



Building a Stronger New Brunswick Response to Climate Change

**Discussion Guide
May 2016**

Government of New Brunswick

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A message from the Minister

In accordance with Motion A-19 of the Legislative Assembly, I am pleased to table this discussion guide, entitled *Building a Stronger New Brunswick Response to Climate Change*.

Climate change affects all New Brunswickers, and we each have a role to play in responding to its challenges and opportunities. With this in mind, one of the most important tasks of the Select Committee on Climate Change is to engage with New Brunswickers to obtain ideas and opinions about the vital next steps this province should take in responding to this important issue. The actions that will subsequently be developed will have a vital role in shaping the future of our province and will represent a large step forward in our efforts to respond to climate change. It will be an ambitious but necessary path and the time to start is now.



Honourable Brian Kenny
Minister
Environment and Local Government

The Select Committee on Climate Change looks forward to hearing from New Brunswickers. Comments may be directed to:

The Select Committee on Climate Change
c/o The Clerk of the Legislative Assembly of New Brunswick
706 Queen Street
Fredericton, NB E3B 1C5

Telephone: 506-453-2506, Monday to Friday, 8:15 a.m. - 5 p.m.

Fax: 506-453-7154

Email: leg-consultations@gnb.ca

Members of the Select Committee on Climate Change of the New Brunswick Legislature

- Andrew Harvey, MLA, Carleton-Victoria
- Bernard LeBlanc, MLA, Memramcook-Tantramar
- Monique LeBlanc, MLA, Moncton East
- John Ames, MLA, Charlotte-Campobello
- Wilfred Roussel, MLA, Shippagan-Lamèque-Miscou
- Jody Carr, MLA, Oromocto-Lincoln
- Brian Keirstead, MLA, Albert
- David Coon, MLA, Fredericton South

About this discussion guide

Climate change is the single most significant challenge of our generation, and its impacts are being felt around the globe. In New Brunswick, average temperatures are rising; high-intensity precipitation events are more common; the sea level is rising; coastal areas are increasingly affected by erosion and flooding; and inland floods are occurring with greater frequency.

On April 8, 2016, Environment and Local Government Minister Brian Kenny announced the creation of the Select Committee on Climate Change. The committee will be responsible for engaging with New Brunswickers on the issue of climate change and reporting back to the Legislature with its recommendations. Additionally, the Minister, on behalf of the Government of New Brunswick, has invited First Nations communities to engage in a government-to-government discussion on climate change. All New Brunswickers are encouraged to participate and share their ideas and opinions.

This discussion guide is meant to begin a dialogue on how New Brunswickers can strengthen our collective efforts to fight climate change in a way that respects New Brunswick's distinct economic challenges and opportunities.

Your ideas will greatly assist the committee in its work.

Structure of this guide

The guide's initial sections provide some background information about climate change in a New Brunswick context, including the economic opportunities that will result from an effective response.

The section *Building a stronger response to climate change* is the heart of the document. It lays out some potential actions the provincial government could take in general terms. It is not an action plan; it is a list of possibilities intended to encourage the development of additional ideas. The final section contains a list of important questions that may help stimulate further discussion.

Additional material has been included in the appendices:

Appendix A contains the text of the motion that established the Select Committee on Climate Change and outlines its responsibilities.

Appendix B contains the text of the recent *Vancouver Declaration on Clean Growth and Climate Change* in which the leaders of Canada's provinces and territories and the Prime Minister of Canada pledged to work together to achieve a pan-Canadian framework for clean growth and climate change. This will enable Canada to meet its commitments under the 2015 *Paris Agreement*.

Appendix C contains a glossary of key terms.

Appendix D contains highlights of climate change action plans in other Canadian provinces.

Appendix E contains a list of readings so the issues and questions raised in this discussion guide can be further explored.

The challenge

The science on climate change is clear. The Intergovernmental Panel on Climate Change (IPCC), the world's foremost authority, has stated that an increase in global temperatures of more than by 2.0°C will result in significant, irreversible impacts. The current level of greenhouse gas (GHG) emissions is expected to push global temperatures over this 2.0°C threshold before the end of this century (IPCC *Climate Change 2013 – The Physical Science Basis*. 2013). The panel has also determined that it is “extremely likely” that human activity has been the dominant cause of the warming that has taken place since the mid-20th century (IPCC *Climate Change 2014 Synthesis Report Summary for Policymakers*. 2014).

Climate change is already evident in New Brunswick in the form of increased temperatures, more intense precipitation and rises in sea levels. As a result, the province can expect an elevated risk of heat-related health concerns, pests and invasive species, flood damage, coastal erosion, extreme winds and icing of trees and power lines.

In the 2015 *Paris Agreement* under the United Nations *Framework Convention on Climate Change*, 195 countries have agreed to take the necessary steps to hold the increase in the global average temperature to well below 2°C and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. This historic agreement is the first-ever universal, legally binding global climate deal and signals the intention of countries to adjust their policies and budgets to achieve lower carbon economies. This commitment is expected to encourage major private- and public-sector investments in new technologies and responses that will have far reaching social, economic and environmental results. The urgency surrounding this issue is further acknowledged in the recent *Vancouver Declaration on Clean Growth and Climate Change* (Appendix B) signed by Canada's First Ministers. This declaration confirms the need for stronger Canadian action on climate change.

Economic opportunities

Responses to climate change offer the potential for long-term job creation in the province and can provide a stimulus for investment in innovation and business development. These opportunities are real. As an example, it is estimated that the measures put forward in Alberta's *Climate Leadership Plan* will result in significant reductions in GHG emissions, accompanied by roughly 3,000 new local jobs in sectors such as skilled trades, construction, retail sales, professional services and manufacturing (Alberta Climate Leadership Panel. *Climate Leadership – Report to the Minister*. 2015). In our province, it has been estimated that a sustained, 15-year energy efficiency program would create 2,000 to 3,000 full-time equivalent jobs, boost the total value of goods and services produced in New Brunswick by \$300 to \$400 million per year and result in GHG reductions of two million to three million tonnes per year (Dunsky Energy

Evidence of climate change in New Brunswick is available from the Department of Environment and Local Government's Climate Change Indicators

http://www2.gnb.ca/content/gnb/en/departments/elg/environment/content/climate_change/content/climate_change_indicators.html.

“The available evidence clearly supports that the Earth's climate is changing, that these changes are driven by greenhouse gas emissions resulting from human activity, and that without substantial mitigation of these emissions the scale and pace of climate change will pose substantial risks to the earth.”

– Council of Canadian Academies, 2015. *Technology and Policy Options for a Low-Emission Energy System in Canada*.

“First Ministers commit to...Foster and encourage investment in clean technology solutions for Canada and the world that hold great promise for economic growth and long-term job creation...”

– Canadian Intergovernmental Conference Secretariat. *Vancouver Declaration on Clean Growth and Climate Change*. 2016.

Consulting. *Macroeconomic Impacts from Investing in Energy Efficiency in Canada 2012-2042: Province-by-Province Summary of Results*. 2014).

The global transition set in motion by the *Paris Agreement* and affirmed by the *Vancouver Declaration* 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.

Goals

Reducing GHG emissions is vital to limiting future global temperature increase and related climate change. Adapting to climate change is also necessary because a portion of the GHGs already released into the atmosphere will remain for many years. Current trends in climate change will continue even with a decline in emissions. New Brunswick's response to climate change must therefore address both GHG emission reduction (mitigation) and preparation for inevitable climate change (adaptation).

Mitigation: Meeting a GHG reduction target

In August 2015, the Conference of New England Governors and Eastern Canadian Premiers adopted a new regional target range for the reduction of GHG emissions of 35 per cent to 45 per cent below 1990 levels by 2030 and confirmed the previous regional targets. These target levels are now:

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

A new, stronger climate action plan would signal New Brunswick's renewed commitment to play its part in achieving regional GHG emission reduction targets. It could also provide the province's response to the *Canadian Energy Strategy*, released by Canada's premiers in 2015, which recognizes the urgency of addressing climate change and transitioning to a low-carbon economy.

Adaptation: Adjusting to a changing climate

Given that climate change is already taking place, New Brunswick's response must include a strategy comprising actions designed to build resilience into communities that will help buffer businesses, infrastructure and natural resources. Acting early and adapting to the changing climate is far more effective and less costly than dealing with climate impacts after they have occurred.

Guiding principles

In establishing the Select Committee on Climate Change (Appendix A), the Government of New Brunswick has established the following guiding principles:

- New Brunswick's responses to climate change must be consistent with the provincial government's vision of positioning New Brunswick as a leader in job creation and economic development;
- Sustainable development of New Brunswick's energy and resource sectors is of key importance in making the transition to a low-carbon economy; and

- New Brunswick's responses to climate change will recognize that investing in clean technology, especially in areas such as renewable energy, energy efficiency and cleaner production and use of energy, hold great promise for sustainable economic development and job creation.

In addition it is important that:

- actions are defined in such a way that their implementation can be measured and reported; and
- to ensure accountability, those responsible for leading the actions be clearly identified.

The context for New Brunswick's response

Our economy

New Brunswick has an economy dominated by energy-intensive, export-oriented industries. It is therefore particularly important for our province that investments are aimed at reducing energy waste and increasing the availability of cleaner energy alternatives within our economy. Transitioning to a low-carbon economy is no longer just a climate issue; it is increasingly about access to export markets and being competitive in attracting new investment. We must be aware of ongoing changes in our primary export destinations (the northeastern United States), and in potential new markets in Europe and other parts of the world. We must also acknowledge the risk that carbon-intensive New Brunswick products may be subject to market or regulatory challenges in destination jurisdictions that will make our products much less desirable.

“New Brunswick and its energy future are closely tied to what is going on in the rest of the world. The province is an energy intensive economy that competes in a global market. Natural resource processing and other energy intensive sectors need to be cost competitive with global suppliers to remain in business in New Brunswick.”

– New Brunswick Energy Commission. *Final Report 2010-2011*.

Our GHG emissions

A new, integrated approach to GHG emissions reduction is required if New Brunswick is to do its part to meet our climate change obligations and maintain economic competitiveness. Figure 1 illustrates the distribution of GHG emissions among various economic sectors in New Brunswick. Industry, transportation and electricity generation are the three dominant contributors to provincial GHG emissions.

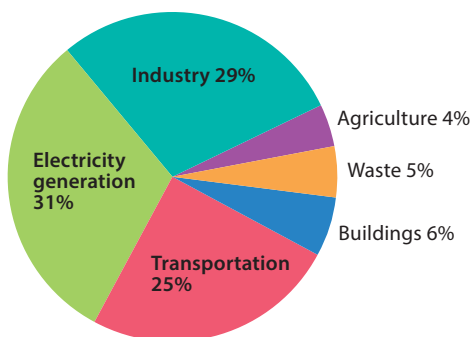


Figure 1: GHG emissions in New Brunswick, 2014

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

Electricity generation contributes about 31 per cent of New Brunswick's total GHG emissions. These emissions are managed in the same way as those from industrial facilities. Approvals under the Air Quality Regulation – *Clean Air Act* must be obtained and GHG reporting and management plans are required for large emitters. To reduce GHG emissions from this sector, NB Power has developed an electricity energy efficiency plan (NB Power. *2014/15 - 2016/17 Electricity Efficiency Plan*). In addition, the province's Renewable Portfolio Standard requires NB Power to source 40 per cent of in-province electricity sales from renewable sources (such as hydro, wind, solar and biomass) by 2020. Currently, about 30 per cent of the province's electricity demand is met by renewable sources (NB Power Annual Report 2014-2015).

Industrial facilities and processes are responsible for about 29 per cent of New Brunswick’s total GHG emissions. The Department of Environment and Local Government currently attaches conditions to approvals issued under the Air Quality Regulation – *Clean Air Act*. All industrial facilities that emit 50,000 tonnes or more of GHGs per year are required to report their emissions to the Department and to Environment and Local Government as well as Climate Change Canada and prepare and adopt GHG management plans. A similar requirement applies to projects and activities that require a review under the Environmental Impact Assessment Regulation if GHG emissions are 50,000 tonnes or greater. There are no regulatory restrictions that specifically limit GHG emissions.

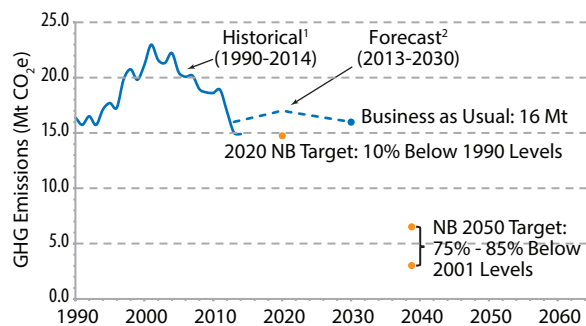
Transportation-related emissions contribute about 25 per cent of New Brunswick’s total GHG emissions. Canada’s federal vehicle emission standards apply to all vehicles, from passenger cars to heavy-duty trucks, and require that any vehicles sold for use in Canada meet increasingly stringent GHG emission standards.

Energy use in buildings accounts for approximately six per cent of New Brunswick’s total GHG emissions. Emissions are created principally by the use of fossil fuels to provide heat and hot water in buildings. Electricity use in buildings is also indirectly responsible for a large portion of electricity generation emissions. Energy efficiency improvements, along with the use of renewable energy, are helping households and businesses to save money on energy costs and reduce GHG emissions both from fuel use in their buildings and indirectly from electricity generation. New technologies such as LED lighting and heat pumps are expanding the potential for energy efficiency in homes and buildings.

The remaining nine per cent of New Brunswick’s total GHG emissions are primarily related to the agricultural and waste management sectors. Gas management systems at New Brunswick’s regional landfills capture methane emissions (a potent GHG) making it available as an energy source.

Future emissions

Although New Brunswick’s GHG emissions have declined in recent years, they are projected to remain relatively constant in the future. This, along with increasingly stringent GHG reduction targets adopted by the Conference of New England Governors and Eastern Canadian Premiers and the provincial government, means that additional GHG reduction measures will be required.



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.

Figure 2: Future GHG emission trend for New Brunswick

Impacts of climate change

In recent years, New Brunswick has experienced the effects of extreme weather events, some of which resulted in significant economic losses. Examples include the coastal storm surge of Jan. 21, 2001, that increased sea levels along the Northumberland Strait by as much as 4.2 metres above normal low tides and caused extensive flooding at Pointe-du-Chêne in southeastern New Brunswick, resulting in the largest reported storm surge in Atlantic Canada. According to Environment Canada, climate change and rises in sea levels will likely combine in the future to produce new record water levels during coastal storms (Environment Canada. *Impacts of Sea-Level Rise and Climate Change on the Coastal Zone of Southeastern New Brunswick*. 2006). The frequency of coastal flooding will also increase. Storm surges in southeastern New Brunswick that have about a one-per-cent chance of occurring in a given year will in future be 20 times more common (R.J. Daigle Enviro. *Updated Sea-Level Rise and Flooding Estimates for New Brunswick Coastal Sections*. 2014).

During the past century, temperatures in New Brunswick have increased by 1.5°C, and seasonal temperatures have increased in all parts of the province. Climate models predict that, by 2100, New Brunswick's mean annual temperature will increase by as much as 5°C. The number of very hot days (+35°C) is also projected to increase dramatically in some parts of the province. From 2000 to 2010, there were more extreme rainfall events (50 millimetres or more of rain over a 24-hour period) in Fredericton and Moncton than any other decade on record. Climate models project that New Brunswick will experience less frequent but more intense precipitation events, increasing the annual total precipitation throughout the province (New Brunswick Department of Environment and Local Government. *Climate Change Indicators Webpage*; Roy, P. and Huard D. *Future Climate Scenarios – Province of New Brunswick*. 2016).

In New Brunswick, adaptation to climate change is included in the mandate of the Climate Change Secretariat. Previous climate change action plans have included various measures aimed at building greater resilience to a changing climate. Examples of adaptation research in an Atlantic Canada context are available at the [Atlantic Climate Adaptation Solutions website](#).

Recent actions in the rest of Canada

Many of our provincial and territorial counterparts have already taken significant steps in GHG reduction. These include British Columbia, with its carbon tax; Alberta, with its GHG regulatory program and a price on carbon emissions; Quebec, with its Green Fund and new cap-and-trade program; Nova Scotia, with a cap on electricity generation emissions; and Ontario and Manitoba, with their recent commitments to join Quebec and California in a cap-and-trade program. These provinces are embracing action on climate change to maintain their economic competitiveness in changing markets and stimulate investment in innovation and development. The contents of climate change actions plans in other provinces are summarized in Appendix D.

The importance of partnerships and collaboration

Collaboration with partners will continue to be a cornerstone for successfully addressing climate change and is particularly important for a small province such as New Brunswick. Examples of existing partnerships include several inter-provincial and international collaborative arrangements such as the Conference of New England Governors and Eastern Canadian Premiers regional action plans; regional collaborations among the Atlantic provinces (the Regional Adaptation Collaborative and the Atlantic Climate Adaptation Solutions Association); the Gulf of Maine Council's Climate Network; various collaborative engagements among provinces under the *Canadian Energy Strategy*; and the development of the *Pan-Canadian Framework on Climate Change* as called for in the *Vancouver Declaration on Clean Growth and Climate Change* (Appendix B).

At the national level, the 2016 federal budget contains a Low-carbon Economy Fund that will provide \$2 billion over two years, starting in 2017-18, to support provincial and territorial actions that materially reduce GHG emissions. This budget also proposes to provide more than \$100 million over five years, starting in 2016-17, to Environment and Climate Change Canada to continue to advance the federal government's domestic climate change objectives. Planned investments in green infrastructure, public transit, housing and adaptation to climate change offer other funding opportunities.

Partnerships are also important within New Brunswick. A wide range of collaborations are proving to be highly effective in achieving climate change objectives. Valuable partnerships with local governments, businesses, academia and non-profit organizations can continue to expand opportunities such as climate change adaptation and smart growth community planning, resulting in energy-efficient, low-carbon and climate resilient communities.

Building a stronger response to climate change

In this guide, potential actions to address climate change are organized under four headings:

1. Mitigation: transitioning to a low-carbon economy;
2. Adaptation: Responding to the impacts and risks of climate change;
3. Provincial government leadership; and
4. Measuring and reporting.

Key background information is presented under each heading, along with subheadings describing a few examples of the many corresponding actions that could be taken. At the end of this guide, several important questions are listed to help stimulate ideas and discussion.

1. Mitigation: Transitioning to a low-carbon economy

Mitigation means taking steps to reduce future climate change by reducing GHG emissions. Mitigation poses challenges, but it also creates opportunities to build a greener economy – one that takes advantage of emerging economic opportunities in a world demanding environmentally responsible products, services and practices.

According to the New Brunswick Climate Change Secretariat, 92 per cent of GHG emissions in New Brunswick are a result of using energy (i.e., for manufacturing, transportation, electricity generation and heating buildings). This means that there are essentially two pathways to a lower GHG future for this province:

1. reducing energy consumption (i.e., energy efficiency); and
2. reducing emissions from the energy that is used (i.e., employing low-emission energy sources).

In fact, plans to reduce GHG emissions in other jurisdictions have typically included elements of both approaches.

Various approaches to energy efficiency and reduced emissions are described in the following paragraphs.

Efficient use of energy

The potential energy savings available to New Brunswick homes, businesses and institutions as a result of actions to improve energy efficiency in our electricity system have been estimated by NB Power to be equivalent to about 609 MW, (NB Power. *Integrated Resource Plan*. 2014), representing about 14 per cent of our current electricity generation capacity.

A significant portion of our electricity is generated by burning fossil fuels and, as previously described, about 31 per cent of provincial GHG emissions result from the generation of electricity. A broad and aggressive suite of

“Improvements in energy efficiency can result in early gains and provide a foundation for the cost-effective introduction of low-emission technologies, but deeper emission reductions will require energy substitution...”

– Council of Canadian Academies, 2015. *Technology and Policy Options for a Low-Emission Energy System in Canada*.

“Energy efficiency is essentially a low-cost, under-developed energy resource.”

– Alberta Climate Leadership Panel. *Climate Leadership Report to the Minister*. 2015

energy efficiency programs covering all fuels therefore has a real potential to allow significant reductions of fossil fuel imports and GHG emissions in this province.

Renewable and low-emission energy

Potential actions:

Maximizing the efficient use of energy could involve actions such as:

- Helping residents, businesses and industry reduce their electricity bills by enhancing energy efficiency programs;
- Developing additional energy efficiency programs for all fuels (i.e., over and above electricity efficiency programs);
- Continuing to encourage innovation such as Smart Grid technologies to facilitate additional efficiency gains in electricity service in the mid to long term; and
- Taking steps to help incorporate energy efficiency in the designs of buildings.

Are there other ways New Brunswick could take advantage of opportunities to improve energy efficiency?

New Brunswick has a wealth of existing and potential renewable energy sources, including hydro, biomass (e.g., wood pellets), wind, tidal and solar energy. These offer lower GHG emissions plus an array of local benefits for sustainable economic development.

According to NB Power, 62 per cent of the province's electricity already comes from renewable or non-emitting sources obtained from within New Brunswick, including biomass (4.5 per cent), hydroelectricity (20.1 per cent), wind (5.8 per cent) and nuclear (31.6 per cent). A further 22.5 per cent of our electricity is purchased from outside the province and does not contribute to our own GHG emissions (NB Power. *Annual Report 2014-2015*). The *2011 Energy Blueprint* increased the province's commitment to clean energy by requiring New Brunswick to meet 40 per cent of its electricity demand with renewable energy by 2020. If the electricity generated from the Point Lepreau Nuclear Generating Station is included, 75 per cent of the province's electricity demand will be met by renewable and non-emitting sources by 2020.

"Renewable Energy may, if implemented properly, contribute to social and economic development, energy access, a secure energy supply, and reducing negative impacts on the environment and health."

– Intergovernmental Panel on Climate Change. *Special Report on Renewable Energy Sources and Climate Change Mitigation*. 2012

GHG emissions from transportation

Transportation contributes about 25 per cent of New Brunswick's total GHG emissions. To achieve emission reductions, initiatives are available in three general areas:

1. vehicle choices (e.g., smaller engine sizes and more fuel efficient engines);
2. vehicle fuels (e.g., electric and hybrid vehicles); and
3. transportation modes (e.g., use of energy efficient alternatives for movement of freight, public transit, ride-sharing, bicycling, shifting from rail to pipelines, and use of strategic transportation corridors).

Among other things, Ontario's *Climate Change Strategy* pledges to reduce emissions from transportation by promoting the uptake of zero emission and plug-in hybrid vehicles.

– Government of Ontario. *Climate Change Strategy*. 2015.

Potential actions:

Expanding our use of New Brunswick's renewable and low-emission energy alternatives could involve actions such as:

- Requiring NB Power to source increasing amounts of in-province electricity sales from emission-free or carbon-neutral sources;
- Helping ensure that our power distribution infrastructure and the way it is administered facilitate the use of alternative energy sources; and
- Continuing to encourage the involvement of New Brunswickers in developing small-scale renewable energy projects and exploiting emerging energy technologies.

What are some other approaches to increasing our use of renewable and low-emission energy?

Use of energy-efficient vehicles is an initial part of achieving lower emissions in transportation. Greater awareness of the environmental and economic cost of larger or less efficient vehicles may help to reduce emissions. Going further, the availability of electric vehicles and hybrids is growing rapidly. When powered by electricity generated from low emission sources, these vehicles produce much lower GHG emissions and air pollution than vehicles powered by gasoline and diesel fuel. Because New Brunswick's electricity is increasingly sourced from low emission or non-emitting sources, the environmental benefits of switching to electric vehicles can be significant. Emissions from freight movement can be reduced through the use of alternative fuels, adding aerodynamic features to trucks and advances in engine designs. Shifting the mode of transportation (e.g., from rail to pipelines) can reduce energy use and resultant emissions. As well, better access to clean alternative transportation such as public transit, ride-sharing and bicycling reduces transportation emissions, offers affordable transportation and can stimulate improvements in community design.

Potential actions:

Reducing GHG emissions from the transportation sector could involve actions such as:

- Increasing the level of awareness of the benefits of energy-efficient vehicles;
- Creating and implementing strategies aimed at increasing the number of electric and hybrid electric vehicles; and
- Clearing the way for cleaner travel options such as public transit, carpooling, ride-sharing bicycling and walking.

What are some other specific steps could be taken to reduce transportation-related GHG emissions?

Industrial GHG emissions

Industrial facilities and processes are responsible for about 29 per cent of New Brunswick's total GHG emissions. The provincial government currently requires industries emitting more than 50,000 tonnes of GHGs per year to report their emissions and submit GHG management plans.

Potential actions:

Reducing GHG emissions from industrial sources could involve actions such as:

- Lowering the GHG emission reporting and management threshold; and
- Establishing regulations that limit GHG emissions.

Are there other, more effective approaches could be used to reduce industrial GHG emissions?

Carbon pricing

As the term suggests, carbon pricing means charging a price for carbon (GHG) emissions to the atmosphere. Simply put, when GHG emissions cost money, this creates an incentive to reduce these emissions, either by reducing energy use or by switching to energy sources that emit fewer GHGs. Although the term “carbon pricing” is commonly used, a price can be established for a full range of GHGs based on their climate impact relative to carbon dioxide. Carbon pricing is more than just a theoretical concept; it is already being applied. In fact, once Ontario and Manitoba implement their cap-and-trade programs, around 90 per cent of Canadians will be paying a price for carbon emissions. In addition, all of the northeastern United States, California, Europe and many other countries have put a price on carbon emissions.

Developing a system to establish a price of carbon can be a complex task. Three main options are available including:

1. A carbon tax: Under this option, a tax is placed on GHG emissions resulting from the use of carbon-based fuels (e.g., oil, gasoline, diesel fuel, coal). The revenue is either retained by government or redistributed to taxpayers.
2. A Green Fund supported by a carbon levy: This option is similar to a carbon tax, but the proceeds are kept separate from government’s general revenue and directed to a Green Fund. Green Funds are used to make investments in additional climate change responses such as energy efficiency, renewable and low-emission energy and adaptation to climate change.
3. A cap-and-trade program: Under this option, a cap (upper limit) is placed on emissions from one or more industrial plants or types of industries. Those subject to the cap can either lower their emissions to meet the requirement or purchase emission allowances (also known as quotas, permits or credits) from those who are emitting less than the cap allows. The sale and purchase of emission allowances is done through markets set up by government. Revenue raised from government’s initial sale of emission allowances can be used to establish a Green Fund as described under Option 2 or could be directed to general revenue as described under Option 1.

In the first two options, the carbon price is set by government. In the third option, the carbon price is determined by the emission allowance market. One important implication of this key difference is that Options 1 and 2 lead to certainty about the future carbon price (i.e., it is known in advance according to a schedule set by government) while emission reductions can only be estimated. Under Option 3, it is the emission reductions that are known, while the carbon price is uncertain and subject to market fluctuations.

In 2015, Alberta introduced its Climate Leadership Plan. One element is a carbon price that will be applied on transportation and heating fuels starting at \$20 per tonne on Jan 1, 2017, and moving to \$30 per tonne on Jan 1, 2018.

Resultant revenue will be fully reinvested into measures that reduce emissions such as clean technology, green infrastructure, renewable energy and energy efficiency and also to provide transition help to those most affected by the carbon price.

– Government of Alberta. *Climate Leadership Plan*. 2015.

Potential actions

Moving toward carbon pricing in New Brunswick could involve actions such as:

- Investigating potential carbon pricing options for New Brunswick including the implications of not instituting a carbon price; and
- Identifying the best option for New Brunswick informed by further engagement with New Brunswickers.

Is carbon pricing an appropriate action for New Brunswick?

Each of the above options generates revenue that can be used to provide tax rebates or can be redistributed to energy efficiency and renewable energy programs, clean energy development, adaptation to climate impacts and other climate-related programs.

Carbon sinks and carbon sequestration

A carbon sink is anything that absorbs carbon or keeps it from entering the atmosphere. Carbon sinks include natural features such as wetlands, soils and trees and can also be artificial, such as facilities for long-term underground carbon storage. Carbon sinks sequester (store and isolate) carbon and may represent an important method of mitigating climate change by keeping some GHGs out of the atmosphere and offsetting emissions that take place elsewhere. For example, land-use management decisions applied to forests and farms can increase carbon storage through measures such as conservation tillage, conversion of marginal agricultural lands back to forests, and urban forestry.

Potential actions:

Maximizing the availability of carbon sinks in New Brunswick's next steps could involve actions such as:

- Continuing to identify and encourage opportunities for enhancing forest and agricultural carbon sinks; and
- Encouraging restoration, preservation and management of green buffers and urban forests.

How can New Brunswick take advantage of these and other carbon sinks?

Research and innovation

Technological innovations and advancements are critical to accelerating the transition to a low-carbon economy. They are also key to releasing the resulting job-creation potential in sectors such as renewable and low-emission energy sources, energy storage and Smart Grid technologies. As an example, research and development focused on bio-industries (creating energy, medicine, food and other value-products from our forests, ocean and agriculture) is already well underway in New Brunswick (BioNB. *Bioscience in New Brunswick*).

Potential actions:

Enhancing research and innovation in low-carbon technologies and related sectors could be accomplished by actions such as:

- Building connections and encouraging collaborations between businesses, researchers and technological experts; and
- Helping researchers, innovators and early adopters gain access to capital investment.

What other approaches are available to enhance the development of low-carbon technologies in New Brunswick?

2. Adaptation: Responding to the impacts and risks of climate change

In Canada and around the world, there is a heightened awareness of the importance of adaptation to the effects of a changing climate. Adaptation to the adverse effects of climate change is a key component of the *Paris Agreement* and the process recently initiated by First Ministers under the *Vancouver Declaration* to develop a pan-Canadian framework for clean growth and climate change (Appendix B) also includes adaptation as a key initiative.

“Given the far-ranging adverse impacts of climate change, adaptation must be an integral component of an effective strategy to address climate change, along with mitigation.”

– Global Leadership for Climate Action. *Facilitating an International Agreement on Climate Change: Adaptation to Climate Change*. 2009

Climate change adaptation means making adjustments in our decisions and activities, in response to observed or expected changes in climate. While potentially costly, early adaptation to climate change is critical if we want to avoid the much higher future costs of impaired human health and safety, damage to property and loss of natural resources. Timely adaptation will also help maintain and enhance our province’s economic competitiveness, the well-being of residents and resilience of communities.

Identifying climate change

A changing climate presents both risks and opportunities for New Brunswick. To reduce the risks and take advantage of the opportunities, we need to fully understand the challenges posed by a changing climate. Measuring climate change and predicting future climatic trends in New Brunswick are essential to building our resilience and reducing our vulnerability.

Potential actions:

Helping ensure that New Brunswickers have the information they need to incorporate future climate change in their decisions and activities could involve actions such as:

- Strengthening research capabilities in climate change; and
- Developing a more coordinated and collaborative approach to tracking changes in the physical environment (e.g., temperature, precipitation, sea levels and migration of pests and invasive species, etc.).

Are there other actions that would help address New Brunswick’s need for accurate, reliable information about climate change?

Identifying vulnerabilities and enabling planning for climate change

New Brunswickers rely heavily on natural resources such as trees, fish, wildlife, agricultural land and water. All of these are influenced by climate. Our economy is therefore particularly vulnerable to climate change. In addition, rises in sea levels, more frequent and intense rainfall events, high winds, ice storms and other extreme weather resulting from climate change are posing challenges to designers, owners and managers of infrastructure such as water and wastewater systems, roads and drainage facilities.

Climate risks and adaptation planning can be comprehensively incorporated in provincial decision-making; however, while the provincial government has an important role to play in building New Brunswick’s resilience to climate change, many of the most important decisions will be made at the local level. Community planners, property owners, local governments, First Nations, infrastructure owners, businesses, community and environmental groups, and resource managers all need important climate and adaptation information and tools for guidance.

The identification of vulnerabilities to climate change effects is the first step in adaptation at the local and provincial levels. Once vulnerabilities have been identified, plans and strategies can be devised to reduce them proactively.

Potential actions:

Identification of climate change vulnerabilities and planning for climate change could require actions such as:

- Developing analytical and educational tools to assist in the identification and response to vulnerabilities;
- Requiring that future climate impacts be considered as part of public funding decisions for roads, buildings and other infrastructure;
- Establishing targets for the completion of vulnerability assessments and adaptation plans for the natural environment, natural resources, agriculture, communities and infrastructure; and
- Working with communities and regions to incorporate climate change and adaptation in land-use planning.

What other steps should be taken to identify and assess New Brunswick's vulnerabilities to climate change?

Taking advantage of potential economic opportunities

There will be opportunities for certain sectors (e.g., agriculture and tourism) as the climate changes. New Brunswick could take advantage of these. Furthermore, New Brunswick is a leader in the adaptation field, and there may be opportunities to market our tools and approaches beyond our borders.

Potential actions:

Positioning New Brunswick to take advantage of any economic opportunities that may result from global efforts to combat climate change could involve actions such as:

- Examining new opportunities in agriculture, fisheries and aquaculture as a result of changing growing conditions; and
- Working with the tourism and recreation sectors to pursue other new opportunities presented by our changing climate.

What other steps should be taken now to help New Brunswick capture any potential economic opportunities that may result from global efforts to combat climate change?

3. Provincial government leadership

As a major energy consumer, the provincial government has a role to play in demonstrating specific actions that respond to climate change and in inspiring others to take action.

GHG emissions from provincial vehicles and facilities

The provincial government owns and operates about 1,000 buildings and 4,500 vehicles. These assets produce around 400,000 tonnes of GHG emissions annually, with energy costs of \$85 million each year (*New Brunswick Climate Change Action Plan 2014 - 2020*).

"Recognizing that government is responsible for the carbon pollution that it generates, carbon neutrality is about achieving net-zero greenhouse gas (GHG) emissions. British Columbia has shown global leadership and has made a strong commitment to action by becoming a carbon neutral government in 2010 – an unprecedented achievement for provincial or state government in North America."

– Government of British Columbia. *Carbon Neutral Government*.

Additional work is required to ensure that the provincial government continues to lead by example. Low-carbon procurement policies can achieve value for money while responding to the impacts on climate associated with the production, purchase, use and disposal of goods and services.

A more comprehensive approach is to work toward achieving a carbon-neutral government; one in which government operations and facilities have zero net carbon emissions. In practice, carbon neutrality is usually accomplished by a combination of emission reductions and carbon offsets.

Potential actions:

Reducing GHG emissions associated with government buildings and vehicles could involve actions such as:

- Developing energy efficiency, carbon emission or renewable energy standards for government-owned and -funded facilities;
- Showing leadership in areas such as energy audits, low carbon procurement and travel alternatives for public servants; and
- Moving toward a carbon-neutral government.

How else could government show leadership and inspire action in relation to mitigating or adapting to climate change?

Building broader awareness

Reducing GHG emissions and adapting to the impacts of climate change require the engagement of individuals, businesses, organizations and governments at all levels. The fight against climate change will be more successful when all New Brunswickers are clearly aware of the serious nature of the issues and know what they can do in response.

Potential actions:

A broader awareness of climate change including its causes, magnitude, risks and opportunities, could be achieved by actions such as:

- Facilitating education and awareness initiatives both inside and outside the formal education system;
- Helping New Brunswick households and individuals understand what they can do to drive the cultural shift needed to reduce GHG emissions; and
- Sharing emerging information about climate change as it becomes available.

What are some other steps that could be taken to build awareness and educate New Brunswickers about all aspects of climate change?

4. Measuring and reporting

Measurement, 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. Accurate measures of progress in implementing climate actions are also of increasing importance in international agreements on GHG reduction. Finally, timely reporting coupled with assigning responsibility for implementing or leading specific actions can encourage compliance.

An understanding of the province's energy consumption and GHG emissions profile is necessary to measure progress in GHG reduction and to assess opportunities for further emission reductions. With respect to adaptation, the true measure of progress lies in determining whether there has been an actual increase in adaptive capacity rather than simply listing the number of adaptation plans completed.

Potential actions:

Accurate measurement and transparent reporting of progress in implementing New Brunswick's response to climate change could require actions such as:

- Ensuring the ongoing release of annual progress reports on implementation;
- Assigning specific responsibilities for implementing and reporting the results of specific actions; and
- Using appropriate monitoring criteria, tools and information management systems.

What other steps are necessary to help ensure transparent, timely and accurate reporting on progress?

Questions to consider

One of the most important tasks of the Select Committee on Climate Change is to seek ideas and opinions from New Brunswickers. The following questions supplement those contained in the preceding sections and are intended to further stimulate ideas and discussion about New Brunswick's response to climate change:

1. What are the best ways to ensure that energy efficiency and other GHG reduction strategies will provide the highest economic benefits for the province? What approaches would benefit both the environment and the economy?
2. What specific steps are required to help direct the provincial economy toward a low-carbon future? What specific elements of the low-carbon economy should New Brunswick pursue as a priority?
3. Given that a reliable energy system is essential for a functioning society and given that burning fossil fuels is a major source of GHG emissions, what is the appropriate mix of renewable and non-renewable energy resources that the province should pursue now and in the future?
4. How can GHG emission reductions be achieved while improving the competitiveness of New Brunswick industries?
5. What are the most effective methods to influence the behaviours of individuals, households, governments and business to reduce energy waste and advance investment in low-carbon opportunities?
6. For what priority areas should New Brunswick seek federal funding in the areas of mitigation and adaptation?
7. What are the proper roles for individuals, businesses, communities, non-governmental organizations and governments in climate change mitigation and adaptation?
8. How do governments ensure that efforts to build resilience remain ambitious and sustained?
9. What climate information, science and tools are needed to support decision-making, and what improvements can be made in the way information is collected and disseminated, and services are provided?
10. What are the most effective instruments and approaches, including policies, programs, standards, regulations, laws and others to implement strong, complementary adaptation actions within New Brunswick?

New Brunswick's Select Committee on Climate Change wants to hear from you. Please send your ideas, thoughts and comments to:

The Select Committee on Climate Change
c/o The Clerk of the Legislative Assembly of New Brunswick
706 Queen Street
Fredericton, NB E3B 1C5

Telephone: 506-453-2506, Monday to Friday, 8:15 a.m. - 5 p.m.
Fax: 506-453-7154
Email: leg-consultations@gnb.ca

Appendix A

Text of the Legislature's motion to establish the Select Committee on Climate Change

April 8, 2016

WHEREAS Climate change is the single most significant challenge of our generation;

WHEREAS government's vision is to position New Brunswick as a leader in job creation and economic development;

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;

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;

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;

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;

BE IT THEREFORE RESOLVED THAT the House appoint a 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;

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;

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;

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.

Appendix B

Vancouver Declaration on Clean Growth and Climate Change

March 3, 2016

Canada stands at the threshold of building our clean growth economy. This transition will create a strong and diverse economy, create new jobs and improve our quality of life, as innovations in steam power, electricity and computing have done before. We will grow our economy while reducing emissions. We will capitalize on the opportunity of a low-carbon and climate-resilient economy to create good-paying and long-term jobs. We will do this in partnership with Indigenous peoples based on recognition of rights, respect and cooperation.

We will build on the leadership shown and actions taken by the provinces and territories, as exemplified by the 2015 Quebec Declaration and Canadian Energy Strategy, by working together and including federal action. We will build on the momentum of the Paris Agreement by developing a concrete plan to achieve Canada's international commitments through a pan-Canadian framework for clean growth and climate change. Together, we will leverage technology and innovation to seize the opportunity for Canada to contribute global solutions and become a leader in the global clean growth economy.

To that end, First Ministers agree to the following:

1. Increase the Level of Ambition

Recognizing the Paris Agreement which calls for significant reductions in global greenhouse gas (GHG) emissions to limit global warming to less than 2°C and to pursue efforts to limit it to 1.5°C above preindustrial levels;

Recognizing that the level of ambition set by the Paris Agreement will require global emissions to approach zero by the second half of the century and that all governments, Indigenous peoples, as well as civil society, business and individual Canadians, should be mobilized in order to face this challenge, bringing their respective strengths and capabilities to enable Canada to maximize the economic growth and middle class job opportunities of a cleaner, more resilient future;

First Ministers **commit to**:

- **Implement** GHG mitigation policies in support of meeting or exceeding Canada's 2030 target of a 30% reduction below 2005 levels of emissions, including specific provincial and territorial targets and objectives;
- **Increase** the level of ambition of environmental policies over time in order to drive greater GHG emissions reductions, consistent with the Paris Agreement;
- **Better coordinate** GHG emissions reporting systems among jurisdictions to accurately and transparently assess the progress and the impact of our climate actions towards our respective and collective targets.

2. Promote Clean Economic Growth to Create Jobs

Recognizing that the cost of inaction is greater than the cost of action with regard to GHG emissions mitigation and adaptation to the impacts of climate change;

Recognizing that clean growth which supports the transition to a climate-resilient and low carbon economy by 2050 is necessary to ensure the future prosperity of Canada and Canadians;

Recognizing the diversity of provincial and territorial economies, and the need for fair and flexible approaches to ensure international competitiveness and a business environment that enables firms to capitalize on opportunities related to the transition to a low carbon economy in each jurisdiction;

Recognizing the economic importance of Canada's energy and resource sectors, and their sustainable development as Canada transitions to a low carbon economy;

Recognizing that growing our economy and achieving our GHG emissions targets will require an integrated, economy-wide approach that includes all sectors, creates jobs and promotes innovation;

Recognizing 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;

First Ministers **commit to:**

- **Ensure** deep reductions in GHG emissions and a competitive economy, provide certainty to business, and contribute global solutions to a global issue;
- **Foster and encourage** investment in clean technology solutions for Canada and the world that hold great promise for economic growth and long-term job creation;
- **Implement** measures grounded in the view that clean growth and climate change policies are of net economic, environmental and social benefit to Canadians.

3. Deliver Mitigation Actions

Recognizing that a collaborative approach between provincial, territorial and federal governments is important to reduce GHG emissions and enable sustainable economic growth;

Recognizing the important role all governments have in the global effort to reduce GHG emissions, and that a number of provinces and territories have already joined or are exploring entry into regional and international efforts to reduce GHG emissions;

Recognizing that development of new technologies and deployment of existing technologies and innovations in areas such as cleaner energy production and use, renewable and alternative energy, energy efficiency and innovative financial instruments will create new and competitive economic opportunities, domestically and abroad, that can facilitate the transition to a more resilient, low carbon economy;

Recognizing that carbon pricing mechanisms are being used by governments in Canada and globally to address climate change and drive the transition to a low carbon economy;

Recognizing that provinces and territories have been early leaders in the fight against climate change and have taken proactive steps, such as adopting carbon pricing mechanisms, placing caps on emissions, involvement in international partnerships with other states and regions, closing coal plants, carbon capture and storage projects, renewable energy production (including hydroelectric developments) and targets, and investments in energy efficiency;

Recognizing that the federal government has committed to ensuring that the provinces and territories have the flexibility to design their own policies to meet emission reductions targets, including their own carbon pricing mechanisms, supported by federal investments in infrastructure, specific emission reduction opportunities and clean technologies;

First Ministers **commit to:**

- **Transition** to a low carbon economy by adopting a broad range of domestic measures, including carbon pricing mechanisms, adapted to each province's and territory's specific circumstances, in particular the realities of Canada's Indigenous peoples and Arctic and sub-Arctic regions. The transition also requires that Canada engage internationally;
- **Foster** investments in clean technologies to reduce the GHG emissions associated with the production and consumption of energy, including renewable and alternative energy, energy efficiency and storage, and other technologies which may include carbon capture and storage;
- **Encourage** the sharing of information, expertise and best practices in order to foster a business environment that favours investments in innovative clean technologies related to climate change;
- **Work together** to enhance carbon sinks, including in agriculture and forestry, taking into account international best practices and accounting standards, to recognize their contribution to mitigating GHG emissions, and toward the establishment of a pan-Canadian offset protocols framework and verified carbon credits that can be traded internationally.

4. Increase Action on Adaptation and Climate Resilience

Recognizing that Canada has already experienced severe impacts of climate change, including forest fires, droughts, flooding, coastal erosion, thawing permafrost, invasive species, and the spread of diseases previously foreign to Canada;

Recognizing that the health and security of populations, as well as the economy, infrastructure, cultural heritage and ecosystems are being impacted by climate change, and that climate risks and inaction have significant implications for the economic and social development prospects of provinces, territories, Indigenous peoples and Canada as a whole;

Recognizing that Canada's northern and coastal regions are particularly vulnerable and disproportionately affected by the impacts of climate change;

Recognizing the importance of traditional ecological knowledge in regard to understanding climate impacts and adaptation measures;

Recognizing that comprehensive adaptation efforts must complement ambitious mitigation measures to address unavoidable climate change impacts;

First Ministers **commit to:**

- **Implement** strong, complementary adaptation policies within our respective jurisdictions to address climate risks facing our populations, infrastructures, economies and ecosystems, in particular in Canada's northern regions;
- **Support** climate resilient and green infrastructure, including disaster mitigation;
- **Strengthen** the collaboration between our governments and Indigenous peoples to support local adaptation efforts.

5. Enhance Cooperation

Recognizing that in the Paris Agreement, Parties agreed that they should, when taking action to address climate change, recognize and respect the rights of Indigenous peoples;

Recognizing that, in April 2015, Premiers concluded the Québec Summit on Climate Change with the Declaration of the Premiers of Canada by which they have agreed to act together in the fight against climate change;

Recognizing the leadership of the provinces and territories in developing the Canadian Energy Strategy, which was released in July 2015 and charts a path for shaping the sustainable development of Canada's energy future;

Recognizing the importance of provincial and territorial actions to enable the achievement of clean growth and climate change objectives and targets;

Recognizing the commitment of the federal government to work with the provinces and territories in order to complement and support their actions without duplicating them, including by promoting innovation and enabling clean growth across all sectors;

Recognizing that Canada cooperates with the United States and Mexico on energy and the environment, including through a recently signed Memorandum of Understanding on Climate Change and Energy Collaboration;

Recognizing the importance of public education, participation and access to information to increase climate change awareness and literacy;

First Ministers **commit to:**

- **Strengthen** the collaboration between our governments and Indigenous peoples on mitigation and adaptation actions, based on recognition of rights, respect, cooperation and partnership;
- **Strengthen** pan-Canadian intergovernmental cooperation and coordination on clean growth and climate change, including through mechanisms such as the Canadian Council of Ministers of the Environment, Ministers of Finance, Ministers of Innovation and Economic Development, and Energy Ministers, in collaboration with Indigenous peoples;
- **Implement** a collaborative, science-based approach to inform Canada's future targets that will increase in stringency as required by the Paris Agreement;
- **Enable** the participation of provinces and territories in cooperative activities related to their jurisdictions with the United States and Mexico on energy and climate change mitigation and adaptation;
- **Facilitate** cooperation to strengthen public communication and participation on climate change, improve public climate literacy, promote the actions taken by governments to reduce GHG emissions, and support international engagement.

Taking Action

- In order to achieve these commitments, First Ministers agree to work together to develop a pan-Canadian framework on clean growth and climate change, and implement it by early 2017. It will build on measures that the provinces and territories have taken, be supported by broad engagement with Indigenous peoples and all Canadians, and be informed by science and evidence. It will inform the development and submission of Canada's Nationally Determined Contribution and its long-term low greenhouse gas emission development strategy under the Paris Agreement as Canada's plan to achieve our international commitments. Specific actions include:

1. Early actions by the Government of Canada:

- a. Supporting climate change mitigation and adaptation through investments in green infrastructure, public transit infrastructure and energy efficient social infrastructure;
- b. Investing in GHG emission reductions by working together on how best to lever federal investments in the Low Carbon Economy Fund to realize incremental reductions;
- c. Fulfilling Canada's commitment to Mission Innovation, made in Paris in December 2015, by doubling government investment in clean energy research and development over the next five years, and spurring private sector investment in clean technology;
- d. Advancing the electrification of vehicle transportation, in collaboration with provinces and territories;
- e. Fostering dialogue and development of regional plans for clean electricity transmission; and
- f. Investing in clean energy solutions to help get Indigenous, remote and northern communities off diesel.

2. Working together to build on provincial and territorial actions by identifying measures that governments could take to reduce emissions and grow the economy in the longer term:

- a. First Ministers direct that reports be developed by working groups to identify options for action in four areas: clean technology, innovation and jobs; carbon pricing mechanisms; specific mitigation opportunities; and adaptation and climate resilience. Each working group will assess impacts on economic and environmental outcomes. The reports will be provided to the ministerial tables charged with overseeing their work, as outlined below, by September 2016. Ministers will review these reports and provide their recommendations to First Ministers by October 2016, and make the working group reports public.
- b. Working groups will be established in these four areas to prepare the reports. The working groups will be led by federal and provincial or territorial co-chairs, and will be composed of members from federal, provincial and territorial governments. Each of the groups will include Indigenous peoples in their work. The working groups will be encouraged to commission expert analysis and reports as necessary to support their work, and engage stakeholders.
- c. The **Working Group on Clean Technology, Innovation and Jobs** will provide a report with options on how to stimulate economic growth, create jobs, and drive innovation across all sectors to transition to a low-carbon economy, leveraging regional strengths. This working group will consider a range of policy tools to bring new and emerging technology and innovations to market, sustain a competitive economy, reduce GHG emissions, encourage growth and investment, and increase exports of clean technologies, services and expertise. Their work will be overseen by Ministers of Innovation and Economic Development, who will receive their report.
- d. The **Working Group on Carbon Pricing Mechanisms** will provide a report with options on the role of carbon pricing mechanisms in meeting Canada's emissions reduction targets, including different design options taking into consideration existing and planned provincial and territorial systems. It will consider various elements of carbon pricing policy, including coverage, comparability and stringency, as well as market transactions related to mitigation technologies and international trends in carbon pricing and markets. It will consider the effectiveness of various carbon pricing mechanisms to contribute to the certainty of emission reductions and their efficiency at achieving this objective at the lowest possible cost, and take account of particular challenges, such as those facing northern and remote communities. It will also address issues that are particularly important to industry and investors, such as predictability, and approaches to address interprovincial and international competitiveness, including carbon leakage. Their work will be jointly overseen by Ministers of Finance and the Canadian Council of Ministers of the Environment, who will both receive their report.
- e. The **Working Group on Specific Mitigation Opportunities** will provide a report with options on how to promote clean growth and achieve a range of ambitious reductions in key sectors, including large industrial emitters, transportation, electricity generation and transmission, built environment, agriculture and forestry, and government operations as well as individual energy conservation actions. The working group will also look at approaches to internationally transferred mitigation outcomes, in the context of the Paris Agreement. The

working group, supported by technical sub-groups, will consider various emissions reduction opportunities, taking into consideration existing and planned policies. Their work will be overseen by the Canadian Council of Ministers of the Environment, who will receive their report.

- f. The **Working Group on Adaptation and Climate Resilience** will provide a report with options on a comprehensive approach to adapt to the impacts of climate change, support affected communities and build greater climate resilience. This working group will identify specific priorities in support of approaches to climate change adaptation, including disaster mitigation and conservation, and will consider a range of policy tools to foster research, innovation and investments in resilient infrastructure; integrate information, expertise and best practices from Indigenous peoples; and support the development of jurisdictional policies. This work will be overseen by the Canadian Council of Ministers of the Environment, who will receive their report.

3. Working together on Energy Efficiency and Clean Energy Technology and Innovation:

- a. Federal, provincial and territorial Energy Ministers will collaborate on specific actions being undertaken through the Canadian Energy Strategy, including energy conservation and efficiency, clean energy technology and innovation and delivering energy to people and global markets, in order to contribute to the pan-Canadian framework on clean growth and climate change.
- b. The Government of Canada will advance the harmonization of energy efficiency standards and development of innovative approaches across Canada and with North American partners.

4. Engage Indigenous peoples in the development of the pan-Canadian framework on clean growth and climate change

- a. The working group process will be complemented by a broader engagement process with Indigenous peoples.

5. Engage the public in the development of the pan-Canadian framework on clean growth and climate change

- a. The public, including youth, will be engaged using online tools in particular to solicit input and to increase climate change awareness and literacy.

6. First Ministers will meet in fall 2016 to finalize the pan-Canadian framework on clean growth and climate change, and review progress on the Canadian Energy Strategy.

Appendix C

Glossary

Adaptation – Actions taken to prepare people, property, infrastructure, businesses, communities and natural resources for the effects of climate change. The goal is to reduce the potential for negative consequences of climate-related impacts.

Alternative transportation – Alternative modes of transportation that do not involve single-occupancy vehicles powered by gasoline or diesel (e.g., bicycling, walking, vanpooling, carpooling, public transit).

Cap-and-trade – (*see Emissions trading scheme*)

Carbon-based fuels – Fuels whose energy derives from the burning (oxidation) of carbon compounds. Fossil fuels (e.g., oil and natural gas) are examples of carbon-based fuels.

Carbon capture and storage – Technologies that allow GHGs (typically carbon dioxide) to be removed from industrial emissions and sequestered (stored) to keep them from entering the atmosphere.

Carbon Dioxide Equivalent Units (CO₂e) – The amount of a GHG that has the same climate change impact as a given amount (typically a tonne) of carbon dioxide.

Carbon market – (*see Emissions trading scheme*)

Carbon neutral – A carbon-neutral organization is one that has achieved net zero carbon emissions on its facilities and operations. The term “net zero” is used because, in practice, carbon neutrality is usually accomplished by a combination of emission reductions and carbon offsets.

Carbon offsets – Projects or activities that offset (compensate for) GHG emissions from a given facility or activity by reducing carbon emissions elsewhere. When used as part of an emissions trading scheme, the offset must take place in a sector of the economy not covered by the scheme.

Carbon pricing – A way to account for the cost to society of the negative effects of emitting GHGs to the atmosphere. A carbon price forces emitters and/or the users of their products to pay a cost for GHG encourages emission reductions and drives advances in low-emission practices and technologies.

Carbon sequestration – Emission reduction achieved by the capture and the long-term storage of carbon dioxide emissions that would otherwise be emitted to the atmosphere.

Carbon sink – a natural or artificial feature that absorbs and stores more carbon than it releases.

Clean technology sector – A sector of the economy containing businesses involved in the research, development or deployment of technological innovations aimed at reducing emissions related to energy production, transmission, storage and use.

Climate change – Climate change refers to a change in the state of the climate that persists for an extended period, typically decades or longer. Climate change may be due to natural causes such as fluctuations in solar output and volcanic eruptions, or due to human activities that cause changes in the composition of the atmosphere or land-use.

Climate change vulnerability – The degree to which people, property of communities are susceptible to, or unable to cope with, adverse effects of climate change.

Electric and hybrid electric vehicles – Electric vehicles are any vehicle that is partially or wholly powered by an electric motor and must be plugged into an electrical supply. Hybrid electric vehicles refer to vehicles that contain both an electric motor and an internal combustion engine. Some hybrid vehicles do not need to be plugged into an electrical supply because the required electricity is generated by the internal combustion engine.

Emission allowance – The amount of GHGs (typically carbon dioxide) that a company or business is allowed to emit. Emissions allowances can be traded (bought and sold) under an emission trading scheme.

Emission cap – The maximum allowable GHG emissions specified for an industrial facility or an industrial sector.

Emission standard – An emission level that, by law or by voluntary agreement, may not be exceeded.

Emissions trading scheme – A method of GHG regulation in which the total amount of GHG emissions are fixed (capped) for a particular industrial sector and the total amount of allowable emissions is divided into a number of emission allowances that can then be traded (bought and sold) by companies within that sector. Some emission trading schemes also include a market for trading carbon offsets.

Energy efficiency – Using a smaller amount of energy to achieve the same result.

Fossil fuels – Fuels derived from buried combustible geologic deposits of organic materials (remains of ancient plants and animals). Examples include peat, coal, oil and natural gas. These fuels contain a great deal of carbon and therefore emit carbon dioxide and other GHGs when burned.

Green economy – An economy focused on taking advantage of the opportunities presented by challenging global realities including: a) the need to reduce GHG emissions and adapt to climate change; b) resource scarcity; and c) the need to reduce the environmental impacts of production and consumption.

Green Fund – Money set-aside to support projects, programs, policies and other activities identified in a climate change action plan or in other climate change commitments.

Green infrastructure – Facilities that improve the quality of the environment and lead to a more sustainable economy during the long term. Examples include wastewater treatment plants, low-carbon energy generation and improved waste management systems.

Greenhouse gases (GHGs) – Gases in the earth’s atmosphere that trap reflected solar radiation (heat) that would otherwise escape into space. The main GHGs in the earth’s atmosphere are water vapour, carbon dioxide, methane, nitrous oxide and ozone. GHGs have different climate change impacts so, to avoid confusion, they are sometimes expressed as carbon dioxide equivalent amounts.

Intergovernmental Panel on Climate Change (IPCC) – Established in 1988 by the World Meteorological Organization and the United Nations Environment Program, the IPCC reviews scientific and technical literature and publishes assessment reports widely recognized as the most credible existing sources of information on climate change.

Low-carbon economy – An economy based on sources of energy that emit fewer GHGs to the atmosphere than fossil fuels. This means using fuels that contain less or no carbon (e.g., hydrogen) or renewable sources of energy such as wind, solar and tidal power.

Megatonne – One million tonnes.

Renewable energy – Renewable energy is obtained from resources that can be naturally replenished, including wind, solar, hydro, biomass (plant material) and geothermal sources.

Renewable Portfolio Standard – Renewable Portfolio Standard (*RPS*) is a regulation that requires the increased production of energy from renewable energy sources, such as wind, solar, biomass and geothermal.

Resilience – A measure of the sustained ability of people, property, infrastructure, businesses, communities or natural resources to withstand and recover from adverse situations such as climate change.

Smart Grid – An electrical distribution system that automatically gathers and acts on information (e.g., about the behaviour of suppliers and consumers) to improve the efficiency, reliability, economics and sustainability of the production and distribution of electricity.

Tonne – 1,000 kilograms (also referred to as a metric ton).

Appendix D

Summary of climate action plans in Canadian provinces

Climate change actions	BC	AB	SK	MB	ON	QC	NS	PEI	NL	NB
Action plan in place	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2020 target	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2030 target				☑	✓	✓				
2050 target	✓	✓		✓	✓	✓	✓	✓	✓	✓
Carbon pricing	✓ ¹	✓ ²		✓ ³	☑ ⁴	✓ ⁵				
Offsets program*	✓ ^{**}	✓		☑	☑	✓				
Climate/Green Fund		✓	✓	☑	✓	✓				
Renewable electricity policy/target/status	✓93%	✓	✓	☑98%	✓	✓98%	✓	✓		✓
Energy efficiency programs	✓		✓	✓	✓	✓	✓	✓	✓	✓
Electrification of transportation	✓			✓	✓	✓				
Commitment to phase out coal	N/A	✓		✓	Achieved	N/A	✓		N/A	
Regulation of industrial emitters	✓	✓	✓	☑						✓
Adaptation plan	✓	✓		✓	✓	✓	✓	✓	✓	✓
Carbon-neutral government commitment	✓			☑	☑	☑				

☑ Recently announced or pending item.

* Nothing precludes those in provinces without a regulated offsets program from participating in a voluntary offsets market.

** Offsets program related to the carbon-neutral government in British Columbia.

1 BC: carbon tax of \$30 per tonne of CO₂ equivalent is applied (e.g., equates to approximately 7¢ per litre for gasoline).

2 AB: currently large emitters pay \$15/tonne for emissions above their allocated limit. A carbon charge of \$15/tonne is proposed for all sectors for 2017 increasing to \$30 for 2018.

3 MB: has announced it will develop a cap-and-trade program for large emitters (and will join the Western Climate Initiative) and will consult on different carbon pricing options.

4 ON: is developing a cap-and-trade system similar to Quebec's and is planning to link its system with those in QC and California.

5 QC: has an economy-wide cap-and-trade system covering 85 per cent of its emissions. QC system is linked to California's; therefore QC entities have access to carbon units issued by both QC and California (these jurisdictions hold joint auctions for permits).

Appendix E

Additional reading

The issues and questions raised in this guide can be further explored in the following references:

Declarations, resolutions and agreements on climate change

- [The Paris Agreement under the United Nations Framework Convention on Climate Change](#), December 2015.

The *Paris Agreement* was signed by 195 countries, all committing to strengthen the global response to the threat of climate change by keeping global temperature rise well below 2°C above pre-industrial levels. Under the agreement, countries are responsible for taking action on both mitigation by reducing GHG emissions, and adaptation by strengthening efforts that will help build climate change resiliency.

- [New England Governors and Eastern Canadian Premiers: Resolution 39-1 Concerning Climate Change](#), Aug. 31, 2015.

During the 39th annual conference of New England Governors and Eastern Canadian Premiers agreed to set an emissions target, decreasing carbon pollution by 35 per cent to 45 per cent below 1990 levels by 2030. This target is meant to position the provinces and states to achieve a long-term goal of 75 per cent to 85 per cent of 2001 emission levels by 2050.

- [Canadian Energy Strategy; Canada's Premiers](#), July 17, 2015.

The premiers agreed to the *Canadian Energy Strategy* with an objective to maintain the highest degree of environmental safeguards and protection, including addressing climate change, climate resilience and reducing GHG emissions globally.

- [Declaration of the Premiers of Canada; Quebec Summit on Climate Change](#), April 14, 2015.

The declaration recognizes that the cost of inaction is greater than the cost of action. The premiers committed to implement programs and measures to adapt to climate change and to help mitigate global warming by reducing GHG emissions.

Other references

- Acadia Centre. [Energy Efficiency: Engine of Economic Growth in Canada, A macroeconomic modeling & tax revenue impact assessment](#).
- Council of Canadian Academies. [Technology and policy Options for a Low-Emission Energy System in Canada](#).
- Environment Canada. [The Science of Climate Change](#). 2015.
- Province of New Brunswick. [New Brunswick Climate Change Action Plan 2014 – 2020](#). 2014.
- Intergovernmental Panel on Climate Change. [Fifth Assessment Report \(AR5\). Summary for Policy-Makers](#). 2014.
- NB Power. [Integrated Resource Plan 2014](#). 2014.
- NB Power. [2014/15 - 2016/17 Electricity Efficiency Plan](#). 2014.

