. This must be addressed through a concentrated federal / provincial / territorial effort.

# Regional Action

New Brunswick has joined with the other four eastern Canadian provinces and six New England states in the Conference of New England Governors and the Eastern Canadian Premiers (NEG/ECP) to address common regional issues and concerns.

The NEG/ECP workshop on climate change led to development of a regional action plan. Fifty experts in the field spoke at the 2001 “Climate Change - New Directions for the Northeast” workshop and participated in discussions with over 200 delegates from the region (References 8 and 9).

The workshop concluded that:

- *The region is very vulnerable to climate change because of its extensive shoreline, the many large urban populations on the coasts, and the high dependence on natural resources*
- *The provinces and states in the Northeast region have many common interests and opportunities for cooperation in responding to climate change*
- *Action on climate change should begin immediately*
- *Regional leadership can be used to advance national commitments, particularly in the US.*

The regional Climate Change Action Plan (Reference 7) will be reviewed for progress every five years, starting in 2005, when additional actions will be considered. The plan includes establishment of a standardized emissions registry, reduction of emissions, study of the effects of climate change, adaptation, and public education and awareness commitments.

The NEG/ECP Climate Change Action Plan has specific regional targets:

- *Reduce regional emissions to 1990 levels by 2010 and 10% below 1990 by 2020*
- *Reduce government building, vehicle and equipment related emissions 25% by 2012*
- *Reduce electricity emissions, per unit of generation, by 20% by 2025*
- *Increase energy saved through energy conservation programs by 20% by 2025*

Each jurisdiction will develop an action plan and an inventory of their greenhouse emissions, and will report reductions in a regional emissions registry. Emissions trading within the region will be explored.

The scope of action New Brunswick expects to undertake as part of this plan will be similar to those implied by participating in the National Implementation Strategy in Canada. The NEG/ECP Plan is, for the most part, complementary to Canada’s National Implementation Strategy. However, one action item in the NEG/ECP plan will be difficult to pursue. A formal emissions trading system with New England is unlikely as credits toward a Kyoto target will not be recognized internationally as the United States does not intend to ratify the Protocol.



# New Brunswick Circumstances

Understanding the sources of GHG emissions is key in attempting to reduce those emissions. While New Brunswick accounts for only 3% of Canada's GHG emission total, all jurisdictions will be called upon to do their part to address the climate change problem. Some 90% of New Brunswick's emissions come from the combustion of fossil fuels. The remaining emissions are non-energy emissions from such sources as landfills and agriculture. Electricity generation and transportation together account for three-quarters of the total emissions (Figure 4). New Brunswick's economy is largely natural resource-based and our manufacturing industries are energy intensive. We are also very export dependent with little control over commodity prices, so additional input costs cannot easily be passed on to the market (Reference 36). The energy-intensive nature of our economy presents particular challenges with respect to GHG emission reduction strategies, energy costs and economic competitiveness. As our economy continues to grow, we would normally expect the emissions of GHG to grow as well.

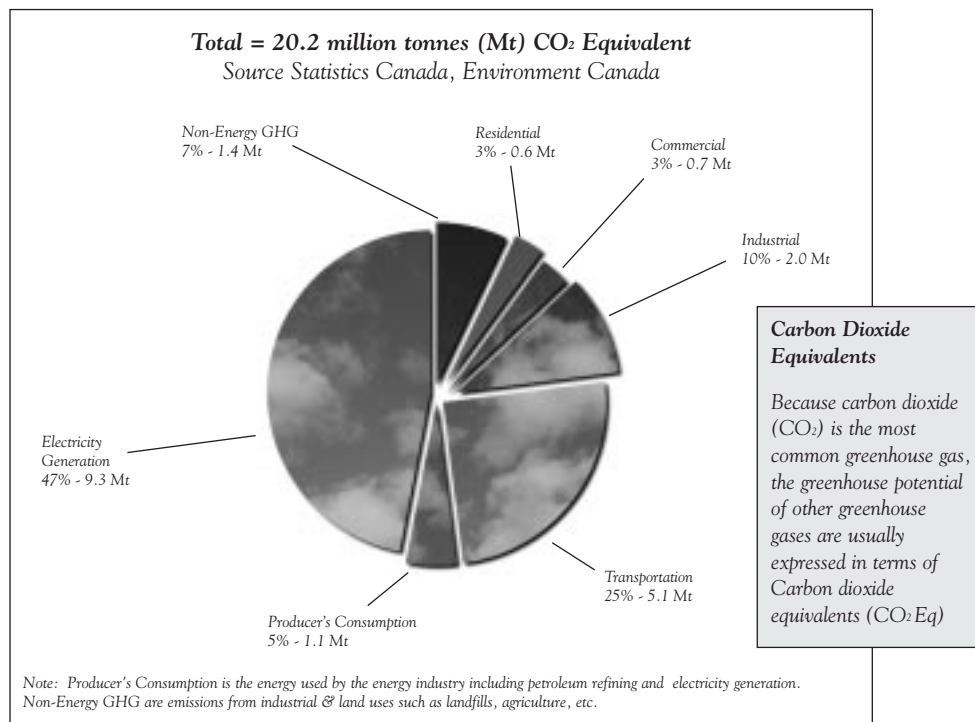


Figure 4: Greenhouse Gas Emissions in New Brunswick, 2000

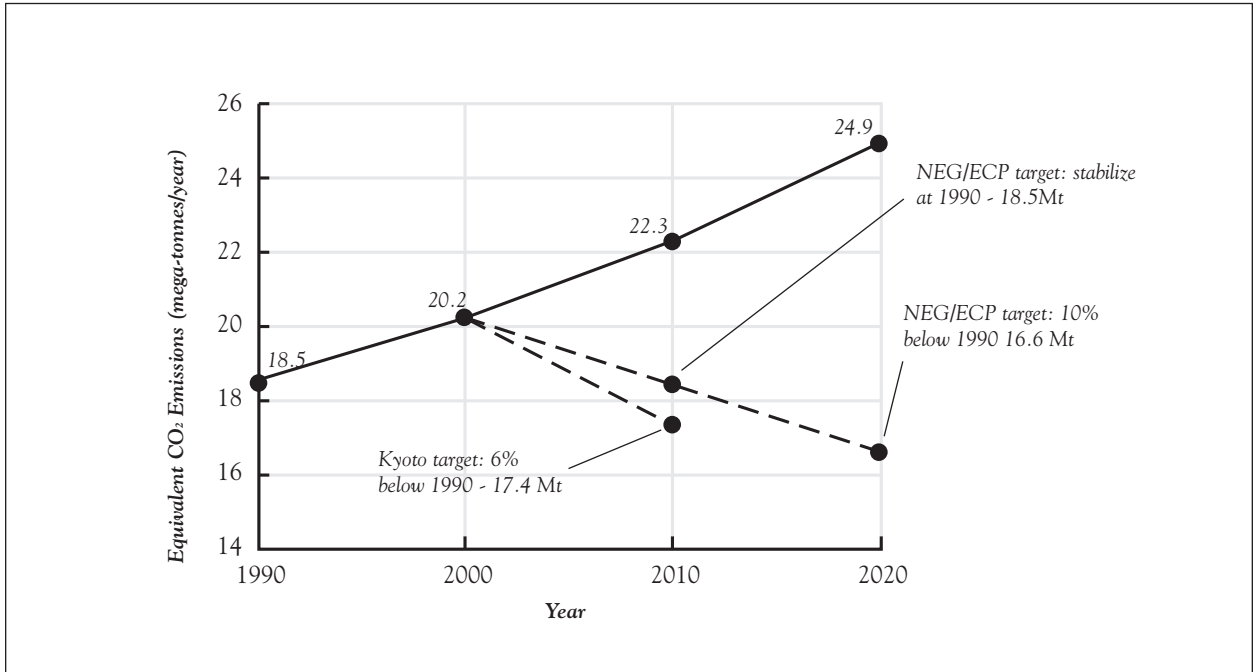


Figure 5 Projected Greenhouse Gas Emissions in New Brunswick  
 Business as Usual Case  
 Source: DNRE

With no new efforts to reduce GHG emissions, they will increase by 23% over current emissions by the year 2020. The graph in Figure 5 shows the reduction targets of both the Kyoto Protocol and the NEG/ECP Action Plan, and the gap between these targets and projected emissions if they were to be applied directly to New Brunswick. No provincial targets of this nature have yet been set. This graph indicates the aggressiveness of these targets. Very significant changes in emissions would be required to meet them, and the longer the delay in taking action, the more pronounced is the action that will be required.

For some perspective on the magnitude of the challenge, the emissions impacts of some hypothetical actions are shown in Table 1. Any decisions of this magnitude would require major financial investments and could also bring either net benefits or significant costs to the public.

Hypothetical Action	Emissions Impact
Energy Efficiency implemented in all sectors; major program effort	decrease 1-2 Mt/yr.
Lepreau closes; generation replaced with natural gas	increase 2 (Mt/yr.)
Lower natural gas market penetration than expected	increase 0.4 Mt/yr.
Add a second nuclear plant to replace oil (or Orimulsion) generation	decrease 2.3 Mt/yr.

Table 1.  
 Hypothetical Emissions Reductions Actions and Impacts  
 (Million tonnes of CO<sub>2</sub> per year)

Energy efficiency, fuel switching, cogeneration and renewable energy generally involve many small projects at many locations. Together, they can replace a large generating station while being more reliable and efficient. Potential for numerous such investments exist. Emissions trading, permitting and offset systems are being developed that may add value to projects and technologies that reduce or absorb GHG emissions, making them much more attractive investments.

New Brunswick's commitments to doing its part toward Canada's climate change response and toward the NEG/ECP regional plan present both significant economic challenges and opportunities. Any major decisions on GHG emission reductions will have a direct link to energy consumption and economic competitiveness. Our capacity to capture the economic opportunities depends in large measure on strong partnerships with other governments, industry, organizations, academia, and the public. Federal funding, separately or as part of a national response to international climate change actions, will be an essential component to the province's final responses.





# Public Policy and Strategic Issues

There are many climate change issues that relate to specific economic sectors. However, it may be helpful to first consider some overall public policy issues. Discussion of these broad issues will help establish guiding principles and priorities such that stakeholders can become engaged and from which the most appropriate action can be determined. Key areas include:

- *Reducing uncertainty*
- *Analyzing and implementing options*
- *Setting targets*
- *Ensuring comprehensiveness*
- *Examining emission trading mechanisms*
- *Prioritizing adaptation and emissions reduction options*

A series of discussion questions follow each of the next sections.

## Reduce Uncertainty

Analysis of the impacts of both the changing climate and measures to reduce GHG emissions is a major challenge. There is uncertainty about what the changing climate will do to our natural environment and our built infrastructures, and there is uncertainty about the costs and benefits of measures for reducing emissions. The complex regional diversity in industry and trade, social demographics, natural resources, habitat, and geography presents a particular challenge to establishing a level of certainty that will facilitate action.

There are still uncertainties around the Kyoto accounting rules on measures to reduce or sequester emissions, and for measuring and reporting results. It is unclear how emissions trading will be implemented and how much New Brunswick can rely on such a mechanism, especially with the United States not being part of the Kyoto Protocol. There is uncertainty about the costs of these tools.

- *What will be the impact on our competitiveness if the US is not in a trading system?*
- *Will there be assistance from the federal government to complete analysis work?*
- *What are the consequences of climate change actions?*

These are all questions that can only be resolved over time through further analytical work and negotiations with the various parties concerned. Participating in national and regional processes will also help New Brunswick increase its ability to respond more adequately to these questions.

Discussion Questions:

- *What efforts and priorities should be placed on the analytical and consultation components of an action plan?*
- *How can risks and costs associated with emissions reduction measures be balanced with the objectives of maintaining economic competitiveness?*

## Analyzing and Implementing Options

New Brunswick will probably take a risk management approach in developing its first climate change strategies and phase in its action as knowledge is built. It is important to build our capacity to analyze and evaluate our options. However, we will need to be prepared to take action on measures we know to be beneficial and affordable. Energy efficiency, for example, has multi-pollutant benefits and so makes both economic and environmental sense. Renewable energy development is also a “no regrets” option. There are also many ways to support incentive programs to promote efficiency and renewable energy. Public funding, as well as funding raised through special charges on energy consumption, are used widely in the US to stimulate investment in these technologies.

Discussion Questions:

- *What resources should be applied in areas where uncertainty remains?*
- *Is the risk management approach the best approach?*
- *What should the role of government be and what level of resources should be applied?*
- *How strong a role should the federal government play in funding and other support?*
- *How should the action be achieved; with regulation of the private sector, with public funds or with special funding or incentive schemes involving industry and consumers?*
- *How can the private sector be engaged comprehensively and equitably?*
- *How should New Brunswick participate with other jurisdictions?*

## Setting Targets

The uncertainty that remains around a number of emission reduction issues affects the decision about whether the province should set its own target. The ability to achieve a significant provincial emissions reduction target would be greatly enhanced if there is federal / provincial cooperation and federal support, including the opportunity for special funding. Any target set for New Brunswick should be compatible with targets set regionally and nationally.

There is a need to strike a balance between reducing emissions and achieving greater economic competitiveness. It is unlikely that questions on the economic impacts of attempting to meet specific targets will be answered to everyone's satisfaction in the near term. There was similar uncertainty when reduction targets were set for acid rain, smog and mercury emissions.

Discussion Questions:

- *Would a provincial target be effective in reducing emissions?*
- *What is the minimum information that is needed to develop the confidence to set targets?*
- *How would we determine what targets, in any, would be appropriate for New Brunswick?*
- *Can New Brunswick make commitments without setting targets?*

## Comprehensiveness

Although New Brunswick emits only 3% of Canadian greenhouse gases and, in turn, Canada is responsible for only 3% of world emissions, our per capita emissions are among the highest in the world (Reference 8). This reflects the energy intensiveness of our economy. The question that is asked frequently in international fora is "If Canadians and other developed nations do not take action, how can developing countries be expected to do so?"

The issues are "horizontal" - cutting across many sectors - and any response has to be comprehensive. Climate change is not an issue where we can point to one or two major industries and expect them to solve the problem. Everyone is implicated. Awareness of all New Brunswickers of our climate change objectives and of what they can do to achieve them will help in identifying what kind of Plan we might develop for ourselves.

Discussion Questions:

- *How can climate change policies be integrated with other policies to achieve complementary goals such as reducing pollution while increasing economic efficiency?*
- *How can we tap the knowledge base and ingenuity of New Brunswickers?*
- *How can the broadest range of public and private sector organizations and individuals be engaged?*

## Emission Trading Mechanisms

To help manage the risks of climate change actions at the least cost, as well as to help achieve more comprehensive engagement or more equitable sharing of the burden, economic instruments such as an emissions trading system are being considered. Emissions trading programs use the marketplace to achieve emissions reductions at the lowest cost. This is accomplished by allowing companies that can achieve emission reductions in excess of what they are required to do, or that sequester carbon through approved silviculture, soil management or other programs, to generate emissions credits. These credits can then be sold to other companies that, despite best efforts, are unable to meet their emission reduction targets. This approach has been successfully used in the United States to accomplish acid rain emission reductions. Average costs without trading were projected to be in excess of \$1000 per ton of emissions reduced. The trading program reduced these costs to less than \$200 per ton. This is an important issue for New Brunswick. Emissions trading will likely be necessary to help New Brunswick meet commitments to the NEG/ECP Climate Change Action Plan and to assist Canada to meet its commitments to the Kyoto Protocol.

- *Who will pay for emission trades?*
- *Should we be concerned about the transfer of wealth to other jurisdictions if New Brunswick firms purchase emissions permits beyond our boundaries?*
- *Are there opportunities for New Brunswick to offer trading credits to our own industries and to investors from outside the province to create investment here?*
- *What will the balance in permit trade look like - net economic gain or loss?*

## Adaptation

The current buildup of GHG in the atmosphere will take many years to be reabsorbed by the earth. Emission reductions made today will take many years to reduce those concentrations and thus slow the rate of climate change. Delaying reductions means an even longer delay in reversing the global trends. Meanwhile, the changes will continue to occur and our society must learn to adapt. Adaptation means such things as adopting new planning processes for our coastal areas, engineering structures to withstand higher storm surges or more violent weather, growing different species of trees and crops, and changing the emphasis or schedule of tourism promotions. Considerable emphasis has been placed on the need for adaptation in the National Implementation Strategy and the NEC/ECP plan.

- *With the inherent vulnerability of this region, what is the appropriate balance of efforts for New Brunswick between adaptation and emissions reduction?*
- *What resources do we have to apply to the wide range of adaptation issues?*
- *How can adaptation be achieved at minimal cost to industry and consumers?*

# Setting an Action Plan

New Brunswick must identify its priorities - what areas need attention first in order to set the stage for future actions and to start producing early results? New Brunswick has examined the priorities of the Canadian National Implementation Strategy, the NEG/ECP Action Plan, and plans already developed by other jurisdictions. From this review, we see that early climate change responses share six common themes:

**Government leadership:** Governments can lead by example by practicing energy efficiency and implementing fuel switching in their own operations; purchasing “green” power products and services; sharing successes; and implementing appropriate incentives, regulations and tax treatment. These actions send appropriate signals to private businesses and to the public. They can also have cost implications, positive and negative, that must be taken into account.

**Enhancing awareness and understanding:** Reducing GHG emissions and adapting to climate change will require significant involvement of all our society, from industry and businesses to homeowners and individuals. People will need reliable, comprehensive information about how climate change is affecting New Brunswick and how they can respond.

**Integration with Air Pollution Objectives:** Most measures to reduce GHG emissions also reduce emissions of other air pollutants. The province has taken a more integrated perspective in emissions reductions over the years and expects to continue this approach.

**Technology research, development and innovation:** New and advanced technologies to help reduce GHG emissions are needed.

**Investing in knowledge:** To make decisions that will produce real change, decision-makers need analysis of the effectiveness of different reduction and adaptation options.

**Working with Partners:** Approaches will need to be developed that are practical and effective in enabling partners, other governments, industry, communities, organizations and individuals to work together.

These are likely to be priority themes in any New Brunswick action plan. They are consistent with the government’s new Prosperity Plan in areas such as investing in people and embracing innovation through support for new low emission and energy efficient technologies and practices. These priorities are also consistent in creating a competitive fiscal and business environment with appropriate government leadership. Other themes that could be built into the province’s plan include support of strategic infrastructure including efficient waste diversion and treatment, transportation and energy systems, and new community planning approaches.



# Sectoral Response Options

There is a long and varied list of options for action that could help New Brunswick work towards its climate change commitments. This section presents some of these for further discussion and exploration. Some options focus on sectors of the economy with the highest emissions, the electricity and the transportation sectors. The industrial and buildings sectors also have good potential for effective action. The forestry, agriculture and fisheries sectors are most vulnerable to the effects of climate change and options appropriate for these sectors are also presented here.

The reports of the 16 Issue Tables (Reference 5) are a rich source of potential actions. New options for reducing emissions, sequestering carbon, or adapting to the inherent change that is already taking place may be developed as new information and priorities emerge.

The options presented in the following sections are examples only, presented to inspire consideration, discussion and feedback. These examples have not necessarily been considered by Government.

## Electricity

Electricity generation is the largest source of GHG emissions, contributing 47% of the province's total. Options to substantially change the generation mix in the province in the short term, such as those presented in Table 1, present many challenges, not the least of which are the very large associated capital costs. Those costs, when passed on to industry and consumers, could ultimately affect industrial and business competitiveness and the affordability of services to the public.

The New Brunswick Energy Policy (Reference 1) released in January 2001, has set the stage for the opening of the electricity market. In the meantime, the Government is restructuring NB Power and seeking private investment in the electricity system. All of these changes will be undertaken with a commitment to maintaining and enhancing our environment.

Recent surveys in other jurisdictions have suggested that many consumers are prepared to pay higher prices for electricity produced with cleaner technologies. Is this true in New Brunswick? Some actions will actually help them save money.

Consumers can practice energy efficiency or switch to space and water heating options that save money and also reduce costs for the utility.

Some other factors to consider in evaluating GHG emission reduction options in the electricity sector include:

- *Opportunities to also reduce harmful air pollutants such as mercury and those causing acid rain and smog*
- *The restructuring of the electricity regulatory regimes in the region*
- *The availability of natural gas to reduce electricity demand*
- *The role of nuclear generation*
- *Technological advances in energy efficiency, renewable energy and distributed generation*

Many complicating factors need to be better understood to arrive at the appropriate balance of objectives for the province. The electricity Market Design Committee (MDC) made recommendations on the restructuring of the electricity market. Government has accepted recommendations regarding encouragement of smaller, cleaner generators, the development of a Renewable Portfolio Standards, and is reviewing barriers to the construction of additional co-generation. Government referred the remaining MDC recommendations on the environment and renewables to the Climate Change Action Plan process. These recommendations (Reference 38) included further consideration of:

- *Green power*
- *A new energy efficiency program*
- *Emissions trading systems*
- *Emissions performance standards for companies selling electricity into the Province*

Possible Climate Change Response Options For This Sector Could Include:

- *Placing information on the emissions generated in supplying each customer's demand on electricity bills, allowing customers to make cleaner energy choices*
- *Making natural gas more widely available throughout the Province*
- *Supporting a system of emissions credits or debits based on an emissions performance standard to provide economic advantages to cleaner generation technologies investments in New Brunswick*
- *Programs to encourage consumers to switch from electric resistance space and water heating to other fuels or to heat pumps*
- *Energy efficiency and demand side management opportunities, evaluated against new electrical generation investments.*
- *Adding GHG emissions and adaptation to climate change impacts as part of evaluations in the approval processes for new or refurbished electricity facilities*
- *Reducing barriers to development of inter-provincial / international transmission facilities for enhancing trade and regional system efficiencies*
- *Clarifying the role of nuclear energy*

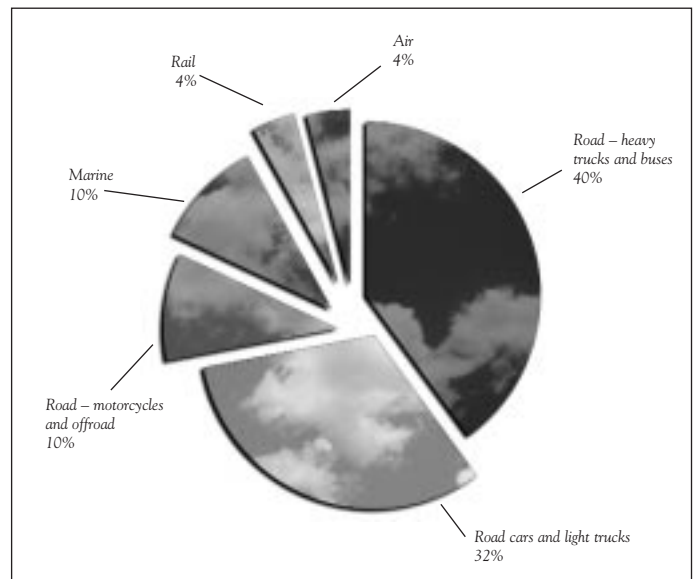


- *Expanding the Appliance Efficiency Regulation (General Regulation-Energy Efficiency Act, 95-70)*
- *Procuring electricity from low-emission or renewable sources*
- *Supporting programs for small distributed generation systems such as micro-turbines, wind power, fuel cells and small hydro*

## Transportation

Transportation is critical for the efficient functioning of the New Brunswick economy. The province's geographic location makes it a natural corridor of inter-provincial and international transportation links for the other Atlantic Provinces with central Canada and the United States. However, the transportation system is also critical internally to allow the operation of the resource based economy and provide services for what remains a largely rural population. The Province is responsible for 18,000 km of roads to service the population of 729,000. The arterial highway system comprises only 12% of the total road network but handles up to 70% of the total vehicle-kilometers driven outside of urban areas.

Transportation contributes 24% of the total New Brunswick greenhouse gas emissions. Road transportation accounts for 82% of transportation emissions, with heavy trucks and buses, and personal vehicles each contributing almost half of the on-road emissions (Figure 6).



**Figure 6: Transportation Sector Emissions**  
Source: DNRE

### Passenger Transportation

There are about 657,000 vehicles registered in New Brunswick, of which 73% are passenger vehicles or light trucks. Within the passenger vehicle and light truck class, registrations of heavier passenger vehicles, including luxury vehicles, sport utility vehicles (SUV's) and light trucks, have taken the lead over lighter, more fuel-efficient vehicles in terms of sales of new vehicles since 1995 (Figure 7).

The factors influencing this trend include lower gasoline prices, low interest loans and leasing options, and peoples' expectation that they are safer in a larger vehicle. There is recent evidence as well that, on average, we are driving more kilometers each year. These trends are of particular concern in respect of increasing air emissions and raise an important public policy issue about the balance between consumer choice and reduced automobile emissions, particularly in a province where 50% of the population resides in rural areas.

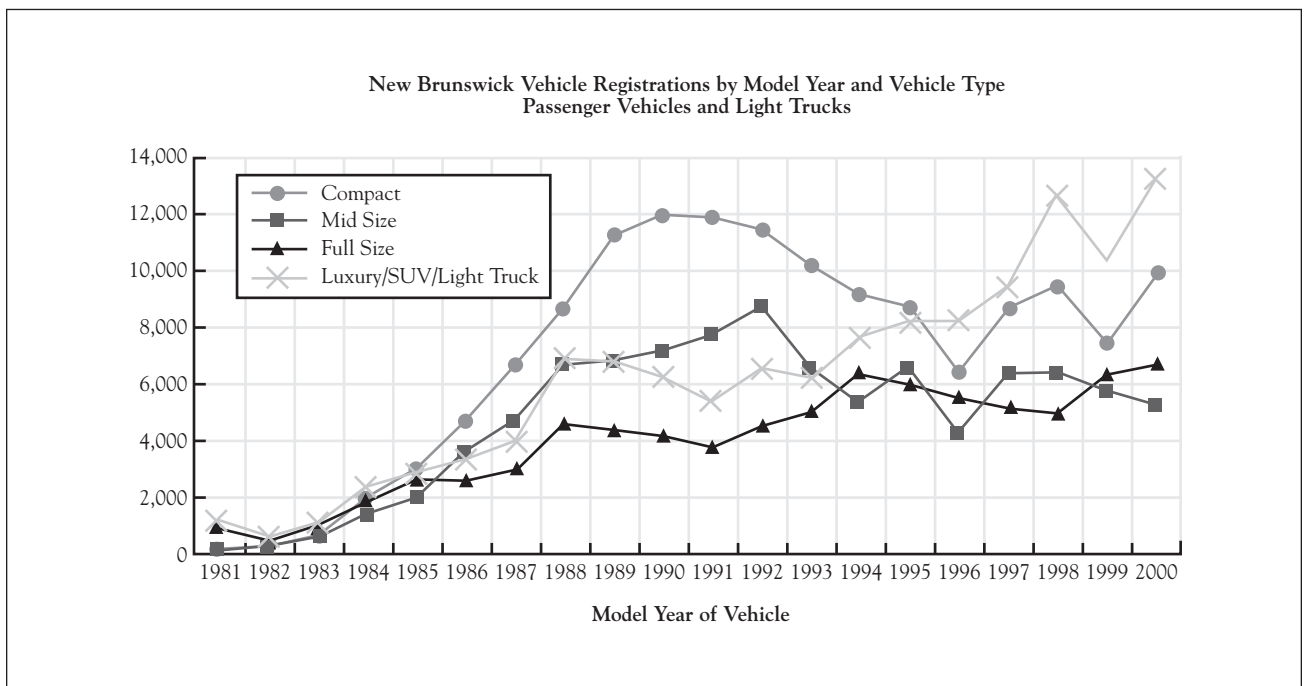


Figure 7.

### Freight Transportation

New Brunswick is an export-dominated economy with 40% of the value of its exports traveling on the province's roads. Although rail has usually been found to be the most energy efficient mode on single long distance links, this measurement represents only a small portion of the total transportation flow and ignores distribution issues at rail end points. Rail transportation is more suited for bulk resource movements while trucks are the door to door freight delivery choice of retailers. Truck fuel efficiency has more than doubled in the last 20 years. Trucks have become larger and emissions have been reduced. Dispatch has become more efficient with the deregulation of the industry. All of these improvements are reducing their total impact.

## Infrastructure

The transportation infrastructure of roads, bridges and road surfacing technologies will be increasingly influenced by the changing climate. Climate change will play a greater role in the transportation system planning process. Adapting road and bridge designs and locations to withstand more extreme weather events is becoming increasingly important. Highway planning and design will also be important in reducing GHG emissions.

Possible Climate Change Response Options For This Sector Could Include:

- *Improved urban transit services*
- *Car / van pooling*
- *Increased use of intercity bus services*
- *More fuel efficient vehicles*
- *Better land use planning*
- *Telecommuting, communications technology and employer flexibility programs*
- *Pedestrian and bicycle infrastructure*
- *Parking pricing policies*
- *Improved traffic flow*
- *Enhanced vehicle inspection and maintenance programs*
- *Reducing and enforcing speed limits*
- *Enhanced road construction and maintenance techniques for reduced rolling resistance.*
- *Intermodal passenger and freight systems*
- *Better driver education*
- *Alternative fueled and more efficient vehicles*

## Industry

Industrial activities directly contribute 10% of the GHG emissions of the province. These activities are major consumers of electricity and transportation services, also contributing significantly to GHG emissions. The pulp and paper, petroleum refining and mining and smelting operations dominate the sector from an emissions perspective. Large industries typically have the awareness, capacity and competitive motivation to assess improvement options and to make technological changes. Large emissions reductions have already been achieved by some operations as a benefit of the national Voluntary Challenge Registry (VCR) program. It encouraged the registration of emission reductions achieved voluntarily by industry through energy efficiency and other programs. However, more awareness and assistance is needed to encourage smaller industries to become part of the program. In all instances, impacts on economic competitiveness will need to be taken into account.

Possible Climate Change Response Options For This Sector Could Include:

- *Fuel switching*
- *Cogeneration of heat and electricity*
- *A renewed Voluntary Challenge program*
- *Enhanced capital cost allowances for energy efficient equipment*
- *Energy audit programs and incentives*
- *Performance standards among like industries*
- *Research and innovation support for small- to medium-size industries*
- *Boiler efficiency programs*

## Buildings

Residential and commercial buildings directly contribute 6% of the GHG emissions from New Brunswick, essentially from burning oil for water and space heating. Indirectly, however, this sector is responsible for a much larger portion of emissions because some 67% of residential buildings rely on electric space and water heating. While using electricity produces no emissions where it is consumed, those emissions are released at the generating station.

Emissions growth in the buildings sector is relatively low compared to other jurisdictions. New Brunswick has a highly successful R2000 house construction standard program. Over several years, it has produced a relatively high level of efficiency in all new housing stock. There are over 270,000 residential units in the province with single detached homes accounting for about 80% of the total. Commercial building standards have also improved. Continuing advancements can still be made in the entire building sector, particularly with ventilation systems, appliance and equipment efficiency, and fuel switching. For these reasons, an emphasis on improving older existing buildings is likely to be the most effective way to reduce emissions.

This province's high reliance on electrical space and water heating represents both a challenge and an opportunity for New Brunswick. Conversions from electricity to oil or natural gas can produce large reductions in GHG emissions (Figure 8), particularly when combined with the installation of high efficiency combustion equipment. Any reduction in electricity consumption results in reduced coal or oil-fired generation, reducing GHG emissions by a factor of 3 to 1, or more, for each unit of electricity displaced. A key public policy issue specific to buildings is the extent to which governments and the electric utilities should promote fuel switching away from electricity.

Large quantities of potable water are used in many buildings. The provision of this water, its treatment, heating, cooling, and the treatment of the resulting wastewater uses considerable quantities of energy. The efficient use of water thus has the potential to also significantly reduce GHG emissions while providing other environmental and cost benefits (Reference 40).

Possible Climate Change Response Options For This Sector Could Include:

- *Model energy codes and rating systems for all new buildings and renovations*
- *Fuel switching from electricity for heating*
- *Water use efficiency technologies*
- *Advanced, regulated standards for equipment and appliances.*
- *Housing, institutional and commercial retrofit and renovation programs.*
- *Energy performance labeling for equipment and appliances.*
- *Energuide for houses, program with energy audits and advice.*
- *Develop R2000 retrofit standards for existing houses.*
- *Demonstration and commercialization of advanced heat pump, renewable energy, distributed cogeneration technologies*
- *Education and awareness programs*
- *Energy and water pricing signals*
- *Full life cycle costing for energy related decisions*
- *Landscaping and tree planting for shading and windbreaks*
- *Building and subdivision orientation to maximize passive solar energy input*

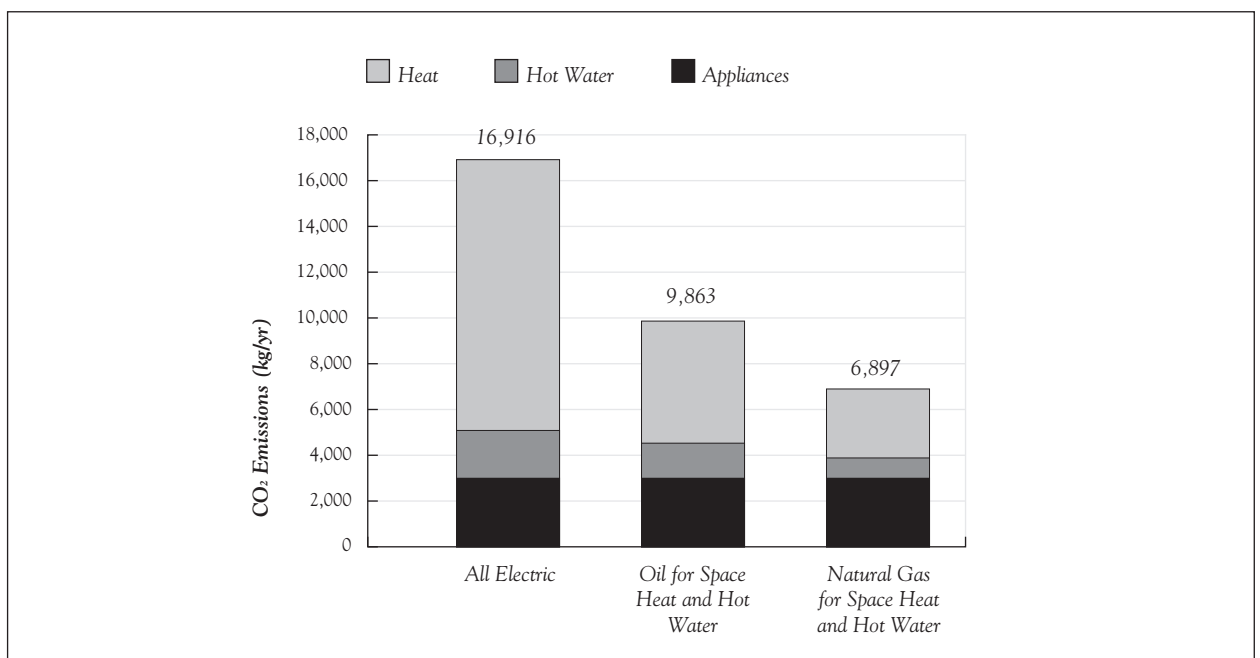


Figure 8: Energy Related CO<sub>2</sub> Emissions for a Typical NB Home

## Forestry

Forests are a valuable resource as wildlife habitat and as a primary resource for industry, tourism and recreation. This section focuses on the forests themselves. Discussion of processing and manufacturing is included as part of the industry section. A primary concern for forest managers is how tree species will adapt to changes in climate. Their potential to store carbon will also receive attention.

### Impacts on Forests

Many projected impacts of climate change are based on a scenario where the concentration of atmospheric CO<sub>2</sub> doubles in the next 100 years. A recent New England study (Reference 28) suggests that, if this were the case, dramatic changes could occur in our forests, including the elimination of important species and migration of others into the region.

Although these are scenarios and not predictions, they identify real risks to New Brunswick forests and the large potential impacts on our economy. For example, a changing mix of species in the forest will likely require the forest-products industry to modify its research goals, its silviculture practices, and its production and manufacturing technologies. While it is quite possible that future forests will grow faster and produce more biomass, the forest-products industry will have to adapt throughout a long period of change (Reference 29).

A warmer climate could also result in an increased incidence of forest fires and new insect infestations. Large-scale occurrence of such events could reduce the sustainable annual harvest of wood resulting in economic losses in the forest industry, reduce the opportunities for outdoor recreation, and have critical impacts on wildlife.

### Carbon Sequestering

As trees grow, they actively remove carbon dioxide from the atmosphere, fixing it into their wood and into the soil. Because carbon is taken from the atmosphere and stored (“sequestered”) in this way, forests might be considered as “carbon sinks”. The CO<sub>2</sub> is stored in wood and paper products while some is eventually released to the atmosphere when the wood decomposes or is burned. The value of emission credits from the carbon sinks of New Brunswick forests could make a significant contribution to our Climate Change Action Plan. It is estimated that unmanaged mature forests in New Brunswick sequester in the order of 55 tonnes of carbon per hectare each year. This number can be doubled, or even tripled for some species, under a managed plantation scenario (Reference 30).

Studies continue to better estimate of the capacity of New Brunswick forests to sequester CO<sub>2</sub>. It will take some time to finalize the international accounting system and to set a value on these actions. Models are being built to assist in these determinations.

### Reforestation / Afforestation

Various forest management activities, such as the planting of trees, and the tending of stands to increase their growth rates and ultimate total wood volumes, provide opportunities to offset GHG emissions. New Brunswick has been planting about 500 hectares (ha) of abandoned privately owned farmland per year under an afforestation component of its private land silviculture program. In addition, about 10,000 ha of Crown land is replanted each year after being harvested. These activities may create emissions credits in the future. However, this is somewhat offset by an unknown amount of clearing that takes place each year for various types of development including infrastructure right of ways, housing, commercial and industrial facilities and farming.

Possible Climate Change Response Options For This Sector Could Include:

- *Analytical programs to determine the potential of forests as carbon sinks*
- *Sustainable forest management activities on both private and Crown land*
- *Maintain or increase silviculture efforts*
- *Encourage planting of non-forested areas*
- *Determine if and when to grow alternate species for reforestation*

### Agriculture

The agricultural sector has been estimated to contribute approximately 10-13% of Canada's GHG emissions. The contribution is much lower in New Brunswick at about 3%. These emissions are principally in the form of N<sub>2</sub>O from fertilizer use and CH<sub>4</sub> produced by ruminant animals and from manure decomposition. The CO<sub>2</sub> contributions from energy use are relatively low.

The primary concerns for agriculture are adaptation and enhancing the sequestering of carbon in soils. Agriculture has always dealt with the variations of weather. Crop and livestock selection and developing management systems that try to maximize the advantages of climate and minimize the risks are all part of producing food in Canada. The challenges of adjusting to increasing variability in climate and the risks of new pests and diseases are substantial.

Some aspects of climate change that are likely to have an impact on agriculture include changes to the length and temperature of the growing season and over-wintering period for crops, redistribution patterns for precipitation, more extended droughts and less reliable snow cover, changes in insects and crop diseases, increase in the frequency and severity of storms, and erosion and crop damage.

Much of the research on the potential for new insect and disease infestations and on agricultural responses to climate change is at an early stage. There are many questions arising from complex biological systems that need further work. It will be an additional challenge to identify and implement strategies to reduce emissions or sequester greenhouse gases in soils. However, many of the changes that could help agriculture adapt to climate change could also help implement new best management practices, reducing other environmental impacts.

Other options that will allow the agriculture sector to adapt to climate change include strategic selection of crops and varieties that can take advantage of changes in the growing season, new market opportunities, increased irrigation and improvement and retrofitting of dykes and water control structures.

Possible Climate Change Response Options For This Sector Could Include:

- *Improved crop rotation*
- *Permanent cover on environmentally sensitive land*
- *Manure management*
- *Fertilizer management*
- *Livestock grazing management*
- *Soil conservation and erosion reduction.*
- *Use of riparian buffer zones and windbreaks.*
- *Production of bio-fuels*
- *Nutrition and feed alternatives for ruminant animals*

## **Fisheries and Aquaculture**

GHG emissions from the fisheries and aquaculture sector are relatively low. The primary implications for the sector are the need to adapt to changes in fish populations caused by climate change and other environmental impacts.

Changes in climate could have several impacts on fisheries and aquaculture. Water temperatures may change as a result of changes in ocean currents. This in turn could have impacts on the numbers of species occurring off our shores, on their abundance, and on their distributions and interactions. Important species may migrate elsewhere or even be eliminated if habitat is altered or lost, and new species could appear. Estuaries, where fresh water and salt water mix, are some of the most productive marine environments. They could be affected by changes in the volumes and timing of seasonal precipitation. There is a potential for a change in overall sustainable harvests for present coastal and estuarine species. Sea-level rise could also impact infrastructure in coastal areas including production and processing operations.

Fish production is influenced by many factors. A relationship between climate change and marine species cannot be easily determined. The principal response to climate change is continued research.



# Cross Sector Response Options

## Government Leads by Example

Government operations result in significant GHG emissions from buildings, equipment and vehicles. The electricity, natural gas and oil used for power and heat all contribute emissions.

New Brunswick has a strong record of leading by example to encourage more responsible choices for businesses and individuals, and to encourage the availability of new products and technology for the public. The significant purchasing power of the government can increase the availability of new products and services and decrease their cost to consumers. For example, when government procurement policy demands a product or service with higher efficiency, suppliers are motivated to provide that product or service, which then becomes available to all consumers. The Provincial Buildings Initiative (PBI), which reduces energy use in government buildings, has been described as the best in Canada. This approach is now available to the private sector. The province requires that all new public housing units meet the R-2000 standard, partially a cause for the success of the R-2000 program and its positive influence on the construction of all new homes and other buildings, as described previously. Leading by example often makes economic sense as many of the opportunities to reduce GHG emissions can also lead to dollar savings.

New Brunswick has already made significant commitments to changing its own operations in response to the climate change and other challenges. These commitments are outlined in the New Brunswick Energy Policy (Reference 1), in the NEG/ECP Climate Change Action Plan (Reference 7) and in the Waste Reduction and Diversion Action Plan (Reference 39). Some of these include:

- *Energy efficiency in policy decisions and in procurement*
- *Extending the PBI to hospitals, nursing homes and Crown corporations*
- *Showcasing renewable energy and innovative technologies*
- *Fuel efficient vehicles*
- *Environmentally Preferable Products*
- *Teaching employees to reduce emissions both in the office and on the road*

Possible Climate Change Response Options Could Include:

- *Improving the efficiency of space and water heating*
- *Fuel switching from electricity to oil or natural gas.*
- *Developing green procurement policies*
- *Acquisition of buildings, equipment, vehicles and leased space with high levels of energy efficiency and that reduce waste.*
- *Improving the energy efficiency levels and fuel choices in the assisted housing stock.*
- *Financing opportunities, such as a revolving fund, that departments can access to implement measures leading to reduced emissions and waste*
- *Procuring green energy*
- *Supporting work at home or telecommuting demonstrations*
- *Implementing a vehicle inspection and maintenance strategy so all government vehicles are operating at peak efficiency and meeting emissions standards*
- *Partnering with other governments and agencies, First Nations, and municipalities*

## Public Education and Outreach

Most people understand that climate change is a serious public issue and that everyone must do their part to reduce GHG emissions. At the same time, many are uncertain of the implications of the changing climate and its effects on the province and the local environment. Perhaps more importantly, many New Brunswickers may not know what they can do to help reduce GHG emissions. Enhancing awareness and understanding of these issues is essential to enable New Brunswickers to take advantage of the opportunities to reduce emissions, understand the impact, and to adapt to the impacts of climate change.

The province, in cooperation with the federal government and private sector partners, is sponsoring a Public Education and Outreach Hub (Reference 34). This project is intended to help develop a network of organizations and individuals that will share information, advance the understanding of climate change, and encourage people to take appropriate action.

Possible Climate Change Response Options Could Include:

- *Long term support for the education and outreach networks, expansion into communities and to other non-governmental organizations*
- *Information, promotional materials and activities to assist local service groups, educators, industry and business leaders, and the media*
- *Community based demonstration projects*
- *Clear and factual information on costs and benefits of energy options for consumers*
- *Support for municipal and other non-governmental organizations*

## Technology

A key to future emissions reductions is the development and adoption of cleaner technologies and new processes. The Government is putting new focus on innovation and technology in its long-term prosperity plans. There are many opportunities in clean energy technologies that can be advanced in the province and have potential to be marketed throughout the world.

One area with promise is in distributed electricity generation. There are many potential opportunities for small to medium sized renewable energy developments such as wind power, co-generation and micro-turbine applications. New Brunswick's high-quality electricity infrastructure, telecommunications control systems, and the introduction of natural gas represents particular advantages for our province.

Prospective measures to help the development of cleaner, more efficient technology include:

- *Support for technologies that have promise for the province and for export*
- *Demonstration programs to help kick-start commercialization*
- *International market assessments for GHG emission gas reduction technology*
- *Technology information web page with any specific New Brunswick information*

## Analysis and Planning

Much more needs to be known about both the impacts of climate change and measures to reduce GHG emissions. Many policies and response options are economically feasible in their own right while others carry costs that may impact consumer affordability and the economic competitiveness of businesses. Major policy decisions, which could have large impacts on the economy, need to be based on the best available data and analysis.

Government costs could increase as well. The province will be expected to be accountable for GHG emissions, including monitoring emissions levels, verifying reductions and reporting to registries. A comprehensive plan of action to combat climate change will require ongoing analysis and planning in order to choose the measures that are effective and affordable without negatively affecting economic competitiveness. Building this capacity and funding it will be a challenge considering the many Government priorities competing for such resources.

## Integrated Action

Integrating climate change responses with existing health, economic, environmental and social objectives are one of the best ways to obtain the most effective emission reductions. For the most part, the GHG emission reduction objectives and air quality objectives are complementary. Recently the Canadian Council of Ministers of Environment issued a communiqué stating:

“Ministers recognized that the problems of climate change, smog, and acid rain have common sources and noted the opportunity this presents to pursue integrated solutions”.

New Brunswick is actively participating in regional and national initiatives to address the air quality issues such as acid rain, smog and toxic air pollutants. New Brunswick is committed to further reduce annual emissions of sulphur dioxide by 30% by 2005 and 50% by 2010 from the existing cap set in 1994. New Brunswick has also committed to the Canada-wide Standards for particulate matter and ozone, the primary constituents of smog. Standards are also being developed to reduce the levels of mercury in the environment. New Brunswick has also committed to reduce nitrogen oxide emissions that contribute to both smog formation and acid rain.

To meet these commitments, efforts are underway to develop multi-pollutant emissions reduction strategies that result in multiple benefits without compromising the existing commitments. These strategies will eventually be applied in a number of sectors, including those that rely on fossil fuel and wood combustion for heat or energy. In New Brunswick, key sectors include electric power generation, base metal smelting, pulp and paper, wood products and asphalt plants. These industries are energy intensive and, generally speaking, the multi-pollutant strategies should be very effective. These same actions have the potential to ensure that these industries remain economically competitive by reducing their energy intensity and by introducing new product and service lines.

## Partnerships and Cooperation

The New Brunswick Climate Change Action Plan, developed by and for New Brunswickers, will be considerably more effective if initiatives include cooperation among all levels of government and the private sectors. Any plan's success will depend to a great extent on partnerships with the federal government, especially partnerships that can provide financial and technical assistance to enhance the province's capacity to deliver programs. The federal government, for example, is already beginning to deliver on an extensive list of programs being delivered by the Office of Energy Efficiency of Natural Resources Canada (Reference 15) with which we must be coordinated.

Municipalities can also play a substantial role in addressing climate change. Local governments and their national and provincial associations are in a strong position to pass information to their residents, local organizations, and businesses, and to invest in their own operations. Local actions carry the potential for "quality of life benefits" and reinvestment opportunities for the entire community.

Possible Climate Change Response Options Could Include:

- *An expanded Voluntary Challenge program designed to engage businesses and other levels of government*
- *Initiating cooperation with specific countries, particularly through NAFTA as an example, targeted to develop new international initiatives*
- *Cooperating with specific countries to participate in international initiatives such as Joint Implementation and the Clean Development Mechanism under the Kyoto Protocol*
- *Joint training and capacity building activities among municipalities and other organizations*
- *Community targeted programs such as energy efficiency drives, funding mechanisms and learning events*
- *Solid waste diversion measures among communities*

- *Encouraging recycling of municipal garbage and industrial wastes to reduce energy used in production of new replacement goods*
- *Collection of gases generated by biodegradation in landfills*
- *Full cost pricing of water and other provincial, regional and municipal services.*
- *Appropriate land use and community planning to reduce transportation and other service requirements*

## Cross-sectoral Adaptation to Impacts

Despite best efforts to reduce GHG emissions, such reductions cannot prevent some level of climate change and its impacts from occurring. We will have to cope with and adapt to many climate-related changes that have already begun.

The potential impacts of climate change are very broad. A single aspect of climate change, like sea-level rise, can lead to accelerated coastal erosion; threats to natural habitats; impacts on fisheries; damage to provincial and federal parks; undermining of roads, dams and bridges; impacts on water distribution and waste treatment systems; losses of personal property; and damage to coastal structures including homes, docks and processing plants. The next level of impacts could touch on fundamental aspects of our society, such as spread of disease, public health and safety issues, or the provision of emergency and medical services. Given the projected extent of climate change impacts, we need to prepare mechanisms that will help our society adapt.

Climate change poses risks to human health and well being including injuries and death from extreme weather events, respiratory and cardiovascular diseases from increased air pollution, increased insect-borne diseases, and threats to quality drinking water supplies.

Considerable work is being done on the health impacts of climate change (Reference 31). For example, Health Canada is leading a national effort to integrate climate change considerations into current public health policies and practices by all levels of government and key stakeholders (Reference 32). New Brunswick participates in the collaborative policy networks and information activities to address priority health issues.

The Canadian Climate Impacts and Adaptation Research Network (C-CIARN) is a network of researchers with the objective of coordinating research on climate change impacts and adaptation and distributing key information to communities, governments and industries. At the national level, analysis of the co-benefits of reducing GHG emissions gases is being assessed. (Reference 31).

Possible Climate Change Response Options Could Include:

- *Participate actively in the Canadian Climate Impacts and Adaptation Research Network (C-CIARN).*
- *Integrate health and well-being into climate change planning.*
- *Recognize and evaluate the co-benefits of GHG emissions reductions.*
- *Support information dissemination on climate change impacts and adaptation.*



# In Summary

The government wants to hear the opinions, concerns and ideas of all New Brunswickers about the issues addressed herein. The Action Plan will be developed in consultation with all stakeholders as part of a comprehensive and coordinated approach with our fellow provinces, the New England States and Canada. It needs to gauge the level of concern, the level of understanding of the issues, the information that is required for good decision-making and the commitment to tackling the uncertainties of this issue. Your response will be important in developing our own New Brunswick Climate Change Action Plan.





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