
# New Brunswickers' Response to Climate Change

## Final Report of the Select Committee on Climate Change

Second Session
of the
58th Legislative Assembly
of
New Brunswick


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**Second Session**
Fifty-eighth Legislative Assembly
of the Province of New Brunswick

Final Report of the
Select Committee on Climate Change

Legislative Assembly of New Brunswick
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To the Honourable
The Legislative Assembly of
The Province of New Brunswick

Mr. Speaker:

I have the pleasure to present herewith the Final Report of the Select Committee on Climate Change entitled *New Brunswickers' Response to Climate Change*. Your Committee was given the task of engaging with New Brunswickers on the issue of climate change and reporting back to the Legislature with recommendations.

The report represents the results of your Committee's engagements and deliberations on what a stronger New Brunswick response to climate change should look like and what we may reasonably expect the government to achieve through our recommendations.

On behalf of the Committee, I would like to thank the presenters, government departments and members of the public, including First Nations, who appeared before the Committee and submitted written briefs. Everyone generously gave of their time to inform the Committee on this important issue and propose innovative and unique solutions for New Brunswick.

I would also like to express my sincere appreciation to the members of the Committee for their valuable contribution in carrying out our mandate and to the various government officials and legislative staff who participated in the process and provided support to our work.

Respectfully submitted,

Andrew Harvey, M.L.A.
Chair

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# Executive Summary

The Select Committee on Climate Change, an all-party Committee of the Legislative Assembly, was appointed by the House on April 8, 2016. The Committee was, by motion of the House, charged with conducting public consultations, informed by a climate change discussion guide, *Building a Stronger New Brunswick Response to Climate Change,* and reporting to the House with recommendations. The Committee was fortunate to hear from a wide diversity of New Brunswickers who shared their opinions about how New Brunswick should respond to the opportunities and challenges presented by climate change.

New Brunswick is already experiencing the impacts of climate change, including sea level rise, extreme rainfall events, coastal and inland flooding, accelerated coastal erosion, heat waves, diseases, and some migration of invasive species. The scope and magnitude of the change and its impacts are expected to increase in the future.

Every single person and economic sector in New Brunswick will be affected by climate change. The collaborative and coordinated participation of the public and private sectors, non-governmental organizations (NGOs), academia, households, and First Nations, is essential if New Brunswick is going to address this challenge. No single entity can tackle the climate change challenge by itself.

Based on the Committee's public engagement efforts and subsequent deliberations, the Committee wishes to highlight the following recommendations under six themes:

1. **Responding to Climate Change: General Principles.** The province's collective response to reducing greenhouse gas (GHG) emissions and adapting to the impacts of climate change must be guided by sound principles:

    - *be bold*
    - *incorporate climate change considerations into all decision-making*
    - *recognize New Brunswick's unique circumstances and opportunities*
    - *focus on the most efficient and effective actions*
    - *ensure sustained action*
    - *work together and share the responsibility*

2. **Government Leadership.** Government must take a strong leadership role in addressing the challenges and opportunities of climate change. Example actions include:

    - *establishing a committee of Cabinet dedicated to climate change*
    - *introducing a Climate Change Act*
    - *requiring climate change consideration in all Memorandums to the Executive Council*
    - *including climate change consideration in the mandate letters to all Ministers and Crown corporations*
    - *developing energy management plans for all government departments*
    - *enhancing the role of the Climate Change Secretariat*
    - *establishing a multi-stakeholder climate advisory council*
    - *developing a communications strategy to educate New Brunswickers about the causes of climate change*
    - *including capacity building (human, knowledge and financial) as a component of all actions*
    - *investing in the training of workers in the fields of energy efficiency and renewable energy*
    - *measuring and reporting on New Brunswick's climate actions*

3. **Economic Opportunities.** The government's response to climate change offers economic opportunities. Example actions include:

   - *creating the conditions for growth and job creation in the areas of clean technology, products and services*
   - *enabling greater private investments in community economic development corporations*
   - *reducing energy costs and re-investing the savings into the economy*

4. **Adaptation: Responding to the Impacts and Risks of Climate Change.** Climate change adaptation is about making informed, forward-looking decisions considering future climate conditions. Government must take immediate action to adapt to climate change. Example actions include:

   - *acquiring up-to-date climate information*
   - *strengthening research capabilities into the impacts of climate change*
   - *ensuring that the impacts of climate change and extreme weather are considered in all infrastructure decisions*
   - *requiring completed climate change adaptation plans to access infrastructure funding*
   - *promoting and utilizing natural infrastructure*
   - *implementing statements of provincial interest related to climate change under the* Community Planning Act
   - *incorporating climate change knowledge into all forest management plans*
   - *encouraging agricultural practices that promote soil health and reduce soil erosion*
   - *partnering with the insurance industry to make flood insurance available to high risk homeowners*
   - *updating and implementing New Brunswick's Flood Risk Reduction Strategy (2014)*

5. **Mitigation: Transitioning to a Low-Carbon Economy.** An aggressive, integrated approach to GHG emissions reduction is required if New Brunswick is to do its part to meet climate change obligations and maintain economic competitiveness. Government must take action to reduce GHG emissions. Example actions include:

   - *establishing clear GHG emissions reduction targets of 40 per cent below 1990 levels by 2030 and 80 per cent below 2001 levels by 2050*
   - *phasing out fossil fuels used in electricity generation by 2030*
   - *developing energy efficiency targets for all government owned and funded facilities*
   - *establishing a permanent, independent provincial agency with a mandate for energy efficiency and promotion of renewable energy*
   - *increasing the target for in-province electricity sales from renewable sources to 60 per cent by 2030*
   - *setting a target of 5,000 electric vehicles in New Brunswick by 2020 and 20,000 by 2030*
   - *electrifying the government vehicle fleet*
   - *focusing on industrial energy efficiency*
   - *exploring opportunities for carbon offset markets*
   - *establishing a made in New Brunswick carbon pricing mechanism after specific conditions are met*

6. **Funding for Climate Change Initiatives.** Government must ensure that climate change mitigation and adaptation initiatives are adequately supported. Example actions include:

    - *establishing a dedicated climate change fund*
    - *ensuring all revenue, including any revenue derived from carbon pricing, is placed in the fund and invested back to consumers and economic sectors*
    - *reporting annually and being transparent on expenditures and performance of the fund*
    - *allowing for multi-year funding for climate-related initiatives*

The imagination, determination and range of knowledge of those who presented, along with the work that communities, individuals and governments have already undertaken are reasons for optimism in the face of the broad scope of required actions. New Brunswickers are eager to build on the progress to date. Based on the diversity of ideas that were presented, there is a role and a place for everyone as New Brunswick moves forward to address climate change and put the province on a pathway to a low-carbon economy that creates jobs and sustains families and communities.

# Introduction

## The Context for New Brunswick's Response

The Intergovernmental Panel on Climate Change, the world's foremost authority, has stated that an increase in global temperatures of more than 2.0 degrees Celsius will result in significant, irreversible impacts. The current level of GHG emissions is expected to push global temperatures over this 2.0 degrees Celsius threshold before the end of this century. The panel has also determined that it is "extremely likely" that human activity is responsible for the warming that has already taken place since the mid-20th century. New Brunswick is already experiencing climate change; the scope and magnitude of the change are expected to increase in the future.

The global transition set in motion by the 2015 *Paris Agreement* under the *United Nations Framework Convention on Climate Change,* its subsequent ratification by Canada, and the *Vancouver Declaration on Clean Growth and Climate Change,* includes many opportunities for New Brunswick to be more efficient and competitive; to open new business opportunities; and to build more resilience and diversity into our economy. Responses to climate change in the areas of GHG emissions reduction and climate change adaptation have resulted in real economic benefits in other jurisdictions. These responses can also offer the potential for long term job creation in the province and can provide a stimulus for investment in innovation and business development.

Industry, transportation, and electricity generation are the three dominant contributors to provincial GHG emissions (Figure 1).

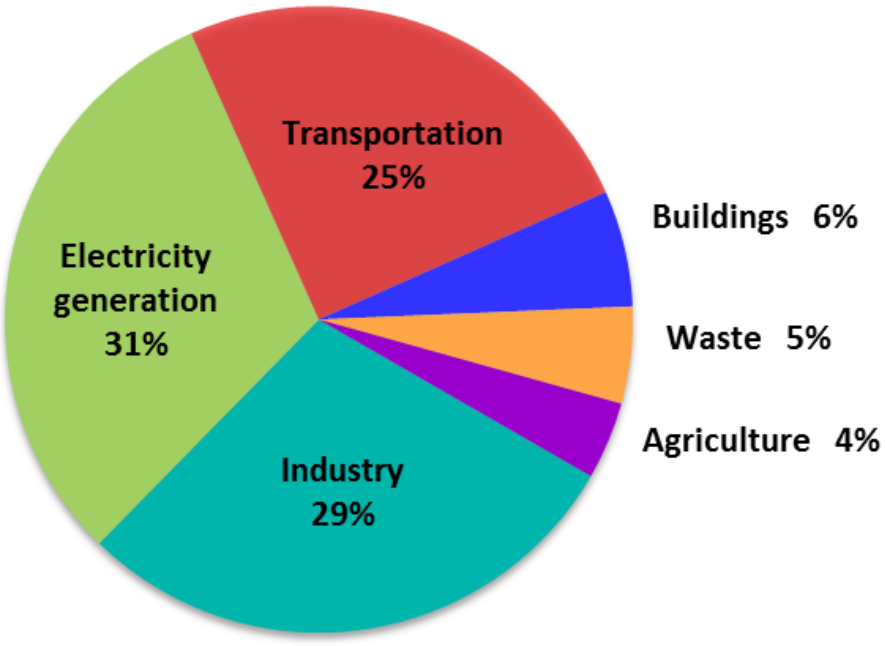


**Figure 1: GHG emissions in New Brunswick, 2014**

*Source: Environment and Climate Change Canada. National Inventory Report. 2016*

Although New Brunswick's GHG emissions have declined in recent years, they are not predicted to decline in the future under the status quo (Figure 2). This, along with the GHG reduction targets adopted by the Conference of New England Governors and Eastern Canadian Premiers and the provincial government, means that substantial additional GHG reduction measures will be required to meet New Brunswick's targets of:

- 10 per cent below 1990 levels by 2020;
- 35 to 45 per cent below 1990 levels by 2030; and
- 75 to 85 per cent below 2001 levels by 2050.

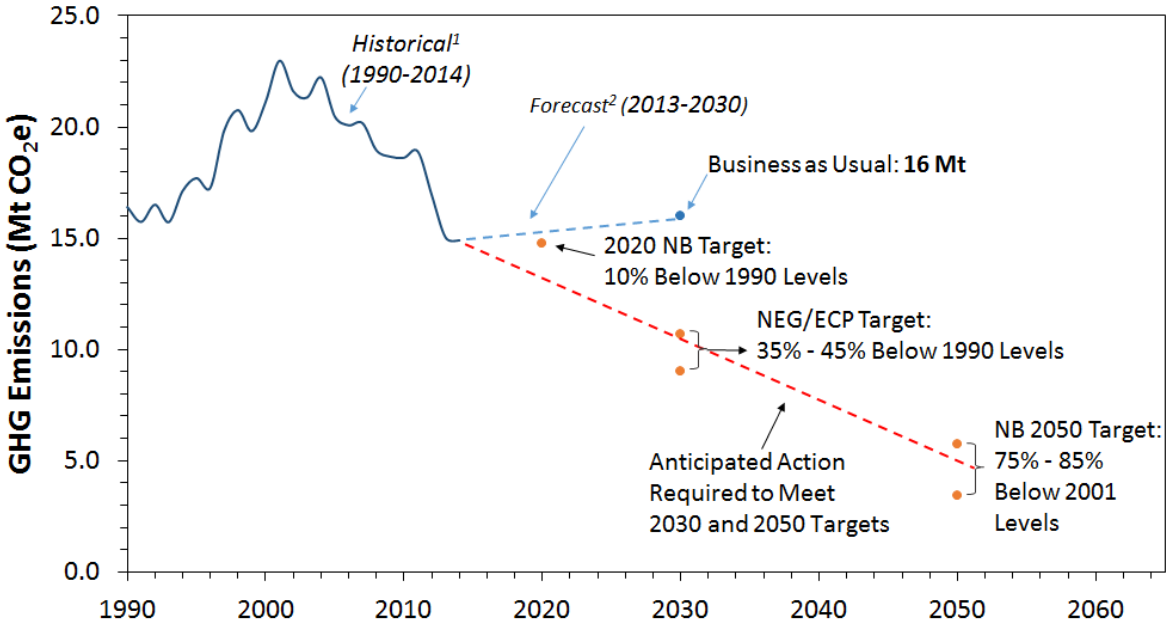


**Figure 2: Future GHG emission trend for New Brunswick**

1. Environment and Climate Change Canada, 2016. National Inventory Report 1990–2014: Greenhouse Gas Sources and Sinks in Canada
2. Environment and Climate Change Canada, 2016. Canada's Second Biennial Report on Climate Change. *Note: Forecast data is for the period 2013 to 2030. Forecast data will be updated by Environment and Climate Change Canada in October 2016 to reference 2014 historical data.*

Investments aimed at energy efficiency and cleaner energy alternatives are especially important in light of New Brunswick's energy-intensive industries and the growing importance of less carbon-intense products in our export markets. Timely investments in adaptation will also help to maintain and enhance New Brunswick's economic competitiveness, the well-being of residents, and the resilience of communities. Many of our provincial and territorial counterparts have already taken significant steps in GHG reduction and climate change adaptation.

An ambitious, integrated approach to GHG emissions reduction is required if New Brunswick is to do its part to meet its climate change obligations and maintain economic competitiveness. As part of this approach, collaboration with partners will continue to be a cornerstone and is particularly important for a small province such as New Brunswick.

Additional information outlining the global, national, and provincial context for New Brunswick's responses to climate change can be found in the discussion guide entitled *Building a Stronger New Brunswick Response to Climate Change.*

## Climate Change Impacts in New Brunswick

World-wide, the rate of warming has accelerated over the past 45 years. In Canada, the mean temperature has increased by 1.6 degrees Celsius (twice the global rate) and by 2.2 degrees Celsius in the Arctic (3 times the global rate).

Climate change is already evident in New Brunswick in the form of increased temperatures, more intense precipitation, and higher sea levels. In general, New Brunswickers can expect the future to be warmer, wetter, and stormier. Fluctuations in the timing of precipitation may also result in periods of drought. Sea levels are expected to rise by more than one metre by 2100. There is an elevated risk of a variety of adverse effects including health concerns, pests and invasive species, impacts on water quality and quantity, coastal and inland flooding and erosion, extreme winds, and icing of trees and power lines.

Community infrastructure, such as storm sewers, sewage treatment facilities, and water supplies, is particularly vulnerable. Climate change impacts can also contribute to road, bridge, port, rail, and airport disruptions, and increased costs for infrastructure repair and maintenance. These disruptions in productivity, critical trade infrastructure, electricity generation, and supply chains would have far-reaching consequences for many economic sectors, services to consumers, and businesses. Tourism and recreation activities that are weather-dependent are particularly sensitive to climate change.

Climate change represents a threat to physical and mental health and a challenge to the health system. Natural disasters have a negative impact on public health and can reduce individual and community resilience. Often there is a disproportionate impact on the most vulnerable members of society.

New Brunswick's resource-based economy is also vulnerable. Climate change is creating risks as well as operational and sustainability challenges for forestry, agriculture, fisheries and aquaculture production, while providing some additional opportunities, such as an expanded growing season and new crop species.

New Brunswick's ecosystems are being impacted. The speed of climate change is of particular concern as it will likely unfold more rapidly than many species can adapt.

Climate change will impact the natural environment upon which First Nations communities depend. There will be changes to wildlife and plant species, traditional medicines, and waterways. This will result in significant impacts on the culture and way of life for many First Nations communities.

# Mandate of the Committee

On April 8, 2016, the Legislature appointed a Select Committee on Climate Change. The all-party Committee is responsible for engaging with New Brunswickers on the issue of climate change and reporting to the Legislature with recommendations. The text of the motion to establish the Select Committee on Climate Change is contained in Appendix A.

# Public Engagement

## Engagement Process

All New Brunswickers were encouraged to assist the Committee in its work by sharing their ideas and opinions on the topic of climate change. On May 25, 2016, the Minister of Environment and Local Government tabled a discussion guide entitled *Building a Stronger New Brunswick Response to Climate Change* in support of public engagement.

To help ensure that as many people as possible were able to make their views known, the Committee issued a public invitation to participate in public hearings and submit a written brief to the Committee. Between August 26 and September 13, 2016, public hearings took place in all regions of the province: Perth-Andover, Edmundston, Atholville, Shippagan, Moncton, Sackville, Saint John and Fredericton, and with First Nations communities in Elsipogtog and Tobique First Nations and the Mi'gmawe'l Tplu'taqnn Inc. (MTI). During the months of July and August, the Committee also received briefings from notable experts and government departments.

All told, over 150 presenters took the time to appear before the Committee and many more attended the public hearings. In addition, the Committee received over 40 written submissions from interested New Brunswickers (Appendix B).

## New Brunswickers' Ideas about Responding to Climate Change

Committee members are grateful for the sincere and knowledgeable presentations and submissions received. New Brunswickers are passionate about their province and committed to its continued success. Many respondents provided the Committee with references that contained a wealth of information. All information received was carefully reviewed and considered in the preparation of this report.

The vast majority of presenters acknowledged the predominant scientific opinion that climate change is real and human-caused, although a few presenters questioned the validity of climate change and the assertion that it is caused by humans. The Committee heard that there is general consensus about the urgency of responding to climate change and that there are many ideas about how best to proceed.

The necessary responses to climate change touch all sectors of New Brunswick's society and economy, including agriculture, forestry, fisheries, aquaculture, electricity generation, energy use, transportation, land-use planning, education, and health care. No single region, sector, government department, organization, or community can tackle the climate change challenge by themselves; collaborative and coordinated action is essential. The ideas, skills, and energies required to adequately respond to climate change are scattered throughout the province and arranged in a variety of formal and informal networks. This is an organizational challenge but it also represents an advantage: no one need shoulder the burden alone.

A detailed summary of the themes, key messages, and suggestions received by the Committee during public engagement is contained in Appendix C.

# Recommendations of the Committee

The recommendations of the Committee are outlined in the following section of the report and are grouped under six themes which emerged from the Committee's public engagement efforts and subsequent deliberations.

1. Responding to Climate Change: General Principles
2. Government Leadership
3. Economic Opportunities
4. Adaptation: Responding to the Impacts and Risks of Climate Change
5. Mitigation: Transitioning to a Low-Carbon Economy
6. Funding for Climate Change Initiatives

## Responding to Climate Change: General Principles

Considering the messages received during public engagement, the Committee recommends that government:

**1.** Use the following principles to guide New Brunswick's climate actions and the province's collective response to reducing GHG emissions and adapting to the impacts of climate change:

**a.** **Be bold.** Responding to climate change will require a number of simultaneous actions, some of which will be unprecedented in scale and scope.

**b.** **Incorporate climate change considerations into all decision-making.** Climate change considerations should be integrated into decision-making across all levels of government, communities, households, and businesses using the best available scientific and socio-economic data, validated and augmented by local and traditional knowledge.

**c.** **Recognize New Brunswick's unique circumstances and opportunities.** The unique economic, social, and geographical conditions in New Brunswick must be taken into consideration when designing and implementing actions to maximize health, social, ecological, and economic benefits.

**d.** **Focus on the most efficient and effective actions.** Seek maximum value for the efforts expended and undertake initiatives that will be the most efficient, effective and have the greatest impact on GHG emissions and climate change adaptation. There is a need to direct resources to both adaptation (preparing for effects of climate change) and mitigation (reducing GHG emissions).

**e.** **Ensure sustained action.** A climate change action plan is not the final goal. Responding to climate change requires sustained action and the ongoing availability of human and financial resources. Responding to climate change is a long-term commitment.

**f.** **Work together and share the responsibility**. Continued collaboration, engagement, cost-sharing, and information-sharing are needed both in developing and implementing actions; it is a shared responsibility. Governments, the private sector, households, NGOs, academia, and First Nations all have a key role to play.

## Government Leadership

The response to climate change is a shared responsibility involving all New Brunswickers. Government must take a strong leadership role in addressing the challenges and opportunities presented by a changing climate.

The Committee heard that the objectives of reducing GHG emissions and adapting to the impacts of climate change will be more achievable when all New Brunswickers are aware of the serious nature of the issues and know how they can participate in response. Capacity building refers to growing the strengths, skills, knowledge, competencies, and abilities of New Brunswickers to respond to climate change. Capacity, including human, knowledge and financial, was identified as a key component to being able to respond to the opportunities and challenges posed by climate change.

Measuring, reporting, and verification are important elements of an effective response to climate change and are vital to assessing progress. Transparent reporting will also enable government and all New Brunswickers to track the effectiveness of GHG reduction initiatives, measure progress in adapting to climate change, and make any adjustments necessary to achieve provincial targets and goals.

The Committee offers recommendations under each of the following categories to support the theme of government leadership.

### Role of Government in Leading Change

To ensure proper accountability for the implementation of New Brunswick's climate actions, the Committee recommends that government:

2. Establish a committee of Cabinet dedicated solely to the issue of climate change, chaired by the Premier, to oversee the implementation of New Brunswick's climate actions.

3. Introduce an overarching Climate Change Act that:

    a. Establishes specific GHG emission targets;
    b. Requires climate implications (adaptation and mitigation) to be considered in all government-funded and government-approved projects and decision-making; and
    c. Ensures mechanisms are in place to implement New Brunswick's climate actions.

4. Require climate change, both GHG emissions and climate change adaptation, to be considered during the development of all Memorandums to the Executive Council.

5. Include in the mandate letters to all Ministers and Crown corporations the requirement to:

    a. Consider climate change in all decision-making;
    b. Establish specific GHG reduction targets for the department or corporation; and
    c. Assume responsibility for GHG reduction and climate change adaptation for specific economic sectors related to the department or corporation.

6. Lead by example on climate change through actions and decisions by developing the most effective and efficient tools (policy, legislation, incentives, disincentives, financing) to address climate change.

7. Establish low-carbon footprint requirements for all government and Crown corporation procurement to assist in meeting emissions targets (i.e. purchase products produced with the lowest possible GHG emissions).

8. Develop energy management plans for all government departments.

9. Ensure the Climate Change Secretariat has the power, authority, and resources to:

    a. Coordinate, measure and report on GHG reductions, adaptation achievements and implementation progress, in cooperation with other government departments and Crown corporations, directly to the Cabinet Committee;
    b. Establish a multi-stakeholder climate advisory council as part of a new robust engagement model, including input on priorities for a climate fund;
    c. Manage the continued engagement with provincial partners including municipalities, First Nations, academia, private sector, and NGOs, and federal, provincial, territorial, and international jurisdictions on climate change matters;
    d. Coordinate the gathering and dissemination of information relating to climate change;
    e. Facilitate innovation and research, and demonstrate what is possible through best practices related to climate change; and
    f. Lead the development of public awareness and education programs on climate change.

### Building Awareness

To support and build awareness around climate change, the Committee recommends that government:

10. Develop a bold and comprehensive communications strategy to educate New Brunswickers about the causes of climate change, including the linkage between human activity and climate change, and identify opportunities for all New Brunswickers to participate in solutions. Include partners to enable similar efforts and messages to be delivered outside of government.

11. Develop a central repository for different types of climate information. The information should be easy to access, understand, and interpret. An outreach strategy is needed to ensure that partners are aware of the information and its value.

12. Incorporate climate change into the education curriculum for all grades, including experiential learning and connecting students with climate change initiatives in their local communities.

### Building Capacity

To continue to build the capacity needed to respond to climate change in New Brunswick, the Committee recommends that government:

13. Include capacity building (human, knowledge, and financial) as a fundamental component of all actions.

14. Support and strategically invest in research at New Brunswick universities and colleges.

15. Invest in training of workers, particularly in the trades, to create a new workforce oriented to energy efficiency, energy management, and renewable energy.

16. Strengthen linkages between researchers, NGOs, local communities, and First Nations, to create partnerships and increase local capacity.

### Measuring and Reporting

To support a robust framework for measuring and reporting on New Brunswick's climate actions, the Committee recommends that government:

17. Establish and publicize the baseline conditions against which initiatives will be measured. Actions must be measurable and include clear timelines and responsibilities. Focus on quantifiable indicators.

18. Develop performance indicators to demonstrate improvements in adaptation over time.

19. Report annually to the Legislative Assembly on progress towards responding to climate change.

## Economic Opportunities

The Committee heard that responses to climate change offer the potential for job creation in the province and can provide a stimulus for investment in innovation and business development.

To support and promote the economic and job creation opportunities associated with climate change, the Committee recommends that government:

20. Create the conditions for growth and job creation in the areas of clean technology, products and services related to climate change in all sectors such as housing, agriculture, forestry, manufacturing, energy efficiency, renewable energy, information technology, and transportation.

21. Enable greater private investments in community economic development corporations that are supporting climate change initiatives.

22. Recognize the large financial opportunities that exist through reducing energy costs and the potential for reinvesting the savings into New Brunswick's economy.

## Adaptation: Responding to the Impacts and Risks of Climate Change

The Committee heard that climate change is already evident in New Brunswick in the form of increased temperatures, more intense precipitation, and higher sea levels. Even with significant reductions in GHGs, the impacts of climate change will continue to be felt by New Brunswickers for decades into the future.

Climate resilience is the ability to survive and flourish in the face of a changing climate. Climate change adaptation is a key means to achieving climate resilience, and is about making informed forward-looking decisions considering future climate conditions.

Acquiring up-to-date climate information to inform decision–making and implementing effective adaptation measures will save lives, minimize damages, and lower costs over the long term for individuals, businesses, organizations, and governments. Taking immediate action to adapt to climate change will help ensure communities; infrastructures; the health care system; natural resource, agriculture, fisheries and aquaculture sectors; and natural systems function into the future.

The Committee offers recommendations under each of the following categories to support the theme of adaptation.

### Acquiring Climate Information and Supporting Research

To ensure New Brunswick has access to the best available climate information and research the Committee recommends that government:

**23.** Acquire the most up-to-date predictive climate change information for all parts of the province and ensure the modeling capacity exists to support decision-making, including planning.

**24.** Strengthen research capabilities into the impacts of climate change by identifying research priorities and encouraging greater collaboration and sharing of information across partners (e.g., academic institutions, other jurisdictions, federal government, NGOs).

### Building Climate-Resilient Infrastructure

To ensure that infrastructure in New Brunswick is adapted to future climate conditions, the Committee recommends that government:

**25.** Promote and utilize natural infrastructure (e.g., forests, wetlands, salt marshes, floodplains) as an important tool to buffer against climate change impacts.

**26.** Ensure that the impacts of climate change and extreme weather are considered in all infrastructure decisions and the lifecycle assessment of all infrastructure projects (design, construction, operation, and maintenance).

### Supporting Community Adaptation Planning

To promote climate resilient communities in New Brunswick, the Committee recommends that government:

**27.** Ensure NGOs and local community partners are supported so they can continue to guide communities through the adaptation planning process.

**28.** Make the preparation and implementation of climate change adaptation plans mandatory for local and municipal governments that apply for provincial infrastructure funding. Develop guidelines for identifying vulnerabilities and creating adaptation plans.

**29.** Conduct climate change adaptation planning at a regional scale and empower regional service commissions to coordinate this exercise.

**30.** Amend the *Community Planning Act* and *Municipalities Act* to respond to the needs of local governments and their priorities for adaptation.

**31.** Implement statements of provincial interest under the *Community Planning Act* to establish province-wide standards and requirements for responding to climate change at the community level. Allow communities to exceed these standards if they choose.

### Adapting Forest Management

To ensure forest management practices are adapted to future climate conditions, the Committee recommends that government:

**32.** Incorporate climate change knowledge into Crown land operating plans and all forest management plans to promote diversity in age, species composition, and genetic diversity to increase resilience.

**33.** Modify silvicultural investments to promote techniques that lead to greater forest resilience.

**34.** Plan forest activities on a watershed basis to manage peak flow events associated with extreme precipitation.

### Adapting Agriculture

To help build a resilient agricultural sector and ensure practices are adapted to future climate conditions, the Committee recommends that government:

**35.** Support research into the impacts of climate change on agriculture and examine new crop and market opportunities as a result of changing growing conditions.

**36.** Encourage future federal-provincial-territorial funding agreements (e.g. Growing Forward) to include a stronger focus on climate change.

**37.** Encourage agricultural practices that promote soil health and reduce vulnerability to soil erosion.

**38.** Establish a program to assist with riparian buffer restoration in agricultural areas, recognizing that riparian buffers between agricultural activities and watercourses are important to address erosion and runoff from extreme weather events.

### Adapting Fisheries

To promote a fishery that is adapted to climate change and ready to respond to new opportunities, the Committee recommends that government:

**39.** Urge the federal Department of Fisheries and Oceans to:

- **a.** Ensure that sufficient refuge harbours and wharves exist for protection from storm events;
- **b.** Adjust the timing of fishing seasons in response to changing marine conditions; and
- **c.** Move more quickly to take advantage of new fisheries that may appear in New Brunswick waters.

### Adapting Ecosystems

To increase the stability and resilience of natural and human systems, the Committee recommends that government:

**40.** Recognize the importance of ecosystems (e.g., wetlands, forests, soil, dunes, coastal salt marshes) in buffering the impacts of climate change, and integrate ecosystem services (e.g., temperature control, maintaining air quality, erosion control, water quality improvement, flood reduction) into land-use planning.

41. Identify and focus on the most climate-vulnerable species, habitats, and landscapes as targets for adaptation action and manage for landscape connectivity to allow for species migration.

### Reducing Climate-Related Hazards and Risks

To ensure the continued safety of New Brunswickers and shift from reactive to proactive emergency management planning, the Committee recommends that government:

42. Ensure provincial disaster financial assistance programs and insurance products are responsive to climate change.

43. Work in partnership with the insurance industry to make flood insurance available to high-risk homeowners and promote awareness of available products.

44. Consider future climate conditions when making decisions about replacing or repairing infrastructure following disasters ("build back better" or relocate).

45. Update and implement *New Brunswick's Flood Risk Reduction Strategy* (2014) to more prominently consider climate change, including:

    a. Ensuring that new infrastructure is not located in hazard areas; and
    b. Empowering and educating homeowners about ways to reduce the risk to existing infrastructure located in hazard areas and enhance awareness of the numerous publications and tools already available.

### Adapting to the Health Impacts of Climate Change

To ensure the continued health and well-being of New Brunswickers in a changing climate, the Committee recommends that government:

46. Support ongoing research into climate-related health risks, including drinking water quality and quantity, increased risk of heat-related incidents, psychological and physiological impacts of extreme weather events, and the potential spread of vector-borne diseases.

## Mitigation: Transitioning to a Low-Carbon Economy

Canada is responsible for approximately 1.6 per cent of global GHG emissions and is the ninth largest emitter among all nations. New Brunswick is responsible for approximately 3 per cent of Canada's emissions and 0.03 per cent of global emissions. It is the nation's third largest emitter on a per capita basis after Alberta and Saskatchewan.

The Committee heard that while the amount of New Brunswick's emissions is small on the global scale, most presenters were in general agreement that the province should do its part to meet Canada's national emissions reduction targets and its regional commitments. The majority supported the transition to a low-carbon economy with the goal of reducing fossil fuel consumption.

An ambitious, integrated approach to GHG emissions reduction is required if New Brunswick is to do its part to meet its climate change obligations and maintain economic competitiveness. Energy efficiency, renewable

energy, emissions reduction in transportation and industrial processes, carbon sequestration, land-use planning, and carbon pricing were all identified as tools to assist in reducing New Brunswick's GHG emissions.

There are two basic approaches to carbon pricing:

- A carbon levy (carbon tax) establishes a dollar amount that is charged per unit of GHG emissions. It is usually calculated according to the carbon content of the fossil fuel that is consumed to obtain energy. The carbon price is known in advance so industries and consumers can budget for the cost of their emissions and plan their energy use accordingly. It is not possible, however, to know in advance the size of the resultant reduction in GHG emissions.
- Under an emissions trading scheme (cap-and-trade system or carbon market), the government sets a cap (limit) on the amount of GHGs that can be emitted by a particular sector (e.g., oil and gas, pulp and paper, electricity generation). Emission allowances (also known as quotas, permits, or credits) are sold or given to individual companies by the government. Emission allowances can be traded (bought and sold). There is certainty as to the level of GHG reductions that will be achieved but the cost companies will have to pay to emit GHGs is not known in advance.

The Committee heard that a carbon levy/tax is generally less complex and easier to administer than a cap-and-trade system and that carbon pricing can be designed to achieve different objectives. By tailoring specific features within a carbon pricing scheme or combining features of both, various objectives can be optimized but there are always trade-offs.

The Committee offers recommendations under each of the following categories to support the theme of mitigation.

### GHG Reduction Targets

The Committee acknowledges the GHG reduction target for 2020 of 10 per cent below 1990 levels. To achieve additional GHG emissions reduction, the Committee recommends that government:

**47.** Establish specific GHG emission targets for 2030 and 2050 that fall within the target range of previously adopted regional targets:

- **a.** 40 per cent below 1990 levels by 2030; and
- **b.** 80 per cent below 2001 levels by 2050.

**48.** Phase out fossil fuels used in electricity generation by 2030 and replace with renewable energy and energy efficiency; social and economic impacts must be considered.

### Energy Efficiency

To implement robust actions on energy efficiency in support of GHG emissions reduction targets, the Committee recommends that government:

**49.** Set ambitious, measurable, short, medium, and long-term targets for energy efficiency for all sectors.

**50.** Develop energy efficiency targets for all government-owned and funded facilities.

**51.** Adopt the National Energy Code of Canada for Buildings and National Building Code within a year of their release nationally and invest in training of inspectors to ensure adequate enforcement. Implement the necessary legislation to allow this to occur.

**52.** Require energy labeling for all new building construction, both residential and commerical.

**53.** Urge the federal government to:

- **a.** Improve energy efficiency through revisions to the building standards for First Nations housing; and
- **b.** Ensure that energy efficiency is included as a component of social housing agreements.

**54.** Explore the potential for the Property-Assessed Clean Energy (PACE) Program in New Brunswick as a means of financing for private property owners to implement energy efficiency and renewable energy improvements.

**55.** Establish a permanent, independent provincial agency with a mandate for energy efficiency and promotion of renewable energy across all sectors (industrial, commercial, residential, and transportational) and all fuel types. The mandate of the agency should include:

- **a.** Clear performance-based targets for program delivery, subject to performance audits;
- **b.** Sustained funding, including financial incentives and financing mechanisms, to support enhanced and progressive long-term programs;
- **c.** Expanded capacity and programs to support low-income New Brunswickers;
- **d.** Active promotion and recruitment of participants to enhance program uptake; and
- **e.** Training for building contractors through partnerships with the New Brunswick Home Builders' Association and other stakeholders.

### Renewable Energy

To increase renewable energy production in New Brunswick in support of GHG emissions reduction targets, the Committee recommends that government:

**56.** Increase the target for in-province electricity sales from renewable sources to 60 per cent by 2030.

**57.** Show leadership by using renewable energy to heat and power government buildings.

**58.** Investigate and remove existing barriers to the greater implementation of renewable power generation, distributed energy generation, and net metering.

**59.** Support the uptake of increased renewables for both electricity generation and residential/business heating in New Brunswick, through financial incentives, policy, and legislation.

**60.** Expand the small-scale community renewable energy program.

**61.** Work with the federal government to address the barriers to using registered retirement savings plan investments to support community economic development corporations with their renewable energy projects.

**62.** Mandate NB Power to:

- **a.** Reduce fossil fuel use in electricity generation by increasing electricity generation from renewable sources;
- **b.** Accelerate the implementation of the Smart Grid initiative to increase the penetration of renewables into the market; and
- **c.** Expand net metering and make the development of distributed energy generation a high priority.

### Transportation Emissions

To achieve GHG emissions reduction in the transportation sector, the Committee recommends that government:

**63.** Set a target of 5,000 electric vehicles on the road in New Brunswick by 2020 and 20,000 by 2030. To achieve this target:

- **a.** Implement the required incentives, regulations, and policies; and
- **b.** Develop the required charging infrastructure to support electric vehicle targets, including rapid charging stations.

**64.** Lead by example by electrifying the government vehicle fleet.

**65.** Develop a specific program for the electrification of taxis and local delivery vehicles.

**66.** Work with the freight and trucking industry to increase fuel efficiency in commercial trucking and pilot the use of alternative fuels such as propane, natural gas, and bio-diesel.

**67.** Institute public transportation planning at the regional level to allow for route integration and improvements in access.

**68.** Work with communities to improve public transport ridership and alternative forms of transportation, such as carpooling, cycling, and walking.

### Industrial Emissions

To achieve industrial GHG emissions reduction, the Committee recommends that government:

**69.** Create and enforce stringent GHG emissions reduction regulations under the *Clean Air Act*.

**70.** Mandate the development of energy management plans as a condition of the Approval to Operate, pursuant to the Air Quality Regulation of the New Brunswick *Clean Air Act*.

**71.** Provide incentives and programs to support initial implementation of industrial energy efficiency. Programs should include a performance-based approach, a focus on energy management information systems, and training and capacity building.

### Agricultural Emissions

To achieve agricultural GHG emissions reduction, the Committee recommends that government:

**72.** Link financial incentives for agriculture to the development of farm-management plans that include methane and fertilizer management.

### Carbon Sequestration

To support an increase in carbon sequestration in New Brunswick as a means to mitigate GHG emissions, the Committee recommends that government:

**73.** Explore the opportunity for participation in carbon offset markets (voluntary and regulated), for large and small industry, as a means to capture GHG emissions and generate revenue and economic opportunities for New Brunswickers.

**74.** Direct revenue generated from carbon sequestration on Crown land to a climate change fund.

**75.** Encourage and support forest and agriculture practices that are known to increase carbon sequestration and conduct research into the most effective silviculture and agricultural practices for increasing carbon sequestration.

**76.** Incorporate the use of materials that have sequestered carbon or were produced with low carbon emissions into building specifications and requirements.

### Planning for Climate Change

To help promote smart growth principles and planning that incorporate GHG emissions reduction, the Committee recommends that government:

**77.** Adopt community and regional land-use planning requirements that address ways to shape land-use to incorporate energy efficiency, energy conservation, carbon sequestration, and reduce emissions.

**78.** Provide incentives to promote smart growth (natural infrastructure, green buildings, and low impact developments) and sustainable community design.

**79.** Incorporate GHG emissions reduction considerations into lifecycle assessments of all infrastructure projects.

**80.** Amend the *Community Planning Act* and *Municipalities Act* to respond to the needs of local governments and their priorities for mitigation.

### Carbon Pricing

There was general, but not unanimous, support for some form of carbon pricing to drive emissions reduction and generate revenue to fund other responses to climate change. More engagement and analysis is required before a carbon pricing mechanism is established.

The Committee recommends that government:

**81.** Develop a made-in-New Brunswick carbon pricing mechanism, as opposed to having one imposed on New Brunswickers by the federal government, that is conditional on:

- **a.** Directing all revenue from carbon pricing to a dedicated climate change fund, not general revenue;
- **b.** Undertaking a detailed analysis of the social, financial, economic, and environmental impacts of the various carbon pricing mechanisms and revenue investment options. The analysis should be made public and consider the:
  - **i.** Potential impacts on consumers and businesses (including capacity to pay) and industry (including trade-exposed, energy-intensive New Brunswick industries);
  - **ii.** Cost of administering any carbon pricing mechanism; and
  - **iii.** Impact on GHG emissions reduction.
- **c.** Protecting low-income New Brunswickers;
- **d.** Including all economic sectors;
- **e.** Considering the approach taken by neighboring jurisdictions;
- **f.** Developing the mechanism with the engagement of all concerned interests; and
- **g.** Ensuring the carbon-pricing mechanism is outlined in legislation and receives public consultation through a committee of the Legislative Assembly.

## Funding for Climate Change Initiatives

The Committee heard that dedicated funding for climate change initiatives is essential to ensure sustained, ambitious, and collaborative action.

To ensure that climate change mitigation and adaptation initiatives are adequately supported, the Committee recommends that government:

**82.** Establish and administer a climate change fund that will:

- **a.** Ensure revenue derived from carbon pricing is invested back to consumers and economic sectors with the majority of the revenue dedicated to GHG emissions reduction (energy conservation and efficiency, and renewables) and the remaining balance to climate change adaptation;
- **b.** Be completely transparent regarding who is paying and how the revenue is spent;
- **c.** Ensure expenditures are done in accordance with government's climate action priorities;
- **d.** Involve a multi-stakeholder climate advisory council to provide input on funding priorities; and
- **e.** Consider all existing provincial and federal funds and opportunities to align or incorporate within the climate change fund and better utilize and leverage the revenue from these funds to meet government's climate action priorities.

**83.** Report annually on expenditures and performance of the climate change fund to the Legislative Assembly's Standing Committee on Public Accounts.

**84.** Make provisions for multi-year funding for climate-related initiatives.

**85.** Reinvest government energy management savings back into departmental actions to address climate change.

# Appendix A:

# Motion to Establish the Select Committee

| MOTION 19 | MOTION 19 |
|---|---|
| WHEREAS Climate change is the single most significant challenge of our generation; | attendu que les changements climatiques représentent le défi le plus important avec lequel notre génération est aux prises ; |
| WHEREAS government's vision is to position New Brunswick as a leader in job creation and economic development; | attendu que la vision du gouvernement est de faire du Nouveau-Brunswick un chef de file de la création d'emplois et du développement économique ; |
| WHEREAS the government recognizes the economic importance of New Brunswick's energy and resource sectors, and their sustainable development as New Brunswick transitions to a low carbon economy; | attendu que le gouvernement reconnaît l'importance économique des secteurs de l'énergie et des ressources du Nouveau-Brunswick et du développement durable de ces secteurs pendant la transition du Nouveau-Brunswick vers une économie de faibles émissions de carbone ; |
| WHEREAS the government recognizes that investing in clean technology solutions, especially in areas such as renewable energy, energy efficiency and cleaner energy production and use, holds great promise for sustainable economic development and long-term job creation; | attendu que le gouvernement reconnaît que l'investissement dans des solutions axées sur les technologies propres, surtout dans des domaines comme les énergies renouvelables, l'efficacité énergitique et la production et l'utilisation de l'énergie propre, offre d'excellentes perspectives de développement économique durable et de création d'emplois à long terme ; |
| WHEREAS the government recognizes that New Brunswick is already experiencing impacts of climate change, including sea level rise, extreme rainfall events, coastal and inland flooding, more coastal erosion, heat waves, some migration of invasive species, and diseases; | attendu que le gouvernement est conscient que le Nouveau-Brunswick subit déjà les répercussions des changements climatiques, y compris l'élévation du niveau de la mer, des épisodes de pluie extrême, des inondations côtières et intérieures, davantage d'érosion côtière, des vagues de chaleur, la migration d'espèces envahissantes et les maladies ; |
| WHEREAS the government wishes to foster dialogue on how to seize opportunities that come along with fighting climate change and address its impacts in a way that respects New Brunswick's distinct economic challenges and opportunities; | attendu que le gouvernement veut favoriser le dialogue au sujet des façons de saisir les occasions qui se présentent dans la lutte contre les changements climatiques et d'aborder les répercussions de ces changements d'une manière qui respecte les défis et les possibilités économiques propres au Nouveau-Brunswick ; |
| BE IT THEREFORE RESOLVED THAT the House appoint a | qu'il soit à ces causes résolu que la Chambre constitue |

Select Committee on Climate Change that will be charged with the responsibility of conducting public consultations, informed by a climate change discussion guide to be laid before the House and deemed referred to the committee, and reporting to the House with recommendations;

un Comité spécial sur les changements climatiques ayant pour mission de mener des consultations publiques, en s'appuyant sur un guide de discussion sur les changements climatiques qui sera déposé à la Chambre et réputé avoir été renvoyé au comité, et de déposer à la Chambre un rapport assorti de recommandations ;

BE IT FURTHER RESOLVED THAT, in addition to the powers traditionally conferred upon the said committee by the Standing Rules, the committee shall have the following additional powers:

- to meet during sittings of the House and during the recess after prorogation until the following session;
- to adjourn from place to place as may be convenient;
- to retain such personnel and expertise as may be required to assist the committee;
- to hold such public consultations as it deems necessary;

que, investi des pouvoirs traditionnellement conférés en vertu du Règlement, le comité soit aussi habilité :

- à siéger pendant les séances de la Chambre et après la prorogation, jusqu'à la session suivante ;
- à tenir séance à divers endroits, au besoin ;
- à s'adjoindre le personnel et les specialists-conseils qu'il requiert ;
- à tenir les consultations publiques qu'il estime nécessaires ;

BE IT FURTHER RESOLVED THAT, during a period when the Legislative Assembly is adjourned or prorogued, the committee may release a report by depositing a copy with the Clerk of the Legislative Assembly, and, upon the resumption of the sittings of the House, the Chair shall present the report to the Legislative Assembly;

que, si l'Assemblée législative est ajournée ou prorogée, le comité soit habilité à rendre public un rapport par le dépôt d'un exemplaire au bureau du greffier de l'Assemblée législative, lequel rapport, après la rentrée parlementaire, sera présenté à l'Assemblée législative par la présidence du comité

BE IT FURTHER RESOLVED THAT the said committee be composed of Mr. Harvey, Mr. Bernard LeBlanc, Ms. LeBlanc, Mr. Ames, Mr. Roussel, Mr. Jody Carr, Mr. Keirstead, and Mr. Coon.*

et que le comité soit composé de M. Harvey, de M. Bernard LeBlanc, de M$^{me}$ LeBlanc, de M. Ames, de M. Roussel, de M. Jody Carr, de M. Keirstead et de M. Coon.*

* Note: The membership of the committee was amended by motion of the House on June 29, 2016 by replacing "Mr. Ames" with "Mr. LePage".

* Note : La composition du comité a été modifiée sur une motion de la Chambre le 29 juin 2016 par la substitution, à « M. Ames », de « M. LePage ».

# Appendix B:

# List of Public Hearing Participants and Written Briefs Submitted

Adaptation to Climate Change Team, Simon Fraser University

Agricultural Alliance of New Brunswick

Allen, Tyler

American Society of Heating, Refrigerating and Air-Conditioning Engineers, New Brunswick and Prince Edward Island Chapter

Andrews, J. Robin

Arp, Paul A.

Arsenault, Paul

ARTisticc, Université de Moncton

Association francophone des municipalités du Nouveau-Brunswick

Association of Professional Engineers and Geoscientists of New Brunswick

Astephen, Lynaya

Aster Group

Atlantic Canada Fish Farmers Association

Atlantic Lab for Avian Research, University of New Brunswick

Atlantic Provinces Trucking Association

Atlantica Centre for Energy

Augustine, Freda

Augustine, Noel

Barlow, Georgianna

Barlow, Ken

Bastarache, Brian

Bathurst Sustainable Development

Bear Nicholas, Andrea

Bear, Rocky

Bear, Victor

Beckley, Tom

Biomass Solution

Blaney, Phillip

Bleau, Lise

Bourque, Charles

Brooks, Cecelia

Brown, David

Byrne, Mary Anne

Canaan-Washademoak Watershed Association

Canadian Fuels Association

Canadian Gas Association

Canadian Home Builders' Association of New Brunswick

Canadian Manufacturers and Exporters, New Brunswick and Prince Edward Island Divisions

Canadian Parks and Wilderness Society, New Brunswick Chapter

Canadian Propane Association

Canadian Taxpayers Federation

Canadian Union of Postal Workers

City of Edmundston

City of Fredericton

City of Moncton

Cleland, James

Coastal Zones Research Institute

Coleman, Mary Ann

Comité consultatif sur l'adaptation aux changements climatiques dans la Péninsule acadienne

Comité VerTige, école Mathieu-Martin

Community Forests International

Connell, Rhonda

Conservation Council of New Brunswick

Coombs, David

Council of Canadians

Defazio, Ronald Nicholas

Department of Agriculture, Aquaculture and Fisheries, Province of New Brunswick

Department of Energy and Resource Development, Province of New Brunswick

Department of Environment and Local Government, Province of New Brunswick

Department of Health, Province of New Brunswick

Department of Justice and Public Safety, Province of New Brunswick

Department of Transportation and Infrastructure, Province of New Brunswick

Devor, Teresa

Diamond, Dorothy

Dietz, Sabine

Ducks Unlimited Canada

Duivenvoorden, Carl

Dupuis, Serge

Eastern Charlotte Waterways

EfficiencyOne

Ekoko, Patricia

Electric Vehicle Multi-stakeholder Advisory Group

Elgin Eco Association

Emera New Brunswick

Enbridge Gas New Brunswick

Energy Performance Services Inc.

Engineers Canada

EOS Eco-Energy Inc.

F.W. Technologies

Finite Carbon

Five Tier Farms

Foord, David

Forest NB

Francis, Cora

Francis, Ernestine

Francis, Kenneth

Francis, Robert

Francis, Serena

Friends of Rockwood Park

Fundy North Fishermen's Association

Fundy Solar Energy

Gilbey, Stuart

Gorman, Jamie

Green Light

Grégoire, Michel

Groupe de développement durable du Pays de Cocagne

Guillemot, Julie

Haché, Emma

Hédou, Michel

Institute for Catastrophic Loss Reduction

Insurance Bureau of Canada

International Brotherhood of Electrical Workers, Local 37

Irving Oil Ltd.

J.D. Irving Ltd.

Jolicoeur, Serge

Kennebecasis Watershed Restoration Committee

Kersey, David

Knockwood, Rebecca

Labillois, Gordon

Leach, Andrew

LeBlanc, John

Leblanc, Michel

LeBlanc, Roger

LeBrun, Érik

Levesque, Francine

Levi, Tara

MacPhail, Donald

Marten, Peter

Martin, Tina

McAllister, Ann

McCabe, Darren

McLaughlin, Sylva

McLean, Tom

McQueen, Ian

McShane, Anne

Millier, Nathan

Ministère des Transports, de la Mobilité durable et de l'Électrification des transports, Province of Quebec

Moss, Heidi

Murphy-Flatt, Sharon

National Farmers Union in New Brunswick

Nature Conservancy of Canada

Nature NB

Naveco Power Inc.

Navius Research Inc.

New Brunswick Anti-Shale Gas Alliance

New Brunswick Business Council

New Brunswick Climate Change Research Collaborative

New Brunswick Environmental Network

New Brunswick Federation of Woodlot Owners

New Brunswick Lung Association

New Brunswick Peat Producers Association

New Brunswick Power Corporation

New Brunswick Road Builders and Heavy Construction Association

New Brunswick Rural and Urban Transportation Advisory Committee, Economic and Social Inclusion Corporation

New Clear Free Solutions

Organic Crop Improvement Association Atlantic

Ouranos Consortium on Climate Change

Paul, Doreen

Paul, Sydney

Pearce, Joan

Perley, Hart

Perley, Kisuhs

Perley, Ross

Philippe, Johanne

Pohl, Ann

Polchies, Patrick

Post Carbon Greater Moncton

Projet de restauration des dunes de Le Goulet

Proulx, Marie-Nicole

Quest NB

R.J. Daigle Enviro

Ratliffe, A.T.

Red Head Anthony's Cove Preservation Association

Reed, Lee

Restigouche Regional Service Commission

Restigouche River Watershed Management Council

Robichaud, Serge

Ross, Jenna

Royal College of Physicians and Surgeons of Canada

Saint John Citizens Coalition for Clean Air

Salonius, Peter

Sanipas, John Joe

Sappier, Deana

Sappier, Gary

Sappier, Gary, Sr.

Savidge, Rodney

Savoie, Marc

Seeley, Colin

Sheppard, Margo

Siemens Canada Limited

Simon, Jesse

Soucy, Paul-Émile

Southeast Regional Service Commission

St. Amand, Francine

St. Jacques, Ken

Steele, Ann Mary

Stephen, Rick

Stop Spraying NB

Stote, Dan

Sustainability Program, University of New Brunswick

Sustainable Energy Group

Thibodeau, Liane

Thomas, Leland

Thompson, David

Thoughtful Dwellings

Town of Sackville

Town of Saint Andrews

Vihvelin, Thomas

Village of Perth-Andover

Walters, Bradley B.

Waugh, Joe

Wrightman Alpines Nursery

WWF-Canada

Wysote, Glenda

Youth for Action on Climate Change

Zirpolo, John

Zolondek, Daniel

# Appendix C:

# New Brunswickers' Ideas about Responding to Climate Change

## Table of Contents

## Introduction

The Committee was fortunate to hear from a wide diversity of New Brunswickers who shared their opinions about how New Brunswick should respond to the opportunities and challenges presented by climate change.

There is general consensus about the urgency of responding to climate change and there are many ideas about how best to proceed. The imagination, determination and range of knowledge of those who presented, along with the work that communities, individuals and government have already undertaken are reasons for optimism in the face of the broad scope of required actions. New Brunswickers are eager to build on the progress to date. Based on the diversity of ideas that were presented, there is a role and a place for everyone as New Brunswick moves forward to address the challenges ahead.

Given the volume of information received by the Committee it was not possible to capture every individual suggestion made to the Committee. What follows is a summary of the key themes, messages and suggestions drawn from the results of the Committee's public engagement.

## Theme 1: Government Leadership

### Government Organization

Key messages received by the Committee:

- Within the provincial government, departmental responsibilities and mandates could be revised to make them more conducive to driving progress in addressing climate change.
- The Climate Change Secretariat needs a higher profile and greater authority.
- Interdepartmental coordination on climate change is required. Although it is occurring, additional attention and prioritization will make it more effective.
- Government departments do not currently have specific greenhouse gas (GHG) emissions reduction targets for their own activities or the activities they regulate.
- Responsibilities for sectors such as transportation are spread across different departments. This dispersed responsibility makes concerted, focused, and mitigative actions difficult to implement and track.
- Split federal-provincial jurisdiction is hindering some climate change actions (e.g. protection of fish and fish habitat).

Key suggestions received by the Committee:

- Increase the profile and responsibility of the Climate Change Secretariat within government: Create a new department to oversee the climate change file or move the Secretariat to the Executive Council Office.
- Establish a cabinet committee, chaired by the Premier, to drive the outcomes of a climate change action plan. Climate change should be a top consideration in policy making.
- Direct individual Ministers to address climate change via their mandate letters. Include an emphasis on climate change adaptation and reducing GHG emissions in each departmental decision and state the emissions reduction expectations for each department's operations.
- Assign responsibilities for GHG reduction, including reduction targets within specific sectors (e.g. transportation), to the corresponding government departments.
- Establish a type of multi-stakeholder climate advisory council as part of a new robust engagement model.
- Create a renewable energy branch or a green energy branch within the Department of Energy and Resource Development.

- Reform the New Brunswick Energy and Utilities Board to remove barriers to reducing electricity demand.
- De-couple NB Power revenue from throughput or volume sales. Use performance-based rate-making that includes energy efficiency and conservation performance metrics.
- Move towards municipalization by strengthening political and organizational structures within local governments. This will encourage communities to take action.

### Roles and Responsibilities

Key suggestions received by the Committee:

The Provincial Government should:

- Provide strong leadership on climate change extending beyond the election cycle through actions and decisions.
- Consider climate change in all decision-making.
- Develop the necessary policy and regulatory tools to address climate change.
- Send a clear and unambiguous statement about its policy directions (avoid mixed messages).
- Provide guidance and establish best practices for others that are responsible for taking action on climate change.
- Be a leader in influencing behavior through education and awareness.
- Provide information and incentives to help citizens decide for themselves the best course of action.
- Enable others to succeed: Provide financial and human resource support for the actors and stakeholders that are critical to implementing New Brunswick's response to climate change.
- Provide ongoing funding to ensure sustained, ambitious and collaborative action.
- Take a central role in nurturing innovations and supporting research; which are a product of mission-oriented government intervention and support.
- Provide investment and support for testing ideas and demonstrating what is possible.
- Make climate change adaptation a planning imperative for the province.
- Measure and report on progress towards meeting climate change commitments.

Regional Service Commissions should:

- Provide strong leadership on climate change through actions and policy decisions.
- Consider climate change in all decision-making.
- Initiate, oversee and report on collaborative action at the regional level.
- Deliver on regional planning.
- Be empowered to deliver adaptation planning in unincorporated areas.
- Be a delivery agent for government's messaging about climate change.

Communities and Municipalities should:

- Provide strong leadership on climate change, through actions and policy decisions.
- Consider climate change in all decision-making.
- Deliver emergency management planning.
- Lead community adaptation planning efforts.
- Be the key agent for climate change delivery at the local level.
- Implement all available land-use planning and building approval functions available to reduce risk.

Watershed Groups and other Non-Governmental Organizations (NGOs) should:

- Provide a focal point for local climate action and education.
- Initiate, oversee, implement and report on collaborative action at the local level by employing their capacities and knowledge in the areas of mitigation, adaptation, renewable energy, ecosystem resilience, etc.
- Assist in the collection and dissemination of information, including environmental data, best practices, success stories and failures, etc.
- Be a trusted partner to communities and act as a gateway for citizens to discuss issues.

The Private Sector should:

- Consider climate change in all decision-making.
- Assess operations and buildings for climate-related vulnerabilities.
- Make steady advances in emissions reduction and energy efficiency within their facilities.
- Develop products and services that respond to climate change.

Individuals and Households should:

- Recognize that cumulative choices made by individuals and households do make a difference.
- Take responsibility for their choices, such as the types of transportation they use, and where and how they build their homes.
- Prepare themselves and their properties for climate-related threats.

Professional Associations should:

- Support outreach initiatives by working with governments and serve as a link to expertise at national and local levels.
- Provide training to members on climate change and how to incorporate climate change considerations into their professional practice.

Universities and Colleges should:

- Include the topic of climate change in course curriculum. Develop partnerships with communities to collaborate on community-based climate change projects.
- Conduct research into emerging issues related to climate change.
- Collect information to track changes in environmental conditions.

First Nations should:

- Participate as partners in efforts to address climate change.
- Share observations with respect to climate change, specifically traditional ecological knowledge.

### Provincial Policies and Legislation

Key messages received by the Committee:

- Improvements to some legal and policy instruments are necessary to facilitate more timely and effective responses to climate change.

Key suggestions received by the Committee:

- Create an overarching Climate Change Act that establishes GHG targets and puts the mechanisms in place to implement the climate change action plan.

- Use legislation to ensure that climate implications (adaptation and mitigation) of all government-funded and government-approved projects are assessed.
- Conduct a strategic review of all government funding (e.g. government subsidies, tax credits, etc.) and eliminate all those that are contrary to the goals of GHG emissions reduction and climate adaptation.
- Proclaim the *New Brunswick Building Code Act* to increase the speed with which the province can adopt successive versions of the National Building Code.
- Make various improvements to the *Community Planning Act* and *Municipalities Act* including:
  - provide additional tools to communities to advance smart energy policies (e.g. allow local improvement charges to support new technology);
  - give communities an ability to offer incentives to homeowners and developers (e.g., to retrofit buildings to reduce their vulnerability to climate change or install renewable energy);
  - provide an ability for communities to explore other sources of revenue beyond property taxes (e.g. development charges).
- Implement climate-sensitive provincial planning and energy policies. Statements of provincial interest under the *Community Planning Act* should be used to establish province-wide standards and requirements for responding to climate change at the community level. Allow communities to exceed these standards if they choose.
- Institute low carbon footprint requirements for all government procurement (i.e. purchase products produced with the lowest possible GHG emissions).
- Regulation must be accompanied by sufficient resources to ensure compliance.

### Building Awareness

Key messages received by the Committee:

- Information is available but is generally scattered, difficult to access and/or not being shared.
- Government departments are not sharing their information, even within government.
- The majority of New Brunswickers believe that the Earth is getting warmer but less than half believe it is mostly due to human activities.
- On the whole, New Brunswickers are unaware of the significant threat posed by climate change.
- It is better to warn people about risk than to keep silent for fear of upsetting them.
- More education is required to gain public support for action on climate change.
- There is a strong need to educate the public about climate change and energy choices.
- Education is more than “preaching.” It should also demonstrate examples.
- Accepting the need for significant changes to the status quo may be the most difficult challenge.
- Government has a role in the assembly and distribution of climate change information.
- Deliberation and engaged discussions with peers have been shown, in some instances, to be more beneficial in changing behavior than education alone.
- It is important to focus on children and youth because they will be the ones who will be the most affected by climate change and may be the most willing to act.

Key suggestions received by the Committee:

- Create a climate change observatory (modelled after public health observatories).
- Encourage citizens to monitor changes in their living environment and create a “citizen science hub”.

- Develop a central web-based information portal to access different types of climate information. Provide the expertise to help interpret the information.
- Collect and distribute information using government resources and locally and community-based networks such as the New Brunswick Environmental Network.
- Make use of local and traditional knowledge in measuring and responding to climate change.
- Invest in formal and informal education and training that demonstrates to New Brunswickers the causes of climate change and the opportunities for all citizens to participate in solutions; provide examples of what people can do.
- Make the link between human activity and climate change in order to get support for action on climate change; identify actions that people can take.
- Urge the Department of Education and Early Childhood Development to develop a climate change curriculum for all grades that includes connecting students with climate change initiatives in their local communities.
- Improve the advertising of existing programs such as NB Power's energy efficiency grants and Locally-Owned Renewable Energy Small Scale (LORESS) program.
- Include the topic of climate change in post-secondary course curriculum.
- Educate citizens about extreme weather preparations.
- Focus on publicizing both climate and non-climate benefits of proposed programs and actions. Even if some people dispute the causes of climate change, many can accept the value of energy efficiency, job creation, improving economic competitiveness, increasing energy security and adapting to extreme weather events.

### Building Capacity

Key messages received by the Committee:

- A lack of capacity was identified as a challenge to responding to climate change and although funding is a key component of capacity building, having the human resources and knowledge/awareness to be able to respond to climate change is also key.
- A lack of capacity is a particular concern at the local level, where many decisions are made and implemented.
- Some capacity to act has already been established in many communities throughout the province due to programs and resources, such as the Environmental Trust Fund (ETF) and the federally-funded Atlantic Regional Adaptation Collaborative.
- Investments in innovation, pilot studies and implementation of new technologies can build capacity within the economy. This will help ensure that resources spent on climate change initiatives both here and elsewhere can flow to New Brunswick.
- Many First Nations communities struggle to engage in the climate change conversation because of a lack of capacity.

Key suggestions received by the Committee:

- Include capacity building (financial, human and knowledge) as a fundamental component of all actions.
- Invest in post-graduate research at New Brunswick universities to train highly skilled people.
- Invest in training and retraining of workers, particularly in the trades, to create a new workforce oriented to energy efficiency, energy management and renewable energy.
- Form linkages between scientists and local communities; create university-community partnerships.
- Assist First Nations communities to access funding, such as the ETF, which can be used to build local capacity and knowledge.

### Measuring and Reporting Progress

Key messages received by the Committee:

- To be effective, a climate change action plan must identify specific actions with measurable targets.
- Timelines must be set and specific agencies (e.g., government departments and Ministers) must be made responsible and accountable for achieving the targets.
- The Climate Change Secretariat currently publishes an annual progress report detailing actions taken to meet climate action plan commitments.
- The way to ensure that climate responses remain ambitious and sustained is to publically report on progress and make this information widely available.
- Appropriate performance indicators must be identified and sufficient information must be collected to measure changes in these indicators.

Key suggestions received by the Committee:

- Establish and publicize the baseline conditions against which changes will be measured. Action plan commitments should be measurable and include clear timelines and responsibilities. Focus on quantifiable indicators.
- Continue to report on progress towards meeting climate change commitments. Be transparent about successes and failures.
- Conduct research into developing performance indicators to demonstrate improvements in resilience (adaptation) over time.
- Take into account the full life cycle of the sector or activity being measured, for all measuring and reporting of emissions reduction.

## Theme 2: Economic Opportunities

Key messages received by the Committee:

- Responding to climate change represents significant economic potential for New Brunswick. There are numerous opportunities that exist across New Brunswick in the areas of renewable energy (e.g. solar, biomass, wind, tidal, and hydro) and energy efficiency.
- If New Brunswick expects to capture the full economic benefits of changing to a low-carbon economy, any resources gained through this measure should stay in New Brunswick to further stimulate economic transition and technological change.
- Investments in innovation, pilot studies and implementation of new technologies represent economic opportunities for New Brunswick.
- Resources dedicated to conservation, renewable energy and energy efficiency are investments that can provide short and long term gains in GHG reductions and job creation.
- GHG reduction leads to environmental and economic benefits.
- A changing climate can present economic development opportunities in the forest, fisheries, agriculture and aquaculture sectors.
- The business sector is ready to invest in innovation to create economic prosperity and transition to a low carbon economy.
- Sustaining economic growth and accelerating emissions reduction can be achieved by increasing the rate of capital investment.

- A long-term vision is required to identify potential career opportunities for the children of today in a future low carbon economy.

Key suggestions received by the Committee:

- Use local capacity and build local economic development by supporting NGOs to carry out climate work.
- Launch an independent and objective study to determine viability of new energy jobs.
- Take action in areas such as smart grid technology and climate adaptation to exploit business opportunities stemming from New Brunswick's existing expertise.
- Invest heavily in and transition quickly to energy efficiency and renewable energy to capture the maximum economic benefits.
- Focus on labor-intensive climate responses such as silviculture and energy efficiency retrofits of existing buildings.
- Create an economic multiplier effect for large scale renewable energy investments by building publically owned generation capacity and reinvesting the resultant revenue from electricity sales.
- Help keep New Brunswick capital in the province by increasing opportunities for local involvement in renewable energy generation, carbon sequestration (carbon credits) and enabling greater private investments in community economic development corporations.
- Support retraining and training of workers, particularly in the trades, including general contracting, electrical engineering, renewable energy technicians, software engineers (for Smart Grid and other electricity-related innovations).
- Research potential new species that could be used as economic forest products.

## Theme 3: Adaptation: Responding to the Impacts and Risks of Climate Change

### Acquiring Climate Information and Supporting Research

Key messages received by the Committee:

- Accurate, up-to-date, authoritative and regionally relevant climate information is critical to support decision-making and adaptation planning across all sectors of the economy including health, infrastructure, transportation, agriculture, natural resource and ecosystem management, manufacturing, tourism, insurance, water-management, land-use planning, and disaster management.
- New Brunswick is fortunate to have a number of academic institutions researching climate change impacts. There is an opportunity for greater collaboration with partners within and outside the province.

Key suggestions received by the Committee:

- Provide the best available climate change predictions for all parts of the province and update regularly as new information becomes available.
- Translate climate data into information and products (e.g. tools, regionally relevant information) that decision- makers can easily access.
- Develop stronger climate and environmental monitoring networks.
- Ensure New Brunswick has access to sufficient climate modelling capacity to support decision-making; partner with out-of-province expertise as required.
- Ensure climate information has adequate detail to guide the development of construction standards for buildings, bridges, culverts, etc.

- Share climate information across all stakeholders; provincially, locally and regionally.
- Conduct research into the impacts of climate change on New Brunswickers (e.g., pests and disease, health impacts, social impacts, blue green algae, heat stress, extreme events, predictive modeling of coastal erosion etc.).
- Provide mapping to communities to help plot and identify their vulnerabilities. This includes accurate, large scale topographic mapping and provincially sanctioned flood hazard mapping for New Brunswick's coastlines and inland waters, including mapping of coastal erosion rates. Maps of risks and hazards should be available in the form of an internet-based atlas to help communicate risks and vulnerabilities.

### Building Climate-Resilient Infrastructure

Key messages received by the Committee:

- Physical infrastructure supports public health and public service delivery as well as business and economic prosperity.
- Infrastructure renewal provides an opportunity to take climate change into consideration in infrastructure design. If buildings, roads or other structures are damaged as a result of floods or other disasters, this provides an opportunity to "build back better" so that the new construction is less vulnerable than what it replaced.
- When designing new infrastructure, engineering adaptation is driven by good data. An informed client (e.g. a municipal government knowledgeable about climate-related risks) will demand a better product from engineers.
- Climate change adaptation adds minimal cost to new home construction. It is generally harder and more expensive to retrofit existing buildings.
- Asset management plans can be used to prioritize work and help ensure that repairs and upgrades are performed in advance of failure.
- Knowledge of hazards on the part of government may result in liability if the risk to the public is not disclosed.
- New Brunswick has traditionally lagged behind in adoption of building code updates.
- Land-use planning can significantly reduce risk.

Key suggestions received by the Committee:

- Consider climate change during the planning process to ensure that new infrastructure is not being constructed in hazard areas. Provide statements of provincial interest under the *Community Planning Act* to guide local decisions.
- Promote and incentivize the use of natural infrastructure (e.g. forests, wetlands and floodplains that buffer climate change impacts) to encourage their preservation.
- Incorporate climate change as a significant component of asset management planning.
- Consider the impacts of climate change and more extreme weather in all infrastructure decisions and the lifecycle assessment of all infrastructure projects (design construction and operation and maintenance).
- Assume a provincial leadership role to update engineering design standards based on the most recent climate projections.
- Include future climate considerations and requirements in government requests for proposals and procurement processes.

- Train professionals so that they are aware of the predictive tools at their disposal and can understand how to consider future climate in their professional practice.
- Adopt the National Building Code in the year it is issued or implement New Brunswick's own building code amendments to address the needs and opportunities of New Brunswickers.

### Supporting Community Adaptation Planning

Key messages received by the Committee:

- Adaptation at the community level generally means embarking on a systematic review of the anticipated nature and scale of climate change in the community and the resultant vulnerabilities (e.g. flooding of a main street blocking access to a hospital). These can then be listed and ranked in order of priority according to the level of risk they represent. Solutions can then be identified in an adaptation plan.
- Various actors in New Brunswick are already engaged in community adaptation planning. These early adopters have developed nodes of expertise and their experiences should be shared with others.
- NGOs play a critical role in New Brunswick in helping to guide communities through the adaptation planning process. They are willing partners and some are ready to expand this role.
- Capacity is a major barrier to being able to advance community adaptation planning. Both human and financial resources are needed.
- Numerous communities and organizations have benefitted from the ETF to obtain the resources needed to complete vulnerability assessments and adaptation planning.
- While the benefits of adaptation can be more immediate than those of mitigation, it can take a long time to implement adaptation projects. It is therefore important to start as soon as possible.
- Cost-benefit analysis is a useful tool to help inform adaptation decision-making.
- It is important to not dilute community adaptation efforts by trying to accomplish too many projects. It was suggested that an appropriate focus for New Brunswick would include actions to mitigate flood risk (coastal and inland) and to protect critical infrastructure (e.g. roads, drinking water supplies, wastewater treatment facilities).
- Communication between community leadership and its members is an essential component of any adaptation planning exercise and critical to keep the community engaged and informed.
- Land-use planning implies making decisions about the locations of buildings, roads, businesses, services etc., and the preservation of natural features. These decisions can reduce vulnerability of people and property to climate-related hazards. Land-use planning in New Brunswick requires attention if it is to realize its potential in adaptation to climate change.
- Adaptation can be implemented using existing tools such as zoning by-laws (which some New Brunswick communities are already using for this purpose), and building codes. It is also important to give New Brunswickers the knowledge and impetus to protect their homes and properties.
- Regional service commissions can play a strong role in helping to deliver on community adaptation.

Key suggestions received by the Committee:

- Ensure NGOs are supported so they can continue to guide communities through the adaptation planning process.
- Make the preparation and implementation of climate change adaptation plans mandatory for communities that apply for provincial infrastructure funding.

- Ensure mandated adaptation plans address how to build human and leadership capacity to deal with change (i.e. adaptation is about more than just physical infrastructure).
- Develop a standardized and simplified process by government for identifying vulnerabilities and creating adaptation plans. It is important to focus on the process and not just the final plan.
- Consider retreat (i.e. relocation from a hazardous area) among the suite of adaptation options.
- Create a comprehensive on-line inventory of local adaptation initiatives, including examples of New Brunswick-based case studies.
- Ensure that adaptation planning is more than just a paper exercise; plans must be implemented, evaluated and updated.
- Research methods to measure the effectiveness of adaptation plans, to verify that risks and vulnerabilities have actually been reduced.
- Implement provincial planning policies that require consideration of climate change in land-use planning decisions. Review the *Community Planning Act* and the *Municipalities Act* to address regulatory barriers.
- Provide a financial signal to encourage building owners to take measures to adapt (protect) their property from future damage, such as a vulnerability tax on non-adapted homes in flood-exposed areas, or tax breaks for adapted homes.
- Mandate NB Power to make the electrical distribution grid "climate ready" (i.e. decrease its vulnerability to extreme weather events).
- "Municipalize" New Brunswick to ensure that the political structures, degree of organization, and capacity are in place to fully engage with other agencies and their own residents in taking action on climate change.
- Conduct climate change adaptation planning at the regional scale and draw linkages to regional service commissions.
- Empower regional service commissions to deliver adaptation planning for unincorporated areas.

### Adapting Forest Management

Key messages received by the Committee:

- Climate is a major driver of forest growth. The character and composition of New Brunswick's forests will change in the future as a result of climate change, but the extent of these changes remains uncertain.
- Gains in forest productivity due to a warmer climate and the "fertilization" effect of increased atmospheric carbon dioxide may be offset by increased stresses on forests (extreme heat, pests, drought, fire, etc.). On-going forest monitoring and research is important and there is an on-going need to assess the vulnerability of New Brunswick's forests to climate change.
- The sustainability of current forest practices and the increasing vulnerability of New Brunswick's forests is a concern due to clear-cut harvesting practices, the size of riparian areas (buffers), the level of watercourse protection in headwater streams, siltation associated with forest roads, inadequate protection of cold water refugia for fish, and the use of herbicides such as glyphosate.
- Over-harvesting would leave the landscape more vulnerable to the effects of climate change such as flooding and erosion driven by intense precipitation.
- Forest practices that result in a forest monoculture (low species diversity) would reduce forest resilience to climate change.
- In managed forests, silviculture was identified as a tool that could both create immediate employment and improve forest health and productivity.

Key suggestions received by the Committee:

- Integrate watershed level planning in forestry practices and modeling of equivalent clear-cut areas to serve as a means to manage peak flow events associated with future extreme precipitation.
- Use forest management practices that promote diversity in age, species composition and genetic diversity to increase resilience.
- Incorporate new climate change knowledge into forest management plans as it becomes available. In particular, it is important to retain capacity for rapid reaction to emerging threats.
- Limit the size and use of clear-cuts in favour of selective harvesting.
- Research the most effective silviculture practices for increasing forest productivity.

### Adapting Agriculture

Key messages received by the Committee:

- Climate change may include some positive benefits, such as longer growing seasons leading to larger yields, more crops suited to larger parts of New Brunswick, and lower livestock feed costs. However, climate change also increases the risk of extreme weather events and related issues (e.g. soil erosion, stream-bank washouts, periodic droughts, viability of pollinators, introduction of invasive species, pests and diseases, reduced range for existing species, etc.).
- Farmers are on the front lines of climate change and are forced to adapt on a daily basis.
- Family farms contribute to sustainable rural development, land stewardship and local food security.
- Crop insurance is currently not available for hail damage in New Brunswick. Climate change and the increase in extreme events and localized storm events will make it a challenge to offer an affordable product for farmers in the future.
- Riparian buffers between agricultural activities and watercourses are important to address erosion and run off from extreme events. These buffers may be too small.
- Diversification is an adaptation strategy. Small scale, diversified farming is more resilient in the face of extreme climate than large, monoculture plantations.

Key suggestions received by the Committee:

- Implement agricultural mitigation and adaptation actions jointly because of their close linkage.
- Conduct farm trials on new crops with a lens on future climate conditions.
- Enhance weather forecasting to allow farmers to better plan for future conditions.
- Transmit information directly to farmers to enhance education.
- Encourage agricultural practices that promote soil health.

### Adapting Fisheries and Aquaculture

Key messages received by the Committee:

- Negative climate-related impacts are being experienced (e.g. storm surges and floods, decline of herring fishery, and green crab invasive species). There are concerns regarding invasive species and new or more virulent pests and diseases.
- Commercial fishery operators often hold licenses for a variety of different fish species rather than focusing on a single species; they understand the importance of adapting to changing species mixes.

- Lobster populations have declined in the Gulf of Maine south of New Brunswick. Climate may be playing a role, but it is difficult to differentiate between climate change effects and natural population cycles in lobster and other marine life.
- Adaptation opportunities include "hardening" of federal wharf infrastructure to resist storm damage and enhanced habitat/coastal zone protection policies.
- Concerns were expressed about the potential impacts from proposed large scale marine-based projects such as the shipping terminal associated with the Energy East pipeline project.
- Fuel use data is collected by the province but not provided to the industry.
- Changes to marine ecosystems could affect current commercial stocks and their range. The sector will need access to new fisheries, and opportunities for new species in new locations.

Key suggestions received by the Committee:

- Lobby the federal government (i.e. the Department of Fisheries and Oceans) to move more quickly to take advantage of new fisheries that may appear in New Brunswick waters.
- Look for opportunities to combine the development of marine protected areas with sustainable, adaptive fisheries.
- Ensure that sufficient refuge harbours and wharves are available so that boats can reach shelter in the event of sudden, major storms and deteriorating weather conditions.
- Adapt aquaculture practices to decrease the reliance on pesticides to protect marine ecosystems.
- Provide fuel use data to members of the fishing industry so they know where efficiency improvements can be made.

### Adapting Ecosystems

Key messages received by the Committee:

- Natural systems (e.g. forests, wetlands, dunes, beaches, salt marshes) buffer the negative impacts of climate change, adding stability and resilience to both natural and human systems.
- Natural systems have an inherent ability to adapt to change, but the rapid pace of climate change erodes this ability.
- There is uncertainty about how natural systems will be impacted by climate change, but any actions taken to increase the ability of these systems to adapt will be important (e.g. maintaining connectivity for wildlife movements, maintaining and expanding protected natural areas, etc.).
- Coastal squeeze is impacting some coastal ecosystems as they are trapped between rising sea levels and hard infrastructure inland (e.g. sea walls, rock revetment).

Key suggestions received by the Committee:

- Conduct more research into the value of ecosystem services (e.g. temperature control, maintaining air quality, erosion control, water quality improvement, flood reduction, etc.).
- Identify and focus on the most climate-vulnerable landscapes as targets of adaptation measures. Key conservation data sets are needed to inform this type of decision-making (i.e. need to identify vulnerable species and habitats and identify required conservation lands).
- Implement the recently developed Long Term Wetland Management Strategy.

- Increase the size of protected natural areas in the province (both terrestrial and marine). Develop intermediate targets and timelines. Permanently conserve large tracts of natural intact lands and provide for connectivity to allow wildlife movements between them.
- Ensure a strong linkage between New Brunswick's Water Strategy and climate change.

### Reducing Climate-Related Hazards and Risks

Key messages received by the Committee:

- There is room for improvement regarding disaster preparation at the individual, community and provincial level.
- The Department of Justice and Public Safety has convened a Round Table on Emergency Management and Resilience. A resiliency strategy is being developed by the Department to help drive the shift from reactive to proactive measures.
- At present, there are few disincentives to keep local governments from allowing new development in flood prone areas. The resultant financial risk often falls on the province and disaster financial assistance programs.
- New insurance products are now on the market to address overland flooding, based on a national flood mapping exercise completed by the insurance industry.
- The insurance industry is championing the creation of a national flood strategy which will aim to transfer risk from taxpayers (i.e. disaster financial assistance programs) to policyholders (private industry).

Key suggestions received by the Committee:

- Integrate future climate considerations into planning for disasters and into strategies for disaster response and recovery.
- Consider future climate conditions when making decisions about how to "build back better" following disasters.
- Shift focus from disaster recovery to risk mitigation (resilience).
- Empower and educate homeowners to make the right decisions. Enhance awareness of the numerous publications and tools already available to assist homeowners to reduce their risk to climate hazards.
- Fully implement New Brunswick's *Flood Risk Reduction Strategy*, which was released in 2014.

### Adapting to the Health Impacts of Climate Change

Key messages received by the Committee:

- Climate change affects the health and well-being of New Brunswickers, both directly and indirectly.
- Climate related hazards to public health include extreme heat, extreme weather, air pollution, vector borne diseases, and access to safe nutritious food and clean water. New vector borne diseases (e.g. Lyme disease) may present increased risk to New Brunswickers in a changing climate.
- The Department of Health has undertaken several initiatives to address these hazards (e.g. Heat Alert Response System, Air Quality Health Index Program, Healthy Built Environment Working Group and Action Plan). More work is needed.
- The impacts of climate change on mental health and children are opportunities for future research and policy development.

Key suggestions received by the Committee:

- Continue to work collaboratively with stakeholders and educate the public about climate-related health hazards.
- Conduct ongoing research into climate-related health hazards, including new vector borne diseases.

## Theme 4: Mitigation: Transitioning to a Low-Carbon Economy

### Energy Efficiency

Key messages received by the Committee:

- Energy efficiency delivers tangible savings for energy users. The cheapest energy is the energy we do not use. Energy efficiency is the "first fuel" to consider in climate change plans; it is viewed by many as the fastest, lowest risk and most effective way to reduce GHG while improving competitiveness and creating locally-sourced, clean, innovative jobs.
- Impediments to achieving greater energy efficiency include lack of knowledge of available options, an inability by households and businesses to produce the initial capital investments, and the extended timeframes required to realize a positive return on investment. Financial incentives coupled with sound advice are essential to increase the uptake of energy efficiency measures.
- In theory, NB Power (which currently houses provincial energy efficiency programs) can address multi-fuel energy efficiency, but cannot use electricity rates to fund such programs. Such programs would have to be funded from other sources.
- NB Power would require direction from government if they are to expand their energy efficiency programs. Potential funding sources include: a) consumers; b) utility level incentive programs funded by ratepayers; and c) tax-payers.
- There is a general lack of awareness of existing energy efficiency programs offered by NB Power.
- To ensure success of energy efficiency programs and investments, it is critical to have a permanent, consistently supported, provincial energy efficiency agency which focuses on all fuels and all sectors. Nova Scotia's Efficiency One was inspired by the former, stand-alone version of Efficiency NB and is a potential example to follow.
- There are pros and cons associated with a power utility providing energy efficiency programs. The utility has useful data on customers' energy use, but this could be provided to outside delivery agencies as well. Energy efficiency lowers their sales and revenue but also lowers the amount of capital needed to invest in new generation capacity. Power utilities are generally rewarded based on avoided capital expenditure.
- According to NB Power's integrated resource plan, there is potential to reduce power consumption by 609 MW; 60 per cent through energy efficiency and 40 per cent through Smart Grid technology.
- It is possible to achieve much higher levels of energy efficiency than is required under current building codes. For example, "net zero" homes have already been introduced to New Brunswick and are self-sufficient with respect to energy.
- Canada's National Building Code and National Energy Code set the required standards for building construction including energy efficiency. The 2012 National Building Code with energy efficiency requirements was adopted by New Brunswick in 2015. New Brunswick has not yet adopted the National Energy Code of Canada for Buildings. These delays are hampering the advancement of energy efficiency in New Brunswick.

- Community energy plans can be employed to help define a community's priorities regarding energy, efficiency improvements, cutting of emissions, driving economic development and yielding cost savings for businesses and individuals.
- It is important to not fixate on increased cost of electricity from renewable sources. Because of gains in energy efficiency, a higher kilowatt per hour rate does not guarantee a higher energy bill. Focus on lower bills rather than lower rates.

Key suggestions received by the Committee:

- Expand and reinvigorate energy efficiency programs with adequate funding to support enhanced, long-term programs.
- Set ambitious measurable short, medium and long-term targets for energy efficiency.
- Remove energy efficiency programming from NB Power and establish a permanent, independent provincial agency dedicated to energy conservation and efficiency. Assign clear, performance based targets for delivery of efficiency programs, subject to third party auditing.
- Provide financial incentives for energy efficiency upgrades to buildings such as grants, rebates, or low interest/no interest loans attached to a property tax bill or electricity bill. Include specific programs for low income households and First Nations.
- Include an "all fuels" approach, not just electricity, and an "all sectors" approach, not just housing, to enhance uptake of energy efficiency programs.
- Actively promote and recruit participants into energy efficiency programs to encourage greater efficiency in homes.
- Require energy performance assessments or audits for home sales as part of Multiple Listing Service listings.
- Adopt the National Energy Code of Canada for Buildings and National Building Code in the year they are released nationally and invest in training of inspectors to ensure adequate enforcement.
- Lobby for revisions to the National Building Code to include greater strides in energy efficiency.
- Advocate to the federal government for revisions to the building standards for First Nations housing to improve energy efficiency.
- Ensure that energy efficiency is included as a component of social housing agreements with the federal government.
- Promote "net zero" housing to inform New Brunswickers that it is a viable option.
- Mandate NB Power to implement time-of-use pricing to encourage off-peak use of electricity.
- Include water conservation requirements in all investments in water and wastewater treatment facilities to save energy and reduce emissions.
- Provide training in energy efficient construction for building contractors.
- Promote building energy labeling as means to encourage the market to produce more efficient homes.

### Renewable Energy

Key messages received by the Committee:

- Presenters understood renewable energy to mean energy obtained from naturally-replenished sources including wind, solar, hydro, tidal, biomass (organic material from plants/trees and animal waste) and geothermal sources.
- New Brunswick has a diversity of renewable energy resources encompassing these sources but they are not being used to their full potential.

- While the current renewable electricity target of 40 per cent by 2020 is a good start, the goal should be to achieve 100 per cent renewable electricity as quickly as possible.
- The cost of electricity from renewable energy has traditionally exceeded the cost of power from conventional sources except in large scale operations, such as wind farms and hydro, but the gap is closing. In particular, customer-based solar power has become increasingly competitive as the price of solar panels has fallen.
- There is a need to identify and remove regulatory barriers to make renewable energy easier to implement. The goal should be a flexible and open regulatory regime for power generation.
- The intermittent and fluctuating characteristics of power generated by some renewables like wind and solar present challenges to the management and stability of the electricity distribution system. There is a need to ensure that a base load generating facility is available to back up intermittent renewable sources.
- If Mactaquac Generating Station is closed, this important source of base load renewable energy would have to be replaced.
- Various opinions were expressed regarding the early closure of the Belledune coal fired generation plant and the resultant impacts on electricity rates and grid stability.
- Under its LORESS program, NB Power is currently evaluating proposals for small scale (up to 40 MW) renewable energy projects for First Nations.
- There is a strong desire for additional community-owned renewable energy opportunities.
- Taking advantage of renewable energy's potential for developing a distributed energy generation system was viewed by many as a priority. Some believe that this goal is constrained by NB Power's efforts to manage the scale and speed of distributed energy generation.
- If distributed energy generation is coupled with an ability of the system operator to manage energy use remotely (smart grid), this would allow the system operator greater flexibility to even out fluctuations in power generation (supply side management) and use (demand side management). The distributed power sources would also enhance energy security at the household and community level in the event of power interruptions.
- Increased uptake of energy efficiency is an important facilitator for renewable energy.
- Energy storage is a key limiting factor for rapid deployment of renewable energy. Battery storage systems remain expensive but costs are falling as mass production has begun to accelerate.
- Overseen by a regional system operator, a future "North American eastern energy loop" could be used to connect electrical generation facilities in Newfoundland and Labrador, Nova Scotia, New Brunswick, New England and Quebec. The "loop" would facilitate the use of renewables by creating the ability to manage the base load over a broader region and providing an opportunity to sell clean power to northeastern USA.
- A key to enabling distributed renewable energy is to ensure that New Brunswick's energy policies and regulations will allow and encourage power customers to participate in initiatives (e.g. providing an attractive "feed-in tariff" pricing arrangement). The Committee heard that the current net metering program administered by NB Power is flawed because producers must buy back their energy from the grid and are charged Harmonized Sales Tax on the transaction.
- Expertise in grid control technology is marketable globally but the window of opportunity is short if New Brunswick wants to take full advantage of its current expertise.
- Ownership of energy assets was raised by several presenters. There is a strong preference towards publicly-owned and community-owned assets. This would keep more resources in the province (rather than paying it to large private facility owners) and boost local economies.
- Community economic development corporations are a vehicle by which individuals can invest in renewable energy projects in their own communities. One obstacle is that regulations do not currently allow registered retirement savings plan investments to be used as a contribution.

- The shift to renewables must be guided by sound land-use planning to ensure that generation facilities, power lines and related infrastructure are not placed in locations that will have significant negative impacts in biodiversity or ecological values.
- New Brunswick must "invest in order to win". United Nations analysis suggests that 1.5 per cent of Gross Domestic Product (GDP) is a reasonable target for spending on energy efficiency and clean renewables. This suggests that New Brunswick should spend $500 million per year on such initiatives.
- There is potential to make use of renewable energy for space heating in schools and government buildings.
- Divergent views were expressed about the speed at which New Brunswick should embrace further renewable energy. Some suggested this should take place as soon as possible. Others noted that while the transition to renewable energy is feasible, the rapidity of transition will depend on substantial capital investments. Aside from the technological challenges, accelerated renewable energy deployment would also depend on having enough local resources in the form of trained installers and technicians with specific knowledge to serve specific types of clients.
- Natural gas may have a role during a transition to a low carbon economy, although opposition to developing New Brunswick's natural gas resource remains strong. Regional supplies available from off-shore Nova Scotia may be declining.
- Participants were divided on the role of nuclear energy (including small scale, modular systems) in supplying a reliable base load to back up renewable energy.

Key suggestions received by the Committee:

- Continue to support renewable energy's spread into New Brunswick's electricity generation mix and increase NB Power's renewable energy portfolio above 40 per cent.
- Provide financial incentives to support the uptake and implementation of increased renewables in New Brunswick (e.g., "feed-in tariff", rental programs, pay-as-you-save financing, net metering, etc.) and advertise them more widely. Include specific programs for low income households and First Nations.
- Lobby for changes to the National Building Code to require new buildings to be designed to accommodate renewable energy sources.
- Show leadership by using renewable energy to heat government buildings.
- Investigate and remove any existing regulatory barriers to the greater implementation of renewable power generation, distributed energy generation, net metering, etc.
- Work toward a government mandate for NB Power that expands net metering and makes the development of distributed energy generation a high priority.
- Investigate the potential and feasibility for tidal and small-scale hydro turbines and biofuels.
- Continue to develop and expand markets for biomass in electricity generation.
- Ensure location of renewable energy sites do not conflict with other values (e.g. wildlife and humans).
- Retain the base load generation capacity of Mactaquac dam into the future.
- Continue to support small-scale community renewable energy projects. Adjust NB Power's LORESS program to encourage more participants (e.g., allow for smaller scale projects).
- Increase NB Power's current power purchase agreement for renewable energy.
- Work with the federal government to provide greater certainty regarding the registered retirement savings plan eligibility of investments into community economic development corporations that are involved in renewable energy projects.
- Provide assistance and support for people interested in working in the renewable energy field and provide retraining for fossil fuel energy workers.
- Continue to support the development of Smart Grid technology.

### Transportation Emissions

Key messages received by the Committee:

- Transportation is responsible for approximately 25 per cent of GHG emissions in New Brunswick. Emission intensity has decreased, but total emissions have increased. Freight is the biggest challenge.
- Available approaches to emissions reduction in transportation include:
  - electrification of transportation (especially private vehicles) coupled with an increased use of electricity from non-emitting renewable sources;
  - more fuel-efficient conventional vehicles;
  - fuel efficiency innovations in commercial transportation;
  - reduced dependency on private vehicle ownership through car sharing, public transportation and active (human-powered) transportation; and
  - designing our communities in a way that supports sustainable transportation alternatives.
- New Brunswick has a large rural population that is spread across the province which makes New Brunswickers very car-dependent. Non-fuel efficient vehicles are favoured by many.
- Implementing public transportation in areas of low population density is a particular challenge. Part of the solution may be better integration of services at a regional and provincial scale but lack of frequency of services and fixed schedules limit the utility of such services.
- Petroleum fueled transportation underpins New Brunswick's economy and transportation is critical to an export driven economy.
- Regulatory barriers exist that impede both the sale of electricity at vehicle charging stations and the implementation of fuel efficiency innovations in commercial transportation.
- At the provincial level, there is no single department with a mandate for coordinated climate change action in the area of transportation.
- In absence of practical alternatives to the status quo, a carbon price on fuel may have little impact on consumer behavior or GHG emissions from transportation.
- While falling in price, the costs of electric vehicles remain significantly higher than conventional vehicles. There are no incentives in New Brunswick for purchasing or licensing electric vehicles.
- Charging infrastructure for electric vehicles is relatively undeveloped in New Brunswick. This may inhibit the uptake of electric vehicles in the province and may impact tourism.
- For vehicles, propane may represent a lower emission alternative than gasoline or diesel. There is a large fleet of propane-fueled vehicles already in Canada and the fuelling infrastructure is already well-established.
- The required fueling infrastructure for using compressed natural gas in transportation is not well-developed and additional research is required.
- The trucking industry has taken several initiatives to reduce fuel consumption including trailer skirts and speed limiters. Technological advancements on fuel efficiency are expected to be greater for cars than trucks in the short term.
- A multi-stakeholder electric vehicle advisory group was established and produced *An Electric Vehicle Roadmap for New Brunswick — A Discussion Document for Public and Stakeholder Engagement (2016).*
- The Economic and Social Inclusion Corporation is developing a comprehensive public transportation plan for the province.

Key suggestions received by the Committee:

- Set ambitious targets for private electrical vehicle purchase and use in New Brunswick.
- Provide purchase incentives (e.g. a cash rebate) for electric vehicles.

- Develop the required infrastructure (charging stations) to support electric vehicles.
- Begin the progressive electrification of the government vehicle fleet.
- Implement pilot studies into the use of electric school busses (follow the Quebec example).
- Provide incentives for consumers to purchase fuel-efficient conventional vehicles.
- Place a tax or other disincentive on high emission (non-fuel efficient) vehicles.
- Remove regulatory barriers that are impeding actions such as: increasing fuel efficiency in commercial trucking (e.g. wide single tires in place of dual axels), the sale of electricity to vehicle owners at charging stations, and the increased uptake of vehicles fuelled by propane.
- Implement province-wide public transit (bus and rail). Institute public transportation planning at the regional level to allow for route integration.
- Explore car sharing and/or "dial a bus" programs as a potential option for public transit (e.g. in rural areas and small communities).
- Create a better institutional arrangement to coordinate climate change action in transportation at the provincial level.

### Industrial Emissions

Key messages received by the Committee:

- Industrial emitters account for approximately 29 per cent of New Brunswick's GHG emissions.
- Large industrial emitters (those who emit 50,000 tons or more of GHG per year) must submit a greenhouse gas management plan including voluntary emissions reduction targets to the Department of Environment and Local Government.
- There are currently no mandatory GHG emission limits for industries in New Brunswick.
- The operators of some large emitters in New Brunswick have taken steps to reduce GHG emissions and there are some ongoing opportunities for further reductions as older facilities are progressively upgraded and replaced. In other cases, further, deeper cuts in emissions may be more difficult to achieve.
- Transitioning to a low carbon economy should not involve promoting the Energy East pipeline project and the expected increase in industrial emissions that would follow the approval of the pipeline.
- For industry, a great deal of the effort to reduce emissions involves energy efficiency.
- Many organizations (including government) do not have a firm handle on how much they spend (or waste) on energy and how this affects their GHG emissions.
- Energy management has to be all energy, not just electricity.
- Making energy use visible can help drive energy efficiency in facility management and industrial processes. Making the connection between energy production, consumption and climate is essential.
- Efficiency programs are essential. In most jurisdictions these are financially supported by the utility or the government, through grants or other incentives. For industries, finding resources for the initial investment can be a challenge and they may not have the human resources or knowledge to proceed.
- The potential exists for energy savings and emissions reduction in industrial processes but support, both financial and knowledge transfer, is required to "make a culture of efficiency happen". Transformation of culture takes time. Permanent change will be a long term investment and require ongoing engagement.

Key suggestions received by the Committee:

- Create and enforce stringent emissions reduction regulations. For example, impose caps on GHG emissions as part of Certificates of Approval issues under the *Clean Air Act* or as part of a new Climate Change Act.

- Do not develop an emissions reduction policy that would drive energy-intensive industries out of the province.
- Implement carbon capture technologies appropriate to industrial processes as part of an overall shift to closed-loop (non-emitting, zero waste) manufacturing.
- Implement energy management and other technologies that manage industrial processes more efficiently.
- Provide incentives and programs to support initial implementation of industrial energy efficiency programs.
- Consider the following for any efficiency program for large scale industry in New Brunswick:
  - support to help industry change to more energy efficient technologies,
  - programs and incentives to help drive change,
  - an ability to measure resultant energy savings,
  - a performance-based approach where organizations are held accountable for increased energy efficiency (e.g. in order to obtain rebates),
  - implementation of energy management information systems, and
  - training and capacity building.
- Do not move forward with the Energy East pipeline project.

### Carbon Sequestration

Key messages received by the Committee:

- Forests, wetlands and soils have the unique and valuable ability to remove carbon dioxide directly from the atmosphere. These natural carbon sinks play an important role in helping regulate atmospheric concentrations of carbon dioxide.
- Carbon pulled from the atmosphere by trees is locked into timber via photosynthesis. Forest products can be used to displace building materials with a larger carbon footprint.
- Fire suppression, pest control, and silviculture (planting and thinning trees) can enhance the ability of forests to store carbon.
- Silviculture is labour intensive and creates employment.
- Forests can remain harvestable while being managed for carbon sequestration. As forests are harvested and replanted over the years, the total carbon storage in growing trees can be maintained. Forest management practices are an important consideration. Clear-cuts and young forest plantations have little ability to absorb carbon.
- The ability of trees to store carbon can be monetized by owners of forest lands by selling carbon offsets.
- There are two types of markets for carbon offsets: voluntary markets and regulated markets. In voluntary markets, specific protocols are generally less stringent on how the forest is managed or how the offsets are administered over time as compared to regulated markets. Regulated carbon markets are ones where more detailed and stringent protocols are in place to dictate how forests are required to be managed. Offsets sold into a regulated market tend to receive a higher price than voluntary offsets.
- California is the largest purchaser of regulated forest offsets in North America and has developed a forest offset protocol. California is a member of the Western Climate Initiative along with British Columbia, Ontario and Quebec.
- There is currently no Canadian forest offset protocol for the regulated market. A Canadian member of the Western Climate initiative would need to create a protocol and open it to other Canadian jurisdictions in order for New Brunswick to participate without becoming a member itself. Alternatively, New Brunswick could join the Western Climate Initiative and develop its own forest offset protocol, which would also require the province to design and launch a cap-and-trade program and open it to inter-jurisdictional carbon trading.

- Selling offsets to the regulated market would represent an opportunity for both small and large woodlot owners and leaseholders in New Brunswick, despite the challenges for small woodlot owners in terms of cost of verification and economies of scale.
- Carbon offset revenues represent an emerging opportunity to contribute to the rural economy. Therefore, there is an economic incentive to move towards a more sustainable forestry model.
- Carbon sequestration in soils describes the process of storing carbon in agricultural soils, whereby techniques are employed to increase the rate at which carbon dioxide is removed from the atmosphere and converted to plant material.
- There may be a potential to monetize the carbon-sequestering ability of soils but the science is not as well developed as for forests. Soil carbon credits are not universally recognized.
- Effective policies are needed that will protect natural carbon sinks from development.

Key suggestions received by the Committee:

- Adopt the long term goal of participation in "seamless" carbon off-set schemes that extend across jurisdictional boundaries.
- Enable monetized forest and soil carbon sequestration by developing accounting and baseline protocols. Include provisions that would allow for the aggregation of smaller holdings to allow smaller landowners to participate in monetized carbon sequestration.
- Conduct research into the most effective silviculture practices for increasing forest productivity. Institute large scale silviculture, including tree planting, to create immediate employment and improve forest health.
- Improve wetland protection and forest management practices.
- Avoid the use of herbicides like glyphosate, which removes carbon-sequestering plant material from forests.
- Link financial incentives to the development of farm-management plans that include: methane and fertilizer management (to reduce nitrous oxide emissions), installation of renewable energy, soil conservation through organic and mixed crop practices, as well as riparian zone protection.
- Encourage agricultural practices that are known to sequester soil carbon. Conduct research into the effects of various farm practices on the carbon sequestering ability of farm soils and other GHG reduction potential.
- Establish training programs (e.g. via New Brunswick Community College) to develop the necessary skills for sequestering carbon in agricultural soils.

### Community-Scale Mitigation and Planning for Smart Growth

Key messages received by the Committee:

- Communities can take action to reduce GHG emissions from their own operations and from the people and businesses located within their boundaries.
- New Brunswick communities are already taking actions to reduce their GHG emissions. As an example, a number of New Brunswick communities have joined the Federation of Canadian Municipalities' Partners for Climate Protection program.
- Urbanization of rural areas bordering New Brunswick's largest cities is leading to development that is automobile focused. This is a source of GHG emissions, a loss of tax base for the cities and increased infrastructure costs.
- Land-use planning can affect the distances people must travel and the methods used, affecting GHG emissions. Poor land-use decisions result in energy waste and increased GHG emissions. Mitigation efforts in communities are easily undone by insufficient land-use planning in unincorporated areas.

Key suggestions received by the Committee:

- Accelerate the creation of regional plans to address ribbon development and sprawl outside municipal boundaries.
- Adopt community land-use planning requirements that address ways to shape land-use to incorporate energy efficiency and energy conservation and reduce emissions.
- Invest in multi-modal transportation (car sharing, public transit, and active transportation like walking and cycling).
- Incorporate the use of materials that either sequester carbon or were produced with low carbon emissions into building specifications and requirements.
- Integrate the protection of carbon sinks into land-use planning.
- Require a lifecycle assessment of all infrastructure projects for impacts on GHG emissions compared to other options to find the best available alternative.
- Provide incentives to promote smart growth (green infrastructure, green buildings, low impact developments) and sustainable community design. Undertake an exercise to evaluate and remove barriers.
- Make improvements to the *Community Planning Act* and *Municipalities Act*. Make changes to the rules that govern community development corporations.

### Carbon Pricing

Key messages received by the Committee:

- There is general (but not unanimous) support for some form of carbon pricing to drive emissions reduction and generate revenue to fund other responses to climate change. The support is conditional on how the revenue from any carbon pricing program is recycled back into the economy to assist in emissions reduction and adaptation activities. Some sectors want to see the revenue from any carbon pricing program recycled directly back into their sector to support emissions reduction.
- Economy-wide carbon pricing systems such as carbon levy/tax or cap-and-trade system are widely regarded as the most efficient policy tools for reducing GHG emissions and are consistent with the “polluter pays” principle. There are two basic approaches:
  - A carbon levy (carbon tax) establishes a dollar amount that is charged per unit of GHG emissions. It is usually calculated according to the carbon content of the fossil fuel that is consumed to obtain energy. The carbon price is known in advance so industries and consumers can budget for the cost of their emissions and plan their energy use accordingly. It is not possible to know in advance the size of the resultant reduction in GHG emissions — set price, somewhat unknown GHG reductions.
  - Under an emissions trading scheme (cap-and-trade system or carbon market), government sets a cap (limit) on the amount of GHGs that can be emitted by a particular sector (e.g., oil and gas, pulp and paper, electricity generation, etc.). Emission allowances (also known as quotas, permits or credits) are sold or given to individual companies by government. Emission allowances can be traded (bought and sold). There is certainty as to the level of GHG reductions that will be achieved but the cost companies will have to pay to emit GHGs is not known in advance — variable price, known GHG reductions.
- A carbon levy/tax is generally less complex and easier to administer than a cap-and-trade system.
- Reducing GHG emissions by placing a price on carbon will likely impose a cost on the economy, but this cost can be offset by complimentary programs funded by the revenues of the carbon pricing regime.

- Carbon pricing can be designed to achieve different objectives. By tailoring specific features within a carbon pricing scheme various objectives can be optimized, but there are always trade-offs:
  - If the main objective is to achieve a specific level of GHG emissions reduction, then a cap-and-trade approach with a firm (and potentially declining) emission cap can provide the required level of certainty. Using the resultant carbon revenue to invest in emission-reduction technology (i.e., energy efficiency and clean energy) can result in further abatement. Some of the revenue can be directed to adaptation initiatives.
  - If the main objective is to raise a specific amount of revenue to fund climate change initiatives, then a carbon tax/levy can provide the required level of certainty. Again, appropriate re-investment can drive further emissions reduction and/or fund climate adaptation initiatives.
  - If a secondary objective is to maximize economic activity, the best approach may be to use carbon revenue to reduce other taxes and invest in clean energy technology to create employment. However, this approach may not be the most effective in achieving a GHG objective. A high carbon price may have a negative effect on GDP, households, and certain industries if not off-set by tax reductions.
  - If a secondary objective is to mitigate impacts on low-income households, a portion of carbon revenue can be transferred to them.
  - If a secondary objective is to maintain competitiveness for key industries, carbon revenue can be used to compensate emissions-intensive and trade-exposed sectors. This can be done under both cap–and-trade and tax. However, this approach may not be the most effective in achieving a GHG objective.
- Predictive models can be used to assess the impacts of specific carbon pricing policies on New Brunswick's emissions and economy.
- New Brunswick must participate in national carbon pricing discussions with a view to developing a harmonized approach. New Brunswick companies do not want to jeopardize their export markets by not being aligned with other neighbouring jurisdictions when it comes to carbon pricing.
- New Brunswick will need new policies (or more stringent existing policies) to achieve its GHG targets.
- New Brunswick already has a high tax rate. A poorly designed carbon price could create a drag on the economy and have a disproportionate effect on low income households.
- New Brunswick's largest industries (oil refining, pulp and paper) are energy-intensive and export-oriented. Getting the carbon price wrong could leave some industries facing large increases in production costs while struggling to compete against lower cost producers elsewhere.
- Some commercial sectors of the economy, such as farmers, can be considered as "price takers". This means they would have a limited ability to pass the extra costs of carbon pricing to their customers. This could have a significant impact on their economic viability.

Key suggestions received by the Committee:

- Develop a carbon pricing mechanism and regulatory measures aimed at meeting specific emissions reduction targets for New Brunswick.
- If a carbon pricing system is implemented:
  - Ensure that early adopters who have already taken action to reduce their emissions are not penalized;
  - Ensure a broad "economy-wide" approach aimed at both the consumer and industry in order to drive behavior;
  - Establish a price that is high enough to drive the required emissions reductions;
  - Consider the potential adverse impacts on trade exposed, energy intensive New Brunswick industries and allow time for transition, but do not grant too many free credits;

- Give appropriate consideration to commercial sectors of the economy that are "price takers" and their ability to absorb a price on carbon;
- Shield low income households and other consumers who may be disproportionately affected (e.g. rebates indexed to income);
- Be completely transparent regarding who is paying and how the revenue is spent;
- Consider the cost of administering a carbon pricing program when deciding how to proceed;
- Consider the existing tax burden on New Brunswickers and their ability to absorb additional costs;
- Monitor the system to ensure that the intended objectives are being achieved;
- Direct revenue to a dedicated fund, for example a climate change fund to support a variety of climate change initiatives. It should not go to general revenue;
- Use the revenue to drive further emissions reductions and adaptation to climate change.
- Clearly define the term "revenue neutral carbon price";
- Conduct additional analysis to assess the impacts of specific carbon pricing policies on New Brunswick's emissions and economy; and
- Align the chosen approach with other jurisdictions in the Atlantic region and ultimately, the Western Climate Initiative so energy intensive, export-based New Brunswick businesses are not placed at a competitive disadvantage.

## Theme 5: Funding for Climate Change Initiatives

Key messages received by the Committee:

- Funding sources are varied and include:
  - consumers, wholesalers and producers under a carbon pricing regime;
  - the federal government (e.g., under the mitigation component of the Disaster Financial Assistance Program, the National Disaster Mitigation Program and the Low Carbon Economy Fund);
  - homeowners and others who decide to take up renewables, improve energy efficiency, or perform retrofits
  - utility ratepayers via utility rates;
  - private investors who participate in community economic development funds; and
  - provincial taxpayers.
- The ETF is a special-purpose government account that receives funding through beverage container deposits. The ETF has been used successfully to fund community-based, action-oriented projects.
- ETF funding can be used to leverage additional funds from other sources (federal programs, businesses, private foundations, etc.).
- The Property-Assessed Clean Energy model is an innovative mechanism for financing energy efficiency and renewable energy improvements on private property, which are paid back over time by the property owners.

Key suggestions received by the Committee:

- Make provisions for multi-year ETF funding (to avoid the need for an annual application) to match the federal funding cycle, make it easier to leverage funding from industry and private trust funds, and allow more time to obtain matching funding.
- Reactivate the former ETF working group in which the Department of Environment and Local Government and stakeholders met to discuss issues and priorities associated with the fund.

- Broaden the scope of the types of projects for which ETF funding could be made available (e.g. for shared community energy efficiency programs).
- Adapt the ETF to receive revenue from other sources, including potential revenue generated from carbon pricing.
- Provide dedicated funding to support climate change initiatives led by NGOs, rural communities and local service districts.
- Ensure the complete transparency of revenue sources, recipients and administration costs associated with climate change programs.
- Explore the potential for Property-Assessed Clean Energy Programs in New Brunswick as a means of financing energy efficiency and renewable-energy improvements on private property.